Document DOC3218435

Revision 1

Senographe Pristina™ 10.x

and options: Senographe Pristina™ 3D, SenoBright™ HD, Pristina Serena™, Pristina Serena™ 3D, Pristina SerenaBright™

DICOM CONFORMANCE STATEMENT

INTEROPERABILITY DOCUMENTATION

1 Overview

Senographe Pristina is a digital mammography imaging system. It provides DICOM 3.0 support to receive scheduled procedures from RIS and update status of procedures, to transfer and/or archive images to PACS or Review Workstation, to print images, and to export data on media.

This DICOM Conformance Statement documents capabilities of product(s) identified below:

Product Name	Product Model Name(s)	Software Product Version(s)
Senographe Pristina	Senographe Pristina	10.x

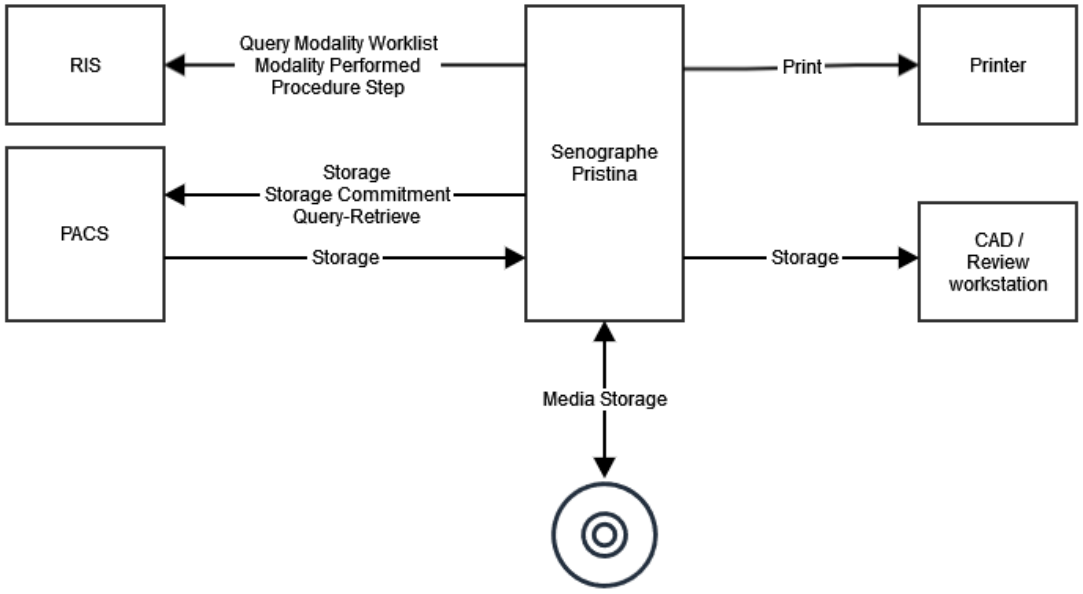

Figure 1-1 Overview of Implemented Services

1.1 Content and Transfer

Table 1-1 lists all Storage SOP Classes and the supported transfer mechanisms as well as the usage scenarios for those instances.

The "Transfer Syntax Set" column lists the sets of Transfer Syntaxes defined in Table 1-2 that are applicable to each SOP Class. The "DIMSE", "DICOM Web" and "Media Services" columns indicate the roles supported for each SOP Class.

The "Function" columns indicate how the instances are used by the system:

- Create: The system creates instances of the SOP Class. The type of the created SOP Class is indicated by one of the following abbreviations:
  - S: Standard SOP Class
  - SE: Standard Extended SOP Class
  - SP: Specialized SOP Class
  - P: Private SOP Class

- Display: The system displays the instances of the SOP Class to the user, either by displaying the SOP Instances natively or by applying instances of another suitable SOP Class to the image instances (e.g., a Presentation State or CAD SR).
- Process: The system processes the instances of the SOP Class to derive some further information that is made available to the user (e.g., a CAD processing algorithm, or a 3D Rendering).
- Archive: The system stores the instances of the SOP Class and makes them available again.

Table 1-1 Storage SOP Classes

SOP Classes		Transfer Syntax Set	DIMSE Services		DICOM Web Services		Media Services			Function			
			SCU	SCP	UA	OS	FSC	FSU	FSR	Create	Display	Process	Archive
Media Storage Directory Storage	1.2.840.10008.1.3.10	BD	N	N	N	N	Y	N	Y	S	Y	N	N
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	LL; L; U	Y	Y (*)	N	N	Y	N	Y	SE	Y	N	N
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	LL; U	Y	N	N	N	N	N	N	SE	N	N	N
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	U	Y	Y	N	N	Y	N	Y	SE	Y	N	N
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	U	Y	Y	N	N	Y	N	Y	SE	Y	N	N
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	NI	Y	Y	N	N	Y	N	Y	S	Y	N	N
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	U	Y	Y	N	N	Y	N	Y	N	Y	N	N
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	NI	Y	Y	N	N	Y	N	Y	See Table 1-3			

(*) As an SCP for Breast Tomosynthesis Image Storage, the system supports only the 3 uncompressed and the JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]) transfer syntaxes.

Table 1-2 Supported Transfer Syntaxes

Transfer Syntax Set	Transfer Syntax Name	Transfer Syntax UID	DICOM Web Service Bulkdata Media Type
Lossless Compressed Transfer Syntax Set (LL)	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	image/jpeg
	JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80	image/jls
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	image/jp2
Lossy Compressed Transfer Syntax Set (L)	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	image/jpeg
Non-Image Transfer Syntax Set (NI)	Implicit VR Little Endian	1.2.840.10008.1.2	N/A
	Explicit VR Little Endian	1.2.840.10008.1.2.1	application/octet-stream
	Explicit VR Big Endian (Retired)	1.2.840.10008.1.2.2	N/A
Uncompressed Transfer Syntax Set (U)	Implicit VR Little Endian	1.2.840.10008.1.2	N/A
	Explicit VR Little Endian	1.2.840.10008.1.2.1	application/octet-stream
	Explicit VR Big Endian (Retired)	1.2.840.10008.1.2.2	N/A
Basic Directory Transfer Syntax Set (DICOMDIR) (BD)	Explicit VR Little Endian	1.2.840.10008.1.2.1	N/A

1.1.1 Structured Reporting Root Template IDs

Table 1-3 lists all Template IDs (TID) of Root Templates that are supported by the system. The "Function" column indicates how the system uses the content of the DICOM SR:

- CREATE: The system creates instances using the specified TID.
- RENDER: The system displays the content of the SR, without using the data for any processing.
- EXTRACT_DATA: The system can extract structured data from the content and use the data for subsequent processing (e.g., reporting).
- OVERLAY: The system uses the information in the SR to display information directly on the images (e.g., Mammography CAD markers).
- ARCHIVE: The system stores instances for later retrieval.

The "SOP Class UID" column indicates which of the SR Storage SOP Classes are used to encode the information or to store it. If multiple SOP Classes are supported the "Condition" column describes the conditions for using the different SOP Classes.

Table 1-3 Supported Root SR Template IDs (TIDs)

Name	Root TID	Function	SOP Classes		Condition
Projection X-Ray Radiation Dose	10001	CREATE; EXTRACT_DATA	X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	

1.2 DIMSE Services

1.2.1 Verification

Table 1-4 lists support for the Verification SOP Class.

Table 1-4 Verification SOP Class

SOP Classes		Transfer Syntax		SCU	SCP
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	Y	Y

1.2.2 Storage

For details on supported Storage SOP Classes see Section 1.1.

1.2.3 Workflow Management

Table 1-5 lists all supported Workflow Management SOP Classes.

Table 1-5 Workflow Management SOP Classes

SOP Classes		Transfer Syntax		SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
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	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N

1.2.4 Query/Retrieve

Table 1-6 lists all supported Query/Retrieve SOP Classes.

Table 1-6 Query/Retrieve SOP Classes

SOP Classes		Transfer Syntax		SCU	SCP
Study Root Q/R - Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Study Root Q/R - Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N

1.2.5 Printing

Table 1-7 lists all supported Printing SOP Classes.

Table 1-7 Printing SOP Classes

SOP Classes		Transfer Syntax		SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Basic Film Session	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Basic Film Box	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N
Printer	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	Y	N
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	N
		Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	N

1.3 DICOM Web Services - N/A

N/A

1.4 Media Services

Table 1-8 lists all supported Media Application Profiles.

Table 1-8 Supported Media Application Profiles

Media Storage Application Profile	FSC	FSR	FSU
Compact Disk - Recordable			
STD-GEN-CD	Y	Y	N
DVD			
STD-GEN-DVD-JPEG	Y	Y	N
USB			
STD-GEN-USB-JPEG	Y	Y	N

1.5 Real-Time Video Service - N/A

N/A

1.6 De-identification Profiles - N/A

N/A

1.7 Specific Character Sets

Table 1-9 Supported Specific Character Sets

Defined Term	IANA	Description
Single-Byte Character Sets without Code Extensions		
ISO_IR 6	ISO-646	Default Repertoire (ASCII)
ISO_IR 100	ISO-8859-1	Latin Alphabet No.1 (Western Europe)

2 Table of Contents

Contents

3 Introduction

3.1 Audience

This document is intended for the audience listed below. It is assumed that the reader has a working knowledge of the DICOM Standard.

The document structure was designed for easier access to relevant information for different user groups:

- Clinical Users, who want to get an overview of the implemented interoperability features of the system can see Section 4 Implementation Model.
- Personnel involved in Sales can use the information in Section 1 to assess the compatibility between different systems involved in a sales situation.
- System Integrators can use information in Section 6 during system installation and also information from Section 5 Service and Interoperability Description for details regarding the implemented services.
- Field Service Engineers can use the details from Section 5 Service and Interoperability Description and from Section 7 Network and Media Communication Details for troubleshooting.
- Hospital IT staff focusing on security can use the details provided in Section 8 Security regarding implemented Security features.
- Research Personnel may be interested in using information provided in Annex A Information Object Definitions (IODs) or Annex B Structured Report Content Encoding to get detailed imaging and measurement information.

3.2 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Senographe Pristina and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1] . DICOM by itself does not guarantee interoperability.

- The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.
- This Conformance Statement should not replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, it is the user's responsibility to perform the following validation activities:
  - The comparison of Conformance Statements from Senographe Pristina and other DICOM conformant equipment is the first step towards assessing interconnectivity and interoperability between those systems.
  - Test procedures should be defined and executed to validate the required level of interoperability with specific DICOM conformant equipment, as established by the healthcare facility.

Senographe Pristina has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement of Senographe Pristina together with the IHE Technical Framework may facilitate the process of validation testing.

3.3 Trademarks

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3.6 Terms and Definitions

The following list includes DICOM Terms, that are used throughout this Conformance Statement:

Abstract Syntax	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Entity (AE)	A representation of the external behavior of an application process in terms of DICOM Network Services, Web Services and/or media exchange capabilities implemented in one or more roles. A single device may have multiple Application Entities.
Application Entity Title (AET)	The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
Application Context	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
Association	A network communication channel set up between Application Entities.
Attribute	A unit of information in an Information Object Definition; a Data Element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower-level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Data Element	A unit of information as defined by a single entry in the data dictionary. An encoded Information Object Definition (IOD) Attribute that is composed of, at a minimum, three fields: a Data Element Tag, a Value Length, and a Value Field. For some specific Transfer Syntaxes, a Data Element also contains a VR Field where the Value Representation of that Data Element is specified explicitly
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. Examples: MR Image IOD, CT Image IOD, Print Job IOD. The Attributes within an IOD may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient's Name, Patient ID, Patient' Birth Date, and Patient's Sex.
Negotiation	First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.
Origin Server	Refers to the program that can originate authoritative responses to HTTP requests for a given Target Resource. The term "server" refers to any implementation that receives a web service request message from a user agent.
Presentation Context	The set of DICOM Network Services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Private SOP Class	A SOP Class that is not defined in the DICOM Standard but is published in an implementation's Conformance Statement.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU)	Role of an Application Entity that uses a DICOM Network Service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).
Service/Object Pair Class (SOP Class)	The specification of the network or media transfer (service) of a particular type of data (object) ; the fundamental unit of a DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair Instance (SOP Instance)	An information object; a specific occurrence of information exchanged in a SOP Class. E.g., a specific X-ray image.
Specialized SOP Class	A SOP Class that is derived from the Standard that is specialized by additional type 1, 1C, 2, 2C, or 3 Attributes, by enumeration of specific permitted Values for Attributes, or by enumeration of specific permitted Templates. The additional Attributes may either be drawn from the Data Dictionary in PS3.6 or may be Private Attributes.
Standard SOP Class	A SOP Class defined in the Standard, and that is implemented and used without any modifications.
Standard Extended SOP Class	A SOP Class that is defined in the standard, and that is extended by additional type 3 Attributes. The additional Attributes may either be drawn from the DICOM Data Dictionary in PS3.6 or may be Private Attributes.
Tag	A 32-bit identifier for a Data Element, represented as a pair of four-digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element].
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), Little Endian Explicit Value Representation.
TLS-Secured Port	TCP port on which an implementation accepts TLS connections to exchange DICOM information.
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
User Agent	A client in a network protocol used in communications within a client-server distributed computing system. In particular, the Hypertext Transfer Protocol (HTTP) identifies the client software originating the request, using a user-agent header, even when the client is not operated by a user.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR) ; with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

The following list includes product specific definitions used throughout this Conformance Statement:

CESM	Contrast Enhanced Spectral Mammography
DBT	Digital Breast Tomosynthesis

3.7 Abbreviations

Abbreviations that are used in this DICOM Conformance Statement are listed here.

AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CDA	Clinical Document Architecture
CID	Context Identifier
DCS	DICOM Conformance Statement
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
ELE	Explicit VR Little Endian
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IANA	Internet Assigned Numbers Authority
IHE	Integrating the Healthcare Enterprise
ILE	Implicit VR Little Endian
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standardization
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
NTP	Network Time Protocol
OID	Object Identifier
OS	Origin Server
PDU	Protocol Data Unit
PHI	Protected Health Information
PPS	Performed Procedure Step
QIDO-RS	Query based on ID for DICOM Objects by RESTful Services
RTV	Real-Time Video
SCP	Service Class Provider
SCU	Service Class User
SDP	Service Description Protocol
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
STOW-RS	STore Over the Web by RESTful Services
TCP/IP	Transmission Control Protocol/Internet Protocol
TID	Template Identifier
UA	User Agent

UI	User Interface
UID	Unique Identifier
UL	Upper Layer
UPS	Unified Procedure Step
UPS-RS	Unified Procedure Step by RESTful Services
VR	Value Representation
WADO-RS	Web Access to DICOM Objects by RESTful Services
WADO-URI	Web Access to DICOM Objects by URI

3.8 References

[1] National Electrical Manufacturers Association (NEMA), Rosslyn, VA USA. PS3 / ISO 12052 Digital Imaging and Communications in Medicine (DICOM) Standard. http://www.dicomstandard.org .

[2] Integrating the Healthcare Enterprise (IHE). IHE Radiology Technical Framework. http://www.ihe.net/Resources/technical_frameworks/#radiology .

4 Implementation Model

This DICOM Conformance Statement covers all versions 10.x of Senographe Pristina, including its options Senographe Pristina 3D, SenoBright HD, Pristina Serena, Pristina Serena 3D, and Pristina SerenaBright.

4.1 Application Entities and Data Flow

The network and media interchange application model for the Senographe Pristina is shown in Figure 4-1 Senographe Pristina Application Data Flow Diagram.

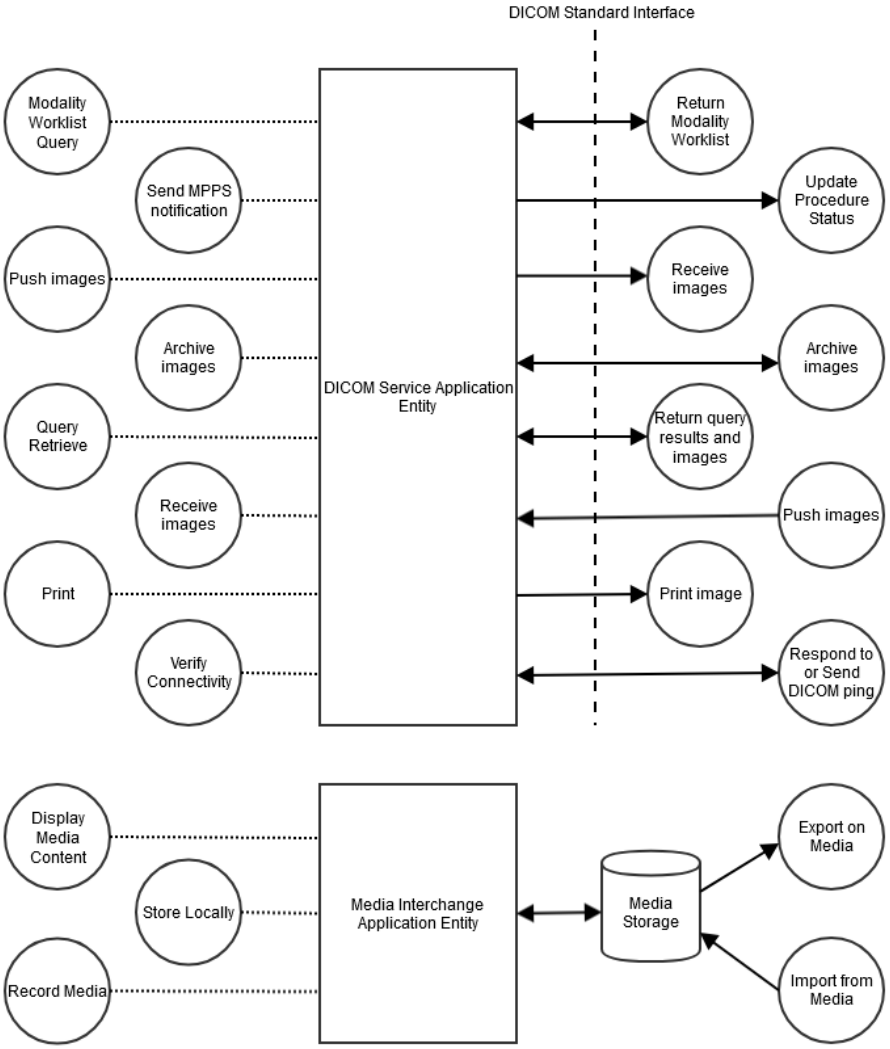

Figure 4-1 Senographe Pristina Application Data Flow Diagram

This section describes the organization of the supported Services into Application Entities based on the default configuration of the system. This may change based on the actual setup at the customer site. See Section 6 for details about the configurability of Services into AEs.

4.1.1 Functional Definition of DICOM Service Application Entity

The DICOM Service AE is invoked by the following Real-World Activities:

- Modality Worklist Query

  The user or the system initiates a modality worklist query to the modality worklist SCP with a given set of query parameters. The worklist query can be manual or automatic. The modality worklist SCP returns responses matching the query parameters. Worklist items from the returned worklist query responses are presented to the user. The user then chooses the desired worklist item and begins the image acquisition process.

- Send Modality Performed Procedure Step Notification

When the user begins the image acquisition process and generates the first image, the DICOM Service AE sends a N-CREATE message to the configured MPPS SCP to indicate that the image acquisition process has been started for the requested procedure.

The user can close the acquisition session either by completing the acquisition process or discontinuing the ongoing procedure. On closing the acquisition session, the DICOM Service AE sends N-SET message to the configured MPPS SCP to indicate the acquisition state of the requested procedure, with appropriate MPPS status (COMPLETED or DISCONTINUED).

- Push Images

  For this operation, the user selects some studies, series or images on the browser and then sends the selected studies, series, or images to one or several remote DICOM AE. The transfer activity is displayed on a specific icon. The declaration of remote DICOM AE is done through a configuration tool.
  Push of images can also be automatic. This can be configured in Image preference.

- Archive Images

  For this operation, the user selects some studies, series or images on the browser and sends them to the wanted remote DICOM AE. This initiates the DICOM push of the selected exam/series/images to the remote AE. After the successful storage of the selected exam/series/images on the remote AE, a storage commitment request is sent to the remote DICOM AE. The transfer/storage commit activity is displayed in the job management queue.

  The declaration of remote DICOM AE with archiving support is done through the configuration tool.

  Push of images can also be automatic. This can be configured in Image preference. After every successful storage of the automatic pushed exam/series/images to the remote AE, a storage commitment request is sent to the remote DICOM AE, and the storage commit activity is displayed in the job management queue.

  The DICOM Service AE is indefinitely listening for association requests and no user action is required to receive the Storage Commitment notification (N-EVENT-REPORT) from the remote AE.

- Query / Retrieve

  For this operation, the user queries one or a set of remote DICOM databases to obtain a list of data at Study/Series/Image level by clicking on the icon that represents the wanted remote DICOM AE.

  Once the remote browser has displayed query results, the user can retrieve the study/series/images from the remote DICOM AE.

- Receive Images

  When remote DICOM hosts sends DICOM images to DICOM Service AE, images are stored in the local database, the browser displays the content of the local database.

- Print

  The Film composer allows the user to select printers. Direct print from the viewer is also supported. When user presses the "Print" Button, the DICOM Service AE tries to establish the association with requested printer and sends the images for printing. It is possible to set the print in an automatic mode. DBT volume cannot be printed.

- Verify Connectivity

  The user can choose to verify a remote Application Entity. Upon user's request, DICOM Service AE sends out a verification request to a Remote AE.

The DICOM Service AE also acts as an SCP for incoming Verification requests. No user action is required to process Verification requests from Remote AEs.

4.1.2 Functional Definition of Media Interchange Application Entity

The DICOM Media Interchange AE supports the following functions:

- Generate and write a DICOM File Set (FSC) in a one-shot activity. (SAVE).
- Read a DICOM File Set (FSR) on an Interchange Media (QUERY).
- It can copy SOP instances from the media onto local storage. (RESTORE).

5 Service and Interoperability Description

5.1 Mapping of Services to Application Entities

Table 5-1 provides an overview of the Application Entities and the Services supported by each AE.

Table 5-1 Service to AE Mapping

Application Entity	Supported Services	Role								
		DIMSE		DICOM Web		DICOM Media			Real-Time Video	
		SCU	SCP	Origin Server	User Agent	FSC	FSU	FSR	SCU	SCP
DICOM Service AE	Basic Worklist Management	Y	N	N	N	N	N	N	N	N
	MPPS	Y	N	N	N	N	N	N	N	N
	Storage	Y	Y	N	N	N	N	N	N	N
	Storage Commitment	Y	N	N	N	N	N	N	N	N
	Query/Retrieve	Y	N	N	N	N	N	N	N	N
	Print Management	Y	N	N	N	N	N	N	N	N
Media Interchange AE	Media Storage	N	N	N	N	Y	N	Y	N	N

5.2 DIMSE Services

5.2.1 Basic Worklist Management Service

5.2.1.1 SCU of the Modality Worklist Information Model - FIND SOP Class

As a Service Class User of the Modality Worklist Information Model - FIND SOP Class, the Senographe Pristina uses the C-FIND-RQ message to query the SCP. It supports the Query Keys listed in Table 5-2.

In the "Matching Type" column, the following Values can be used:

- SINGLE_VALUE: SCU can request single Value matching on this Attribute.
- UID: SCU can request List of UID matching on this Attribute.
- WILDCARD: SCU can request Wildcard matching on this Attribute.
- RANGE: SCU can request Range matching on this Attribute.
- SEQUENCE: SCU can request sequence matching on this Attribute.
- UNIVERSAL: SCU can request that the Attribute be a return Value (universal matching).

In the "Query Value Source" column, the following Values can be used:

- FIXED: The query Value cannot be modified by the user or by configuration.
- GENERATED: The query Value is generated by the system (e.g., current date as the study date).
- CONFIGURATION: The query Value is dependent on system configuration.
- USER: The query Value is entered by the user.
- SCANNED: The query Value is read from a barcode scanner or similar device.
- EMPTY: The query Value is sent with a zero-length Value to indicate it is a return key only.

In the "Display on UI" column the following Values can be used:

- D: the return Value is displayed on the main UI by default.
- C: the return Value is displayed on the main UI if configured.
- N: the return Value is never displayed.

Table 5-2 Supported C-FIND Query Parameters for Modality Worklist - SCU

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Scheduled Procedure Step						
Scheduled Procedure Step Sequence	(0040,0100)	SEQUENCE	FIXED		N	
>Scheduled Station AE Title	(0040,0001)	SINGLE_VALUE; UNIVERSAL	USER; EMPTY		N	Matching is supported as follows: 1. Worklist AET is supplied for matching (Single value matching). 2. No AE title is supplied (universal matching), In case of universal matching, if attribute is absent or empty in response, the SPS is accepted
>Scheduled Procedure Step Start date	(0040,0002)	UNIVERSAL; SINGLE_VALUE; RANGE	EMPTY; USER		D	Matching is supported as one of the following: 1. No date is supplied (universal matching). 2. One date is supplied for matching (Single value matching). 3. A start date and an end date are supplied for matching (Range of date matching).
>Scheduled Procedure Step Start Time	(0040,0003)	UNIVERSAL	EMPTY		D	Requested in the MWL queries with zero-length value. If attribute is absent or empty in answer, the SPS is accepted. If value is outside of a valid range, the value will be set to zero length
>Modality	(0008,0060)	UNIVERSAL; SINGLE_VALUE	EMPTY; FIXED	MG	N	Matching is supported as follows: 1. No modality is supplied (universal matching). 2. Single Value MG is supplied for matching (Single value matching). If attribute is absent or empty in answer, the SPS is accepted.

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
>Scheduled Performing Physician's Name	(0040,0006)	UNIVERSAL	EMPTY		D	If value does not meet DICOM encoding requirements, it will be corrected before usage. Value is copied into image in attribute Performing Physician's Name (0008,1050). If element is absent or empty in response, the SPS is accepted, and attribute is not copied into image (except if edited by the user beforehand).
>Scheduled Procedure Step Description	(0040,0007)	UNIVERSAL	EMPTY		N	If value does not meet DICOM encoding requirements, it will be corrected before usage. If element is absent or empty in answer, the SPS is accepted, and attribute value is not copied into images. Attribute is copied into images into Request Attribute Sequence (0040,0275). If Requested Procedure Description (0032,1060) and Requested Procedure Code Seq. (0032,1064) code meaning tag values are absent or empty, the value is also copied to Study description (0008,1030) in images.
>Scheduled Protocol Code Sequence	(0040,0008)	SEQUENCE	FIXED		N	Sequence is copied into images within sequence Request Attribute Sequence (0040,0275) If the sequence is absent or empty in answer, the SPS is accepted, and attribute is not copied into images. If sequence is present but incomplete in answer (missing a mandatory attribute) the SPS is accepted, and correction will be applied for image correctness.
>>Code Value	(0008,0100)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty code value in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
>>Coding Scheme Designator	(0008,0102)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty code value in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
>>Coding Scheme Version	(0008,0103)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
>>Code Meaning	(0008,0104)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty code value in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
>Pre-Medication	(0040,0012)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
>Scheduled Procedure Step ID	(0040,0009)	UNIVERSAL	EMPTY		N	If value does not meet DICOM encoding requirements, SPS is accepted, and value will be corrected before usage. If absent or empty in answer, replaced by Requested Procedure ID (0040,1001) value before usage. If it is also absent or empty, replaced by value # before usage. Copied to images in Request Attribute Sequence (0040,0275).
>Requested Contrast Agent	(0032,1070)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
>Scheduled Procedure Step Status	(0040,0020)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Requested Procedure						
Requested Procedure ID	(0040,1001)	UNIVERSAL; SINGLE_VALUE	EMPTY; USER		D	Matching is supported as follows: 1. No value is supplied (universal matching). 2. ID value is supplied for matching (Single value matching). If absent or empty in answer, the SPS is accepted, and value is replaced by #. If value does not meet DICOM encoding requirements, it will be corrected before usage. Attribute is copied into image in Request Attribute Sequence (0040,0275) and its value is copied into Study ID (0020,0010).
Requested Procedure Description	(0032,1060)	UNIVERSAL	EMPTY		D	If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in answer, the SPS is accepted, and other values might be used for copy to image. Attribute is copied to image within Request Attribute Sequence (0040,0275) and its value is copied into Study Description (0008,1030).
Requested Procedure Code Sequence	(0032,1064)	UNIVERSAL	EMPTY		N	If sequence is absent or empty in answer, the SPS is accepted, and sequence not copied to image. If sequence is present but incomplete in answer (missing a mandatory attribute), the SPS is accepted, and correction will be applied for image correctness. Sequence content is copied in images in Procedure Code Sequence (0008,1032).

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
>Code Value	(0008,0100)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty code value in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
>Coding Scheme Designator	(0008,0102)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty coding scheme designator in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
>Coding Scheme Version	(0008,0103)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty coding scheme version in code sequence, the SPS is accepted.
>Code Meaning	(0008,0104)	UNIVERSAL	EMPTY		N	If answer is received with absent or empty code meaning in code sequence, the SPS is accepted. Sequence will be corrected at image creation.
Study Instance UID	(0020,000D)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted, and value is autogenerated. If value does not meet DICOM encoding requirements, it will be corrected before usage.
Study Date	(0008,0020)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Study Time	(0008,0030)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Referenced Study Sequence	(0008,1110)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted, and sequence is not copied to images. If sequence is incomplete (missing a mandatory attribute), the SPS is accepted, and sequence is not copied into images.
>Referenced SOP Class UID	(0008,1150)	UNIVERSAL	EMPTY		N	If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in sequence, SPS is accepted, and the sequence is not copied into images.
>Referenced SOP Instance UID	(0008,1155)	UNIVERSAL	EMPTY		N	If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in sequence, SPS is accepted, and the sequence is not copied into images.
Names of Intended Recipients of Results	(0040,1010)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Imaging Service Request						

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Accession Number	(0008,0050)	UNIVERSAL; SINGLE_VALUE	EMPTY; USER		D	Matching is supported as follows: 1. No value is supplied (universal matching). 2. one value is supplied for matching (Single value matching). If absent or empty in answer, the SPS is accepted, attribute will be empty in images. If value does not meet DICOM encoding requirements, it will be corrected before usage.
Requesting Physician	(0032,1032)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Referring Physician's Name	(0008,0090)	UNIVERSAL	EMPTY		D	If absent or empty in answer, the SPS is accepted, and attribute is created empty in images. If value does not meet DICOM encoding requirements, it will be corrected before usage.
Requesting Service	(0032,1033)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Imaging Service Request Comments	(0040,2400)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Placer Order Number / Imaging Service Request	(0040,2016)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Filler Order Number / Imaging Service Request	(0040,2017)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Visit Identification						
Admission ID	(0038,0010)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Issuer of Admission ID	(0038,0011)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Visit Status						
Current Patient Location	(0038,0300)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient Identification						
Patient's Name	(0010,0010)	UNIVERSAL; SINGLE_VALUE; WILDCARD	EMPTY; USER		D	Matching is supported as follows: No value is supplied (universal matching). one value is supplied for matching (Single value matching). Part of name with leading and trailing * (wild card matching). If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in answer, the SPS is accepted, and the user will have to edit its value.

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Patient ID	(0010,0020)	UNIVERSAL; SINGLE_VALUE	EMPTY; USER		D	Matching is supported as follows: No value is supplied (universal matching) one value is supplied for matching (Single value matching). If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in answer, the SPS is accepted, and attribute will be created empty in images.
Issuer of Patient ID	(0010,0021)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Other Patient IDs	(0010,1000)	UNIVERSAL	EMPTY		N	If value does not meet DICOM encoding requirements, it will be corrected before usage. If absent or empty in answer, the SPS is accepted, and attribute is not copied to images.
Patient Demographics						
Patients Birth Date	(0010,0030)	UNIVERSAL	EMPTY		D	If absent or empty in answer, the SPS is accepted, and attribute is not copied to images. If value does not meet DICOM encoding requirements, it will be corrected before usage.
Patient's Sex	(0010,0040)	UNIVERSAL	EMPTY		D	If absent or empty in answer, the SPS is accepted, and attribute is created empty in images. If value does not meet DICOM encoding requirements, it will be corrected before usage.
Patient's Weight	(0010,1030)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Confidentiality constraint on patient data Description	(0040,3001)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient’s Size	(0010,1020)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient’s Address	(0010,1040)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient’s Telephone Numbers	(0010,2154)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient Comments	(0010,4000)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Patient Medical						
Patient State	(0038,0500)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Pregnancy Status	(0010,21C0)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Medical Alerts	(0010,2000)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Allergies	(0010,2110)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Special Needs	(0038,0050)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Additional Patient History	(0010,21B0)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Standard Extended						

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Study Description	(0008,1030)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted. NOTE: The study description in image is copied from Requested Procedure Description.
Name of Physician(s) Reading Study	(0008,1060)	UNIVERSAL	EMPTY		N	If absent or empty in answer, SPS is accepted.
Operator's Name	(0008,1070)	UNIVERSAL	EMPTY		D	If absent or empty in answer, SPS is accepted.
Breast Implant Present	(0028,1300)	UNIVERSAL	EMPTY		D	If absent or empty in answer, SPS is accepted.

User can cancel the ongoing worklist query by clicking on the Cancel button in the UI. Upon cancel, the Senographe Pristina will send a C-FIND-CANCEL request to the Modality Worklist SCP.

This implementation can receive multiple C-FIND results over a single association. Only one association is opened at a time.

Each C-FIND response received from the remote AE is parsed to verify the length/type of the items in the response. The DICOM Service AE has a lenient policy regarding the rejection of the MWL. In case any parameters retrieved from the MWL are invalid, the system will correct automatically or require/allow the user to enter the value through the UI.

Following acceptance and correction policy is applied on the received worklist items in order to be lenient on DICOM technical violations by the remote AE:

- Trailing space in UI element value will be changed to trailing null.
- Study Instance UID will be locally generated if the Study Instance UID in the worklist item is absent or invalid (for example if it is more than 64 characters).
- Strings (SH, LO) that are VM=1 and contain \ characters will be processed for HL7v2 escape character conversion:
  - \F\ replaced by |
  - \S\ replaced by ^
  - \T\ replaced by &
  - \E\ replaced by #
  - Any other use of \ be replaced by # and the rest of the string will be truncated.
- Strings (CS, SH, LO) that are too long will be truncated. Last character in each truncated value will be set to # (except for CS)
- Replaces individual <CR>, individual <LF>, <CR><LF> combination, and <LF><CR> combination with a canonical NewLine control in Text (ST, LT) . The NewLine control set is appropriate to the display environment (e.g., a single <LF> character in Unix).
- Text (ST, LT) that is too long will be truncated. Last character in each truncated value will be set to #.
- Names (PN) will be truncated at 64 characters per name component group or after the 5th caret.
- Date/Time (DA, DT, TM) that are Type 2 or 3 and are outside a valid range will be set to zero length.
- CS characters that are lower case will be set to upper case, and – changed to _.
- Any missing Type 2 attributes in the query response will be added in with zero length.
- Any invalid Type 2 attribute after the above processing will be set to zero length.

- Any invalid Type 3 attribute after the above processing will be discarded.

Worklist item that does not comply to this acceptance policy is discarded and the next response (if any) is considered.

In case of ERROR, persisted worklist item(s) got from previous request to the configured SCP would be shown.

ISO_IR_100 is the Specific Character Set (0008, 0005) value sent during worklist query and while interpreting response.

5.2.1.2 SCP of the Modality Worklist Information Model - FIND SOP Class - N/A

N/A

5.2.2 Modality Performed Procedure Step Service

5.2.2.1 SCU of the Modality Performed Procedure Step SOP Class

As a Service Class User of the Modality Performed Procedure Step SOP Class, the Senographe Pristina supports the Attributes listed in Table 5-3 in the N-CREATE-RQ and N-SET-RQ messages, if it creates the message.

In the "Source" column the following Values can be used:

- FIXED: the Value is pre-defined and cannot be modified.
- GENERATED: the Value is generated by the system.
- CONFIGURATION: the Value is copied from system configuration.
- MWL: the Value is copied from modality worklist entry.
- USER: the Value is entered by the user.
- SCANNED: the Value is read from a barcode scanner or similar device.
- EMPTY: The Attribute is sent with a zero-length Value

Table 5-3 Supported N-CREATE and N-SET Attributes for Modality Performed Procedure Step - SCU

Attribute Name	Tag	Source	Value N-CREATE	Value N-SET	Comments
Specific Character Set	(0008,0005)	FIXED	ISO_IR 100	ISO_IR 100	
Performed Procedure Step Relationship					
Scheduled Step Attributes Sequence	(0040,0270)			Not sent	
>Study Instance UID	(0020,000D)	MWL; GENERATED	Copied from SPS if received, else generated.	Not sent	
>Referenced Study Sequence	(0008,1110)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>>Referenced SOP Class UID	(0008,1150)	MWL	Copied from SPS if received, else not sent.	Not sent	
>>Referenced SOP Instance UID	(0008,1155)	MWL	Copied from SPS if received, else not sent.	Not sent	

Attribute Name	Tag	Source	Value N-CREATE	Value N-SET	Comments
>Accession Number	(0008,0050)	MWL; USER; EMPTY	Copied from SPS if received, or user input if entered, else sent empty.	Not sent	
>Requested Procedure ID	(0040,1001)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>Requested Procedure Description	(0032,1060)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>Scheduled Procedure Step ID	(0040,0009)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>Scheduled Procedure Step Description	(0040,0007)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>Scheduled Protocol Code Sequence	(0040,0008)	MWL; EMPTY	Copied from SPS if received, else sent empty.	Not sent	
>>Code Value	(0008,0100)	MWL	Copied from SPS if received, else not sent.	Not sent	
>>Coding Scheme Designator	(0008,0102)	MWL	Copied from SPS if received, else not sent.	Not sent	
>>Code Meaning	(0008,0104)	MWL	Copied from SPS if received, else not sent.	Not sent	
Patient's Name	(0010,0010)	MWL; USER	Copied from SPS if received, else user input.	Not sent	
Patient ID	(0010,0020)	MWL; USER	Copied from SPS if received, else user input.	Not sent	
Patient's Birth Date	(0010,0030)	MWL; USER; EMPTY	Copied from SPS if received, or user input if entered, else sent empty.	Not sent	
Patient's Sex	(0010,0040)	MWL; USER; EMPTY	Copied from SPS if received, or user input if entered, else sent empty.	Not sent	
Referenced Patient Sequence	(0008,1120)	EMPTY		Not sent	
Performed Procedure Step Information					
Performed Procedure Step ID	(0040,0253)	GENERATED	Unique string generated by the modality for entire session. It starts at 1 and be one unit incremented for each new PPS instance. It is reinitiated when the system reboots.	Not sent	
Performed Station AE Title	(0040,0241)	CONFIGURATION	Local system’s AE Title.	Not sent	
Performed Station Name	(0040,0242)	CONFIGURATION	Local system’s hostname	Not sent	
Performed Location	(0040,0243)	EMPTY		Not sent	

Attribute Name	Tag	Source	Value N-CREATE	Value N-SET	Comments
Performed Procedure Step Start Date	(0040,0244)	GENERATED	Date of the first image acquisition	Not sent	
Performed Procedure Step Start Time	(0040,0245)	GENERATED	Time of the first image acquisition	Not sent	
Performed Procedure Step Status	(0040,0252)	GENERATED	IN PROGRESS	COMPLETED; DISCONTINUED	
Performed Procedure Step Description	(0040,0254)	MWL; USER	Copied from SPS Scheduled procedure Step Description (0040,0007), or user input.	Copied from SPS Scheduled procedure Step Description (0040,0007), or user input.	
Performed Procedure Type Description	(0040,0255)	EMPTY	Empty	Not sent	
Procedure Code Sequence	(0008,1032)	MWL; EMPTY	Copied from SPS Procedure Code Sequence (0032,1064) if received.	Not sent	
>Code Value	(0008,0100)	MWL	Copied from SPS if received, else not sent.	Not sent	
>Coding Scheme Designator	(0008,0102)	MWL	Copied from SPS if received, else not sent.	Not sent	
>Code Meaning	(0008,0104)	MWL	Copied from SPS if received, else not sent.	Not sent	
Performed Procedure Step End Date	(0040,0250)	GENERATED	Empty	Date when the user pushes the CLOSE EXAM button of the viewer	
Performed Procedure Step End Time	(0040,0251)	GENERATED	Empty	Time when the user pushes the CLOSE EXAM button of the viewer	
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	FIXED	Empty	Sent only if PPS is discontinued	
>Code Value	(0008,0100)	FIXED	Not sent	110513	
>Coding Scheme Designator	(0008,0102)	FIXED	Not sent	DCM	
>Coding Scheme Version	(0008,0103)	FIXED	Not sent	01	
>Code Meaning	(0008,0104)	FIXED	Not sent	“Discontinued for unspecified reason”	
Image Acquisition Results					
Modality	(0008,0060)	FIXED	MG	Not sent	
Study ID	(0020,0010)	MWL; GENERATED	Copied from SPS Requested Procedure ID (0040,1001) if received, else generated.	Not sent	
Performed Protocol Code Sequence	(0040,0260)	MWL	Empty	Copied from SPS Scheduled Protocol code sequence (0040,0008) if received, else not sent	

Attribute Name	Tag	Source	Value N-CREATE	Value N-SET	Comments
>Code Value	(0008,0100)	MWL	Not sent		
>Coding Scheme Designator	(0008,0102)	MWL	Not sent		
>Code Meaning	(0008,0104)	MWL	Not sent		
Performed Series Sequence	(0040,0340)	EMPTY; GENERATED	Empty	Contains as many items as corresponding series acquired during exam.	
>Performing Physician's Name	(0008,1050)	MWL; USER; EMPTY	Not sent	Copied from SPS Scheduled Performing Physician's Name (0040,0006) if received, or from User input if provided, else empty.	
>Protocol Name	(0018,1030)	GENERATED	Not sent	ROUTINE; STEREO; CESM; 3D_ROUTINE; 3D_ROUTINE+2D_ROUTINE; 3D_BIOPSY; CESM_BIOPSY; SAMPLE	
>Operator’s Name	(0008,1070)	MWL; USER; EMPTY	Not sent	Copied from SPS Operator’s Name (0008,1070) if received, or from User input if provided, else empty.	
>Series Instance UID	(0020,000E)	GENERATED	Not sent	Series Instance UID of the referenced series	
>Series Description	(0008,103E)	GENERATED	Not sent	Series Description of the referenced series.	
>Retrieve AE Title	(0008,0054)	EMPTY	Not sent	Empty	
>Referenced Image Sequence	(0008,1140)	GENERATED	Not sent	1 item per image created in the series.	
>>Referenced SOP Class UID	(0008,1150)	GENERATED	Not sent	SOP Class UID of the created image.	
>>Referenced SOP Instance UID	(0008,1155)	GENERATED	Not sent	SOP Instance UID of the created image.	
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	EMPTY	Not sent		
Standard Extended					
Total Number of Exposures	(0040,0301)	GENERATED	Empty	Total number of exposures performed during exam	
Organ Dose	(0040,0316)	GENERATED	Empty	Sum of the "Organ Dose" for the 2D images, DBT sequences and organ doses of incomplete exams (repeated, rejected and aborted)	

Attribute Name	Tag	Source	Value N-CREATE	Value N-SET	Comments
Entrance dose in mGy	(0040,8302)	GENERATED	Empty	Sum of “Entrance dose in mGy" for the 2D images, DBT sequences and entrance dose of incomplete exam (repeated, rejected and aborted)	

The N-CREATE is sent when starting image acquisition and N-SET is sent when the study is closed.

5.2.2.2 SCP of the Modality Performed Procedure Step SOP Class - N/A

N/A

5.2.3 Unified Worklist and Procedure Step Service - N/A

N/A

5.2.4 Instance Availability Notification Service - N/A

N/A

5.2.5 Storage Service

5.2.5.1 SCU of the Storage SOP Classes

As a Service Class User of the Storage Service Class, the Senographe Pristina uses the C-STORE-RQ message to request storage of DICOM objects by a remote SCP. See Section 1.1 Content and Transfer in the Overview for the list of supported SOP Classes.

For details regarding the content of SOP Instances that are created by the system, see Annex A, which describes the underlying IOD of the supported SOP Classes.
Storage requests can be triggered by the user when he first selects the exam/series/image on the local database browser and clicks on the Remote DICOM AE to which the user desires to send the exam/series/image to.

The user can also trigger storage request of a particular image during the exam session (push-on-demand).

The product can be configured to automatically send acquired exam upon study closure by the user.

The product can be configured to automatically send acquired image upon acquisition of the next image (push-on-the-fly).

All instances that have been created using the same worklist entry are grouped in the same study.

The Senographe Pristina creates one series per mammography view and per type of image.

5.2.5.1.1 Transcoding of Transfer Syntaxes – N/A

N/A

5.2.5.2 SCP of the Storage SOP Classes

As a Service Class Provider of the Storage Service Class, the Senographe Pristina receives the C-STORE-RQ message from remote SCUs. See Section 1.1 Content and Transfer in the Section 1 for the list of supported SOP Classes.
Table 5-4 defines the conformance levels of Senographe Pristina.

Table 5-4 Levels of Conformance

Levels of Conformance	2
Level of Digital Signature Support	1

No coercion is applied by Senographe Pristina.

Table 5-5 lists any limitations on displaying or processing instances, e.g., display or processing of the respective SOP Instances is prevented by an unsupported Value for an Attribute or the absence of that Attribute.

The "Effect" column describes what happens if the limitation is encountered. The following Values are used:

- ND: Display is not possible
- LD: Display is limited
- NP: Processing is not possible
- LP: Processing is limited
- OT: Other effects described in the "Comments" column

Table 5-5 Display and Processing Limitations for Storage SCP

Limitation Case			Effect	Comments
Attribute Name	**Tag**	**Value**		
Secondary Capture Image Storage (1.2.840.10008.5.1.4.1.1.7)				
Photometric Interpretation	(0028,0004)	Other than MONOCHROME1 or MONOCHROME2	ND	

Table 5-6 lists the actions performed upon receiving instances from a remote AE and the system behavior when certain conditions are encountered.

Table 5-6 Behavior when storing Instances

Action upon Receiving	Condition	System Behavior
Perform Attribute Validation	Duplicate Instance	Overwrite Instances
	Success	Instances are stored in an internal database
Add to an existing study	Mismatch in study / series detected	Send failure code in storage response
	Success	Instances are stored in a local database

The SCP stores all instances in uncompressed format.

In case of a successful C-STORE operation:

- The stored SOP Instance can be accessed by pushing it from the Senographe Pristina to another device.
- The storage duration is 2 days by default and configurable by the user. After that delay a SOP Instance received from a C-STORE operation is automatically deleted.

The meaning of each case of an unsuccessful C-STORE response status is described in chapter 7.3.2.5.2 SCP of the Storage SOP Classes - C-STORE.

The SCP doesn't return warning C-STORE responses.

5.2.6 Storage Commitment Service

5.2.6.1 SCU of the Storage Commitment SOP Class

As a Service Class User of the Storage Commitment SOP Class, the Senographe Pristina uses the N-ACTION-RQ message to request storage commitment from a remote SCP. In turn, it receives N-EVENT-REPORT-RQ messages from the SCP indicating success or failure of the request.

As a Service Class User of the Storage Commitment Push Model SOP Classes the product supports committing all Storage SOP Classes listed in Section 1.1 Content and Transfer are supported.
The Senographe Pristina doesn't support the Storage Media File Set ID and UID attributes in the N-ACTION-Request.

N-EVENT-REPORT can be received by the Senographe Pristina on the same Association as the N-ACTION, or on a different one.

If the received N-ACTION Response from the SCP has a success status, the Senographe Pristina waits 10 seconds for an N-EVENT-REPORT on the same association. This time-out is not configurable. If the N-EVENT-REPORT request is not received in this time, it closes the association and changes the Job state to "Waiting" indicating the job is waiting for the response from commitment provider. Then it can receive a N-EVENT-REPORT from the SCP at any time on a different association.

Up receiving an N-EVENT-REPORT with an Event Type of 1, the "Archived" flag information in the browser for all the successfully archived exam/series will be updated. The archive status column in the browser will be changed to display "Archived" icon to indicate that the exam/series has been archived successfully. The job queue entry will be removed.

Table 5-7 lists the behavior of Senographe Pristina for each possible Failure Reason (0008,1197) in the Failed SOP Sequence (0008,1198) upon receiving an N-EVENT-REPORT request from the SCP with an Event Type ID of 2 (Storage Commitment Request Complete - Failures Exist).

Table 5-7 Failure Behavior for Storage Commitment SCU

Status Code	Description	Behavior
0110	Processing failure: A general failure in processing the operation was encountered.	The system displays the appropriate error message in the job manager user interface and job is paused.
0112	No such object instance: One or more of the elements in the Referenced SOP Instance Sequence was not available.	The system displays the appropriate error message in the job manager user interface and job is paused.
0119	Class / Instance conflict: The SOP Class of an element in the Referenced SOP Instance Sequence did not correspond to the SOP Class registered for this SOP Instance at the SCP.	The system displays the appropriate error message in the job manager user interface and job is paused.
0122	Referenced SOP Class not supported: Storage Commitment has been requested for a SOP Instance with a SOP Class that is not supported by the SCP.	The system displays the appropriate error message in the job manager user interface and job is paused.
0131	Duplicate Transaction UID: The Transaction UID of the Storage Commitment Request is already in use.	The system displays the appropriate error message in the job manager user interface and job is paused.
0213	Resource limitation: The SCP does not currently have enough resources to store the requested SOP Instance(s).	The system displays the appropriate error message in the job manager user interface and job is paused.

Jobs paused because of a failure of the storage commitment are not automatically retried. However, the user can manually retry the failed jobs from the job queue. Such requests will be treated as new requests. This will go through the complete sequence of operations once again.

5.2.6.2 SCP of the Storage Commitment SOP Class - N/A

N/A

5.2.7 Query/Retrieve Service Class

5.2.7.1 SCU of the Study Root Q/R Information Model - FIND SOP Class

As a Service Class User of the Study Root Q/R - Information Model - FIND SOP Class, the Senographe Pristina uses the C-FIND-RQ message and supports the Query Keys listed in Table 5-8 for hierarchical queries.

In the "Matching Type" column the following Values can be used:

- SINGLE_VALUE: SCU can request Single Value matching on this Attribute.
- UID: SCU can request List of UID matching on this Attribute.
- WILDCARD: SCU can request Wildcard matching on this Attribute.
- RANGE: SCU can request Range matching on this Attribute.
- SEQUENCE: SCU can request Sequence matching on this Attribute.
- UNIVERSAL: SCU can request that the Attribute be a return Value (universal matching).

In the "Query Value Source" column the following Values can be used:

- FIXED: The query Value cannot be modified by the user or by configuration.
- GENERATED: The query Value is generated by the system (e.g., current date as the study date).
- CONFIGURATION: The query Value is dependent on system configuration.
- USER: The query Value is entered by the user.
- SCANNED: The query Value is read from a barcode scanner or similar device.
- EMPTY: The query Value is sent with a zero-length value to indicate it is a return key only.

In the "Display on UI" column the following Values can be used:

- D: the return Value is displayed on the main UI by default.
- C: the return Value is displayed on the main UI if configured.
- N: the return Value is never displayed.

Table 5-8 Supported C-FIND Attribute Matching for Study Root Q/R Model -SCU

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Study Level						
Study Date	(0008,0020)	SINGLE_VALUE; RANGE	USER		D	
Study Time	(0008,0030)	UNIVERSAL	EMPTY		N	
Accession Number	(0008,0050)	SINGLE_VALUE;	USER		N	

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
		WILDCARD				
Patient's Name	(0010,0010)	SINGLE_VALUE; WILDCARD	USER		D	
Patient ID	(0010,0020)	SINGLE_VALUE; WILDCARD	USER		D	
Study ID	(0020,0010)	SINGLE_VALUE; WILDCARD	USER		N	
Study Instance UID	(0020,000D)	UNIVERSAL	EMPTY		N	
Modalities in Study	(0008,0061)	UNIVERSAL	EMPTY		D	
Station Name	(0008,1010)	UNIVERSAL	EMPTY		N	
Study Description	(0008,1030)	UNIVERSAL	EMPTY		D	
Patient’s Birth Date	(0010,0030)	UNIVERSAL	EMPTY		N	
Patient’s Sex	(0010,0040)	UNIVERSAL	EMPTY		N	
Patient’s Birth Time	(0010,0032)	UNIVERSAL	EMPTY		N	
Number of Study Related Instances	(0020,1208)	UNIVERSAL	EMPTY		N	
Series Level						
Series Number	(0008,0011)	UNIVERSAL	EMPTY		D	
Modality	(0008,0060)	UNIVERSAL	EMPTY		N	
Series Instance UID	(0020,000E)	UNIVERSAL	EMPTY		N	
Series Description	(0008,103E)	UNIVERSAL	EMPTY		D	
Series Date	(0008,0021)	UNIVERSAL	EMPTY		D	
Series Time	(0008,0031)	UNIVERSAL	EMPTY		N	
Series Type	(0054,1000)	UNIVERSAL	EMPTY		D	
Manufacturer	(0008,0070)	UNIVERSAL	EMPTY		N	
Number Of Series Related Instances	(0020,1209)	UNIVERSAL	EMPTY		N	
Requested Attributes Sequence	(0040,0275)	UNIVERSAL	EMPTY		N	
Scheduled Procedure Step Description	(0040,0007)	UNIVERSAL	EMPTY		N	
Study Instance UID	(0020,000D)	UID	GENERATED		N	
Image Type	(0008,0008)	UNIVERSAL	EMPTY		N	
Instance Level						
Instance Number	(0020,0013)	UNIVERSAL	EMPTY		D	
SOP Instance UID	(0008,0018)	UNIVERSAL	EMPTY		N	
Image Type	(0008,0008)	UNIVERSAL	EMPTY		N	

Attribute Name	Tag	Matching Type	Query Value Source	Value	Display on UI	Comments
Acquisition Time	(0008,0032)	UNIVERSAL	EMPTY		D	
Modality	(0008,0060)	UNIVERSAL	EMPTY		N	
Contrast / Bolus Agent	(0018,0010)	UNIVERSAL	EMPTY		N	
Slice Thickness	(0018,0050)	UNIVERSAL	EMPTY		N	
Repetition Time	(0018,0080)	UNIVERSAL	EMPTY		N	
Echo Time	(0018,0081)	UNIVERSAL	EMPTY		N	
Inversion Time	(0018,0082)	UNIVERSAL	EMPTY		N	
Number Of Averages	(0018,0083)	UNIVERSAL	EMPTY		N	
Echo Number	(0018,0086)	UNIVERSAL	EMPTY		N	
Spacing Between Slices	(0018,0088)	UNIVERSAL	EMPTY		N	
Data Collection Diameter	(0018,0090)	UNIVERSAL	EMPTY		N	
Trigger Time	(0018,1060)	UNIVERSAL	EMPTY		N	
Reconstruction Diameter	(0018,1100)	UNIVERSAL	EMPTY		N	
Gantry / Detector Tilt	(0018,1120)	UNIVERSAL	EMPTY		N	
Convolution Kernel	(0018,1210)	UNIVERSAL	EMPTY		N	
Flip Angle	(0018,1314)	UNIVERSAL	EMPTY		N	
Image Position (Patient)	(0020,0032)	UNIVERSAL	EMPTY		N	
Image Orientation (Patient)	(0020,0037)	UNIVERSAL	EMPTY		N	
Slice Location	(0020,1041)	UNIVERSAL	EMPTY		N	
Rows	(0028,0010)	UNIVERSAL	EMPTY		N	
Columns	(0028,0011)	UNIVERSAL	EMPTY		N	
Pixel Spacing	(0028,0030)	UNIVERSAL	EMPTY		N	
Units	(0054,1001)	UNIVERSAL	EMPTY		N	
Reconstruction Method	(0054,1103)	UNIVERSAL	EMPTY		N	
Image ID	(0054,0400)	UNIVERSAL	EMPTY		N	
Specific Character Set	(0008,0005)	UNIVERSAL	EMPTY		N	
Detector Secondary Angle	(0018,1531)	UNIVERSAL	EMPTY		D	
Study Instance UID	(0020,000D)	UID	GENERATED		N	
Series Instance UID	(0020,000E)	UID	GENERATED		N	

ISO_IR_100 is the Specific Character Set (0008, 0005) value sent during query and while interpreting response.

5.2.7.2 SCU of the Patient Root Q/R Information Model - FIND SOP Class - N/A

N/A

5.2.7.3 SCU of the Study Root Q/R Information Model - MOVE SOP Class

When the user initiates a Move operation at any level (Study, Series, Image) the DICOM Service AE will initiate a C-MOVE-RQ request to the Remote AE with the DICOM Service AE as the Destination AE. The Storage SCP will handle the incoming images.

Each C-MOVE SCU supports an “Association Timer” and an “Operation Inactivity Timer”. These timers are set to 60 and 300 seconds respectively.

The C-MOVE SCU supports only the Baseline behavior and does not negotiate for Extended behavior during association. During the move operations, Unique Key values for all levels above the Query/Retrieve Level specified will be supplied in the C-MOVE request.

The DICOM Service AE does not send a C-MOVE request with List of UIDs. If the user chooses multiple exams from the remote browser for retrieval, it creates separate association and send one C-MOVE request with single exam UID, for each study. The system works the same way when the user tries to retrieve multiple series.

An individual retrieve-job is created in the job management queue for each exam/series request.

If the user tries to retrieve multiple images within a series, it will create single association and sends multiple C-MOVE requests; one C-MOVE request per image within the same association.

However, for each user request, a single retrieve-job is created in the job management queue.

If the C-MOVE SCU receives a status different from success (0x0000) or pending (0xFF00) during the association, the DICOM Service AE will release the association. This information will be logged in the system log files and the network/job manager queue will be updated accordingly.

During Retrieve, the DICOM Service AE is able to generate a C-MOVE-CANCEL.

When a Cancel response (0xFE00) is received, the DICOM Service AE will release the association. This information will be logged in the system log files and the network queue will be updated accordingly.

5.2.7.4 SCU of the Patient Root Q/R Information Model - MOVE SOP Class - N/A

N/A

5.2.7.5 SCP of the Study Root Q/R Information Model - FIND SOP Class - N/A

N/A

5.2.7.6 SCP of the Patient Root Q/R Information Model - FIND SOP Class - N/A

N/A

5.2.7.7 SCP of the Study Root Q/R Information Model - MOVE SOP Class - N/A

N/A

5.2.7.8 SCP of the Patient Root Q/R - Information Model - MOVE SOP Class - N/A

N/A

5.2.8 Print Management Service

5.2.8.1 SCU of the Basic Grayscale Print Management Meta SOP Class

The Basic Grayscale Print Management Meta SOP Class is composed of the mandatory SOP Classes listed in Table 5-9.

Table 5-9 Basic Grayscale Print Management Meta SOP Classes - SCU

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

5.2.8.1.1 Basic Film Session SOP Class

Table 5-10 lists the supported DIMSE Services for the Basic Film Session SOP Class:

Table 5-10 Services for the Basic Film Session SOP Class - SCU

DIMSE Service Element	Purpose
N-CREATE	Create the Film Session

Table 5-11 lists the supported N-CREATE and N-SET Attributes for Basic Film Session:

Table 5-11 Supported N-CREATE and N-SET Attributes for the Basic Film Session SOP Class - SCU

Attribute Name	Tag	Values	Default
Number of Copies	(2000,0010)	[1…99]	1
Medium Type	(2000,0030)	BLUE FILM	
Film Destination	(2000,0040)	PROCESSOR	

5.2.8.1.2 Basic Film Box SOP Class

Table 5-12 lists the supported DIMSE Services for the Basic Film Box SOP Class:

Table 5-12 Supported Services for the Basic Film Box SOP Classes

DIMSE Service Element	Purpose
N-CREATE	Create the Film Box in a previously created Film Session
N-ACTION	Print the Film Box
N-DELETE	Delete the Film Box

Table 5-13 lists the supported N-CREATE and N-SET Attributes for Basic Film Box:

Table 5-13 Supported N-CREATE and N-SET Attributes for the Basic Film Box SOP Class - SCU

Attribute Name	Tag	Values	Default
Image Display Format	(2010,0010)	STANDARD\C,R	STANDARD\1,1
Film Orientation	(2010,0040)	PORTRAIT; LANDSCAPE	PORTRAIT
Film Size ID	(2010,0050)	14INX17IN; 8INX10IN; 10INX12IN; 10INX14IN; 11INX14IN; 14INX14IN; 24CMX24CM; 24CMX30CM	
Magnification Type	(2010,0060)	REPLICATE; BILINEAR; CUBIC; NONE	CUBIC
Smoothing Type	(2010,0080)	SMOOTH; SHARP	SMOOTH

Attribute Name	Tag	Values	Default
Border Density	(2010,0100)	BLACK	
Trim	(2010,0140)	YES; NO	YES
Configuration Information	(2010,0150)		
Referenced Film Session Sequence	(2010,0500)		
>Referenced SOP Class UID	(0008,1150)	1.2.840.10008.5.1.1.1	
>Referenced SOP Instance UID	(0008,1155)		

5.2.8.1.3 Basic Grayscale Image Box SOP Class

Table 5-14 lists the supported DIMSE Service for the Basic Grayscale Image Box SOP Class:

Table 5-14 Services for the Basic Grayscale Image Box SOP Class

DIMSE Service Element	Purpose
N-SET	Set Image Attributes for a previously created Film Box

Table 5-15 lists the supported N-SET Attributes for Basic Grayscale Image Box:

Table 5-15 Supported N-SET Attributes for the Basic Grayscale Image Box SOP Class -SCU

Attribute Name	Tag	Values	Default
Image Box Position	(2020,0010)		
Requested Image Size	(2020,0030)		
Requested Decimate/Crop Behavior	(2020,0040)	DECIMATE; CROP; FAIL	
Basic Grayscale Image Sequence	(2020,0110)		
>Samples per Pixel	(0028,0002)	1	
>Photometric Interpretation	(0028,0004)	MONOCHROME2	
>Rows	(0028,0010)		
>Columns	(0028,0011)		
>Bits Allocated	(0028,0100)	8; 16	
>Bits Stored	(0028,0101)	8; 12	
>High Bit	(0028,0102)	7; 11	
>Pixel Representation	(0028,0103)	0	
>Pixel Data	(7FE0,0010)		

5.2.8.1.4 Printer SOP Class

Table 5-16 lists the supported DIMSE Services for the Printer SOP Class:

Table 5-16 Services for the Printer SOP Class

DIMSE Service Element	Purpose
N-EVENT-REPORT	Report the printer status in an asynchronous way

DIMSE Service Element	Purpose
N-GET	Retrieve printer information and status.

An N-EVENT-REPORT request can be received by the SCU at any time during an Association.
Table 5-17 summarizes the behavior of the SCU when receiving Event Types within the N-EVENT-REPORT.

Table 5-17 Printer SOP Class N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
Normal	1	Ignored
Warning	2	Ignored
Failure	3	Ignored

If an N-EVENT-REPORT is received when the association is active, the DICOM Service AE handles the relevant states, but the received data is ignored.

Table 5-18 lists the supported N-GET Attributes for Printer SOP Class:

Table 5-18 Supported N-GET Attributes for the Printer SOP Class - SCU

Attribute Name	Tag	Behavior
Printer Status	(2110,0010)	NORMAL: Status is logged and sends Film Session N-CREATE request. WARNING: Status is logged. and sends Film Session N-CREATE request. FAILURE: Status is logged. Fails the print job and displays print failure message on the Job Manager UI.
Printer Status Info	(2110,0020)	Logs the message.
Printer Name	(2110,0030)	Logged if sent by SCP.
Manufacturer	(0008,0070)	Logged if sent by SCP.
Manufacturer Model Name	(0008,1090)	Logged if sent by SCP.
Device Serial Number	(0018,1000)	Logged if sent by SCP.
Software Versions	(0018,1020)	Logged if sent by SCP.

N-Get request is sent when the user initiates the print activity by clicking on the Print button. Based on the N-Get response, the DICOM Service AE continues to send the Film Session's N-CREATE request if status is NORMAL, else pauses the print job and displays the error message on the Film Job Manager UI.

5.2.8.2 SCU of the Basic Color Print Management Meta SOP Class – N/A

N/A

5.2.8.3 SCU of the Basic Annotation Box SOP Class - N/A

N/A

5.2.8.4 SCU of the Print Job SOP Class - N/A

N/A

5.2.8.5 SCU of the Presentation LUT SOP Class - N/A

N/A

5.2.8.6 SCU of the Printer Configuration Retrieval SOP Class - N/A

N/A

5.2.8.7 SCP of the Basic Grayscale Print Management Meta SOP Class - N/A

N/A

5.2.8.8 SCP of the Basic Color Print Management Meta SOP Class - N/A

N/A

5.2.8.9 SCP of the Basic Annotation Box SOP Class - N/A

N/A

5.2.8.10 SCP of the Print Job SOP Class - N/A

N/A

5.2.8.11 SCP of the Presentation LUT SOP Class - N/A

N/A

5.2.8.12 SCP of the Printer Configuration Retrieval SOP Class - N/A

N/A

5.3 DICOM Web Services - N/A

N/A

5.4 Media Services

5.4.1 File Set Creator (FSC)

Senographe Pristina supports creating the Basic Directory IOD as a File Set Creator as defined in Annex A.7.

For a list of supported Media Application Profiles, see Section 1.4 in the Overview.

For a list of supported SOP Classes, see Section 1.1 in the Overview.

5.4.2 File Set Reader (FSR)

Senographe Pristina supports the Media Application Profiles listed in Section 1.4 in the Overview.

For a list of supported SOP Classes, see Section 1.1 in the Overview.

To display or process DICOM Instances contained on the Media, see Section 5.2.5.2.

5.4.3 File Set Updater (FSU) - N/A

N/A

5.5 Real-Time Video Services - N/A

N/A

5.6 Cross Service Considerations – N/A

N/A

5.7 Specific Character Sets

For Specific Character Sets supported in addition to the default character repertoire, refer to Section 1.7 for the Values for Specific Character Set (0008,0005).
The system generates data with only the Specific Character Set ISO_IR 100.

As a Query SCU, it will accept response items with any value of Specific Character Set. However, it will display in the user interface only characters specified as within ISO_IR 6 (ASCII) or ISO_IR 100.

The product user interface will allow the user to enter characters that are within ASCII or ISO_IR 100.

As a Modality Worklist SCU, it only uses ISO_IR 100 Specific Character Set in the worklist query requests.

Generic configuration for Specific Character Sets is covered in Section 6.1. Service specific configuration for Specific Character Sets is addressed in respective subsections of Section 6.2 or Section 6.3.

6 Configuration

Parameters that can be configured can be accessed through the Service User Interface in the Service Desktop.

Throughout all subsections the following Values can be used in the "Configurable" column:

- USER: The parameter is configurable by the user.
- SERVICE: The parameter is configurable by service personnel.
- FIXED: The parameter is not configurable (it has a fixed Value). The Value is required for the configuration of the remote system.
- N/A: The parameter is not applicable for the local or the remote system.

6.1 General Configuration Parameters

Table 6-1 lists general configuration parameters applicable across all supported DICOM Services.

Table 6-1 General Configuration Parameters

Parameter	Configurable	Default Value	Comments
General Parameters			
Timeout waiting for acceptance or rejection Response to an Association Open Request. (Application-Level timeout)	FIXED	20 seconds	This value applies to all supported DICOM Services except for SCU of Storage of Breast Tomosynthesis Image SOP Class

Parameter	Configurable	Default Value	Comments
Timeout waiting for a response to an Association release request (Application-Level Timeout)	FIXED	20 seconds	This value applies to all supported DICOM Services except for SCU of Storage of Breast Tomosynthesis Image SOP Class
Timeout waiting for acceptance or rejection Response to an Association Open Request. (Application-Level timeout) for BTO Storage	SERVICE	30 seconds	This value applies only to SCU of Storage of Breast Tomosynthesis Image SOP Class
Timeout waiting for a response to an Association release request (Application-Level Timeout) for BTO Storage	SERVICE	15 seconds	This value applies only to SCU of Storage of Breast Tomosynthesis Image SOP Class
TCP/IP Settings			
TCP/IP Send Buffer	FIXED	131400 Bytes	
TCP/IP Receive Buffer	FIXED	131400 Bytes	
Inactivity timeout	FIXED	15 seconds	Time waiting for TCP/IP packets
DICOM Services Parameters			
Maximum number of simultaneous Associations accepted	FIXED	4	
Specific Character Set	FIXED	ISO_IR 100	
AE Title	SERVICE	Pristina	System AE Title that is used for all services.

6.2 Configuration of DIMSE Services

The tables in the following subsections show the configuration parameters required for DIMSE Services.

In order to identify whether Senographe Pristina is an SCP and / or an SCU, the following applies:

- SCP: The (Secured) Local Called AET and Remote Calling AET parameters are present.
- SCU: The (Secured) Local Calling AET and Remote Called AET parameters are present.

6.2.1 Basic Worklist Management Service Configuration

Table 6-2 lists Worklist Service configuration parameters:

Table 6-2 Worklist Service Parameters

Local Worklist Configuration Parameters - Worklist Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE	Pristina	The Calling AE Title is the one configured globally for the system and is the same for all services.
Default Modality type	USER	MG	Used to query the remote MWL SCP. Possible choices are MG or empty (universal matching).
Default Scheduled Station AE Title	USER		Used to query the remote MWL SCP.

Local Worklist Configuration Parameters - Worklist Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Default Scheduled Procedure Step Start Date	USER		Used to query the remote MWL SCP.
Auto-refresh interval	USER	15 minutes	Interval between two automatic queries of the remote MWL SCP.
Association timeout	FIXED	30 seconds	
Inactivity timeout	FIXED	180 seconds	
Remote Configuration Parameters - Worklist Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		
Auto-query	SERVICE		On or Off setting to automatically query the remote MWL SCP at regular interval.

6.2.2 Modality Performed Procedure Step Service Configuration

Table 6-3 lists Modality Performed Procedure Step Service configuration parameters:

Table 6-3 MPPS Service Parameters

Local Configuration Parameters - MPPS Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE		The Calling AE Title is the one configured globally for the system and is the same for all services.
Remote Configuration Parameters - MPPS Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		

6.2.3 Unified Worklist and Procedure Step Service Configuration - N/A

N/A

6.2.4 Instance Availability Notification Service Configuration - N/A

N/A

6.2.5 Storage Service Configuration

Table 6-4 lists Storage Service configuration parameters:

Table 6-4 Storage Service Parameters

Local Configuration Parameters - Storage Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE		The Calling AE Title is the one configured globally for the system and is the same for all services.
Called AE Title (SCP)	SERVICE		The Called AE Title is the one configured globally for the system and is the same for all services.
Port	FIXED	4006	
Supported Transfer Syntax as SCP	SERVICE	See Table 1-2	
Supported Storage SOP Classes as SCP	SERVICE	See Table 1-1	
Inactivity timeout as SCP	FIXED	300 seconds	
Association timeout as SCU, except for BTO SOP Class.	FIXED	60 seconds	
Inactivity timeout as SCU, except BTO SOP Class.	FIXED	300 seconds	
Network connection timeout as SCU for BTO SOP Class.	SERVICE	15 seconds	Timeout waiting for the establishment of the TCP/IP connection, when pushing BTO images.
Association reply timeout as SCU for BTO SOP Class.	SERVICE	30 seconds	Timeout waiting for the association accept message from the remote host, when pushing BTO images.
Message read timeout as SCU for BTO SOP Class.	SERVICE	15 seconds	Inactivity timeout during C-STORE operation, when pushing BTO images.
Association release timeout as SCU for BTO SOP Class.	SERVICE	15 seconds	Timeout waiting for the association release accept message from the remote host, when pushing BTO images.
Remote Configuration Parameters - Storage Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		
Transfer syntaxes for BTO SOP Class	SERVICE		List and order of transfer syntaxes that will be proposed when pushing BTO images to this remote host.

6.2.6 Storage Commitment Service Configuration

Table 6-5 lists Storage Commitment Service configuration parameters:

Table 6-5 Storage Commitment Service Parameters

Local Configuration Parameters - Storage Commitment Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE		The Calling AE Title is the one configured globally for the system and is the same for all services.
Port	FIXED	4006	Used for receiving the N-EVENT-REPORT from the remote SCP.
Inactivity timeout	FIXED	15 seconds	
N-ACTION response timeout	FIXED	600 seconds	If N-ACTION response is not received after timeout, the job is marked failed.
N-EVENT-REPORT waiting on same association	FIXED	10 seconds	The system waits for the N-EVENT-REPORT during 10 seconds on the same association used for the N-ACTION. If not received before timeout, then it will close the association and wait for the SCP to send the N-EVENT-REPORT in a new association at any time later.
Remote Configuration Parameters - Storage commitment Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		

6.2.7 Query/Retrieve Service Configuration

Table 6-6 lists Query/Retrieve Service configuration parameters:

Table 6-6 Query/Retrieve Service Parameters

Local Configuration Parameters - Query/Retrieve Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE		The Calling AE Title is the one configured globally for the system and is the same for all services.
C-FIND association timeout	FIXED	30 seconds	
C-FIND inactivity timeout	FIXED	300 seconds	
C-MOVE association timeout	FIXED	60 seconds	
C-MOVE inactivity timeout	FIXED	300 seconds	
Remote Configuration Parameters - Query/Retrieve Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		

6.2.8 Print Management Service Configuration

Table 6-7 lists Print Management Service configuration parameters:

Table 6-7 Print Management Service Parameters

Local Configuration Parameters - Print Management Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Calling AE Title (SCU)	SERVICE		The system uses the same Calling AE Title as the one configured globally for the system.
Print association timeout	FIXED	60 seconds	
Print service request timeout	FIXED	60 seconds	
Print N-ACTION response timeout	FIXED	600 seconds	
Remote Configuration Parameters - Print Management Service			
Parameter	**Configurable**	**Default Value**	**Comments**
Called AE Title (SCP)	SERVICE		
Port	SERVICE		
Host	SERVICE		
Pixel depth	SERVICE	8	Values: 8; 12
Film sizes supported by the Print SCP	SERVICE		Selection of film sizes that are supported by the Printer
Default film composer film size	SERVICE		
Default film composer film orientation	SERVICE		
Configuration information	SERVICE		
Magnification Type	SERVICE	CUBIC	Values: CUBIC; BILINEAR; NONE; REPLICATE
Requested Decimate Crop Behavior	SERVICE	None	Values: None; DECIMATE; CROP; FAIL
Smoothing Factor	SERVICE	SMOOTH	Values: SMOOTH; SHARP
Trim	SERVICE	YES	Values: YES; NO

6.3 Configuration of DICOM Web Services - N/A

N/A

6.4 Configuration of Media Storage Service

No configuration is possible on Media Storage Service.

6.5 Configuration of Real-Time Video Service - N/A

N/A

6.6 Configuration of Audit Trail - Syslog

Table 6-8 lists configuration parameters for the Audit Trail Originator.

Table 6-8 Audit Trail Originator Parameters

Originator Audit Trail Message Transmission-SYSLOG Parameters			
Parameter	**Configurable**	**Default Value**	**Comments**
Remote Port number	SERVICE		
Remote Host name/IP	SERVICE		
Protocol	SERVICE		Values: TCP – Without Syslog UDP – Without Syslog TCP BSD Syslog UDP BSD Syslog TCP IETF Syslog UDP IETF Syslog TLS IETF Syslog TLS BSD Syslog

7 Network and Media Communication Details

7.1 General

The Senographe Pristina implement only one network AE, and thus doesn't have cross AE interactions.

7.1.1 General Association Parameters

Table 7-1 lists Association parameters applicable to all AEs on the system.

Table 7-1 General Association Parameters

	Name	Value
Networking Services	Application Context Name	1.2.840.10008.3.1.1.1
	Implementation Class UID	1.2.826.0.1.3680043.2.60.0.1 (*)
	Implementation Version Name as SCU	jdt280_6387 (*)
	Implementation Version Name as SCP	NUEVO_1_0
	Maximum PDU Length	64234
	ARTIM Timeout	30s
	Maximum number of simultaneous Associations as Association Initiator	2
	Maximum number of simultaneous Associations as Association Acceptor	4
	Maximum number of outstanding asynchronous Transactions	0
Media Services	File Meta Information Version	1
	Implementation Class UID	1.2.826.0.1.3680043.2.60.0.1
	Implementation Version Name	MEDIACREATOR_V1

(*) For the specific case of establishing an association for a C-STORE operation of a Breast Tomosynthesis Image Storage, the Implementation Class UID is "1.2.840.113619.6.401" and Implementation Version Name is "MergeCOM3_5_19_0"

7.2 Specifications

7.2.1 DICOM Service Application Entity

7.2.1.1 Sequencing of Real-World Activities for DICOM Service

Following figures describes sequencing of real-world activities during a typical mammography examination with the Senographe Pristina.

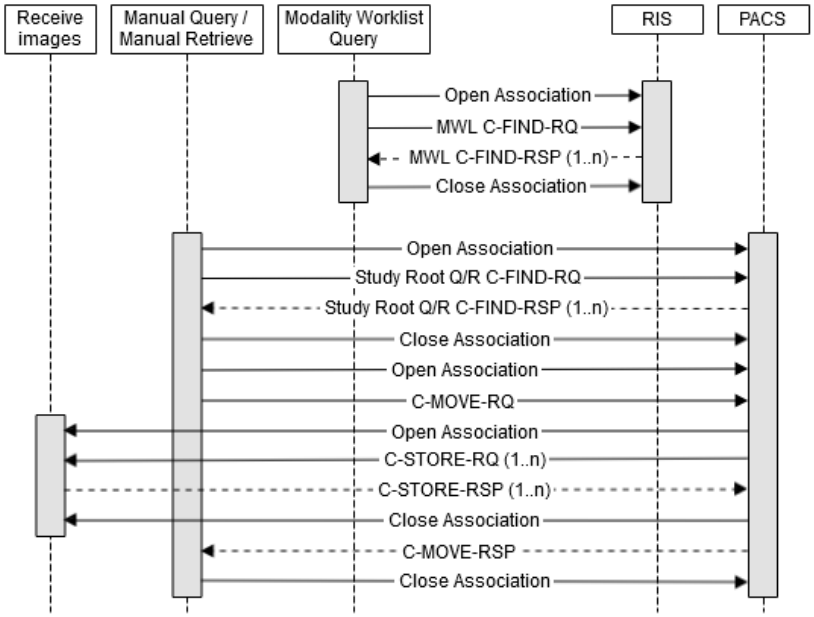

Figure 7-1 Sequencing of Real-World Activities for DICOM Service AE – Before starting an exam

The Figure 7-1 describes the sequencing of real-world activities before performing an examination:

- The Senographe Pristina query the worklist from the RIS to get a list of Scheduled Procedure Steps
- The Senographe Pristina can query the PACS to retrieve images of prior study for the patient for which an exam will be performed.

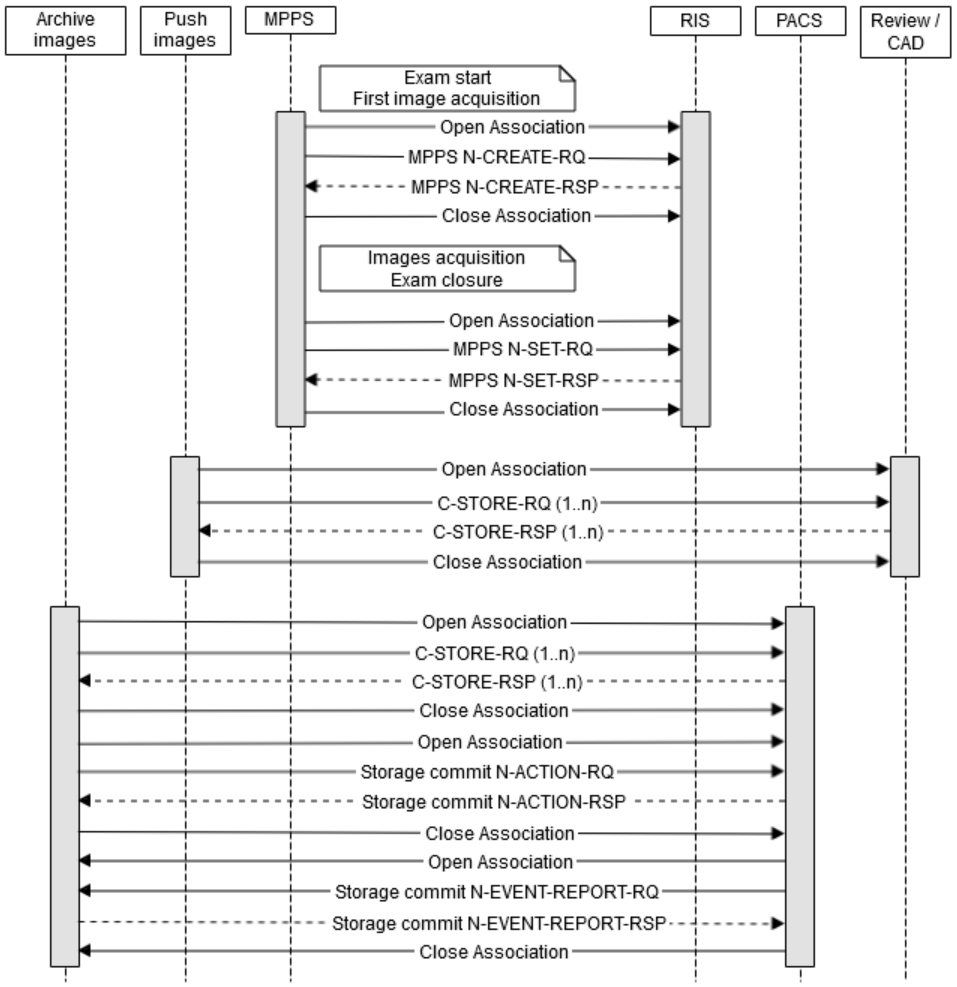

Figure 7-2 Sequencing of Real-World Activities for DICOM Service AE – During and after an exam

The Figure 7-2 describes the sequencing of real-world activities that occurs when an exam is started and until its closure:

- The Senographe Pristina sends a MPPS N-CREATE (in progress) to the PPS Manager when the first image is acquired.
- The Senographe Pristina sends a MPPS N-SET (completed or discontinued) to the PPS Manager when the exam is close.
- At exam closure, or at user request during the exam, the Senographe Pristina pushes the images to a Review System and/or a CAD (Computer Aided Detection) system using a C-STORE request.
- At exam closure, or at user request during the exam, the Senographe Pristina archive the images to a PACS using a C-STORE request followed by a Storage Commitment N-ACTION request. Then Senographe Pristina receives the Storage commitment N-EVENT-REPORT from the PACS.

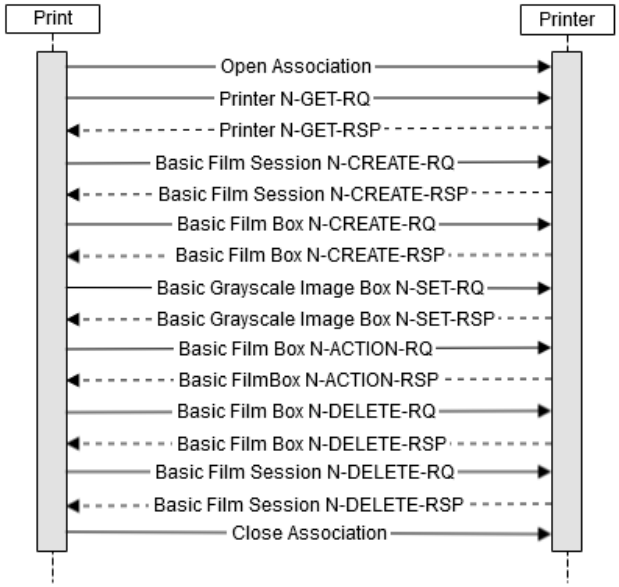

Figure 7-3 Sequencing of Real-World Activities for DICOM Service AE – Printing

The Figure 7-3 describes the sequencing of the real-world activity of Printing. This activity can occur at user request when the Medical Application is opened, or automatically at exam closure.

7.2.1.2 Association Parameters of DICOM Service AE – N/A

N/A

7.2.1.3 Association Initiation

This section details the Association policies of the Application Entity when it is initiating an Association.

7.2.1.3.1 Real-World Activity Modality Worklist Query

The user of Senographe Pristina initiates a query for a modality worklist by pressing the Refresh button or by using the HISRIS Search menu. The refresh can also be automatic and the time between 2 refreshes is configurable. The DICOM Service AE will then initiate an association with the remote AE in order to query for the worklist. The association is closed upon receipt of the final query response from the remote AE. The association can also be closed by the DICOM Service AE upon receipt of error status from the remote AE or upon expiration of association timers.

If the remote AE does not support the proposed Presentation Context, an appropriate error is logged, and the user is notified.

This implementation can receive multiple C-FIND results over a single association. Only one association is opened at a time.

In case of ERROR, persisted worklist item(s) got from previous request to the configured SCP would be shown.

User can cancel the ongoing worklist query by clicking on the Cancel button in the UI. Upon cancel, the DICOM Service AE will send C-FIND-CANCEL request to the Modality Worklist SCP.

Extended Negotiation

The Extended Negotiation parameters for all services that are supported by the Application Entity for the Real-World Activity Modality Worklist Query are described in Table 7-2.

Table 7-2 Extended Negotiation for Modality Worklist Query of DICOM Service AE - Association Initiation

SOP Class	Extended Negotiation	Support	Requested Value
Modality Worklist			
Modality Worklist Information Model - FIND	Fuzzy semantic matching of person names	N	
	Timezone query adjustment	N	

Role Negotiation – N/A
N/A

7.2.1.3.2 Real-World Activity Modality Performed Procedure Step Notification

The DICOM Service AE initiates association to the remote MPPS SCP AE for the following functions during real world activity Modality Performed Procedure Step Notification:

- Start PPS: Initiates a DICOM association to create a DICOM Modality Performed Procedure Step SOP instance in the remote AE via the N-CREATE service.
- Complete PPS: Initiates a DICOM association to update a DICOM Modality Performed Step instance that is already created with the remote AE via the N-SET service. The PPS Status is set to 'COMPLETED'.
- Discontinue PPS: Initiates a DICOM association to update a DICOM Modality Performed Step instance that is already created with the remote AE via the N-SET service. The PPS Status is set to 'DISCONTINUED'.

Only one association is opened at a time. The association is open until the response message is returned from the SCP or a network error occurs.

If the remote AE does not support the proposed Presentation context, an appropriate error message is logged.

Extended Negotiation – N/A
N/A

Role Negotiation – N/A
N/A

7.2.1.3.3 Real-World Activity Push Images

The user first selects the exam/series/image on the local database browser and clicks on the Remote DICOM AE to which the user desires to send the exam/series/image to.

If multiple exams/series are chosen to be pushed, one association will be established for each of the exam/series. A single association will be used for multiple C-STORE operations necessary for the images in an individual series for 2D and non-image SOP instances. For 3D SOP instances, there are multiple separate associations.

This implementation can perform multiple C-STORE operations over a single association.

Upon receiving a C-STORE confirmation containing a successful status, this implementation will perform the next C-STORE operation. The association will be maintained if possible.

Upon receiving a C-STORE confirmation containing a Refused status, this implementation will consider the current request to be a failure and will terminate the association.

For all C-STORE statuses other than success or warnings received, this implementation will consider the current request to be a failure and will terminate the association, except if the C-STORE is invoked from a C-MOVE SCP. In this case it will continue to attempt to send the remaining images in the request on the same association. The error details will be logged in the log files.

Extended Negotiation

The Extended Negotiation parameters for all services that are supported by the Application Entity for the Real-World Activity Push Images are described in Table 7-3.

Table 7-3 Extended Negotiation for Push Images of DICOM Service AE - Association Initiation

SOP Class	Extended Negotiation	Support	Requested Value
Storage			
Applicable to all Storage SOP Classes listed under Section 5.	Level of support	N	
	Level of Digital Signature support	N	
	Element Coercion	N	

Role Negotiation – N/A
N/A

7.2.1.3.4 Real-World Activity Archive Images

This activity is triggered after Push Images if the remote host was declared on the system with an associated Storage Commitment Provider:

1. If images are successfully sent, then the N-ACTION-RQ request is sent to Storage Commitment Provider in a new association. (Remote host and storage commitment provider may have different configurations).
2. The system waits for N-ACTION-RSP from Storage Commitment Provider. N-ACTION is on different association than the C-STORE request.
3. On reception of failure in N-ACTION-RSP, the corresponding job has a failed status in the job management queue.
4. On reception of success, Storage Commitment AE is ready to receive at any time from Storage Commitment Provider the N-EVENT-REPORT-RQ notification. N-EVENT-REPORT can be in the same association than the N-ACTION or in a new one.
5. On reception of the N-EVENT-REPORT-RQ notification from Storage Commitment Provider, system flags the images in the database as committed.
6. When all images are flagged, Storage Commitment AE sends a N-EVENT-REPORT-RSP to the Storage Commitment Provider.

Extended Negotiation – N/A
N/A

Role Negotiation – N/A
N/A

7.2.1.3.5 Real-World Activity Query/Retrieve

The user queries a Remote database by clicking on the corresponding icon on the Senographe Pristina browser source dropdown.

The “Query” operation will cause a “Filter Data” menu to appear. The user can enter values for Patient name, Patient Id, Study Id, Accession number, Study date and Modality. Not entering a value will result in universal match for that field (all possible values). For Study date, the user selects a date matching type from the "Exam date" pull down menu, where the choices are Today, This Week, 30 days, Date Range. If the user selects Date Range, the menu will allow entering a start date and an end date. Once the desired parameters are entered, the user chooses "Search".

The “Query” operation will cause the DICOM Service AE to initiate an association to the selected Remote AE.

On successful query, the list of corresponding study is displayed.

The user can also get the detailed content of one or several study displayed by selecting it, the DICOM Service AE to initiate an association to the selected Remote AE with the Study Instance UID as a matching key (same at series level with Series Instance UID).

The “Filter” menu contains a “Clear” button. If the user selects it, it will empty all the field in the menu and will cause the DICOM Service AE to initiate an association to the selected Remote AE, without any matching key.

The user can cancel the current C-FIND request by initiating Query activity to another network node or clicking on the local database. If a query operation is in progress, the DICOM Service AE will issue a C-FIND-CANCEL message to the remote AE to discontinue the ongoing C-FIND operation.

If a “Failure” status is returned from the Remote AE, the association is closed, and the operation terminated.

When the user initiates a Retrieve operation at any level (Study, Series, Image) the DICOM Service AE will initiate a C-MOVE-RQ request to the Remote AE with the DICOM Service AE as the Destination AE. The Storage SCP will handle the incoming images.

The C-MOVE SCU supports only the Baseline behavior and does not negotiate for Extended behavior during association. During the move operations, Unique Key values for all levels above the Query/Retrieve Level specified will be supplied in the C-MOVE request.

The DICOM Service AE does not send a C-MOVE request with List of UIDs. If the user chooses multiple exams from the remote browser for retrieval, it creates separate association and send one C-MOVE request with single exam UID, for each study. The system works the same way when the user tries to retrieve multiple series.

An individual retrieve-job is created in the job management queue for each exam/series request.

If the user tries to retrieve multiple images within a series, it will create single association and sends multiple C-MOVE requests; one C-MOVE request per image within the same association.

However, for each user request, a single retrieve-job is created in the job management queue.

If the C-MOVE SCU receives a status different from success (0x0000) or pending (0xFF00) during the association, the DICOM Service AE will release the association. This information will be logged in the system log files and the network/job manager queue will be updated accordingly.

During Retrieve operation, the DICOM Service AE is able to generate a C-MOVE-CANCEL.

When a Cancel response (0xFE00) is received, the DICOM Service AE will release the association. This information will be logged in the system log files and the network queue will be updated accordingly.

Extended Negotiation

The Extended Negotiation parameters for all services that are supported by the Application Entity for the Real-World Activity Query/Retrieve are described in Table 7-4.

Table 7-4 Extended Negotiation for Query/Retrieve of DICOM Service AE - Association Initiation

SOP Class	Extended Negotiation	Support	Requested Value
Query			
Applicable to all Query Retrieve - FIND SOP Classes mentioned under Section 5.	Relational queries	N	
	Date-time matching	N	
	Fuzzy semantic matching of person names	N	

SOP Class	Extended Negotiation	Support	Requested Value
	Timezone query adjustment	N	
	Enhanced Multi-Frame Image Conversion	N	
Retrieve			
Applicable to all Query Retrieve - MOVE SOP Classes mentioned under Section 5.	Relational retrieval	N	
	Enhanced Multi-Frame Image Conversion	N	
	Timezone query adjustment	N	

Role Negotiation – N/A

N/A

7.2.1.3.6 Real-World Activity Print

Print application can be used in different ways:

- Autoprint feature.
- Manual print.
- Film composer.

To print automatically, the user must configure it in Image preferences.

To print manually, the user must select the DICOM printer, from Viewing Applications, and press Print Button.

To print with the Film Composer:

1. User must select the DICOM printer from the Film Composer Interface.
2. The images to be printed shall be selected into Film Composer slots from Viewing Applications.
3. The user must press the Print Button to print the images.

The DICOM Service AE will start the Print Session. The Print Session involves establishing association with the printer followed by the next sequence of activities:

a. The DICOM Service AE gets the Printer status using N-GET service. If the Printer returns FAILURE status the print session will be terminated, and the requester will be notified of the printer status.
b. The film session is created using N-CREATE service. In case of error, the print session will be terminated. The attribute values for the Film session will be specified with the film session request.
c. The film box is created using N-CREATE service. The print session will be terminated if the printer fails to create the film box. The film box attribute values will be sent in the film box create request.
d. The image attributes for the images to be printed in this session will be set using the N-SET service. If the printer fails to accommodate the images in the image set, the print session will be terminated. If the user used “film composer”, they will be as many N-SET box as images in the film.
e. The film will be printed using the N-ACTION service. Only film box printing is supported. In case of error, the print session will be terminated.
f. The Film Box instance will be deleted using the N-DELETE service.
g. The SCU does not wait for N-EVENT-REPORT from the Printer after deleting the film box instance. The N-EVENT-REPORT received when the association was still active is handled, but the data received will be ignored.
h. Finally, the association will be terminated and if all the above operations are successful the requester will be notified of the successful print session. This status just indicates that the images to be printed have been successfully sent to the printer.

Extended Negotiation - N/A
N/A

Role Negotiation – N/A
N/A

7.2.1.3.7 Real-World Activity Verify Connectivity

The user can choose to verify a remote Application Entity. Upon user's request, DICOM Service AE sends out a verification request to a Remote AE.

The DICOM Service AE provides standard conformance. In case of failure, the verification is not retried.

Each C-ECHO operation supports an "Association Timer". This timer starts when the association request is sent and stops when the association is established. Time-out is 20 seconds. If the remote AE does not respond with the association time-out, the verification operation is considered as failed.

Extended Negotiation - N/A
N/A

Role Negotiation – N/A
N/A

7.2.1.4 Association Acceptance

This section details the Association policies of the Application Entity when it is the acceptor of an Association.

7.2.1.4.1 Real-World Activity Receive Images

Any remote AE can open an association to the local DICOM Service AE to push images.

Extended Negotiation

The Extended Negotiation parameters for all services that are requested by the Application Entity for the Real-World Activity Receive Images are described in Table 7-5.

Table 7-5 Extended Negotiation for Receive Images of DICOM Service AE - Association Acceptance

SOP Class	Extended Negotiation	Support	Requested Value
Storage			
Applicable to all Storage SOP Classes listed under Section 5.	Level of support	N	
	Level of Digital Signature support	N	
	Element Coercion	N	

Transfer Syntax Selection Policies

This section provides tables that describe the Transfer Syntax preference for different SOP Classes or SOP Class groups when there are multiple Transfer Syntaxes provided by the Association initiator for Real-World Activity Receive images of DICOM Service AE of the system.
When there are multiple Transfer Syntax provided by the Association initiator, selection of the Transfer Syntax by the DICOM Service AE is not based on a preference order, but DICOM Service AE will select the first in the presentation context that is supported.

Table 7-6 Transfer Syntax Selection Preference Order - Image SOP Classes for DICOM Service AE

Preference Order	Transfer Syntax	UID	Comments
0	Explicit VR Little-Endian Transfer Syntax	1.2.840.10008.1.2.1	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Implicit VR Little-Endian Transfer Syntax	1.2.840.10008.1.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Explicit VR Big-Endian Transfer Syntax	1.2.840.10008.1.2.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	JPEG Lossless, Hierarchical, First-Order Prediction Transfer Syntax	1.2.840.10008.1.2.4.70	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes. It is supported only for Breast Tomosynthesis Image Storage SOP Class.

Table 7-7 Transfer Syntax Selection Preference Order - Non-Image SOP Classes for DICOM Service AE

Preference Order	Transfer Syntax	UID	Comments
0	Explicit VR Little-Endian Transfer Syntax	1.2.840.10008.1.2.1	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Implicit VR little-Endian Transfer Syntax	1.2.840.10008.1.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Explicit VR Big-Endian Transfer Syntax	1.2.840.10008.1.2.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.

7.2.1.4.2 Real-World Activity Archive images

The DICOM Service AE is indefinitely listening for associations. No operator action is required to receive a Storage Commitment notification (N-EVENT-REPORT).

N-EVENT-REPORT can be received by the Senographe Pristina on the same Association as the N-ACTION, or on a different one.

If the received N-ACTION Response from the SCP has a success status, the Senographe Pristina waits 10 seconds for an N-EVENT-REPORT on the same association. This time-out is not configurable. If the N-EVENT-REPORT request is not received in this time, it closes the association and changes the Job state to ”Waiting” indicating the job is waiting for the response from commitment provider. Then it can receive a N-EVENT-REPORT from the SCP at any time on a different association.

Transfer Syntax Selection Policies

This section provides tables that describe the Transfer Syntax preference for different SOP Classes or SOP Class groups when there are multiple Transfer Syntaxes provided by the Association initiator for Real-World Activity Receive images of DICOM Service AE of the system.
When there are multiple Transfer Syntax provided by the Association initiator, selection of the Transfer Syntax by the DICOM Service AE is not based on a preference order, but DICOM Service AE will select the first in the presentation context that is supported.

Table 7-8 Transfer Syntax Selection Preference Order - Non-Image SOP Classes for DICOM Service AE

Preference Order	Transfer Syntax	UID	Comments
0	Explicit VR Little-Endian Transfer Syntax	1.2.840.10008.1.2.1	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Implicit VR little-Endian Transfer Syntax	1.2.840.10008.1.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Explicit VR Big-Endian Transfer Syntax	1.2.840.10008.1.2.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.

Role negotiation

The Storage Commitment Provider initiating the association must use the role selection negotiation.

7.2.1.4.3 Real-World Activity Verify Connectivity

The DICOM Service AE provides standard conformance.

Any remote AE can open an association to the DICOM Service AE for the purpose of verification.

The DICOM Service AE monitors an “Operation Inactivity” timer. The connection with the SCU will be terminated if it is inactive for the time-out interval. Time-out is 15 seconds and is not configurable.

Transfer Syntax Selection Policies

This section provides tables that describe the Transfer Syntax preference for different SOP Classes or SOP Class groups when there are multiple Transfer Syntaxes provided by the Association initiator for Real-World Activity Receive images of DICOM Service AE of the system.
When there are multiple Transfer Syntax provided by the Association initiator, selection of the Transfer Syntax by the DICOM Service AE is not based on a preference order, but DICOM Service AE will select the first in the presentation context that is supported.

Table 7-9 Transfer Syntax Selection Preference Order - Non-Image SOP Classes for DICOM Service AE

Preference Order	Transfer Syntax	UID	Comments
0	Explicit VR Little-Endian Transfer Syntax	1.2.840.10008.1.2.1	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Implicit VR little-Endian Transfer Syntax	1.2.840.10008.1.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.
0	Explicit VR Big-Endian Transfer Syntax	1.2.840.10008.1.2.2	Chosen if it is the first in the Presentation Context among the supported Transfer Syntaxes.

7.3 Status Codes

The following sections describe the Status Codes supported by the system for each implemented service as well as the reason for issuing specific Status codes or the associated behavior when receiving it.

7.3.1 General AE Communication and Failure Behavior and Handling

7.3.1.1 Communication Failure Behavior as Association Initiator

Table 7-10 describes behavior of the AE if a communication failure occurs when it initiated an Association.

Table 7-10 DICOM Communication Failure Behavior as Association Initiator

Failure	Failure Behavior
Timeout	The job is marked as failed. The reason is logged and reported to the user.
Association aborted	The job is marked as failed. The reason is logged and reported to the user.
Network Disconnect	The job is marked as failed. The reason is logged and reported to the user.

7.3.1.2 Communication Failure Handling as Association Acceptor

Table 7-11 describes how the AE responds when it receives an Association request that leads to a failure in communication.

Table 7-11 DICOM Communication Failure Handling as Association Acceptor

Exception	Failure response
Failure during processing of an Association request	ABORT message is sent out and the connection is closed
Unrecognized Called AE	AE responds with Association-RJ
Exceed limit for number of connections supported	AE responds with Association-RJ

7.3.2 DIMSE Services

7.3.2.1 Basic Worklist Management Service

7.3.2.1.1 SCU of the Modality Worklist Information Model Find SOP Class - C-FIND

Table 7-12 lists the Status Codes that the SCU of the Modality Worklist Information Model Find SOP Class supports for the C-FIND message and defines the application behavior when encountering the listed Status Codes.

Table 7-12 Status Codes for C-FIND of the Modality Worklist Information Model SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete - No final identifier is supplied	0000	Displays all the worklists items obtained from the SCP.
Failure	Refused: Out of Resources	A700	Logs the error and displays all the persisted worklists.
	SOP Class Not Supported	0122	Worklist query operation is considered as failure and the error message is displayed to the user. Persisted worklist item(s) got from previous request to the SCP will be shown.
	Error: Data Set does not match SOP Class	A900	Logs the error and displays all the persisted worklists.
	Error: Unable to process	C000-CFFF	Logs the error and displays all the persisted worklists.
Cancel	Matching terminated due to cancel	FE00	Closes the association.
Pending	Matches are continuing - Current Match is supplied and any	FF00	Continues to wait for worklists items from SCP.

Service Status	Further Meaning	Status Code	Behavior
	Optional Keys were supported in the same manner as Required Keys.		
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	FF01	Continues to wait for worklists items from SCP.
-	Other status codes	anything else	Worklist query operation is considered as failure and the error message is displayed to the user. Persisted worklist item(s) got from previous request to the SCP will be shown.

7.3.2.1.2 SCP of the Modality Worklist Information Model Find SOP Class - C-FIND - N/A

N/A

7.3.2.2 Modality Performed Procedure Step Service

7.3.2.2.1 SCU of the Modality Performed Procedure Step SOP Class - N-CREATE

Table 7-13 lists the Status Codes that the SCU of the Modality Performed Procedure Step SOP Class supports for the N-CREATE message and defines the application behavior when encountering the listed Status Codes.

Table 7-13 Status Codes for N-CREATE of the Modality Performed Procedure Step SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The system updates the state and indicates the same on the user interface.
Failure	No Such Attribute	0105	Error message is logged into the system log-file and indicates the status on the user interface.
	Invalid Attribute Value	0106	Error message is logged into the system log-file and indicates the status on the user interface.
	Processing Failure	0110	Error message is logged into the system log-file and indicates the status on the user interface. Retries the operation after the configured time is elapsed.
	Invalid SOP Instance	0117	Error message is logged into the system log-file and indicates the status on the user interface.
	No Such SOP Class	0118	Error message is logged into the system log-file and indicates the status on the user interface.
	Missing Attribute	0120	Error message is logged into the system log-file and indicates the status on the user interface.
	Duplicate Invocation	0210	Error message is logged into the system log-file and indicates the status on the user interface.
	Unrecognized Operation	0211	Error message is logged into the system log-file and indicates the status on the user interface.
	Mistyped Argument	0212	Error message is logged into the system log-file and indicates the status on the user interface.
	Resource Limitation	0213	Error message is logged into the system log-file and indicates the status on the user interface. Retries the operation after the configured time is elapsed.

Service Status	Further Meaning	Status Code	Behavior
-	Other status codes	anything else	The operation is deemed 'Failed'. Detailed message is logged into the system log-file and indicates the status on the user interface. Retries the operation after the configured time is elapsed.

7.3.2.2.2 SCU of the Modality Performed Procedure Step SOP Class - N-SET

Table 7-14 lists the Status Codes that the SCU of the Modality Performed Procedure Step SOP Class supports for the N-SET message and defines the application behavior when encountering the listed Status Codes.

Table 7-14 Status Codes for N-SET of the Modality Performed Procedure Step SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The system updates the state and indicates the same on the user interface.
Failure	No Such Attribute	0105	Error message is logged into the system log-file and indicates the status on the user interface.
	Invalid Attribute Value	0106	Error message is logged into the system log-file and indicates the status on the user interface.
	Processing Failure	0110	Error message is logged into the system log-file and indicates the status on the user interface.
	Invalid SOP Instance	0117	Error message is logged into the system log-file and indicates the status on the user interface.
	No Such SOP Class	0118	Error message is logged into the system log-file and indicates the status on the user interface.
	Class-Instance Conflict	0119	Error message is logged into the system log-file and indicates the status on the user interface.
	Duplicate Invocation	0210	Error message is logged into the system log-file and indicates the status on the user interface.
	Unrecognized Operation	0211	Error message is logged into the system log-file and indicates the status on the user interface.
	Mistyped Argument	0212	Error message is logged into the system log-file and indicates the status on the user interface.
	Resource Limitation	0213	Error message is logged into the system log-file and indicates the status on the user interface.
-	Other status codes	anything else	The operation is deemed 'Failed'. Detailed message is logged into the system log-file and indicates the status on the user interface. Retries the operation after the configured time is elapsed.

7.3.2.2.3 SCP of the Modality Performed Procedure Step SOP Class - N-CREATE - N/A

N/A

7.3.2.2.4 SCP of the Modality Performed Procedure Step SOP Class - N-SET - N/A

N/A

7.3.2.3 Unified Worklist und Procedure Step Service - N/A

N/A

7.3.2.4 Instance Availability Notification Service - N/A

N/A

7.3.2.5 Storage Service

7.3.2.5.1 SCU of the Storage SOP Classes - C-STORE

Table 7-15 lists the Status Codes that the SCU of the Storage SOP Class supports for the C-STORE message and defines the application behavior when encountering the listed Status Codes.

Table 7-15 Status Codes C-STORE for the Storage SOP Classes - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Success status displayed in the Network status and browser job manager queue. Log files updated.
Warning	Coercion of Data Elements	B000	Operation considered as successful. Warning is logged in the log files.
	Data Set does not match SOP Class	B007	Operation considered as successful. Warning is logged in the log files.
	Elements Discarded	B006	Operation considered as successful. Warning is logged in the log files.
Failure	Error: Processing Failure	0110	Operation considered as failed. Error displayed in the Network status and browser job manager queue. Log-files updated. Push job is retried
	Out of Resources	A700-A7FF	Operation considered as failed. Error displayed in the Network status and browser job manager queue. Log-files updated. Push job is retried
	Data Set does not match SOP Class	A900-A9FF	Operation considered as failed. Error displayed in the Network status and browser job manager queue. Log-files updated. Push job is not retried
	Cannot Understand	C000-CFFF	Operation considered as failed. Error displayed in the Network status and browser job manager queue. Log-files updated. Push job is retried
-	Other status codes	anything else	Operation considered as failed. Error displayed in the Network status and browser job manager queue. Log-files updated.

7.3.2.5.2 SCP of the Storage SOP Classes - C-STORE

Table 7-16 lists the Status Codes that the SCP of the Storage SOP Classes supports for the C-STORE message and defines conditions in which the listed Status Codes are sent.

Table 7-16 Status Codes C-STORE of the Storage SOP Classes - SCP

Service Status	Further Meaning	Status Codes	Related Fields	Condition (and Comments on Related fields)
Success	Success	0000	N/A	DICOM instance stored successfully.
Refused	Refused: Out of Resources	A700	(0000,0902)	Not enough diskspace to store the DICOM object.

Service Status	Further Meaning	Status Codes	Related Fields	Condition (and Comments on Related fields)
	Refused: Out of Resources	A711	(0000,0902)	Unable to connect to local database for storage (such as maximum connection limit reached).
Failure	Error: Data Set does not match SOP Class	A900	(0000,0902)	Storage of the DICOM object failed due to corrupt/invalid dataset.
	Error: Cannot understand	C000	(0000,0902)	Error while storing DICOM object in the repository.

7.3.2.6 Storage Commitment Service

7.3.2.6.1 SCU of the Storage Commitment Push Model SOP Class - N-ACTION

Table 7-17 lists the Status Codes that the SCU of the Storage Commitment Push Model SOP Class supports for the N-ACTION message and defines the application behavior when encountering the listed Status Codes.

Table 7-17 Status Codes for N-ACTION of the Storage Commitment Push Model SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success		0000	The request for storage comment is considered successfully sent. System displays “waiting” message in the job manager user interface.
Failure	Processing failure	0110	The system displays the appropriate error message in the job manager user interface.
	No such argument	0114	The system displays the appropriate error message in the job manager user interface.
	Invalid argument Value	0115	The system displays the appropriate error message in the job manager user interface.
	Invalid Object instance	0117	The system displays the appropriate error message in the job manager user interface.
	No such SOP Class	0118	The system displays the appropriate error message in the job manager user interface.
	Class-instance conflict	0119	The system displays the appropriate error message in the job manager user interface.
	Unrecognized operation	0211	The system displays the appropriate error message in the job manager user interface.
	Mistyped argument	0212	The system displays the appropriate error message in the job manager user interface.
	Resource limitation	0213	The system logs the appropriate error message and retries the operation after the configured time is elapsed.
-	Other status codes	anything else	The system displays the appropriate error message in the job manager user interface.

7.3.2.6.2 SCU of the Storage Commitment Push Model SOP Class - N-EVENT-REPORT

Table 7-18 lists the Status Codes that the SCU of the Storage Commitment Push Model SOP Class supports for the N-EVENT-REPORT message and defines the application behavior when encountering the listed Status Codes.

Table 7-18 Status Codes for N-EVENT-REPORT for the Storage Commitment Push Model SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success		0000	The storage commitment result received successfully.
Failure	Processing failure	0110	Indicates that an internal error occurred while processing.

7.3.2.6.3 SCP of the Storage Commitment Push Model SOP Class - N-ACTION - N/A

N/A

7.3.2.6.4 SCP of the Storage Commitment Push Model SOP Class - N-EVENT-REPORT - N/A

N/A

7.3.2.7 Query/Retrieve Service

7.3.2.7.1 SCU of the Query/Retrieve FIND SOP Classes - C-FIND

Table 7-19 lists the Status Codes that the SCU of any of the Query/Retrieve FIND SOP Class supports for the C-FIND message and defines the application behavior when encountering the listed Status Codes.

Table 7-19 Status Codes C-FIND for Query/Retrieve FIND SOP Classes - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete - No final identifier is supplied	0000	Processed and gracefully exits the C-FIND request processing.
Failure	Refused: Out of Resources	A700	Browser displays appropriate error to user.
	Error: Data Set does not match SOP Class	A900	Browser displays appropriate error to user.
	Error: Unable to process	C000-CFFF	Browser displays appropriate error to user.
Cancel	Matching terminated due to cancel	FE00	1. Considered as invalid status and the operation is terminated if the query CANCEL was not requested. 2. If the query CANCEL was requested by the SCU, then system gracefully exits the C-FIND request processing.
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	FF00	Processed and the data is displayed in the Browser.
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	FF01	Processed and the data is displayed in the Browser.
-	Other status codes	anything else	Operation terminated and the association is closed. Browser displays appropriate error to user.

7.3.2.7.2 SCU of the Query/Retrieve MOVE SOP Classes - C-MOVE

Table 7-20 lists the Status Codes that the SCU of any of the Query/Retrieve MOVE SOP Class supports for the C-MOVE message and defines the application behavior when encountering the listed Status Codes.

Table 7-20 Status Codes C-MOVE for Query/Retrieve MOVE SOP Classes - SCU

Service Status	Further Meaning	Status Codes	Related Fields	Behavior
Success	Sub-operations Complete - No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Processed and gracefully exits C-MOVE request processing.
Warning	Sub-operations Complete - One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	The system will display the failure message in the job manager user interface.
Failed	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)	The system will display the failure message in job manager user interface and retry the operation after time is elapsed.
	Out of Resources - Unable to perform sub-operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	The system will display the failure message and retry the operation after configured time is elapsed.
	Move Destination unknown	A801	(0000,0902)	The system will display the failure message in job manager user interface.
	Data Set does not match SOP Class	A900	(0000,0901) (0000,0902)	The system will display the failure message in job manager user interface.
	Unable to process	Cxxx	(0000,0901) (0000,0902)	The system will display the failure message in job manager user interface.
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	1. Considered as invalid status and the operation is terminated if the Move CANCEL was not requested. 2. If the Move CANCEL was requested by the SCU, then the system gracefully exits the C-MOVE request processing.
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	The system processes the information and displays the progress in the job manager UI.
-	Other status codes	anything else	-	C-MOVE operation is considered as failure. The system will display the failure message in the job manager user interface and log the information in the log files.

7.3.2.7.3 SCP of the Query/Retrieve FIND SOP Classes - C-FIND - N/A

N/A

7.3.2.7.4 SCP of the Query/Retrieve MOVE SOP Classes - C-MOVE - N/A

N/A

7.3.2.8 Print Management Service

7.3.2.8.1 SCU of the Basic Film Session SOP Class

7.3.2.8.1.1 SCU of the Basic Film Session SOP Class - N-CREATE

Table 7-21 lists the Status Codes that the SCU of the Basic Film Session SOP Class supports for the N-CREATE message and defines the application behavior when encountering the listed Status Codes.

Table 7-21 Status Codes for N-CREATE of the Basic Film Session SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Logs film session instance UID and proceeds for creating film box.
Warning	Memory allocation not supported	B600	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
Failure	No Such Attribute	0105	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid Attribute Value	0106	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate SOP Instance	0111	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute	0120	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute Value	0121	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.1.2 SCU of the Basic Film Session SOP Class - N-SET – N/A

N/A

7.3.2.8.1.3 SCU of the Basic Film Session SOP Class - N-DELETE – N/A

N/A

7.3.2.8.1.4 SCU of the Basic Film Session SOP Class - N-ACTION – N/A

N/A

7.3.2.8.2 SCU of the Basic Film Box Session SOP Class

7.3.2.8.2.1 SCU of the Basic Film Box Session SOP Class - N-CREATE

Table 7-21 lists the Status Codes that the SCU of the Basic Film Box SOP Class supports for the N-CREATE message and defines the application behavior when encountering the listed Status Codes.

Table 7-22 Status Codes for N-CREATE of the Basic Film Box SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Proceed for setting image box.
Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
Failure	No such attributes	0105	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid Attribute Value	0106	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Processing Failure	0110	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate SOP Instance	0111	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute	0120	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute Value	0121	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate Invocation	0210	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed	C616	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.2.2 SCU of the Basic Film Box Session SOP Class - N-SET -N/A

N/A

7.3.2.8.2.3 SCU of the Basic Film Box Session SOP Class - N-DELETE

Table 7-23 lists the Status Codes that the SCU of the Basic Film Box SOP Class supports for the N-DELETE message and defines the application behavior when encountering the listed Status Codes.

Table 7-23 Status Codes for N-DELETE of the Basic Film Box SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Log the success message.
Failure	Processing Failure	0110	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Class Instance Conflict	0119	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Refused: Not Authorized	0124	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate Invocation	0210	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.2.4 SCU of the Basic Film Box Session SOP Class - N-ACTION

Table 7-24 lists the Status Codes that the SCU of the Basic Film Box SOP Class supports for the N-ACTION message and defines the application behavior when encountering the listed Status Codes.

Table 7-24 Status Codes for N-ACTION of the Basic Film Box SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Proceed in parsing N-Action response.
Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	B603	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size is larger than Image Box size. The image has been demagnified.	B604	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size is larger than Image Box size. The image has been cropped to fit.	B609	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

Service Status	Further Meaning	Status Code	Behavior
	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60A	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
Failure	Processing failure	0110	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No such SOP Instance	0112	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such Argument	0114	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid argument Value	0115	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Class-Instance Conflict	0119	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such Action	0123	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Refused: Not Authorized	0124	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate Invocation	0210	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unable to create Print Job SOP Instance; print queue is full.	C602	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size is larger than Image Box size.	C603	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Combined Print Image Size is larger than Image Box size.	C613	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.3 SCU of the Basic Grayscale Image Box SOP Class - N-SET

Table 7-25 lists the Status Codes that the SCU of the Basic Grayscale Image Box SOP Class supports for the N-SET message and defines the application behavior when encountering the listed Status Codes.

Table 7-25 Status Codes for N-SET of the Grayscale Image Box SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Continues setting image box if more images are there, else sends N-Action request.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Requested Min Density or Max Density outside of printer's operating range.	B605	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size is larger than Image Box size. The image has been cropped to fit.	B609	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60A	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
Failure	No Such Attribute	0105	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid Attribute Value	0106	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Processing Failure	0110	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate SOP Instance	0111	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Class Instance Conflict	0119	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute	0120	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Missing Attribute Value	0121	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Refused: Not Authorized	0124	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate Invocation	0210	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Image size is larger than Image Box size.	C603	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

Service Status	Further Meaning	Status Code	Behavior
	Insufficient memory in printer to store the image.	C605	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Combined Print Image Size is larger than Image Box size.	C613	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.4 SCU of the Basic Color Image Box SOP Class - N-SET - N/A

N/A

7.3.2.8.5 SCU of the Printer SOP Class

7.3.2.8.5.1 SCU of the Printer SOP Class - N-EVENT-REPORT

Table 7-26 lists the Status Codes that the SCU of Printer SOP Class supports for the N-EVENT-REPORT message and defines the application behavior when encountering the listed Status Codes.

Table 7-26 Status Codes for N-EVENT-REPORT of the Printer SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	
Failure	Processing Failure	0110	
	No Such SOP Instance	0112	
	No Such Event Type	0113	
	No Such Argument	0114	
	Invalid Argument Value	0115	
	Invalid SOP Instance	0117	
	No Such SOP Class	0118	
	Class-Instance Conflict	0119	
	Duplicate Invocation	0210	
	Unrecognized Operation	0211	
	Mistyped Argument	0212	
	Resource Limitation	0213	
-	Other status codes	anything else	

7.3.2.8.5.2 SCU of the Printer SOP Class - N-GET

Table 7-27 lists the Status Codes that the SCU of the Printer SOP Class supports for the N-GET message and defines the application behavior when encountering the listed Status Codes.

Table 7-27 Status Codes for N-GET of the Printer SOP Class - SCU

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Proceed with parsing dataset returned from N-Get response and perform appropriate operations.

Service Status	Further Meaning	Status Code	Behavior
Warning	Attribute List Error	0107	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
Failure	Processing Failure	0110	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Instance	0112	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Invalid SOP Instance	0117	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	No Such SOP Class	0118	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Class-Instance Conflict	0119	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Refused: Not Authorized	0124	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Duplicate Invocation	0210	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Unrecognized Operation	0211	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Mistyped Argument	0212	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
	Resource Limitation	0213	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.
-	Other status codes	anything else	Fails print job and displays print failure message on Job Manager UI. Error details along with the status code is logged.

7.3.2.8.6 SCU of the Basic Annotation Box SOP Class - N-SET - N/A

N/A

7.3.2.8.7 SCU of the Print Job SOP Class - N/A

N/A

7.3.2.8.8 SCU of the Presentation LUT SOP Class - N/A

N/A

7.3.2.8.9 SCU of the Printer Configuration Retrieval SOP Class - N-GET - N/A

N/A

7.3.2.8.10 SCP of the Basic Film Session SOP Class - N/A

N/A

7.3.2.8.11 SCP of the Basic Film Box SOP Class - N/A

N/A

7.3.2.8.12 SCP of the Basic Grayscale Image Box SOP Class - N-SET - N/A

N/A

7.3.2.8.13 SCP of the Basic Color Image Box SOP Class - N-SET - N/A

N/A

7.3.2.8.14 SCP of the Printer SOP Class - N/A

N/A

7.3.2.8.15 SCP the Basic Annotation Box SOP Class - N-SET - N/A

N/A

7.3.2.8.16 SCP of the Print Job SOP Class - N/A

N/A

7.3.2.8.17 SCP of the Presentation LUT SOP Class - N/A

N/A

7.3.2.8.18 SCP of the Printer Configuration Retrieval SOP Class - N-GET - N/A

N/A

7.3.3 DICOM Web Services - N/A

N/A

8 Security

8.1 Introduction

The security section describes security features implemented by this product. It includes descriptions of non-DICOM network protocols, information to configure firewalls and application whitelists, lists of supported DICOM security profiles as well as Web Security features. Additionally, secured media storage, VPN, etc. are also specified in this security section.

8.2 External Network Requirements

Table 8-1 describes additional non-DICOM network protocols that are used by Senographe Pristina.

Table 8-1 External Network Requirements

Profile	Actor	Transaction	Protocol Used	RFCs	Security Support	Reference
Basic Time Synchronization	NTP Client	Maintain Time	NTP	RFC5905	N	C.1.1
Basic Network Address Management	DHCP Client	Find and Use DHCP Server	DHCP	RFC2131; RFC2132; RFC2563	N	C.1.2
		Maintain Lease	DHCP	RFC2131; RFC2132	N	C.1.2
Application Configuration Management	LDAP Client	Query LDAP Server	LDAP	RFC2251	Y	C.1.3

8.3 TCP Port Configuration

See Section 6 Configuration for information on the usage of ports for DICOM and other protocols. This section contains helpful information for product administrators to configure firewalls, application whitelists, etc.

8.4 DICOM Security Profiles Support

8.4.1 Secure Use and User Identity Profiles

Table 8-2 lists the Secure Use and User Identity Profiles:

Table 8-2 Secure Use and User Identity Profiles

Profile	Creator/Sender	Consumer/Receiver	Reference
Online Electronic Storage Secure Use	N	N	C.2.1
Audit Trail Message Format	Y	N	C.2.2
Audit Trail Message Transmission Profile - SYSLOG-TLS	Y	N	C.2.3
Audit Trail Message Transmission Profile - SYSLOG-UDP	Y	N	C.2.4
Basic User Identity Association	N	N	8.5
User Identity Plus Passcode Association	N	N	8.5
Kerberos Identity Negotiation Association	N	N	8.5
Generic SAML Assertion Identity Negotiation Association	N	N	8.5

8.4.2 Secure Transport Connection Profiles

Table 8-3 describes the Secure Transport Connection Profiles supported by the product. Accepted cipher suites are described in the section listed in the "Reference" column.

Table 8-3 Secure Transport Connection Profiles

Profile	Secured AE	Sender	Receiver	Reference
BCP 195 RFC 8996 TLS Secure Transport Connection Profile	N/A	N	N	C.2.5
Modified BCP 195 RFC 8996 TLS Secure Transport Connection Profile	N/A	N	N	C.2.5

8.4.3 Media Storage Security Profiles

See Section 1.4 Media Services for information on supported secured Application Profiles and secured media.
Table 8-4 details the encryption mechanisms that are supported with secure media.

Table 8-4 Content Encryption used for Secured Media

Encryption	File Set Creator/File Set Updater	File Set Reader
AES	N	N
Triple-DES	N	N

Table 8-5 Content Types used for Secured Media

Content Types	File Set Creator/File Set Updater	File Set Reader
Signed-data	N	N
Digested-data	N	N

Table 8-6 Digest Algorithms used for Secured Media

Digest Algorithms	File Set Creator/File Set Updater	File Set Reader
SHA-1	N	N
SHA256	N	N
SHA384	N	N
SHA512	N	N

8.4.4 Attribute Confidentiality Profiles - N/A

N/A

8.4.5 Digital Signature Profiles – N/A

N/A

8.4.6 Additional DICOM Security Profiles – N/A

N/A

8.5 User Identity Negotiation Support – N/A

N/A

8.6 Web Services Security Features – N/A

N/A

8.7 Other Security Features – N/A

Annexes

A Information Object Definitions (IODs)

This section describes all the SOP Instances natively created by Senographe Pristina , e.g., images created by an acquisition modality or evidence documents created on a review workstation (i.e., all SOP Classes that are marked in the "Created" column in Table 1-1). Details on Attribute coercion are defined in Section 5.2.5.2.

In the "Source" column, the following Values can be used:

- FIXED: The Value is pre-defined and cannot be modified.
- GENERATED: The Value is generated by the system.
- CONFIGURATION: The Value is copied from the system configuration.
- MWL: The Value is copied from a Modality Worklist entry.
- QUERY: The Value is determined by performing a query of any of the supported Query/Retrieve Services.
- USER: The Value is entered by the user.
- SCANNED: The Value is read from a barcode scanner or similar device.
- EMPTY: The Attribute is sent with a zero-length Value.
- SRC_INSTANCE: The Value is copied from previously created/received SOP Instances.

The "Presence" columns reflect the usage of the Module, Functional Group Macro, Attributes, or Value in the Senographe Pristina Implementation and is not necessarily the same as defined in the DICOM Standard. For the "Presence" column the following Values can be used:

- ALWAYS: the module, functional group macro, Attributes or Value is always present.
- CONDITIONAL: the presence of the module, functional group macro, Attributes or Value is dependent on a condition. The condition must be listed in the "Conditions" column.
- SRC_COPY: The presence of the Attributes and Values depends on the availability of these in the source instances, which are used for copying this information.
- EMPTY: The Attribute is present but without a Value (zero length).

A.1 Information Shared Across Multiple IODs

A.1.1 Common Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-1 Patient Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Patient's Name	(0010,0010)	MWL; USER	ALWAYS	CONDITIONAL		If received from RIS or entered by user.	
Patient ID	(0010,0020)	MWL; USER	ALWAYS	CONDITIONAL		If received from RIS or entered by user.	
Patient's Birth Date	(0010,0030)	MWL; USER	ALWAYS	CONDITIONAL		If received from RIS or entered by user.	
Patient's Sex	(0010,0040)	MWL; USER	ALWAYS	CONDITIONAL	M; F; O	If received from RIS or entered by user.	
Other Patient IDs	(0010,1000)	MWL	CONDITIONAL	CONDITIONAL		If received from RIS.	

Table A-2 General Study Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Study Instance UID	(0020,000D)	MWL; GENERATED	ALWAYS	ALWAYS			
Study Date	(0008,0020)	GENERATED	ALWAYS	ALWAYS	Current date		
Study Time	(0008,0030)	GENERATED	ALWAYS	ALWAYS	Current time		
Referring Physician's Name	(0008,0090)	MWL; USER	ALWAYS	CONDITIONAL		If received from RIS or entered by user.	
Study ID	(0020,0010)	MWL; GENERATED	ALWAYS	ALWAYS			If Study ID is missing in the SPS from RIS, value is filled with “#”.
Accession Number	(0008,0050)	MWL; USER	ALWAYS	CONDITIONAL		If received from RIS or entered by user.	
Study Description	(0008,1030)	MWL; USER	CONDITIONAL	CONDITIONAL		If received from RIS or entered by user.	

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Referenced Study Sequence	(0008,1110)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS	
>Referenced SOP Class UID	(0008,1150)	MWL	CONDITIONAL	ALWAYS		If received from RIS	
>Referenced SOP Instance UID	(0008,1155)	MWL	CONDITIONAL	ALWAYS		If received from RIS	
Procedure Code Sequence	(0008,1032)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS	If sequence is received incomplete, it will be corrected as described below in sequence elements
>Code Value	(0008,0100)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, copied with code meaning
>Coding Scheme Designator	(0008,0102)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to ”99LOCAL”.
>Code Meaning	(0008,0104)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to the code value.

Table A-3 Patient Study Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Patient's Age	(0010,1010)	GENERATED	CONDITIONAL	ALWAYS		Generated by the system when the patient’s birth date (0010,0030) is provided	

Table A-4 General Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	MG		
Series Instance UID	(0020,000E)	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Series Number	(0020,0011)	GENERATED	ALWAYS	ALWAYS			
Series Date	(0008,0021)	GENERATED	ALWAYS	ALWAYS	Date when generating new series		
Series Time	(0008,0031)	GENERATED	ALWAYS	ALWAYS	Time when generating new series		
Performing Physician's Name	(0008,1050)	MWL; USER	CONDITIONAL	CONDITIONAL		If received from RIS or entered by user.	
Protocol Name	(0018,1030)	GENERATED	ALWAYS	ALWAYS	ROUTINE; 3D_ROUTINE; CESM; 3D_ROUTINE+2D_ROUTINE; STEREO; 3D_BIOPSY; SAMPLE; CESM_BIOPSY		
Series Description	(0008,103E)	GENERATED	ALWAYS	ALWAYS			
Operators' Name	(0008,1070)	MWL; USER	CONDITIONAL	CONDITIONAL		If received from RIS or entered by user.	
Referenced Performed Procedure Step Sequence	(0008,1111)	GENERATED	CONDITIONAL	ALWAYS	Only one item is present	If a PPS manager has been declared.	
>Referenced SOP Class UID	(0008,1150)	FIXED	ALWAYS	ALWAYS	1.2.840.10008.3.1.2.3.3		
>Referenced SOP Instance UID	(0008,1155)	GENERATED	ALWAYS	ALWAYS			
Body Part Examined	(0018,0015)	FIXED	CONDITIONAL	ALWAYS	BREAST	Not sent for specimen images.	
Patient Position	(0018,5100)	EMPTY	CONDITIONAL	EMPTY		Only in CT images.	Sent empty in CT images, not sent otherwise
Request Attributes Sequence	(0040,0275)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	
>Requested Procedure ID	(0040,1001)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Requested Procedure Description	(0032,1060)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Scheduled Procedure Step ID	(0040,0009)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Scheduled Procedure Step Description	(0040,0007)	MWL	CONDITIONAL	CONDITIONAL		If received from RIS.	
>Scheduled Protocol Code Sequence	(0040,0008)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	If sequence is received incomplete, it will be corrected as described below in sequence elements
>>Code Value	(0008,0100)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, copied with code meaning
>>Coding Scheme Designator	(0008,0102)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to ”99LOCAL”.
>>Code Meaning	(0008,0104)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to the code value.
Performed Procedure Step ID	(0040,0253)	GENERATED	CONDITIONAL	ALWAYS		If a PPS manager has been declared.	
Performed Procedure Step Start Date	(0040,0244)	GENERATED	CONDITIONAL	ALWAYS		If a PPS manager has been declared.	
Performed Procedure Step Start Time	(0040,0245)	GENERATED	CONDITIONAL	ALWAYS		If a PPS manager has been declared.	
Performed Procedure Step Description	(0040,0254)	MWL; USER	CONDITIONAL	ALWAYS		If a PPS manager has been declared.	

Table A-5 Frame of Reference Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Frame of Reference UID	(0020,0052)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	Same frame of reference UID for all images acquired under the same breast compression. After compression is released a new frame of reference UID is generated by the system.
Position Reference Indicator	(0020,1040)	EMPTY	CONDITIONAL	EMPTY		Not sent for specimen images.	

Table A-6 General Equipment Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Manufacturer	(0008,0070)	FIXED	ALWAYS	ALWAYS	GE HEALTHCARE		
Institution Name	(0008,0080)	CONFIGURATION	ALWAYS	ALWAYS			
Institution Address	(0008,0081)	CONFIGURATION	ALWAYS	ALWAYS			
Station Name	(0008,1010)	CONFIGURATION	ALWAYS	ALWAYS			
Institutional Department Name	(0008,1040)	CONFIGURATION	ALWAYS	ALWAYS			
Manufacturer's Model Name	(0008,1090)	FIXED	ALWAYS	ALWAYS	Senographe Pristina		
Device Serial Number	(0018,1000)	GENERATED	ALWAYS	ALWAYS	MAC address of the workstation		
Software Versions	(0018,1020)	GENERATED	ALWAYS	ALWAYS	System software version		
Pixel Padding Value	(0028,0120)	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image or 3D volumes.	

Table A-7 Enhanced General Equipment Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Manufacturer	(0008,0070)	FIXED	ALWAYS	ALWAYS	GE HEALTHCARE		
Manufacturer's Model Name	(0008,1090)	FIXED	ALWAYS	ALWAYS	Senographe Pristina		
Device Serial Number	(0018,1000)	GENERATED	ALWAYS	ALWAYS	MAC address of the workstation		
Software Versions	(0018,1020)	GENERATED	ALWAYS	ALWAYS	System software version		

Table A-8 Image Pixel Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Samples per Pixel	(0028,0002)	FIXED	ALWAYS	ALWAYS	1		
Photometric Interpretation	(0028,0004)	GENERATED	ALWAYS	ALWAYS	MONOCHROME1; MONOCHROME2;		MONOCHROME1 in For Processing images, MONOCHROME2 in For Presentation and BTO images.
Rows	(0028,0010)	GENERATED	ALWAYS	ALWAYS			
Columns	(0028,0011)	GENERATED	ALWAYS	ALWAYS			
Bits Allocated	(0028,0100)	FIXED	ALWAYS	ALWAYS	16		
Bits Stored	(0028,0101)	GENERATED	ALWAYS	ALWAYS	14; 12		14 in For Processing images, 12 in For Presentation images.
High Bit	(0028,0102)	GENERATED	ALWAYS	ALWAYS	13; 11		13 in For Processing images, 11 in For Presentation images.
Pixel Representation	(0028,0103)	FIXED	ALWAYS	ALWAYS	0000H		
Pixel Data	(7FE0,0010)	GENERATED	ALWAYS	ALWAYS			
Pixel Padding Range Limit	(0028,0121)	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image.	

Table A-9 Acquisition Context Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Acquisition Context Sequence	(0040,0555)	EMPTY	ALWAYS	EMPTY			

Table A-10 SOP Common Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
SOP Class UID	(0008,0016)	GENERATED	ALWAYS	ALWAYS			
SOP Instance UID	(0008,0018)	GENERATED	ALWAYS	ALWAYS			
Specific Character Set	(0008,0005)	FIXED	ALWAYS	ALWAYS	ISO_IR 100		
Instance Creation Date	(0008,0012)	GENERATED	CONDITIONAL	ALWAYS		Sent only for GSPS	
Instance Creation Time	(0008,0013)	GENERATED	CONDITIONAL	ALWAYS		Sent only for GSPS	
Content Qualification	(0018,9004)	FIXED	CONDITIONAL	ALWAYS	PRODUCT	Sent only for BTO	

Table A-11 General Acquisition Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Acquisition Date	(0008,0022)	GENERATED	ALWAYS	ALWAYS			
Acquisition Time	(0008,0032)	GENERATED	ALWAYS	ALWAYS			
Images in Acquisition	(0020,1002)	GENERATED	CONDITIONAL	ALWAYS		If DBT Projections or CT image.	For DBT projections, set to the number of projections for this DBT acquisition. For CT images, set to the number of frames in the series.
Irradiation Event UID	(0008,3010)	GENERATED	ALWAYS	ALWAYS			

Table A-12 General Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Instance Number	(0020,0013)	GENERATED	ALWAYS	ALWAYS			
Patient Orientation	(0020,0020)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images and CT images.	
Content Date	(0008,0023)	GENERATED	ALWAYS	ALWAYS			
Content Time	(0008,0033)	GENERATED	ALWAYS	ALWAYS			
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.1.4		
Quality Control Image	(0028,0300)	FIXED	CONDITIONAL	ALWAYS	NO	Not sent for CT images.	
Burned In Annotation	(0028,0301)	FIXED	ALWAYS	ALWAYS	NO		
Lossy Image Compression	(0028,2110)	FIXED	ALWAYS	ALWAYS	00		
Presentation LUT Shape	(2050,0020)	GENERATED	ALWAYS	ALWAYS	IDENTITY; INVERSE		MG For Processing: INVERSE MG For Presentation and CT: IDENTITY.
Image Laterality	(0020,0062)	USER	ALWAYS	ALWAYS	R; L; B		
Anatomic Region Sequence	(0008,2218)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	T-04000		
>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	SRT		
>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	Breast		

11Table A-13 General Reference Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Referenced Image Sequence	(0008,1140)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	If Biopsy stx+ or stx- image.	Reference other images in the biopsy pair (stx+ and stx-)
>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Purpose of Reference Code Sequence	(0040,A170)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	121315		
>>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	DCM		
>>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	Other image of stereoscopic pair		
Source Image Sequence	(0008,2112)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	If For Presentation image	
>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Purpose of Reference Code Sequence	(0040,A170)	FIXED	CONDITIONAL	ALWAYS		If tomosynthesis generated 2D	
>>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS		121322	
>>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS		DCM	
>>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS		Source image for image processing operation	
>Spatial Locations Preserved	(0028,135A)	FIXED	ALWAYS	ALWAYS	YES		

Table A-14 Contrast/Bolus Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Contrast/Bolus Agent	(0018,0010)	USER	CONDITIONAL	ALWAYS		If CESM image with injection.	
Contrast/Bolus Volume	(0018,1041)	USER	CONDITIONAL	ALWAYS		If CESM image with injection.	
Contrast/Bolus Start Time	(0018,1042)	GENERATED	CONDITIONAL	ALWAYS		If CESM image with injection.	
Contrast/Bolus Ingredient Concentration	(0018,1049)	USER	CONDITIONAL	ALWAYS		If CESM image with injection.	

Table A-15 VOI LUT Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
VOI LUT Sequence	(0028,3010)	GENERATED	CONDITIONAL	ALWAYS	One to 4 items may be present	If VOI LUT Function (0028,1056) is SIGMOID	1 item per Window Center values (0028,1050)
>LUT Descriptor	(0028,3002)	GENERATED	ALWAYS	ALWAYS			
>LUT Explanation	(0028,3003)	GENERATED	ALWAYS	ALWAYS	NORMAL; SOFTER; HARDER; USER		
>LUT Data	(0028,3006)	GENERATED	ALWAYS	ALWAYS			
Window Center	(0028,1050)	GENERATED	CONDITIONAL	ALWAYS		If For Presentation image	1 to 4 values
Window Width	(0028,1051)	GENERATED	CONDITIONAL	ALWAYS		If For Presentation image	1 to 4 values
Window Center & Width Explanation	(0028,1055)	GENERATED	CONDITIONAL	ALWAYS	NORMAL; SOFTER; HARDER; USER	If For Presentation image	1 to 4 values
VOI LUT Function	(0028,1056)	GENERATED	CONDITIONAL	ALWAYS	LINEAR; SIGMOID	If For Presentation image	

Table A-16 Display Shutter Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Shutter Shape	(0018,1600)	FIXED	ALWAYS	ALWAYS	POLYGONAL		
Vertices of the Polygonal Shutter	(0018,1620)	GENERATED	ALWAYS	ALWAYS			
Shutter Presentation Value	(0018,1622)	FIXED	ALWAYS	ALWAYS	0		

A.1.2 Common Functional Group Macros - N/A

N/A

A.1.3 Common Private Modules – N/A

N/A

A.1.4 Coded Values

Table A-17 lists Coded Values referenced from the "Value" column of the tables above.

Table A-17 Values and Code Sets shared across IODs

Attribute Name	Tag	Value/Code	Condition	Comments
Image Type	(0008,0008)	ORIGINAL\PRIMARY\	2D Routine Raw image	
		DERIVED\PRIMARY\	2D Routine Processed image	
		DERIVED\SECONDARY\	2D Routine Re-processed image	
		ORIGINAL\PRIMARY\POST_CONTRAST\LOW_ENERGY\LOW_ENERGY	2D CESM Raw low energy image	
		DERIVED\PRIMARY\POST_CONTRAST\LOW_ENERGY\LOW_ENERGY	2D CESM Processed low energy image	
		DERIVED\SECONDARY\POST_CONTRAST\LOW_ENERGY\LOW_ENERGY	2D CESM Re-processed low energy image	
		ORIGINAL\PRIMARY\POST_CONTRAST\HIGH_ENERGY\HIGH_ENERGY	2D CESM Raw high energy image	
		DERIVED\PRIMARY\POST_CONTRAST\SUBTRACTION\\RECOMBINED	2D CESM Recombined image	
		DERIVED\SECONDARY\POST_CONTRAST\SUBTRACTION\\RECOMBINED	2D CESM Re-recombined image	
		ORIGINAL\PRIMARY\STEREO_SCOUT	2D Biopsy Raw scout image	
		DERIVED\PRIMARY\STEREO_SCOUT	2D Biopsy Processed scout image	
		ORIGINAL\PRIMARY\STEREO_PLUS	2D Biopsy Raw stx+ image	
		DERIVED\PRIMARY\STEREO_PLUS	2D Biopsy Processed stx+ image	
		ORIGINAL\PRIMARY\STEREO_MINUS	2D Biopsy Raw stx- image	
		DERIVED\PRIMARY\STEREO_MINUS	2D Biopsy Processed stx- image	
		ORIGINAL\PRIMARY\STEREO_SCOUT\\LOW_ENERGY	2D CESM-Biopsy Raw scout low energy image	
		DERIVED\PRIMARY\STEREO_SCOUT\\LOW_ENERGY	2D CESM-Biopsy Processed scout low energy image	
		ORIGINAL\PRIMARY\STEREO_PLUS\\LOW_ENERGY	2D CESM-Biopsy Raw stx+ low energy image	
		DERIVED\PRIMARY\STEREO_PLUS\\LOW_ENERGY	2D CESM-Biopsy Processed stx+ low energy image	
		ORIGINAL\PRIMARY\STEREO_MINUS\\LOW_ENERGY	2D CESM-Biopsy Raw stx- low energy image	
		DERIVED\PRIMARY\STEREO_MINUS\\LOW_ENERGY	2D CESM-Biopsy Processed stx- low energy image	
		ORIGINAL\PRIMARY\STEREO_SCOUT\\HIGH_ENERGY	2D CESM-Biopsy Raw scout high energy image	
		DERIVED\PRIMARY\STEREO_SCOUT\SUBTRACTION	2D CESM-Biopsy Recombined scout image	

Attribute Name	Tag	Value/Code	Condition	Comments
		ORIGINAL\PRIMARY\STEREO_PLUS\\HIGH_ENERGY	2D CESM-Biopsy Raw stx+ high energy image	
		DERIVED\PRIMARY\STEREO_PLUS\SUBTRACTION	2D CESM-Biopsy Recombined stx+ image	
		ORIGINAL\PRIMARY\STEREO_MINUS\\HIGH_ENERGY	2D CESM-Biopsy Raw stx- high energy image	
		DERIVED\PRIMARY\STEREO_MINUS\SUBTRACTION	2D CESM-Biopsy Recombined stx- image	
		ORIGINAL\PRIMARY\TOMO_PROJ\PROJECTION	3D Routine projection image	
		ORIGINAL\PRIMARY\TOMO_SCOUT	3D Biopsy projection image	
		DERIVED\PRIMARY\TOMO\PLANES	3D Routine Planes CT image	Applicable to CT Image IOD only.
		DERIVED\PRIMARY\TOMO\SLABS	3D Routine Slabs CT image	Applicable to CT Image IOD only.
		DERIVED\PRIMARY\TOMOSYNTHESIS\GENERATED_2D	3D Routine Generated 2D image	

A.2 Breast Tomosynthesis Image IOD

The following table defines the structure of Breast Tomosynthesis Image IOD.

Table A-18 Breast Tomosynthesis Image IOD

IE	Module Name	Presence (Module)	Condition	Reference
Patient	Patient	ALWAYS		Table A-1
Study	General Study	ALWAYS		Table A-2
	Patient Study	ALWAYS		Table A-3
Series	General Series	ALWAYS		Table A-4
	Enhanced Mammography Series	ALWAYS		Table A-20
Frame of Reference	Frame of Reference	ALWAYS		Table A-5
Equipment	General Equipment	ALWAYS		Table A-6
	Enhanced General Equipment	ALWAYS		Table A-7
Image	Image Pixel	ALWAYS		Table A-8
	Acquisition Context	ALWAYS		Table A-9

IE	Module Name	Presence (Module)	Condition	Reference
	Multi-frame Functional Groups	ALWAYS		Table A-21
	X-Ray 3D Image	ALWAYS		Table A-22
	Breast Tomosynthesis Contributing Sources	ALWAYS		Table A-23
	Breast Tomosynthesis Acquisition	ALWAYS		Table A-24
	X-Ray 3D Reconstruction	ALWAYS		Table A-25
	Breast View	ALWAYS		Table A-26
	SOP Common	ALWAYS		Table A-10
	Standard Extended Module for Breast Tomosynthesis Image IOD	ALWAYS		Table A-36
	Private Module for Breast Tomosynthesis Image IOD	ALWAYS		Table A-37

Table A-19 lists the Functional group macros used in Breast Tomosynthesis Image IOD. The usage column defines whether a Macro is used as a shared macro, on a per Frame base or whether depending on the acquisition context can be used in both contexts. The following values are supported:

- PER_FRAME: The macro is used on a per frame basis, the attributes are included in the Shared Functional Group Sequence (5200,9229)
- SHARED: The macro is shared across all frames; the attributes are included in the Per-Frame Functional Group Sequence (5200,9230)
- CONTEXT_DEPENDENT: depending on the acquisition context the macro can either be used on a per frame basis or be shared across all frames.

Table A-19 Functional Group Macros used in Breast Tomosynthesis Image IOD

Functional Group Macro	Presence	Condition	Usage	Reference
Pixel Measures	ALWAYS		CONTEXT_DEPENDENT	Table A-27
Frame Content	ALWAYS		PER_FRAME	Table A-28
Plane Position (Patient)	ALWAYS		PER_FRAME	Table A-29
Plane Orientation (Patient)	ALWAYS		SHARED	Table A-30
Derivation Image	CONDITIONAL	Present in slabs and generated 2D, and in volumes when lossy compression is applied	SHARED	Table A-31
Frame Anatomy	ALWAYS		SHARED	Table A-32
Identity Pixel Value Transformation	ALWAYS		SHARED	Table A-33
Frame VOI LUT With LUT	ALWAYS		SHARED	Table A-34
X-Ray 3D Frame Type	ALWAYS		PER_FRAME	Table A-35

A.2.1 Breast Tomosynthesis Image IOD Specific Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-20 Enhanced Mammography Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	MG		
Referenced Performed Procedure Step Sequence	(0008,1111)	GENERATED	CONDITIONAL	ALWAYS	Only one item is present	If a PPS manager has been declared.	
>Referenced SOP Class UID	(0008,1150)	FIXED	ALWAYS	ALWAYS	1.2.840.10008.3.1.2.3.3		
>Referenced SOP Instance UID	(0008,1155)	GENERATED	ALWAYS	ALWAYS			
Request Attributes Sequence	(0040,0275)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	
>Requested Procedure ID	(0040,1001)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Requested Procedure Description	(0032,1060)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Scheduled Procedure Step ID	(0040,0009)	MWL	CONDITIONAL	CONDITIONAL		If received from RIS.	
>Scheduled Procedure Step Description	(0040,0007)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	If sequence is received incomplete, it will be corrected as described below in sequence elements
>Scheduled Protocol Code Sequence	(0040,0008)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, copied with code meaning
>>Code Value	(0008,0100)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to ”99LOCAL”.
>>Coding Scheme Designator	(0008,0102)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to the code value.

Table A-21 Multi-frame Functional Groups Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Shared Functional Groups Sequence	(5200,9229)	GENERATED	ALWAYS	ALWAYS	Only one item is present		See Table A-19 for content of the sequence.
Per-Frame Functional Groups Sequence	(5200,9230)	GENERATED	ALWAYS	ALWAYS	One or more items may be present		See Table A-19 for content of the sequence.
Instance Number	(0020,0013)	GENERATED	ALWAYS	ALWAYS			
Content Date	(0008,0023)	GENERATED	ALWAYS	ALWAYS			
Content Time	(0008,0033)	GENERATED	ALWAYS	ALWAYS			
Number of Frames	(0028,0008)	GENERATED	ALWAYS	ALWAYS			

Table A-22 X-Ray 3D Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.2.4		
Pixel Presentation	(0008,9205)	FIXED	ALWAYS	ALWAYS	MONOCHROME		
Volumetric Properties	(0008,9206)	GENERATED	ALWAYS	ALWAYS	VOLUME; SAMPLED		VOLUME for Planes, SAMPLED for Slabs and generated 2D.
Volume Based Calculation Technique	(0008,9207)	FIXED	ALWAYS	ALWAYS	TOMOSYNTHESIS		
Bits Allocated	(0028,0100)	FIXED	ALWAYS	ALWAYS	16		
Bits Stored	(0028,0101)	FIXED	ALWAYS	ALWAYS	12		
High Bit	(0028,0102)	FIXED	ALWAYS	ALWAYS	11		
Samples per Pixel	(0028,0002)	FIXED	ALWAYS	ALWAYS	1		
Photometric Interpretation	(0028,0004)	FIXED	ALWAYS	ALWAYS	MONOCHROME2		
Content Qualification	(0018,9004)	FIXED	ALWAYS	ALWAYS	PRODUCT		
Burned In Annotation	(0028,0301)	FIXED	ALWAYS	ALWAYS	NO		
Lossy Image Compression	(0028,2110)	GENERATED	ALWAYS	ALWAYS	00; 01		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Lossy Image Compression Ratio	(0028,2112)	GENERATED	CONDITIONAL	ALWAYS		When lossy compression applied	
Lossy Image Compression Method	(0028,2114)	FIXED	CONDITIONAL	ALWAYS	ISO_10918_1	When lossy compression applied	
Presentation LUT Shape	(2050,0020)	FIXED	ALWAYS	ALWAYS	IDENTITY		

Table A-23 Breast Tomosynthesis Contributing Sources Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Contributing Sources Sequence	(0018,9506)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Contributing SOP Instances Reference Sequence	(0020,9529)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>>Study Instance UID	(0020,000D)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced Series Sequence	(0008,1115)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>>>Series Instance UID	(0020,000E)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>>Series Number	(0020,0011)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>>Referenced Instance Sequence	(0008,114A)	GENERATED	ALWAYS	ALWAYS	1 item per projection image		
>>>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>>>Instance Number	(0020,0013)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Manufacturer	(0008,0070)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Manufacturer's Model Name	(0008,1090)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Device Serial Number	(0018,1000)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Software Versions	(0018,1020)	SRC_INSTANCE	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Acquisition DateTime	(0008,002A)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Station Name	(0008,1010)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Operators' Name	(0008,1070)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Protocol Name	(0018,1030)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Acquisition Protocol Name	(0018,9423)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Rows	(0028,0010)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Columns	(0028,0011)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Bits Stored	(0028,0101)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Lossy Image Compression	(0028,2110)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Detector Type	(0018,7004)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Detector ID	(0018,700A)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Date of Last Detector Calibration	(0018,700C)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Time of Last Detector Calibration	(0018,700E)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Detector Element Spacing	(0018,7022)	SRC_INSTANCE	ALWAYS	ALWAYS			

Table A-24 Breast Tomosynthesis Acquisition Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
X-Ray 3D Acquisition Sequence	(0018,9507)		ALWAYS	ALWAYS	Only one item is present		
>Field of View Shape	(0018,1147)	FIXED	ALWAYS	ALWAYS	RECTANGLE		
>X-Ray Receptor Type	(0018,9420)	FIXED	ALWAYS	ALWAYS	DIGITAL_DETECTOR		
>Source Image Sequence	(0008,2112)	GENERATED	ALWAYS	ALWAYS	One item per projection image.		
>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Field of View Dimension(s) in Float	(0018,9461)	GENERATED	ALWAYS	ALWAYS			
>Field of View Origin	(0018,7030)	GENERATED	ALWAYS	ALWAYS			
>Field of View Rotation	(0018,7032)	GENERATED	ALWAYS	ALWAYS	270; 180; 90; 0		
>Field of View Horizontal Flip	(0018,7034)	GENERATED	ALWAYS	ALWAYS	NO; YES		
>Grid	(0018,1166)	GENERATED	ALWAYS	ALWAYS			
>KVP	(0018,0060)	GENERATED	ALWAYS	ALWAYS			Set to the average of the source images KVP (0018,0060).
>X-Ray Tube Current in mA	(0018,9330)	GENERATED	ALWAYS	ALWAYS			Set to the average of source images X-Ray Tube Current (0018,1151).
>Exposure Time in ms	(0018,9328)	GENERATED	ALWAYS	ALWAYS			Set the converted total of the source images Exposure Time (0018,1150).
>Exposure in mAs	(0018,9332)	GENERATED	ALWAYS	ALWAYS			Set to the converted total of the individual projections' values (0018,1153).
>Start Acquisition DateTime	(0018,9516)	GENERATED	ALWAYS	ALWAYS			
>Primary Positioner Scan Arc	(0018,9508)	GENERATED	ALWAYS	ALWAYS			
>Primary Positioner Scan Start Angle	(0018,9510)	GENERATED	ALWAYS	ALWAYS			
>Primary Positioner Increment	(0018,9514)	GENERATED	ALWAYS	ALWAYS			
>Distance Source to Detector	(0018,1110)	GENERATED	ALWAYS	ALWAYS			Distance from source to image plane at 0°
>Distance Source to Patient	(0018,1111)	GENERATED	ALWAYS	ALWAYS			Distance from source to breast support at 0°

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Estimated Radiographic Magnification Factor	(0018,1114)	FIXED	ALWAYS	ALWAYS	1		
>Anode Target Material	(0018,1191)	GENERATED	ALWAYS	ALWAYS			
>Body Part Thickness	(0018,11A0)	GENERATED	ALWAYS	ALWAYS			
>Exposure Control Mode	(0018,7060)	GENERATED	ALWAYS	ALWAYS	MANUAL; AUTOMATIC		
>Exposure Control Mode Description	(0018,7062)	GENERATED	ALWAYS	ALWAYS			
>Half Value Layer	(0040,0314)	GENERATED	ALWAYS	ALWAYS			
>Organ Dose	(0040,0316)	GENERATED	ALWAYS	ALWAYS			
>Entrance Dose in mGy	(0040,8302)	GENERATED	ALWAYS	ALWAYS			Total entrance dose of the acquisition sequence.
>Focal Spot(s)	(0018,1190)	GENERATED	ALWAYS	ALWAYS			
>Detector Temperature	(0018,7001)	GENERATED	ALWAYS	ALWAYS			
>Filter Type	(0018,1160)	GENERATED	ALWAYS	ALWAYS			
>Filter Material	(0018,7050)	GENERATED	ALWAYS	ALWAYS			
>Compression Force	(0018,11A2)	GENERATED	ALWAYS	ALWAYS			
>Paddle Description	(0018,11A4)	GENERATED	ALWAYS	ALWAYS			
>Per Projection Acquisition Sequence	(0018,9538)	GENERATED	ALWAYS	ALWAYS	On item per projection image.		
>>KVP	(0018,0060)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>X-Ray Tube Current in mA	(0018,9330)	GENERATED	ALWAYS	ALWAYS			Set to conversion from attribute X-Ray Tube Current (0018,1151) in source image.
>>Collimator Shape	(0018,1700)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Collimator Left Vertical Edge	(0018,1702)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Collimator Right Vertical Edge	(0018,1704)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Collimator Upper Horizontal Edge	(0018,1706)	SRC_INSTANCE	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>>Collimator Lower Horizontal Edge	(0018,1708)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Positioner Primary Angle	(0018,1510)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Positioner Primary Angle Direction	(0018,9559)	FIXED	ALWAYS	ALWAYS	CC		
>>Exposure Time in ms	(0018,9328)	GENERATED	ALWAYS	ALWAYS			Set to the conversion from attribute Exposure Time (0018,1150) in source image.
>>Exposure in mAs	(0018,9332)	GENERATED	ALWAYS	ALWAYS			Set to the convention from attribute Exposure (0018,1152) in source image.
>>Relative X-Ray Exposure	(0018,1405)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Organ Dose	(0040,0316)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Entrance Dose in mGy	(0040,8302)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Detector Secondary angle	(0018,1531)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Detector Active Dimension	(0018,7026)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Irradiation Event UID	(0008,3010)	SRC_INSTANCE	ALWAYS	ALWAYS			

Table A-25 X-Ray 3D Reconstruction Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
X-Ray 3D Reconstruction Sequence	(0018,9530)	GENERATED	ALWAYS	ALWAYS	One or more items may be present		
>Reconstruction Description	(0018,9531)	GENERATED	ALWAYS	ALWAYS			Description of algorithm used for 3D reconstruction
>Application Name	(0018,9524)	GENERATED	ALWAYS	ALWAYS			
>Application Version	(0018,9525)	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Application Manufacturer	(0018,9526)	FIXED	ALWAYS	ALWAYS	GE HEALTHCARE		
>Algorithm Type	(0018,9527)	FIXED	ALWAYS	ALWAYS	ITERATIVE		
>Acquisition Index	(0020,9518)	FIXED	ALWAYS	ALWAYS	1		

Table A-26 Breast View Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.2.4		
View Code Sequence	(0054,0220)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Coding Scheme Designator	(0008,0102)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>View Modifier Code Sequence	(0054,0222)	GENERATED	ALWAYS	SRC_COPY	Zero or more items may be present	If view modifier has been selected by the user.	
>>Code Value	(0008,0100)	GENERATED	SRC_COPY	ALWAYS	See Section A.4.4		
>>Coding Scheme Designator	(0008,0102)	GENERATED	SRC_COPY	ALWAYS	See Section A.4.4		
>>Code Meaning	(0008,0104)	GENERATED	SRC_COPY	ALWAYS	See Section A.4.4		
Breast Implant Present	(0028,1300)	MWL; USER	SRC_COPY	SRC_COPY	YES; NO		

A.2.2 Breast Tomosynthesis Image IOD Specific Functional Group Macros

The tables below list the Common Functional Group Macros that can either be used as part of the Shared Functional Groups Sequence (5200,9229) or as part of the Per-frame Functional Groups Sequence (5200,9230) of enhanced image IODs.

Table A-27 Pixel Measures Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Pixel Measures Sequence	(0028,9110)	GENERATED	ALWAYS	ALWAYS			
>Pixel Spacing	(0028,0030)	FIXED	ALWAYS	ALWAYS	0.1\0.1		
>Slice Thickness	(0018,0050)	GENERATED	ALWAYS	ALWAYS			For slabs, value set to slab thickness. For planes, value set to the distance between 2 planes.

Table A-28 Frame Content Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Frame Content Sequence	(0020,9111)	GENERATED	ALWAYS	ALWAYS			
>Frame Reference DateTime	(0018,9151)	GENERATED	ALWAYS	ALWAYS			Set to date and time when 5th DBT exposure was made to acquire the image
>Frame Acquisition DateTime	(0018,9074)	GENERATED	ALWAYS	ALWAYS			Set to the date and time when the first exposure was made to acquire the image.
>Frame Acquisition Duration	(0018,9220)	GENERATED	ALWAYS	ALWAYS			Set to the time elapsed between first and last exposures made to acquire the image

Table A-29 Plane Position (Patient) Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Plane Position Sequence	(0020,9113)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Image Position (Patient)	(0020,0032)	GENERATED	ALWAYS	ALWAYS			

Table A-30 Plane Orientation (Patient) Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Plane Orientation Sequence	(0020,9116)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Image Orientation (Patient)	(0020,0037)	GENERATED	CONDITIONAL	CONDITIONAL			

Table A-31 Derivation Image Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Derivation Image Sequence	(0008,9124)	GENERATED	ALWAYS	CONDITIONAL	Zero or more items may be present	For slabs and generated 2D: value always present For planes: value present only if lossy compression applied	
>Derivation Description	(0008,2111)	FIXED	CONDITIONAL	ALWAYS	ReconDL	If tomosynthesis generated 2D	
>Derivation Code Sequence	(0008,9215)	GENERATED	ALWAYS	ALWAYS	One or 2 items may be present		
>>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	113078; 113040; 113072		
>>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	DCM		
>>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	Maximum intensity projection; Lossy Compression; Multiplanar reformatting		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Source Image Sequence	(0008,2112)	GENERATED	ALWAYS	ALWAYS	One or 2 items may be present		For Slabs, an item is sent with reference to the corresponding Planes image. For generated 2D, 1 item per projection is sent For Planes and Slabs and generated 2D when lossy compression is applied, an item is sent with reference to the corresponding uncompressed image.
>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Purpose of Reference Code Sequence	(0040,A170)	GENERATED	ALWAYS	ALWAYS	Only one item is present.		
>>>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	121322; 121320		
>>>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	DCM		
>>>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	Source image for image processing operation; Uncompressed predecessor		

Table A-32 Frame Anatomy Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Frame Anatomy Sequence	(0020,9071)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Frame Laterality	(0020,9072)	GENERATED	ALWAYS	ALWAYS	R; L; B		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Anatomic Region Sequence	(0008,2218)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	T-04000		
>>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	SRT		
>>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	BREAST		

Table A-33 Identity Pixel Value Transformation Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Pixel Value Transformation Sequence	(0028,9145)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>Rescale Intercept	(0028,1052)	FIXED	ALWAYS	ALWAYS	0		
>Rescale Slope	(0028,1053)	FIXED	ALWAYS	ALWAYS	1		
>Rescale Type	(0028,1054)	FIXED	ALWAYS	ALWAYS	US		

Table A-34 Frame VOI LUT With LUT Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Frame VOI LUT Sequence	(0028,9132)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Window Center	(0028,1050)	GENERATED	ALWAYS	ALWAYS			Up to 4 values are present
>Window Width	(0028,1051)	GENERATED	ALWAYS	ALWAYS			Up to 4 values are present
>Window Center & Width Explanation	(0028,1055)	GENERATED	ALWAYS	ALWAYS	NORMAL; HARDER; SOFTER; USER		Up to 4 values are present
>VOI LUT Function	(0028,1056)	GENERATED	ALWAYS	ALWAYS	LINEAR; SIGMOID		

Table A-35 X-Ray 3D Frame Type Macro

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
X-Ray 3D Frame Type Sequence	(0018,9504)	GENERATED	ALWAYS	ALWAYS			
>Frame Type	(0008,9007)	GENERATED	ALWAYS	ALWAYS	See Section A.2.4		
>Pixel Presentation	(0008,9205)	FIXED	ALWAYS	ALWAYS	MONOCHROME		
>Volumetric Properties	(0008,9206)	GENERATED	ALWAYS	ALWAYS	VOLUME; SAMPLED		VOLUME for Planes, SAMPLED for Slabs
>Volume Based Calculation Technique	(0008,9207)	FIXED	ALWAYS	ALWAYS	TOMOSYNTHESIS		
>Reconstruction Index	(0020,9536)	FIXED	ALWAYS	ALWAYS	1		

A.2.3 Breast Tomosynthesis Image IOD Specific Private Modules

The tables below list private Attributes that are used in multiple IODs generated by the system. For documentation convenience and readability, they are organized in modules, although the concept of modules does not exist in the standard for private Attributes.

Table A-36 Standard Extended Module for Breast Tomosynthesis Image IOD

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Biopsy Target Sequence	(0018,2041)	SQ	1-n	SAFE	GENERATED	CONDITIONAL	CONDITIONAL	One or more items may be present	Only present for Biopsy procedure	
>Target UID	(0018,2042)	UI	1	UNSAFE	GENERATED	ALWAYS	ALWAYS			
>Localizing Cursor Position	(0018,2043)	FL	2	SAFE	GENERATED	ALWAYS	ALWAYS			
>Calculated Target Position	(0018,2044)	FL	3	SAFE	GENERATED	ALWAYS	ALWAYS			
>Target Label	(0018,2045)	SH	1	SAFE	GENERATED	ALWAYS	ALWAYS			Target ID that is displayed in the Viewer.
>Displayed Z Value	(0018,2046)	FL	1	SAFE	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
>Biopsy device ID	(0045,10AF)	SH	1	SAFE	GENERATED	ALWAYS	ALWAYS			Set to the needle ID used during the medical procedure when target is sent.
X-Ray 3D Acquisition Sequence	(0018,9507)	SQ	1	SAFE	GENERATED	ALWAYS	ALWAYS			
>Per Projection Acquisition Sequence	(0018,9538)	SQ	1-n	SAFE	GENERATED	ALWAYS	ALWAYS			
>>Detector Secondary angle	(0018,1531)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Detector active dimension	(0018,7026)	DS	1-2	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			

Table A-37 Private Module for Breast Tomosynthesis Image IOD

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Private Group 0045H (GEMS_SENO_02)										
Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
Clinical View	(0045,101B)	CS	1	SAFE	GENERATED	ALWAYS	ALWAYS			
Radiological Thickness	(0045,1049)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Breast ROI X	(0045,1060)	IS	4	SAFE	GENERATED	ALWAYS	ALWAYS			
Breast ROI Y	(0045,1061)	IS	4	SAFE	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
SOP Instance UID for the lossy compression	(0045,10A6)	UI	1	UNSAFE	GENERATED	ALWAYS	ALWAYS			
Reconstruction parameters	(0045,10A7)	LT	1	SAFE	GENERATED	ALWAYS	ALWAYS			
Paddle Properties	(0045,10AD)	LO	1-n	SAFE	GENERATED	ALWAYS	ALWAYS			
Biopsy Tool Sequence	(0045,10B0)	SQ	1-n	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Biopsy procedure.	
>Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
>ID of the Biopsy Device	(0045,10AF)	SH	1	SAFE	GENERATED	ALWAYS	ALWAYS			
>Biopsy Tool Name	(0045,10B1)	ST	1	SAFE	USER	ALWAYS	ALWAYS			
>Needle Post Fire	(0045,10B2)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle post fire in 1/100 mm
>Needle Notch	(0045,10B3)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle notch in 1/100 mm
>Needle Tip	(0045,10B4)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle tip in 1/100 mm
>Needle Diameter	(0045,10B5)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle diameter value in gauge
>Needle guide head thickness	(0045,10B6)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle guide thickness value in 1/100 mm. Used only in case of micro biopsy. Otherwise, value is set to 0.

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Name of the body	(0045,10B7)	ST	1	SAFE	USER	ALWAYS	ALWAYS	Revolve; ST; Magnum; Vacora; Eviva; EnCor; Generic; FNA and HOOK; Calibration Tool		
>Interface type	(0045,10B8)	ST	1	SAFE	USER	ALWAYS	ALWAYS	H; V		
>Body length	(0045,10B9)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the body in 1/100 mm.
>Device Type	(0045,10BA)	ST	1	SAFE	USER	ALWAYS	ALWAYS	CB; VAD; CALIB; FNA; GENERIC		
>Coaxial Cannula's Length	(0045,10BB)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Coaxial cannula's upper length in 1/100 mm
>Needle guide total length	(0045,10BC)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Full length of the needle in 1/100 mm
>Body Model Image Path	(0045,10BD)	ST	1	SAFE	GENERATED	ALWAYS	ALWAYS			
> Needle Axis To Body Bottom Width Distance	(0045,10BE)	IS	1	SAFE	USER	CONDITIONAL	ALWAYS		When Biopsy Tool is Generic	Distance between the closest gun part to breast support in horizontal position and the needle in 1/100mm
>Needle Axis To Body Top Width Distance	(0045,10BF)	IS	1	SAFE	USER	CONDITIONAL	ALWAYS		When Biopsy Tool is Generic	Distance between the furthest gun part to breast support in horizontal position and the needle in 1/100mm

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Needle Spacer length	(0045,10C0)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle spacer in 1/100mm
CTO reserved series instance UID	(0045,10C5)	UI	1	UNSAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Slabs and Planes	
CTO reserved SOP instance UIDs sequence	(0045,10C6)	SQ	1-n	UNSAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Slabs and Planes	
>Referenced SOP Instance UID	(0008,1155)	UI	1	UNSAFE	GENERATED	ALWAYS	ALWAYS			
Sigmoid Windowing parameters	(0045,10C7)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		If VOI LUT Function (0028,1056) is LINEAR	
Private Group 0073H (GEMS_IDI_01)										
Private Creator	(0073,0010)	LO	1	SAFE	FIXED	CONDITIONAL	ALWAYS	GEMS_IDI_1	Only for tomosynthesis generated 2D	
Height Map Plane Distance	(0073,1020)	DS	1	SAFE	FIXED	CONDITIONAL	ALWAYS	0.1	Only for tomosynthesis generated 2D	
Height Map Plane Offset	(0073,1021)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	
Height Map Plane Indices	(0073,1030)	OW	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	
Central Projection Detector Secondary Angle	(0073,1040)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Detector Active Dimensions	(0073,1050)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	

A.2.4 Breast Tomosynthesis Image IOD Specific Values and Code Sets

Table A-17 lists Coded Values referenced from the "Value" column of the tables above.

Table A-38 Values and Code Sets for Breast Tomosynthesis Image IOD

Attribute Name	Tag	Value/Code	Condition	Comments
Image Type	(0008,0008)	DERIVED\PRIMARY\TOMOSYNTHESIS\MAXIMUM	3D Routine Slabs image	
		ORIGINAL\PRIMARY\TOMOSYNTHESIS\NONE	3D Routine Planes image	
		DERIVED\PRIMARY\TOMOSYNTHESIS\NONE	3D Routine Lossy compressed Planes image	
		DERIVED\PRIMARY\TOMOSYNTHESIS\GENERATED_2D	3D Routine Generated 2D image	
		ORIGINAL\PRIMARY\TOMO_SCOUT\NONE	3D Biopsy Planes image	
		DERIVED\PRIMARY\TOMO_SCOUT\NONE	3D Biopsy Lossy compressed Planes image	

A.3 CT Image IOD

The following table defines the structure of CT Image IOD.

Table A-39 CT Image IOD

IE	Module Name	Presence (Module)	Condition	Reference
Patient	Patient	ALWAYS		Table A-1
Study	General Study	ALWAYS		Table A-2
	Patient Study	ALWAYS		Table A-3
Series	General Series	ALWAYS		Table A-4

Frame of Reference	Frame of Reference	ALWAYS		Table A-5
Equipment	General Equipment	ALWAYS		Table A-6
Acquisition	General Acquisition	ALWAYS		Table A-11
Image	General Image	ALWAYS		Table A-12
	General Reference	ALWAYS		11Table A-13
	Image Plane	ALWAYS		Table A-40
	Image Pixel	ALWAYS		Table A-8
	CT Image	ALWAYS		Table A-41
	VOI LUT	ALWAYS		Table A-15
	SOP Common	ALWAYS		Table A-10
	Standard Extended Module	ALWAYS		Table A-42
	Private Module	ALWAYS		Table A-43

A.3.1 CT Image IOD Specific Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-40 Image Plane Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Pixel Spacing	(0028,0030)	FIXED	ALWAYS	ALWAYS	0.1\0.1		
Image Orientation (Patient)	(0020,0037)	GENERATED	ALWAYS	ALWAYS			
Image Position (Patient)	(0020,0032)	GENERATED	ALWAYS	ALWAYS			
Slice Thickness	(0018,0050)	GENERATED	ALWAYS	ALWAYS			
Slice Location	(0020,1041)	GENERATED	ALWAYS	ALWAYS			Set to Instance Number x Slice thickness

Table A-41 CT Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.3.4		
Samples per Pixel	(0028,0002)	FIXED	ALWAYS	ALWAYS	1		
Photometric Interpretation	(0028,0004)	FIXED	ALWAYS	ALWAYS	MONOCHROME2		
Bits Allocated	(0028,0100)	FIXED	ALWAYS	ALWAYS	16		
Bits Stored	(0028,0101)	FIXED	ALWAYS	ALWAYS	12		
High Bit	(0028,0102)	FIXED	ALWAYS	ALWAYS	11		
Rescale Intercept	(0028,1052)	FIXED	ALWAYS	ALWAYS	0		
Rescale Slope	(0028,1053)	FIXED	ALWAYS	ALWAYS	1		
Rescale Type	(0028,1054)	FIXED	ALWAYS	ALWAYS	US		
KVP	(0018,0060)	GENERATED	ALWAYS	ALWAYS			Set to the average of the source images attribute KVP (0018,0060).
Acquisition Number	(0020,0012)	GENERATED	ALWAYS	ALWAYS			Set to frame number, starting at 0
Distance Source to Detector	(0018,1110)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the image plane at 0°.
Distance Source to Patient	(0018,1111)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the breast support plane at 0°.
Exposure Time	(0018,1150)	GENERATED	ALWAYS	ALWAYS			Set to the converted total of the source images Exposure Time (0018,1150).
X-Ray Tube Current	(0018,1151)	GENERATED	ALWAYS	ALWAYS			Set to the average of source images X-Ray Tube Current (0018,1151).
Exposure	(0018,1152)	GENERATED	ALWAYS	ALWAYS			Set the total of the individual projections' values from projections tags (0018,1152).

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Exposure in microAs	(0018,1153)	GENERATED	ALWAYS	ALWAYS			Set the total of the individual projections' values from projections tags (0018,1153).
Filter Type	(0018,1160)	SRC_INSTANCE	ALWAYS	ALWAYS			
Focal Spot(s)	(0018,1190)	SRC_INSTANCE	ALWAYS	ALWAYS			
Anatomic Region Sequence	(0008,2218)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	T-04000		
>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	SRT		
>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	Breast		
View Code Sequence	(0054,0220)	SRC_INSTANCE	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Coding Scheme Designator	(0008,0102)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Code Meaning	(0008,0104)	SRC_INSTANCE	ALWAYS	ALWAYS			
>View Modifier Code Sequence	(0054,0222)	SRC_INSTANCE	ALWAYS	SRC_COPY	Zero or more items may be present		
>>Code Value	(0008,0100)	SRC_INSTANCE	SRC_COPY	ALWAYS			
>>Coding Scheme Designator	(0008,0102)	SRC_INSTANCE	SRC_COPY	ALWAYS			
>>Code Meaning	(0008,0104)	SRC_INSTANCE	SRC_COPY	ALWAYS			

A.3.2 CT Image IOD Specific Functional Group Macros – N/A

N/A

A.3.3 CT Image IOD Specific Private Modules

The tables below list private Attributes that are used in multiple IODs generated by the system. For documentation convenience and readability, they are organized in modules, although the concept of modules does not exist in the standard for private Attributes.

Table A-42 Standard Extended Module

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Acquisition Date Time	(0008,002A)	DT	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Field of View Shape	(0018,1147)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Field of View Dimension(s) in Float	(0018,9461)	FL	1-2	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Field of View Origin	(0018,7030)	DS	2	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Field of View Rotation	(0018,7032)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Field of View Horizontal Flip	(0018,7034)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Grid	(0018,1166)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Anode Target Material	(0018,1191)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Body Part Thickness	(0018,11A0)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Compression Force	(0018,11A2)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Paddle Description	(0018,11A4)	LO	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Exposure Control Mode	(0018,7060)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Exposure Control Mode Description	(0018,7062)	LT	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Half Value Layer	(0040,0314)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Detector Temperature	(0018,7001)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Positioner Primary Angle	(0018,1510)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Detector ID	(0018,700A)	SH	1	UNSAFE	SRC_INSTANCE	ALWAYS	ALWAYS			

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Filter Material	(0018,7050)	CS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Organ Dose	(0040,0316)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Entrance Dose in mGy	(0040,8302)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Acquisition Device Processing Code	(0018,1401)	LO	1	SAFE	GENERATED	ALWAYS	ALWAYS			

Table A-43 Private Module

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
Breast ROI X	(0045,1060)	IS	4	SAFE	GENERATED	ALWAYS	ALWAYS			
Breast ROI Y	(0045,1061)	IS	4	SAFE	GENERATED	ALWAYS	ALWAYS			
Radiological Thickness	(0045,1049)	DS	1	SAFE	SRC_INSTANCE	ALWAYS	ALWAYS			
Reconstruction parameters	(0045,10A7)	LT	1-n	SAFE	GENERATED	ALWAYS	ALWAYS			
Sigmoid Windowing parameters	(0045,10C7)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		If VOI LUT Function (0028,1056) is LINEAR	

A.3.4 CT Image IOD Specific Values and Code Sets – N/A

N/A

A.4 Digital Mammography X-Ray Image IOD

The following table defines the structure of Digital Mammography X-Ray Image IOD.

Table A-44 Digital Mammography X-Ray Image IOD

IE	Module Name	Presence (Module)	Condition	Reference
Patient	Patient	ALWAYS		Table A-1
Study	General Study	ALWAYS		Table A-2
	Patient Study	ALWAYS		Table A-3
Series	General Series	ALWAYS		Table A-4
	DX Series	ALWAYS		Table A-45
	Mammography Series	ALWAYS		Table A-46
Frame of Reference	Frame of Reference	ALWAYS		Table A-5
Equipment	General Equipment	ALWAYS		Table A-6
Acquisition	General Acquisition	ALWAYS		Table A-11
Image	General Image	ALWAYS		Table A-12
	General Reference	ALWAYS		11Table A-13
	Image Pixel	ALWAYS		Table A-8
	Contrast/Bolus	CONDITIONAL	Used only in CESM	Table A-14
	Display Shutter	CONDITIONAL	Used only in 3D projections and tomosynthesis generated 2D.	Table A-16
	DX Anatomy Imaged	ALWAYS		Table A-47
	DX Image	ALWAYS		Table A-48
	DX Detector	ALWAYS		Table A-49
	X-Ray Collimator	ALWAYS		Table A-50
	DX Positioning	ALWAYS		Table A-51
	X-Ray Acquisition Dose	ALWAYS		Table A-52
	X-Ray Generation	ALWAYS		Table A-53
	X-Ray Filtration	ALWAYS		Table A-54
	X-Ray Grid	ALWAYS		Table A-55

IE	Module Name	Presence (Module)	Condition	Reference
	Mammography Image	ALWAYS		Table A-56
	VOI LUT	ALWAYS		Table A-15
	Acquisition Context	ALWAYS		Table A-9
	SOP Common	ALWAYS		Table A-10
	Private Module	ALWAYS		Table A-57

A.4.1 Digital Mammography X-Ray Image IOD Specific Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-45 DX Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	MG		
Referenced Performed Procedure Step Sequence	(0008,1111)	GENERATED	CONDITIONAL	ALWAYS	Only one item is present	If a PPS manager has been declared.	
>Referenced SOP Class UID	(0008,1150)	FIXED	ALWAYS	ALWAYS	1.2.840.10008.3.1.2.3.3		
>Referenced SOP Instance UID	(0008,1155)	GENERATED	ALWAYS	ALWAYS			
Presentation Intent Type	(0008,0068)	GENERATED	ALWAYS	ALWAYS	FOR PRESENTATION; FOR PROCESSING		

Table A-46 Mammography Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	MG		
Request Attributes Sequence	(0040,0275)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	
>Requested Procedure ID	(0040,1001)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Requested Procedure Description	(0032,1060)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Scheduled Procedure Step ID	(0040,0009)	MWL	CONDITIONAL	ALWAYS		If received from RIS.	
>Scheduled Procedure Step Description	(0040,0007)	MWL	CONDITIONAL	CONDITIONAL		If received from RIS.	
>Scheduled Protocol Code Sequence	(0040,0008)	MWL	CONDITIONAL	ALWAYS	One or more items may be present	If received from RIS.	If sequence is received incomplete, it will be corrected as described below in sequence elements
>>Code Value	(0008,0100)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, copied with code meaning
>>Coding Scheme Designator	(0008,0102)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to ”99LOCAL”.
>>Code Meaning	(0008,0104)	MWL	CONDITIONAL	ALWAYS		If received from RIS	If missing in sequence, value is set to the code value.

Table A-47 DX Anatomy Imaged Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Laterality	(0020,0062)	USER	ALWAYS	ALWAYS	R; L; B		
Anatomic Region Sequence	(0008,2218)	FIXED	ALWAYS	ALWAYS	One item is present		
>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	T-04000		
>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	SRT		
>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	Breast		

Table A-48 DX Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.1.4		
Samples per Pixel	(0028,0002)	FIXED	ALWAYS	ALWAYS	1		
Photometric Interpretation	(0028,0004)	GENERATED	ALWAYS	ALWAYS	MONOCHROME1; MONOCHROME2		For Processing: MONOCHROME1. For Presentation: MONOCHROME2.
Bits Allocated	(0028,0100)	FIXED	ALWAYS	ALWAYS	16		
Bits Stored	(0028,0101)	GENERATED	ALWAYS	ALWAYS	12; 14		For Processing: 14. For Presentation: 12.
High Bit	(0028,0102)	GENERATED	ALWAYS	ALWAYS	11; 13		For Processing: 13. For Presentation: 11.
Pixel Representation	(0028,0103)	FIXED	ALWAYS	ALWAYS	0000H		
Pixel Intensity Relationship	(0028,1040)	GENERATED	ALWAYS	ALWAYS	LIN; LOG		For Processing: LIN. For Presentation: MG.
Pixel Intensity Relationship Sign	(0028,1041)	GENERATED	ALWAYS	ALWAYS	+1; -1		For Processing: +1. For Presentation: -1.
Rescale Intercept	(0028,1052)	FIXED	ALWAYS	ALWAYS	0		
Rescale Slope	(0028,1053)	FIXED	ALWAYS	ALWAYS	1		
Rescale Type	(0028,1054)	FIXED	ALWAYS	ALWAYS	US		
Presentation LUT Shape	(2050,0020)	GENERATED	ALWAYS	ALWAYS	IDENTITY; INVERSE		For Processing: INVERSE For Presentation: IDENTITY.
Lossy Image Compression	(0028,2110)	FIXED	ALWAYS	ALWAYS	00		
Acquisition Device Processing Description	(0018,1400)	GENERATED	CONDITIONAL	ALWAYS		Only in For Presentation images	
Acquisition Device Processing Code	(0018,1401)	GENERATED	CONDITIONAL	ALWAYS		Only in For Presentation images	
Patient Orientation	(0020,0020)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images	
Burned In Annotation	(0028,0301)	FIXED	ALWAYS	ALWAYS	NO		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
VOI LUT Sequence	(0028,3010)	GENERATED	CONDITIONAL	ALWAYS	One to 4 items may be present	If VOI LUT Function (0028,1056) is SIGMOID	1 item per Window Center values (0028,1050)
>LUT Descriptor	(0028,3002)	GENERATED	ALWAYS	ALWAYS			
>LUT Explanation	(0028,3003)	GENERATED	ALWAYS	ALWAYS	NORMAL; SOFTER; HARDER; USER		
>LUT Data	(0028,3006)	GENERATED	ALWAYS	ALWAYS			
Window Center	(0028,1050)	GENERATED	CONDITIONAL	CONDITIONAL		If For Presentation image	
Window Width	(0028,1051)	GENERATED	CONDITIONAL	CONDITIONAL		If For Presentation image	
Window Center & Width Explanation	(0028,1055)	GENERATED	CONDITIONAL	ALWAYS	NORMAL; SOFTER; HARDER; USER	If For Presentation image	

Table A-49 DX Detector Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Detector Type	(0018,7004)	FIXED	ALWAYS	ALWAYS	SCINTILLATOR		
Detector Configuration	(0018,7005)	FIXED	ALWAYS	ALWAYS	AREA		
Detector Description	(0018,7006)	GENERATED	ALWAYS	ALWAYS			
Detector ID	(0018,700A)	GENERATED	ALWAYS	ALWAYS			
Date of Last Detector Calibration	(0018,700C)	GENERATED	ALWAYS	ALWAYS			
Time of Last Detector Calibration	(0018,700E)	GENERATED	ALWAYS	ALWAYS			
Detector Binning	(0018,701A)	FIXED	ALWAYS	ALWAYS	1.0\1.0		
Detector Conditions Nominal Flag	(0018,7000)	GENERATED	ALWAYS	ALWAYS	YES; NO		
Detector Temperature	(0018,7001)	GENERATED	ALWAYS	ALWAYS			
Sensitivity	(0018,6000)	GENERATED	ALWAYS	ALWAYS			
Detector Element Physical Size	(0018,7020)	FIXED	ALWAYS	ALWAYS	0.1\0.1		
Detector Element Spacing	(0018,7022)	FIXED	ALWAYS	ALWAYS	0.1\0.1		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Detector Active Shape	(0018,7024)	FIXED	ALWAYS	ALWAYS	RECTANGLE		
Detector Active Dimension(s)	(0018,7026)	FIXED	ALWAYS	ALWAYS	286.0\240.0		
Field of View Shape	(0018,1147)	FIXED	ALWAYS	ALWAYS	RECTANGLE		
Field of View Dimension(s)	(0018,1149)	GENERATED	ALWAYS	ALWAYS			
Field of View Origin	(0018,7030)	GENERATED	ALWAYS	ALWAYS			
Field of View Rotation	(0018,7032)	GENERATED	ALWAYS	ALWAYS	270; 180; 90; 0		
Field of View Horizontal Flip	(0018,7034)	GENERATED	ALWAYS	ALWAYS	YES; NO		
Imager Pixel Spacing	(0018,1164)	FIXED	ALWAYS	ALWAYS	0.1\0.1		
Pixel Spacing	(0028,0030)	GENERATED	ALWAYS	ALWAYS			

Table A-50 X-Ray Collimator Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Collimator Shape	(0018,1700)	FIXED	ALWAYS	ALWAYS	RECTANGULAR		
Collimator Left Vertical Edge	(0018,1702)	GENERATED	ALWAYS	ALWAYS			
Collimator Right Vertical Edge	(0018,1704)	GENERATED	ALWAYS	ALWAYS			
Collimator Upper Horizontal Edge	(0018,1706)	GENERATED	ALWAYS	ALWAYS			
Collimator Lower Horizontal Edge	(0018,1708)	GENERATED	ALWAYS	ALWAYS			

Table A-51 DX Positioning Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
View Position	(0018,5101)	GENERATED	ALWAYS	ALWAYS			
View Code Sequence	(0054,0220)	GENERATED	ALWAYS	ALWAYS	Only one item is present		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Coding Scheme Designator	(0008,0102)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>View Modifier Code Sequence	(0054,0222)	GENERATED	ALWAYS	CONDITIONAL	Zero or one items may be present	If view modifier has been selected by the user.	
>>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>>Coding Scheme Designator	(0008,0102)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
Distance Source to Patient	(0018,1111)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	Distance in mm from the source to the breast support.
Distance Source to Detector	(0018,1110)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the image plane.
Estimated Radiographic Magnification Factor	(0018,1114)	GENERATED	ALWAYS	ALWAYS			Set to SID/(SOD – 20 mm) for all images except breast spacer and specimen images. Set to SID/(SOD – 40mm) for images with breast spacer. Set to SID/SOD for specimen images.
Positioner Type	(0018,1508)	FIXED	ALWAYS	ALWAYS	MAMMOGRAPHIC		
Positioner Primary Angle	(0018,1510)	GENERATED	ALWAYS	ALWAYS			
Detector Secondary Angle	(0018,1531)	GENERATED	ALWAYS	ALWAYS			
Body Part Thickness	(0018,11A0)	GENERATED	ALWAYS	ALWAYS			
Compression Force	(0018,11A2)	GENERATED	ALWAYS	ALWAYS			
Paddle Description	(0018,11A4)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	

Table A-52 X-Ray Acquisition Dose Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
KVP	(0018,0060)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
X-Ray Tube Current	(0018,1151)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure Time	(0018,1150)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure	(0018,1152)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure in microAs	(0018,1153)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Distance Source to Detector	(0018,1110)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the image plane.
Distance Source to Patient	(0018,1111)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	Distance in mm from the source to the breast support.
Body Part Thickness	(0018,11A0)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	
Relative X-Ray Exposure	(0018,1405)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined and specimen images.	
Entrance Dose	(0040,0302)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined and specimen images.	
Entrance Dose in mGy	(0040,8302)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined and specimen images.	
Distance Source to Entrance	(0040,0306)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the compression paddle. Value is set to the at 0° for all TOMO projections.

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Comments on Radiation Dose	(0040,0310)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	Breast glandularity in %.
Half Value Layer	(0040,0314)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined and specimen images.	
Organ Dose	(0040,0316)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined and specimen images.	
Organ Exposed	(0040,0318)	FIXED	ALWAYS	ALWAYS	BREAST		
Anode Target Material	(0018,1191)	GENERATED	ALWAYS	ALWAYS	MOLYBDENUM; RHODIUM		
Filter Type	(0018,1160)	FIXED	CONDITIONAL	ALWAYS	STRIP	Not sent for CESM Recombined.	
Filter Material	(0018,7050)	GENERATED	CONDITIONAL	ALWAYS	MOLYBDENUM; SILVER; COPPER	Not sent for CESM Recombined.	

Table A-53 X-Ray Generation Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
KVP	(0018,0060)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
X-Ray Tube Current	(0018,1151)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure Time	(0018,1150)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure	(0018,1152)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure in microAs	(0018,1153)	GENERATED	CONDITIONAL	ALWAYS		Not sent for CESM Recombined.	
Exposure Control Mode	(0018,7060)	GENERATED	ALWAYS	ALWAYS	MANUAL; AUTOMATIC		
Exposure Control Mode Description	(0018,7062)	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Exposure Status	(0018,7064)	GENERATED	ALWAYS	ALWAYS	NORMAL; ABORTED		
Focal Spot(s)	(0018,1190)	GENERATED	ALWAYS	ALWAYS	0.1; 0.3		
Anode Target Material	(0018,1191)	GENERATED	ALWAYS	ALWAYS	MOLYBDENUM; RHODIUM		

Table A-54 X-Ray Filtration Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Filter Type	(0018,1160)	FIXED	CONDITIONAL	ALWAYS	STRIP	Not sent for CESM Recombined.	
Filter Material	(0018,7050)	GENERATED	CONDITIONAL	ALWAYS	MOLYBDENUM; SILVER; COPPER	Not sent for CESM Recombined.	

Table A-55 X-Ray Grid Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Grid	(0018,1166)	GENERATED	ALWAYS	ALWAYS	RECIPROCATING\FOCUSED		

Table A-56 Mammography Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS	See Section A.1.4		
Positioner Type	(0018,1508)	FIXED	ALWAYS	ALWAYS	MAMMOGRAPHIC		
Distance Source to Detector	(0018,1110)	GENERATED	ALWAYS	ALWAYS			Distance in mm from the source to the image plane.
Distance Source to Patient	(0018,1111)	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images.	Distance in mm from the source to the breast support.

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Positioner Primary Angle	(0018,1510)	GENERATED	ALWAYS	ALWAYS			
Positioner Primary Angle Direction	(0018,9559)	FIXED	ALWAYS	ALWAYS	CC		
Image Laterality	(0020,0062)	USER	ALWAYS	ALWAYS	R; L; B		
Organ Exposed	(0040,0318)	FIXED	ALWAYS	ALWAYS	BREAST		
Breast Implant Present	(0028,1300)	MWL; USER	CONDITIONAL	ALWAYS	YES; NO	Not sent for specimen images	
Anatomic Region Sequence	(0008,2218)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	T-04000		
>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	SRT		
>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	Breast		
View Code Sequence	(0054,0220)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Coding Scheme Designator	(0008,0102)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>View Modifier Code Sequence	(0054,0222)	GENERATED	ALWAYS	CONDITIONAL	Zero or one items may be present	If view modifier has been selected by the user.	
>>Code Value	(0008,0100)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>>Coding Scheme Designator	(0008,0102)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
>>Code Meaning	(0008,0104)	GENERATED	ALWAYS	ALWAYS	See Section A.4.4		
Biopsy Target Sequence	(0018,2041)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	Only for Biopsy procedure, in “For Presentation” images, except specimen images.	
>Target UID	(0018,2042)	GENERATED	ALWAYS	ALWAYS			
>Localizing Cursor Position	(0018,2043)	GENERATED	ALWAYS	ALWAYS			
>Calculated Target Position	(0018,2044)	GENERATED	ALWAYS	ALWAYS			
>Displayed Z Value	(0018,2046)	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Target Label	(0018,2045)	GENERATED	ALWAYS	ALWAYS			

A.4.2 Digital Mammography X-Ray Image IOD Specific Functional Group Macros – N/A

N/A

A.4.3 Digital Mammography X-Ray Image IOD Specific Private Modules

The tables below list private Attributes that are used in multiple IODs generated by the system. For documentation convenience and readability, they are organized in modules, although the concept of modules does not exist in the standard for private Attributes.

Table A-57 Private Module

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Private Group 0045H (GEMS_SENO_02)										
Biopsy Target Sequence	(0018,2041)	SQ	1-n	SAFE	GENERATED	CONDITIONAL	CONDITIONAL	One or more items may be present	Only present for Biopsy procedure	
>Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
>Biopsy device ID	(0045,10AF)	SH	1	SAFE	GENERATED	ALWAYS	ALWAYS			Set to the needle ID used during the medical procedure when target is sent.
Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
Angulation	(0045,1006)	DS	1	SAFE	GENERATED	ALWAYS	ALWAYS			
Clinical View	(0045,101B)	CS	1	SAFE	GENERATED	ALWAYS	ALWAYS			
Radiological Thickness	(0045,1049)	DS	1	SAFE	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Mu	(0045,1058)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image and not tomosynthesis generated 2D	
Threshold	(0045,1059)	IS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image.	
Breast ROI X	(0045,1060)	IS	4	SAFE	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image.	
Breast ROI Y	(0045,1061)	IS	4	SAFE	GENERATED	CONDITIONAL	ALWAYS		If For Presentation image.	
User Window Center	(0045,1062)	IS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If For Processing image	
User Window Width	(0045,1063)	IS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If For Processing image	
Segmentation Threshold	(0045,1064)	IS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		if For Presentation image and not tomosynthesis generated 2D	
Image Crop point	(0045,1072)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Biopsy procedure	
Signal Average Factor	(0045,10A0)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for CESM procedure	
Organ dose for source images	(0045,10A1)	DS	2-n	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for CESM procedure	

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Entrance dose in mGy for source images	(0045,10A2)	DS	2-n	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for CESM procedure	
X-ray Source Position	(0045,10A3)	DS	3	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for 3D projections, tomosynthesis generated 2D and Biopsy procedure	
Cumulative organ dose	(0045,10AB)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If DBT projection image.	
Cumulative entrance dose	(0045,10AC)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If DBT projection image.	
Paddle Properties	(0045,10AD)	LO	1-n	SAFE	GENERATED	CONDITIONAL	ALWAYS		Not sent for specimen images	
Biopsy Tool Sequence	(0045,10B0)	SQ	1-n	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Biopsy procedure.	
>Private Creator	(0045,0010)	LO	1	SAFE	FIXED	ALWAYS	ALWAYS	GEMS_SENO_02		
>ID of the Biopsy device	(0045,10AF)	SH	1	SAFE	GENERATED	ALWAYS	ALWAYS			
>Biopsy Device Name	(0045,10B1)	ST	1	SAFE	USER	ALWAYS	ALWAYS			
>Needle Post Fire	(0045,10B2)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle post fire in 1/100 mm
>Needle Notch	(0045,10B3)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle notch in 1/100 mm

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Needle Tip	(0045,10B4)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the needle tip in 1/100 mm
>Needle Diameter	(0045,10B5)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle diameter value in gauge
>Needle guide head thickness	(0045,10B6)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle guide thickness value in 1/100 mm. Used only in case of micro biopsy. Otherwise, value is set to 0.
>Name of the body	(0045,10B7)	ST	1	SAFE	USER	ALWAYS	ALWAYS	Revolve; ST; Magnum; Vacora; Eviva; EnCor; Generic; FNA and HOOK; Calibration Tool		
>Interface type	(0045,10B8)	ST	1	SAFE	USER	ALWAYS	ALWAYS	H; V		
>Body length	(0045,10B9)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Length of the body in 1/100 mm.
>Device Type	(0045,10BA)	ST	1	SAFE	USER	ALWAYS	ALWAYS	CB; VAD; CALIB; FNA; GENERIC		
>Coaxial Cannula's Length	(0045,10BB)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Coaxial cannula's upper length in 1/100 mm
>Needle guide total length	(0045,10BC)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Full length of the needle in 1/100 mm

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Body Model Image Path	(0045,10BD)	ST	1	SAFE	GENERATED	ALWAYS	ALWAYS			
> Needle Axis To Body Bottom Width Distance	(0045,10BE)	IS	1	SAFE	USER	CONDITIONAL	ALWAYS		When Biopsy Tool is Generic	Distance between the closest gun part to breast support in horizontal position and the needle in 1/100mm
>Needle Axis To Body Top Width Distance	(0045,10BF)	IS	1	SAFE	USER	CONDITIONAL	ALWAYS		When Biopsy Tool is Generic	Distance between the furthest gun part to breast support in horizontal position and the needle in 1/100mm
>Needle Spacer length	(0045,10C0)	IS	1	SAFE	USER	ALWAYS	ALWAYS			Needle spacer in 1/100mm
Distance image plan to breast support	(0045,10C1)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D and Biopsy images, except specimen	
Breast Support Properties	(0045,10C3)	LO	2-7	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for Biopsy procedure	
IFF inputs	(0045,10C4)	LO	6	SAFE	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Sigmoid Windowing parameters	(0045,10C7)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		If VOI LUT Function (0028,1056) is LINEAR	
Regal parameters	(0045,10C8)	LT	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If 2D Routine For Processing or 2D Routine For Presentation	
Regal displacement matrix	(0045,10C9)	LT	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		If 2D Routine For Processing or 2D Routine For Presentation	
Private Group 0073H (GEMS_IDI_01)										
Private Creator	(0073,0010)	LO	1	SAFE	FIXED	CONDITIONAL	ALWAYS	GEMS_IDI_1	Only for tomosynthesis generated 2D	
Height Map Plane Distance	(0073,1020)	DS	1	SAFE	FIXED	CONDITIONAL	ALWAYS	0.1	Only for tomosynthesis generated 2D	
Height Map Plane Offset	(0073,1021)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	
Height Map Plane Indices	(0073,1030)	OW	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	
Central Projection Detector Secondary Angle	(0073,1040)	DS	1	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Detector Active Dimensions	(0073,1050)	DS	2	SAFE	GENERATED	CONDITIONAL	ALWAYS		Only for tomosynthesis generated 2D	

A.4.4 Digital Mammography X-Ray Image IOD Specific Values and Code Sets

Table A-17 lists Coded Values referenced from the "Value" column of the tables above.

Table A-58 Values and Code Sets for Digital Mammography X-Ray Image IOD

Attribute Name	Tag	Value/Code	Condition	Comments
View Code Sequence	(0054,0220)	(R-10224, SRT, “medio-lateral”)	ML view	
		(R-10226, SRT, “medio-lateral oblique”)	MLO view	
		(R-10228, SRT, “latero-medial”)	LM view	
		(R-10230, SRT, “latero-medial oblique”)	LMO view	
		(R-10242, SRT, “cranio-caudal”)	CC view	
		(R-10244, SRT, “caudo-cranial (from below) ”)	FB view	
		(R-102D0, SRT, “superolateral to inferomedial oblique”)	SIO view	
		(R-40AAA, SRT, “inferomedial to superolateral oblique”)	ISO view	
		(R-1024A, SRT, “cranio-caudal exaggerated laterally”)	XCCL view	
		(R-1024B, SRT, “cranio-caudal exaggerated medially”)	XCCM view	
		(G-8310, SRT, “tissue specimen from breast”)	Specimen image	
View Modifier Code Sequence	(0054,0222)	(R-102D2, SRT, “Cleavage”)	CV view modifier	
		(R-102D1, SRT, “Axillary Tail”)	AT view modifier	
		(R-102D3, SRT, “Rolled Lateral”)	RL view modifier	
		(R-102D4, SRT, “Rolled Medial”)	RM view modifier	

Attribute Name	Tag	Value/Code	Condition	Comments
		(R-102CA, SRT, “Rolled Inferior”)	RI view modifier	
		(R-102C9, SRT, “Rolled Superior”)	RS view modifier	
		(R-102D5, SRT, “Implant Displaced”)	ID view modifier	
		(R-102D6, SRT, “Magnification”)	Mag view	
		(R-102D7, SRT, “Spot Compression”)	S view modifier	
		(R-102C2, SRT, “Tangential”)	TAN view modifier	
		(R-40AB3, SRT, “Nipple in profile”)	NP view modifier	
		(P2-00161, SRT, “Anterior compression”)	AC view Modifier	
		(R-40ABE, SRT, “Infra-mammary fold”)	IMF view modifier	
		(R-40AB2, SRT, “Axillary tissue”)	AX view modifier	

A.5 Grayscale Softcopy Presentation State IOD

The following table defines the structure of Grayscale Softcopy Presentation State IOD.

Table A-59 Grayscale Softcopy Presentation State IOD

IE	Module Name	Presence (Module)	Condition	Reference
Patient	Patient	ALWAYS		Table A-1
Study	General Study	ALWAYS		Table A-2
	Patient Study	ALWAYS		Table A-3
Series	General Series	ALWAYS		Table A-4
	Presentation Series	ALWAYS		Table A-60
Equipment	General Equipment	ALWAYS		Table A-6
Presentation State	Presentation State Identification	ALWAYS		Table A-61
	Presentation State Relationship	ALWAYS		Table A-62

IE	Module Name	Presence (Module)	Condition	Reference
	Displayed Area	ALWAYS		Table A-63
	Graphic Annotation	ALWAYS		Table A-64
	Graphic Layer	ALWAYS		Table A-65
	Softcopy Presentation LUT	ALWAYS		Table A-66
	SOP Common	ALWAYS		Table A-10

A.5.1 Grayscale Softcopy Presentation State IOD Specific Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-60 Presentation Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	PR		

Table A-61 Presentation State Identification Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Presentation Creation Date	(0070,0082)	GENERATED	ALWAYS	ALWAYS			
Presentation Creation Time	(0070,0083)	GENERATED	ALWAYS	ALWAYS			
Instance Number	(0020,0013)	GENERATED	ALWAYS	ALWAYS			
Content Label	(0070,0080)	FIXED	ALWAYS	ALWAYS	USER ANNOTATION		
Content Description	(0070,0081)	GENERATED	ALWAYS	ALWAYS			
Content Creator's Name	(0070,0084)	GENERATED	ALWAYS	ALWAYS			

Table A-62 Presentation State Relationship Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Referenced Series Sequence	(0008,1115)	GENERATED	ALWAYS	ALWAYS	Only one item is present.		
>Series Instance UID	(0020,000E)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Referenced Image Sequence	(0008,1140)	GENERATED	ALWAYS	ALWAYS	Only one item is present.		
>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced Frame Number	(0008,1160)	GENERATED	CONDITIONAL	CONDITIONAL		If GSPS refers to a BTO image.	

Table A-63 Displayed Area Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Displayed Area Selection Sequence	(0070,005A)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Displayed Area Top Left Hand Corner	(0070,0052)	FIXED	ALWAYS	ALWAYS	1\1		
>Displayed Area Bottom Right Hand Corner	(0070,0053)	GENERATED	ALWAYS	ALWAYS			Set to number of columns and rows of the associated image.
>Presentation Size Mode	(0070,0100)	FIXED	ALWAYS	ALWAYS	SCALE TO FIT		
>Presentation Pixel Aspect Ratio	(0070,0102)	FIXED	ALWAYS	ALWAYS	1\1		

Table A-64 Graphic Annotation Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Graphic Annotation Sequence	(0070,0001)	GENERATED	ALWAYS	ALWAYS	One or more items may be present		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Referenced Image Sequence	(0008,1140)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	If GSPS is referencing a 3D volume. Not sent if referencing a 2D image.	
>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced Frame Number	(0008,1160)	GENERATED	ALWAYS	ALWAYS			
>Graphic Layer	(0070,0002)	FIXED	ALWAYS	ALWAYS	GEHC		
>Text Object Sequence	(0070,0008)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	Sent if annotation has text.	
>>Bounding Box Annotation Units	(0070,0003)	FIXED	ALWAYS	ALWAYS	PIXEL		
>>Anchor Point Annotation Units	(0070,0004)	FIXED	ALWAYS	ALWAYS	PIXEL		
>>Unformatted Text Value	(0070,0006)	USER	ALWAYS	ALWAYS			
>>Bounding Box Top Left Hand Corner	(0070,0010)	GENERATED	ALWAYS	ALWAYS			
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	GENERATED	ALWAYS	ALWAYS			
>>Bounding Box Text Horizontal Justification	(0070,0012)	FIXED	ALWAYS	ALWAYS	LEFT		
>>Anchor Point	(0070,0014)	GENERATED	ALWAYS	ALWAYS			
>>Anchor Point Visibility	(0070,0015)	GENERATED	ALWAYS	ALWAYS	Y; N		
>Graphic Object Sequence	(0070,0009)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	Sent if annotation has graphic	
>>Graphic Annotation Units	(0070,0005)	FIXED	ALWAYS	ALWAYS	PIXEL		
>>Graphic Dimensions	(0070,0020)	FIXED	ALWAYS	ALWAYS	2		
>>Number of Graphic Points	(0070,0021)	GENERATED	ALWAYS	ALWAYS			
>>Graphic Data	(0070,0022)	GENERATED	ALWAYS	ALWAYS			
>>Graphic Type	(0070,0023)	GENERATED	ALWAYS	ALWAYS	POLYLINE; ELLIPSE		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>>Graphic Filled	(0070,0024)	FIXED	CONDITIONAL	CONDITIONAL	N		

Table A-65 Graphic Layer Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Graphic Layer Sequence	(0070,0060)	FIXED	ALWAYS	ALWAYS	Only one item is present		
>Graphic Layer	(0070,0002)	FIXED	ALWAYS	ALWAYS	GEHC		
>Graphic Layer Order	(0070,0062)	FIXED	ALWAYS	ALWAYS	1		
>Graphic Layer Description	(0070,0068)	FIXED	ALWAYS	ALWAYS	User's annotation		

Table A-66 Softcopy Presentation LUT Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Presentation LUT Shape	(2050,0020)	FIXED	ALWAYS	ALWAYS	IDENTITY		

A.5.2 Grayscale Softcopy Presentation State IOD Specific Functional Group Macros – N/A

N/A

A.5.3 Grayscale Softcopy Presentation State IOD Specific Private Modules – N/A

N/A

A.5.4 Grayscale Softcopy Presentation State IOD Specific Values and Code Sets – N/A

N/A

A.6 X-Ray Radiation Dose SR IOD

The following table defines the structure of X-Ray Radiation Dose SR IOD.

Table A-67 X-Ray Radiation Dose SR IOD

IE	Module Name	Presence (Module)	Condition	Reference
Patient	Patient	ALWAYS		Table A-1
Study	General Study	ALWAYS		Table A-2
	Patient Study	ALWAYS		Table A-3
Series	SR Document Series	ALWAYS		Table A-68
Equipment	General Equipment	ALWAYS		Table A-6
	Enhanced General Equipment	ALWAYS		Table A-7
SR Document	SR Document General	ALWAYS		Table A-69
	SR Document Content	ALWAYS		Table A-70
	SOP Common	ALWAYS		Table A-10

A.6.1 X-Ray Radiation Dose SR IOD Specific Modules

All SOP Instances generated by the system use the common modules listed in Table A-1 to Table A-10 or a subset of them, as defined in the IOD specific subsections below.

Table A-68 SR Document Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	SR		
Series Instance UID	(0020,000E)	GENERATED	ALWAYS	ALWAYS			
Series Number	(0020,0011)	GENERATED	ALWAYS	ALWAYS			
Series Date	(0008,0021)	GENERATED	ALWAYS	ALWAYS			
Series Time	(0008,0031)	GENERATED	ALWAYS	ALWAYS			
Series Description	(0008,103E)	FIXED	ALWAYS	ALWAYS	Radiation Dose Structured Report		
Referenced Performed Procedure Step Sequence	(0008,1111)	GENERATED	ALWAYS	CONDITIONAL	Zero or one item may be present	If a PPS manager has been declared.	
>Referenced SOP Class UID	(0008,1150)	FIXED	ALWAYS	ALWAYS	1.2.840.10008.3.1.2.3.3		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Referenced SOP Instance UID	(0008,1155)	GENERATED	ALWAYS	ALWAYS			

Table A-69 SR Document General Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Instance Number	(0020,0013)	FIXED	ALWAYS	ALWAYS	1		
Preliminary Flag	(0040,A496)	FIXED	ALWAYS	ALWAYS	FINAL		
Completion Flag	(0040,A491)	FIXED	ALWAYS	ALWAYS	COMPLETE		
Verification Flag	(0040,A493)	FIXED	ALWAYS	ALWAYS	UNVERIFIED		
Content Date	(0008,0023)	GENERATED	ALWAYS	ALWAYS			Set to the date the document is created.
Content Time	(0008,0033)	GENERATED	ALWAYS	ALWAYS			Set to the time the document is created.
Referenced Request Sequence	(0040,A370)	GENERATED	CONDITIONAL	ALWAYS	One or more items may be present	If SPS is received from the RIS.	
>Study Instance UID	(0020,000D)	MWL	ALWAYS	ALWAYS			
>Referenced Study Sequence	(0008,1110)	MWL	ALWAYS	CONDITIONAL	Zero or one item may be present	If received from RIS	
>>Referenced SOP Class UID	(0008,1150)	MWL	ALWAYS	ALWAYS			
>>Referenced SOP Instance UID	(0008,1155)	MWL	ALWAYS	ALWAYS			
>Accession Number	(0008,0050)	MWL	ALWAYS	CONDITIONAL		If received from RIS	
>Placer Order Number / Imaging Service Request	(0040,2016)	EMPTY	ALWAYS	EMPTY			
>Filler Order Number / Imaging Service Request	(0040,2017)	EMPTY	ALWAYS	EMPTY			
>Requested Procedure ID	(0040,1001)	MWL	ALWAYS	CONDITIONAL		If received from RIS	
>Requested Procedure Description	(0032,1060)	MWL	ALWAYS	CONDITIONAL		If received from RIS	

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Requested Procedure Code Sequence	(0032,1064)	MWL	ALWAYS	CONDITIONAL	Zero or one item may be present	If received from RIS	
>>Code Value	(0008,0100)	MWL	ALWAYS	ALWAYS			
>>Coding Scheme Designator	(0008,0102)	MWL	ALWAYS	ALWAYS			
>>Code Meaning	(0008,0104)	MWL	ALWAYS	ALWAYS			
Performed Procedure Code Sequence	(0040,A372)	EMPTY	ALWAYS	EMPTY			
Current Requested Procedure Evidence Sequence	(0040,A375)	GENERATED	ALWAYS	ALWAYS	One or more items may be present		References to all the acquired and stored x-ray images of the study.
>Study Instance UID	(0020,000D)	SRC_INSTANCE	ALWAYS	ALWAYS			
>Referenced Series Sequence	(0008,1115)	SRC_INSTANCE	ALWAYS	ALWAYS	One or more items may be present		
>>Series Instance UID	(0020,000E)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>Referenced SOP Sequence	(0008,1199)	GENERATED	ALWAYS	ALWAYS	One or more items may be present		
>>>Referenced SOP Class UID	(0008,1150)	SRC_INSTANCE	ALWAYS	ALWAYS			
>>>Referenced SOP Instance UID	(0008,1155)	SRC_INSTANCE	ALWAYS	ALWAYS			

Table A-70 SR Document Content Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Value Type	(0040,A040)	FIXED	ALWAYS	ALWAYS	CONTAINER		
Concept Name Code Sequence	(0040,A043)	GENERATED	ALWAYS	ALWAYS	Only one item is present		
>Code Value	(0008,0100)	FIXED	ALWAYS	ALWAYS	113701		
>Coding Scheme Designator	(0008,0102)	FIXED	ALWAYS	ALWAYS	DCM		

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Code Meaning	(0008,0104)	FIXED	ALWAYS	ALWAYS	X-Ray Radiation Dose Report		
Continuity Of Content	(0040,A050)	FIXED	ALWAYS	ALWAYS	SEPARATE		
Content Template Sequence	(0040,A504)	GENERATED	ALWAYS	ALWAYS	See Annex B for encoding on supported TIDs		

A.6.2 X-Ray Radiation Dose SR IOD Specific Functional Group Macros – N/A

N/A

A.6.3 X-Ray Radiation Dose SR IOD Specific Private Modules – N/A

N/A

A.6.4 X-Ray Radiation Dose SR IOD Specific Values and Code Sets – N/A

N/A

A.7 Basic Directory IOD

Table A-71 defines the structure of the Basic Directory IOD.

Table A-71 Basic Directory IOD

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
File Set Identification Module							
File-set ID	(0004,1130)	GENERATED	ALWAYS	ALWAYS			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Directory Information Module							
Offset of the First Directory Record of the Root Directory Entity	(0004,1200)	GENERATED	ALWAYS	ALWAYS			
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	GENERATED	ALWAYS	ALWAYS			
File-set Consistency Flag	(0004,1212)	FIXED	ALWAYS	ALWAYS	0000H		
Directory Record Sequence	(0004,1220)	GENERATED	ALWAYS	ALWAYS	Zero or more items may be present		
>Offset of the Next Directory Record	(0004,1400)	GENERATED	ALWAYS	ALWAYS			
>Record In-use Flag	(0004,1410)	FIXED	ALWAYS	ALWAYS	FFFFH		
>Offset of Referenced Lower-Level Directory Entity	(0004,1420)	GENERATED	ALWAYS	ALWAYS			
>Directory Record Type	(0004,1430)	GENERATED	ALWAYS	ALWAYS	PATIENT; STUDY; SERIES; IMAGE; PRESENTATION; SR DOCUMENT		
>Referenced File ID	(0004,1500)	GENERATED	CONDITIONAL	ALWAYS		Generated only for Image Directory Record	Starts with A/A/A/A/Z01
>Referenced SOP Class UID in File	(0004,1510)	SRC_INSTANCE	SRC_COPY	ALWAYS			
>Referenced SOP Instance UID in File	(0004,1511)	SRC_INSTANCE	SRC_COPY	ALWAYS			
>Referenced Transfer Syntax UID in File	(0004,1512)	SRC_INSTANCE	SRC_COPY	ALWAYS			
Patient Keys							
>Specific Character Set	(0008,0005)	SRC_INSTANCE	SRC_COPY	SRC_COPY			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Patient's Name	(0010,0010)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Patient ID	(0010,0020)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Patient Birth Date	(0010,0030)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Patient Sex	(0010,0040)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
Study Keys							
>Specific Character Set	(0008,0005)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Study Date	(0008,0020)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Study Time	(0008,0030)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Study Description	(0008,1030)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Study Instance UID	(0020,000D)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Study ID	(0020,0010)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Accession Number	(0008,0050)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
Series Keys							
>Specific Character Set	(0008,0005)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Modality	(0008,0060)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Series Instance UID	(0020,000E)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Series Number	(0020,0011)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Manufacturer	(0008,0070)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Manufacturer's Model Name	(0008,1090)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Performing Physician's Name	(0008,1050)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Institution Name	(0008,0080)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Institution Address	(0008,0081)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Image Type	(0008,0008)	SRC_INSTANCE	SRC_COPY	SRC_COPY			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Keys							
>Specific Character Set	(0008,0005)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Instance Number	(0020,0013)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Rows	(0028,0010)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Columns	(0028,0011)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>SOP Instance UID	(0008,0018)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Acquisition Time	(0008,0032)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Acquisition Datetime	(0008,002A)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Image Type	(0008,0008)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Referenced Image Sequence	(0008,1140)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Slice Thickness	(0018,0050)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Spacing between slices	(0018,0088)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Data Collection Diameter	(0018,0090)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Contrast/Bolus Route	(0018,1040)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Trigger Time	(0018,1060)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Reconstruction Diameter	(0018,1100)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Gantry/Detector Tilt	(0018,1120)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Convolution Kernel	(0018,1210)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Flip Angle	(0018,1314)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Acquisition Time Synchronized	(0018,1800)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Image Position (Patient)	(0020,0032)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Image Orientation (Patient)	(0020,0037)	SRC_INSTANCE	SRC_COPY	SRC_COPY			

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
>Frame of Reference UID	(0020,0052)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Slice Location	(0020,1041)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Synchronization Frame of Reference UID	(0020,0200)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Pixel Spacing	(0028,0030)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Number of Frames	(0028,0008)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Calibration Image	(0050,0004)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Units	(0054,1001)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Attenuation Correction Method	(0054,1101)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Reconstruction Method	(0054,1103)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
SR Document Keys							
>Specific Character Set	(0008,0005)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Instance Number	(0020,0013)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Completion Flag	(0040, A491)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Verification Flag	(0040, A493)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Content Date	(0008,0023)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Content Time	(0008,0033)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>Concept Name Code Sequence	(0040,A043)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>>Code Value	(0008,1000)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>>Coding Scheme Designator	(0008,1002)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>>Code Meaning	(0008,1004)	SRC_INSTANCE	SRC_COPY	SRC_COPY			
>SOP Instance UID	(0008,0018)	SRC_INSTANCE	SRC_COPY	SRC_COPY			

B Structured Report Content Encoding

This section provides the detailed content encoding for all TIDs supported by Senographe Pristina.

Throughout the tables listed in Annex B the following codes are used for the "Source" and "Presence of Content Item" columns.

In the "Source" column, the following Values can be used:

- FIXED: The Value is pre-defined and cannot be modified.
- GENERATED: The Value is generated by the system.
- CONFIGURATION: The Value is copied from the system configuration.
- MWL: The Value is copied from a Modality Worklist entry.
- QUERY: The Value is determined by performing a query of any of the supported Query/Retrieve Services.
- USER: The Value is entered by the user.
- SCANNED: The Value is read from a barcode scanner or similar device.
- EMPTY: The Attribute is sent with a zero-length Value.
- SRC_INSTANCE: The Value is copied from previously created/received SOP Instances.

In the "Presence of Content Item" the following Values can be used:

- ALWAYS: the module, functional group macro, Attributes or Value is always present.
- CONDITIONAL: the presence of the module, functional group macro, Attributes or Value is dependent on a condition. The condition must be listed in the "Comments" column.
- SRC_COPY: The presence of the Attributes and Values depends on the availability of these in the source instances, which are used for copying this information.
- EMPTY: The Attribute is present but without a Value (zero length).

B.1 Projection X-Ray Radiation Dose (TID 10001)

TableB-1shows the encoding of content of a Projection X-Ray Radiation Dose (TID 10001)

TableB-1 Projection X-Ray Radiation Dose (TID 10001)

NL	Rel with Parent	VT	Concept Name	Source	Presence of Content Item	Values	TID	Comments
		CONTAINER	(113701, DCM, "X-Ray Radiation Dose Report")				10001	
>	HAS CONCEPT MOD	CODE	(121058, DCM, "Procedure reported")	FIXED	ALWAYS	(P5-40010, SRT, "Mammography")	10001	
>>	HAS CONCEPT MOD	CODE	(G-C0E8, SRT, "Has Intent")	FIXED	ALWAYS	(R-408C3, SRT, “Diagnostic Intent”)	10001	
>	HAS OBS CONTEXT	CODE	(121005, DCM, "Observer Type")	FIXED	ALWAYS	(121007, DCM, "Device")	1002	
>	HAS OBS CONTEXT	UIDREF	(121012, DCM, "Device Observer UID")	GENERATED	ALWAYS	Unique identifier of the equipment	1004	
>	HAS OBS CONTEXT	TEXT	(121013, DCM, "Device Observer Name")	GENERATED	ALWAYS	Same as Station Name (0008,1010)	1004	
>	HAS OBS CONTEXT	TEXT	(121014, DCM, "Device Observer Manufacturer")	FIXED	ALWAYS	GE HEALTHCARE	1004	
>	HAS OBS CONTEXT	TEXT	(121015, DCM, "Device Observer Model Name")	FIXED	ALWAYS	Senographe Pristina	1004	
>	HAS OBS CONTEXT	TEXT	(121016, DCM, "Device Observer Serial Number")	GENERATED	ALWAYS	Same as Device Serial Number (0008,1000)	1004	
>	HAS OBS CONTEXT	CODE	(113876, DCM, "Device Role in Procedure")	FIXED	ALWAYS	(113859, DCM, “Irradiating Device”)	1004	
>	HAS OBS CONTEXT	TEXT	(110119, DCM, "Station AE Title")	CONFIGURATION	ALWAYS	AE Title of the acquisition device	1004	
>	HAS OBS CONTEXT	CODE	(113705, DCM, "Scope of Accumulation")	FIXED	ALWAYS	(113014, DCM, “Study”)	10001	
>>	HAS PROPERTIES	UIDREF	(110180, DCM, “Study Instance UID”)	GENERATED	ALWAYS	Same as Study Instance UID (00020,000D)	10001	
>	CONTAINS	CODE	(113945, DCM, "X-Ray Detector Data Available")	FIXED	ALWAYS	(R-0038D, SRT, “Yes”)	10001	

NL	Rel with Parent	VT	Concept Name	Source	Presence of Content Item	Values	TID	Comments
>	CONTAINS	CODE	(113943, DCM, "X-Ray Source Data Available")	FIXED	ALWAYS	(R-0038D, SRT, “Yes”)	10001	
>	CONTAINS	CODE	(113944, DCM, "X-Ray Mechanical Data Available")	FIXED	ALWAYS	(R-0038D, SRT, “Yes”)	10001	
>	CONTAINS	CONTAINER	(113702, DCM, "Accumulated X-Ray Dose Data")	GENERATED	ALWAYS		10002	
>>	HAS CONCEPT MOD	CODE	(113764, DCM, "Acquisition Plane")	FIXED	ALWAYS	(113622, DCM, "Single Plane")	10002	
>>	CONTAINS	NUM	(111637, DCM, "Accumulated Average Glandular Dose")	GENERATED	ALWAYS	UNITS=(mGy, UCUM, "mGy") Value=left breast dose	10005	
>>>	HAS CONCEPT MOD	CODE	(272741003, SCT, "Laterality")	FIXED	ALWAYS	(T-04030, SRT, ”Left Breast”)	10005	
>>	CONTAINS	NUM	(111637, DCM, "Accumulated Average Glandular Dose")	GENERATED	ALWAYS	UNITS=(mGy, UCUM, "mGy") Value=right breast dose	10005	
>>>	HAS CONCEPT MOD	CODE	(272741003, SCT, "Laterality")	FIXED	ALWAYS	(T-04020, SRT, ”Right Breast”)	10005	
>	CONTAINS	CONTAINER	(113706, DCM, "Irradiation Event X-Ray Data")	GENERATED	ALWAYS		10003	Repeated for each irradiation event
>>	HAS CONCEPT MOD	CODE	(113764, DCM, "Acquisition Plane")	FIXED	ALWAYS	(113622, DCM, “Single Plane”)	10003	
>>	CONTAINS	UIDREF	(113769, DCM, "Irradiation Event UID")	GENERATED	ALWAYS		10003	
>>	CONTAINS	DATETIME	(111526, DCM, "DateTime Started")	GENERATED	ALWAYS		10003	
>>	CONTAINS	CODE	(113721, DCM, "Irradiation Event Type")	GENERATED	ALWAYS	(113611, DCM, “Stationary Acquisition”); (113613, DCM, “Rotational Acquisition”)	10003	
>>	CONTAINS	TEXT	(125203, DCM, "Acquisition Protocol")	GENERATED	ALWAYS	ROUTINE; 3D_ROUTINE; CESM; 3D_ROUTINE+2D_ROUTINE;	10003	

NL	Rel with Parent	VT	Concept Name	Source	Presence of Content Item	Values	TID	Comments
						STEREO; 3D_BIOPSY; SAMPLE; CESM_BIOPSY		
>>	CONTAINS	CODE	(T-D0005, SRT, "Anatomical structure")	FIXED	ALWAYS	(T-04000, SRT, “Breast”)	10003*	Standard Extended
>>>	HAS CONCEPT MOD	CODE	(G-C171, SRT, "Laterality")	GENERATED	ALWAYS	(G-A100, SRT, “Right”); (G-A101, SRT, “Left”); (G-A102, SRT, “Right and left")	10003*	Standard Extended
>>	CONTAINS	CODE	(111031, DCM, "Image View")	GENERATED	ALWAYS	See Table B-2	10003	
>>>	HAS CONCEPT MOD	CODE	(111032, DCM, "Image View Modifier")	GENERATED	CONDITIONAL	See Table B-3	10003	If view modifier applied.
>>	CONTAINS	CODE	(123014, DCM, "Target Region")	FIXED	ALWAYS	(T-04000, SRT, “Breast”)	10003	
>>	CONTAINS	NUM	(111634, DCM, "Half Value Layer")	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003	
>>	CONTAINS	NUM	(111636, DCM, "Entrance Exposure at RP")	GENERATED	ALWAYS	UNITS=(mGy, UCUM, "mGy")	10003	
>>	CONTAINS	CODE	(113780, DCM, "Reference Point Definition")	FIXED	ALWAYS	(13964, DCM, “At Surface of Patient”)	10003	
>>	CONTAINS	IMAGE	(113795, DCM, "Acquired Image")	SRC_INSTANCE	ALWAYS	Reference (SOP Class and SOP instance UID) to the images part of this irradiation event.	10003A	Row repeated for each image to be referenced.
>>	CONTAINS	NUM	(111631, DCM, "Average Glandular Dose")	GENERATED	ALWAYS	UNITS=(mGy, UCUM, "mGy")	10003B	
>>	CONTAINS	NUM	(113768, DCM, "Number of Pulses")	GENERATED	ALWAYS	UNITS=(1, UCUM, "no units")	10003B	
>>	CONTAINS	NUM	(113793, DCM, "Pulse Width")	GENERATED	ALWAYS	UNITS=(ms, UCUM, "ms")	10003B	Row repeated for each pulse in the irradiation event.
>>	CONTAINS	NUM	(113742, DCM, "Irradiation	GENERATED	ALWAYS	UNITS=(s, UCUM, "s")	10003B	

NL	Rel with Parent	VT	Concept Name	Source	Presence of Content Item	Values	TID	Comments
			Duration")					
>>	CONTAINS	NUM	(113733, DCM, "KVP")	GENERATED	ALWAYS	UNITS=(kV, UCUM, "kV")	10003B	Row repeated for each pulse in the irradiation event.
>>	CONTAINS	NUM	(113734, DCM, "X-Ray Tube Current")	GENERATED	ALWAYS	UNITS=(mA, UCUM, "mA")	10003B	Row repeated for each pulse in the irradiation event.
>>	CONTAINS	NUM	(113824, DCM, "Exposure Time")	GENERATED	ALWAYS	UNITS=(ms, UCUM, "ms")	10003B	
>>	CONTAINS	NUM	(113766, DCM, "Focal Spot Size")	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003B	
>>	CONTAINS	CODE	(111632, DCM, "Anode Target Material")	GENERATED	ALWAYS	(C-150F9, SRT, “Molybdenum or Molybdenum compound”); (C-167F9, SRT, “Rhodium or Rhodium compound”)	10003B	
>>	CONTAINS	CONTAINER	(113771, DCM, "X-Ray Filters")	GENERATED	ALWAYS		10003B	This container and its nested items are repeated for each pulse of the irradiation event.
>>>	CONTAINS	CODE	(113772, DCM, "X-Ray Filter Type")	FIXED	ALWAYS	(113650, DCM, “Strip filter”)	10003B	
>>>	CONTAINS	CODE	(113757, DCM, "X-Ray Filter Material")	GENERATED	ALWAYS	(C-150F9, SRT, “Molybdenum or Molybdenum compound”); (C-137F9, SRT, “Silver or Silver compound”); (C-127F9, SRT, “Copper or Copper compound”)	10003B	
>>	CONTAINS	NUM	(113790, DCM, "Collimated Field Area")	GENERATED	ALWAYS	UNITS=(m2, UCUM, "m2")	10003B	

NL	Rel with Parent	VT	Concept Name	Source	Presence of Content Item	Values	TID	Comments
>>	CONTAINS	NUM	(113788, DCM, "Collimated Field Height")	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003B	
>>	CONTAINS	NUM	(113789, DCM, "Collimated Field Width")	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003B	
>>	CONTAINS	CODE	(111635, DCM, "X-Ray Grid")	FIXED	ALWAYS	(111643, DCM, “Reciprocating grid”)	10003B	
>>	CONTAINS	CODE	(113956, DCM, "CR/DR Mechanical Configuration")	FIXED	ALWAYS	(113954, DCM, “Upright Stand Mount”)	10003C	
>>	CONTAINS	NUM	(112011, DCM, "Positioner Primary Angle")	GENERATED	ALWAYS	UNITS=(deg, UCUM, "deg")	10003C	
>>	CONTAINS	NUM	(111633, DCM, "Compression Thickness")	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003C	
>>	CONTAINS	NUM	(111647, DCM, "Compression Force")	GENERATED	ALWAYS	UNITS=(N, UCUM, "Newton")	10003C	
>>	CONTAINS	NUM	(113737, DCM, “Distance Source to Reference Point”)	GENERATED	ALWAYS	UNITS=(mm, UCUM, "mm")	10003C	
>	CONTAINS	CODE	(113854, DCM, "Source of Dose Information")	FIXED	ALWAYS	(113856, DCM, “Automated Data Collection”)	10001	

B.1.1 Code Sets

The following tables list specific code sets referenced from the Projection X-Ray Radiation Dose (TID 10001)

Table B-2 Projection X-Ray Radiation Dose (TID 10001) – Image View

Coding Scheme Designator	Code Value	Code Meaning
SRT	R-10224	medio-lateral
SRT	R-10226	medio-lateral oblique
SRT	R-10228	latero-medial
SRT	R-10230	latero-medial oblique
SRT	R-10242	cranio-caudal

Coding Scheme Designator	Code Value	Code Meaning
SRT	R-10244	caudo-cranial (from below)
SRT	R-102D0	superolateral to inferomedial oblique
SRT	R-40AAA	inferomedial to superolateral oblique
SRT	R-1024A	cranio-caudal exaggerated laterally
SRT	R-1024B	cranio-caudal exaggerated medially

Table B-3 Projection X-Ray Radiation Dose (TID 10001) – Image View Modifier

Coding Scheme Designator	Code Value	Code Meaning
SRT	R-102D2	Cleavage
SRT	R-102D1	Axillary Tail
SRT	R-102D3	Rolled Lateral
SRT	R-102D4	Rolled Medial
SRT	R-102CA	Rolled Inferior
SRT	R-102C9	Rolled Superior
SRT	R-102D5	Implant Displaced
SRT	R-102D6	Magnification
SRT	R-102D7	Spot Compression
SRT	R-102C2	Tangential
SRT	R-40AB3	Nipple in profile
SRT	P2-00161	Anterior compression
SRT	R-40ABE	Infra-mammary fold
SRT	R-40AB2	Axillary tissue

B.1.2 Measurement Encoding – N/A

N/A

C Security Details

This section provides additional details about security features that are formally described in Section 8.

C.1 External Network Requirement Details

C.1.1 Basic Time Synchronization

Senographe Pristina is not able to find NTP server. The NTP server IP address must be entered in the Service User Interface.

C.1.2 Basic Network Address Management

Senographe Pristina can discover automatically the DCHP server at boot and obtain an IP address from it.

C.1.3 Application Configuration Management

Table C-1 defines the security patterns supported:

Table C-1 LDAP Security Patterns

Actor	LDAP Security Pattern	Supported	Comments
LDAP Client	TLS	Y	
	TLS-Manual	Y	
	Basic	Y	
	Basic-Manual	Y	
	Anonymous	N	
	Anonymous-Manual	N	

C.1.4 DNS Service Discovery – N/A

N/A

C.2 DICOM Security Profile Details

C.2.1 Online Electronic Storage Secure Use – N/A

N/A

C.2.2 Audit Trail Messages

Table C-2 specifies the DICOM Audit Messages that Senographe Pristina can detect and report. It defines the list of triggers that will cause the Audit Message to be generated and if these triggers can be configured or not. It also specifies whether the content of the Audit Message can be configured or not.

Table C-2 DICOM Specific Audit Messages

Audit Message	Used	Supported Triggers	Configurable Triggers	Configurable Message	Comments
Application Activity	Y	1. Application start 2. Application stop	N	N	Event ID 110100
Audit Log Used	N				Event ID 110101

Audit Message	Used	Supported Triggers	Configurable Triggers	Configurable Message	Comments
Begin Transferring DICOM Instances	Y	DICOM SOP instance transferred to remote host starts	N	N	Event ID 110102
Data Export	Y	Image transfer to media device	N	N	Event ID 110106
Data Import	N				Event ID 110107
DICOM Instance Accessed	Y	DICOM SOP instance viewed, updated, deleted	N	N	Event ID 110103
DICOM Instance Transferred	Y	DICOM SOP instance transferred to remote host ends	N	N	Event ID 110104
DICOM Study Deleted	Y	Deletion of one or more studies	N	N	Event ID 110105
Network Entry	N				Event ID 110108
Query	N				Event ID 110112
Security Alert	Y	1. Unix user password updates from Service interface. 2. Network configuration 3. Login user password updates from Admin UI 4. Add / Remove of login user from Admin UI	N	N	Event ID 110113
User Authentication	Y	1. User login 2. User logout	N	N	Event ID 110114
Order Record	N				Event ID 110109
Patient Record	N				Event ID 110110
Procedure Record	N				Event ID 110111

Table C-3 specifies the implementation details of each audit message supported by this product.

Table C-3 Audit Message Details

Real-World Entities	Field Name	Supported	Value Constraints
Application Activity Message			
Event	EventID	Y	EV (110100, DCM, "Application Activity")
	EventActionCode	Y	Enumerated Value E = Execute
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	If application start or stop successfully, the value will be 0
	EventTypeCode	Y	DT (110120, DCM, "Application Start") DT (110121, DCM, "Application Stop")
Active Participant: Application started (1)	UserID	Y	Process ID
	AlternativeUserID	N	Not used
	UserName	Y	Process Name
	UserIsRequestor	Y	Value is "false"

Real-World Entities	Field Name	Supported	Value Constraints
	RoleIDCode	Y	EV (110150, DCM, "Application")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Persons and or processes that started the Application (0..N)	UserID	Y	User ID of the user who logs into the system
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	EV (110151, DCM, "Application Launcher")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Begin Transferring DICOM Instances			
Event	EventID	Y	EV (110102, DCM, "Begin Transferring DICOM Instances")
	EventActionCode	Y	E = Execute
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	N	Not used
Active Participant: Process Sending the Data (1)	UserID	Y	Login user
	AlternativeUserID	N	Not used
	UserName	Y	System name
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	EV (110153, DCM, "Source Role ID")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Process receiving the data (1)	UserID	Y	Destination host IP
	AlternativeUserID	Y	Destination host AETitle
	UserName	Y	Destination host name
	UserIsRequestor	Y	Value is "false"
	RoleIDCode	Y	EV (110152, DCM, "Destination Role ID")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Other Participants (0..N)	UserID	N	Not used
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	N	Not used
	RoleIDCode	N	Not used

Real-World Entities	Field Name	Supported	Value Constraints
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Participating Object: Studies being transferred (1..N)	ParticipantObjectTypeCode	Y	Value is 2 (System object)
	ParticipantObjectTypeCodeRole	Y	Value is 3 (Report)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	EV (110180, DCM, "Study Instance UID")
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Study Instance UID of study/studies transferred
	ParticipantObjectName	N	Not used
	ParticipantObjectQuery	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	Y	Details of SOP class with one or more SOP class UID values
	SOPClass	Y	One or more SOP class UID values
	Accession	N	Not used
	NumberOfInstances	Y	Number of SOP Instance UIDs
	Instances	Y	List of SOP Instance UIDs
	Encrypted	N	Not used
	Anonymized	N	Not used
Participating Object: Patient (1)	ParticipantObjectTypeCode	Y	Value is 1 (Person)
	ParticipantObjectTypeCodeRole	Y	Value is 1 (Patient)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 2 (Patient Number)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Patient ID
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	N	Not used
Data Export			
Event	EventID	Y	EV (110106, DCM, "Export")
	EventActionCode	Y	R = Read
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	N	Not used
Active Participant: Remote Users and Processes	UserID	N	Not used
	AlternativeUserID	N	Not used

Real-World Entities	Field Name	Supported	Value Constraints
(0..n)	UserName	N	Not used
	UserIsRequestor	N	Not used
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: User or Process Exporting the data(1..2)	UserID	Y	Login id
	AlternativeUserID	Y	Not used
	UserName	Y	Process Name
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	EV (110153, DCM, "Source Role ID")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Media (1)	UserID	Y	Media ID
	AlternativeUserID	Y	Media Name
	UserName	N	Not used
	UserIsRequestor	Y	Value is "false"
	RoleIDCode	Y	EV (110154, DCM, "Destination Media")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
	MediaIdentifier	N	Not used
	MediaType	Y	(110030, DCM, “USB Disk Emulation”) (110031, DCM, “Email”) (110032, DCM, “CD”) (110033, DCM, “DVD”) (110034, DCM, “Compact Flash”) (110035, DCM, “Multi-media Card”) (110036, DCM, “Secure Digital Card”) (110037, DCM, “URI”) (110010, DCM, “Film”) (110038, DCM, “Paper Document”)
Participating Object: Studies (0..N)	ParticipantObjectTypeCode	Y	Value is 2 (System object)
	ParticipantObjectTypeCodeRole	Y	Value is 3 (Report)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	EV (110180, DCM, "Study Instance UID")
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Study Instance UID of study/studies exported
	ParticipantObjectName	N	Not used

Real-World Entities	Field Name	Supported	Value Constraints
	ParticipantObjectQuery	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	Y	Details of SOP class with one or more SOP class UID values
	SOPClass	Y	One or more SOP class UID values
	Accession	N	Not used
	NumberOfInstances	Y	Number of SOP Instance UIDs
	Instances	Y	List of SOP Instance UIDs
	Encrypted	Y	Value is either true or false
	Anonymized	Y	Value is either true or false
Participating Object: Patient (1..N)	ParticipantObjectTypeCode	Y	Value is 1 (Person)
	ParticipantObjectTypeCodeRole	Y	Value is 1 (Patient)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 2 (Patient Number)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Patient ID of patient / patients
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	N	Not used
DICOM Instance Accessed			
Event	EventID	Y	EV (110103, DCM, "DICOM Instances Accessed")
	EventActionCode	Y	Enumerated value: C = Create R = Read U = Update D = Delete
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	N	Not used
Active Participant: Person and or Process manipulating the data (1..2)	UserID	Y	Process ID
	AlternativeUserID	N	Not used
	UserName	Y	Process Name
	UserIsRequestor	Y	Value is "false"
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant:	UserID	Y	Login id

Real-World Entities	Field Name	Supported	Value Constraints
Person and or Process manipulating the data (1..2)	AlternativeUserID	Y	Not used
	UserName	Y	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	Not used
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Participating Object: Studies (1..N)	ParticipantObjectTypeCode	Y	Value is 2 (System object)
	ParticipantObjectTypeCodeRole	Y	Value is 3 (Report)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	EV (110180, DCM, "Study Instance UID")
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Study Instance UID of study/studies accessed
	ParticipantObjectName	N	Not used
	ParticipantObjectQuery	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	Y	Details of SOP class with one or more SOP class UID values
	SOPClass	Y	One or more SOP class UID values
	Accession	N	Not used
	NumberOfInstances	Y	Number of SOP Instance UIDs
	Instances	Y	List of SOP Instance UIDs
	Encrypted	N	Not used
	Anonymized	N	Not used
Participating Object: Patient (1)	ParticipantObjectTypeCode	Y	Value is 1 (Person)
	ParticipantObjectTypeCodeRole	Y	Value is 1 (Patient)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 2 (Patient Number)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Patient ID
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	N	Not used
DICOM Instance Transferred			
Event	EventID	Y	EV (110104, DCM, "DICOM Instances Transferred")
	EventActionCode	Y	R = Read
	EventDateTime	Y	Internally generated in UTC format

Real-World Entities	Field Name	Supported	Value Constraints
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	N	Not used
Active Participant: Process that sent the data (1)	UserID	Y	Login user
	AlternativeUserID	Y	System name
	UserName	Y	System name
	UserIsRequestor	Y	If the transfer of the DICOM instance is initiated by the user, the value will be “false”. If the transfer of the DICOM instance is initiated by the system, the value will be “true”.
	RoleIDCode	Y	EV (110153, DCM, "Source Role ID")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Process that received the data (1)	UserID	Y	Destination host IP
	AlternativeUserID	Y	Destination host AETitle
	UserName	Y	Destination host name
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	EV (110152, DCM, "Destination Role ID")
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Active Participant: Other participants that are known, especially third parties that are the requestor (0..N)	UserID	N	Not used
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	N	Not used
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Participating Object: Studies being transferred (1..N)	ParticipantObjectTypeCode	Y	Value is 2 (System object)
	ParticipantObjectTypeCodeRole	Y	Value is 3 (Report)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	EV (110180, DCM, "Study Instance UID")
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Study Instance UID of study/studies transferred
	ParticipantObjectName	N	Not used
	ParticipantObjectQuery	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	Y	Details of SOP class with one or more SOP class UID values

Real-World Entities	Field Name	Supported	Value Constraints
	SOPClass	Y	One or more SOP class UID values
	Accession	N	Not used
	NumberOfInstances	Y	Number of SOP Instance UIDs
	Instances	Y	List of SOP Instance UIDs
	Encrypted	N	Not used
	Anonymized	N	Not used
Participating Object: Patient (1)	ParticipantObjectTypeCode	Y	Value is 1 (Person)
	ParticipantObjectTypeCodeRole	Y	Value is 1 (Patient)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 2 (Patient Number)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Patient ID
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	N	Not used
DICOM Study Deleted			
Event	EventID	Y	EV (110105, DCM, "DICOM Study Deleted")
	EventActionCode	Y	Enumerated value: D = Delete
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	N	Not used
Active Participant: the person or process deleting the study (1..2)	UserID	Y	Login ID
	AlternativeUserID	N	Not used
	UserName	Y	Process Name
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	N	Not used
	NetworkAccessPointID	N	Not used
Participating Object: Studies being deleted (1..N)	ParticipantObjectTypeCode	Y	Value is 2 (System object)
	ParticipantObjectTypeCodeRole	Y	Value is 3 (Report)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	EV (110180, DCM, "Study Instance UID")
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Study Instance UID of study/studies deleted

Real-World Entities	Field Name	Supported	Value Constraints
	ParticipantObjectName	N	Not used
	ParticipantObjectQuery	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	Y	Details of SOP class with one or more SOP class UID values
	SOPClass	Y	One or more SOP class UID values
	Accession	N	Not used
	NumberOfInstances	Y	Number of SOP Instance UIDs
	Instances	Y	List of SOP Instance UIDs
	Encrypted	N	Not used
	Anonymized	N	Not used
Participating Object: Patient (1)	ParticipantObjectTypeCode	Y	Value is 1 (Person)
	ParticipantObjectTypeCodeRole	Y	Value is 1 (Patient)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 2 (Patient Number)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	The Patient ID
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	N	Not used
	ParticipantObjectDescription	N	Not used
Security Alert			
Event	EventID	Y	EV (110113, DCM, "Security Alert")
	EventActionCode	Y	Enumerated Value E = Execute
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	Y	- EV (110137, DCM, "User Security Attributes Changed") when performing update of the username or password, adding or removing users, adding or removing users from groups, enterprise authentication with invalid user, user lock enable or disable, password reset on next logon enable or disable - EV (110128, DCM, "Network Configuration") when DICOM remote host configuration is changed - EV (110130, DCM, "Hardware Configuration") when date, time, time zone configuration is changed - EV (110131, DCM, "Software Configuration") upon software integrity check success, failure and update
Active Participant: Reporting Person and/or	UserID	Y	Process ID
	AlternativeUserID	N	Not used

Real-World Entities	Field Name	Supported	Value Constraints
Process (1..2)	UserName	N	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	Y	not specialized
	NetworkAccessPointID	Y	not specialized
Active Participant: Performing Persons or Processes (0..N)	UserID	Y	User ID of the user who logs into the system
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	Y	not specialized
	NetworkAccessPointID	Y	not specialized
Participating Object: Alert Subject (0..N)	ParticipantObjectTypeCode	Y	Value is 2 (system object)
	ParticipantObjectTypeCodeRole	Y	Value is 13 (Security Resource)
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is 12 (URI)
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	Local System IP Address or User ID
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	Y	Type = “Alert Description” and Value = Text description about the alert
	ParticipantObjectDescription	N	Not used
	SOPClass	N	Not used
	Accession	N	Not used
	NumberOfInstances	N	Not used
	Instances	N	Not used
	Encrypted	N	Not used
	Anonymized	N	Not used
User Authentication			
Event	EventID	Y	EV (110114, DCM, "User Authentication")
	EventActionCode	Y	E = Execute
	EventDateTime	Y	Internally generated in UTC format
	EventOutcomeIndicator	Y	0 for Success
	EventTypeCode	Y	EV (110122, DCM, "Login") EV (110123, DCM, "Logout")

Real-World Entities	Field Name	Supported	Value Constraints
Active Participant: Person Authenticated or claimed (1)	UserID	Y	Sent with value as the “User ID@localhost” when a local user logs in or logs out from the system. Sent with value as the “User ID@localhost” when an enterprise user logs into the system. Sent the value as the “User ID” when an enterprise user log in fails.
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	Y	EV (110150, DCM, “Application”)
	NetworkAccessPointTypeCode	Y	not specialized
	NetworkAccessPointID	Y	not specialized
Active Participant: Node or System performing authentication (0..1)	UserID	Y	localhost
	AlternativeUserID	N	Not used
	UserName	N	Not used
	UserIsRequestor	Y	Value is "true"
	RoleIDCode	N	Not used
	NetworkAccessPointTypeCode	Y	not specialized
	NetworkAccessPointID	Y	not specialized
Participating Object: Alert Subject (0..N)	ParticipantObjectTypeCode	N	Not used
	ParticipantObjectTypeCodeRole	N	Not used
	ParticipantObjectDataLifeCycle	N	Not used
	ParticipantObjectIDTypeCode	Y	Value is empty
	ParticipantObjectSensitivity	N	Not used
	ParticipantObjectID	Y	Value is "Detail"
	ParticipantObjectName	N	Not used
	ParticipantObjectDetail	Y	Type = “Detail” and Value = Text description
	ParticipantObjectDescription	N	Not used
	SOPClass	N	Not used
	Accession	N	Not used
	NumberOfInstances	N	Not used
	Instances	N	Not used
	Encrypted	N	Not used
	Anonymized	N	Not used

C.2.3 Audit Trail Message Transmission Profile - SYSLOG - TLS

See Section 6.6 Audit Trail Syslog Configuration for information about Syslog-TLS parameters.

C.2.4 Audit Trail Message Transmission Profile - SYSLOG - UDP

See Section 6.6 Audit Trail Syslog Configuration for information about Syslog-UDP parameters.

C.2.5 Secure Transport Connection Details – N/A

N/A

C.2.6 Attribute Confidentiality Details - N/A

N/A

C.2.7 Digital Signature Details – N/A

N/A

C.2.8 Additional DICOM Security Profile Details – N/A

N/A

D Mapping of Attributes

D.1 Mapping Between Modality Worklist Instances and MPPS

Table D-1 describes the mapping of Attributes between Modality Worklist Instances and MPPS messages.

In the "Scenario" column the following Values are used:

- SCHEDULED: The image acquisition was scheduled at the RIS and procedure details have been communicated in the MWL query)
- UNSCHEDULED: The image acquisition was performed without Modality Worklist information
- APPEND: Instances acquired are added to an existing study after the initial procedure was finalized

In the "Value Source" columns, the following Values are used. The column cell may additionally contain an Attribute Tag if the value is copied from a different Attribute.

- GENERATED: The Value is generated by the system.
- SRC_INSTANCE: The Value is copied from previously created instances.
- MWL: The Value is copied from a Modality Worklist entry.
- USER: The Value is entered by the user.
- EMPTY: The Attribute is sent with a zero-length Value.

The "Destination" columns either contain TOP, if the Attribute is added to the top level Data Set of the Instance, or contain the Attribute Tag of the Sequence the Attribute will be added to. The "Comments" column can be used to provide additional information regarding the Values added to the Instance or MPPS.

Table D-1 Mapping of Attributes from Modality Worklist to Instance and MPPS

Attribute Name in Image/MPPS	Tag	Scenario	Image		MPPS		Comments
			Value Source	Destination	Value Source	Destination	
Performing Physician's Name	(0008,1050)	SCHEDULED	MWL (0040,0006); USER	TOP	SRC_INSTANCE	(0040,0340)	(0040,0006) is Scheduled Performing Physician Name

Attribute Name in Image/MPPS	Tag	Scenario	Image		MPPS		Comments
			Value Source	Destination	Value Source	Destination	
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	(0040,0340)	(0040,0340) is
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	(0040,0340)	Performed Series Sequence
Scheduled Procedure Step Description	(0040,0007)	SCHEDULED	MWL; USER	(0040,0275) (0040,0254)	SRC_INSTANCE	(0040,0270) (0040,0254)	Scheduled Procedure Step Description (0040,0007) is copied into Performed Procedure Step Description (0040,0254) if user has not modified the procedure description in UI (0040,0270) is Scheduled Step Attribute Sequence
		APPEND	SRC_INSTANCE	(0040,0275) (0040,0254)	SRC_INSTANCE	(0040,0270) (0040,0254)	
Scheduled Protocol Code Sequence	(0040,0008)	SCHEDULED	MWL	(0040,0275)	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence
		APPEND	SRC_INSTANCE	(0040,0275)	SRC_INSTANCE	(0040,0270)	
Scheduled Procedure Step ID	(0040,0009)	SCHEDULED	MWL	(0040,0275)	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence
		APPEND	SRC_INSTANCE	(0040,0275)	SRC_INSTANCE	(0040,0270)	
Referenced Study Sequence	(0008,1110)	SCHEDULED	MWL	TOP	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	(0040,0270)	
Study Instance UID	(0020,000D)	SCHEDULED	MWL	TOP	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence
		UNSCHEDULED	GENERATED	TOP	SRC_INSTANCE	(0040,0270)	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	(0040,0270)	
Requested Procedure Description	(0032,1060)	SCHEDULED	MWL	(0040,0275) (0008,1030)	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence (0008,1030) is study description
		APPEND	SRC_INSTANCE	(0040,0275) (0008,1030)	SRC_INSTANCE	(0040,0270)	
Procedure Code Sequence	(0008,1032)	SCHEDULED	MWL (0032,1064)	(0040,0275)	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	(0040,0275)	SRC_INSTANCE	TOP	
Requested Procedure ID	(0040,1001)	SCHEDULED	MWL	(0040,0275) (0020,0010)	SRC_INSTANCE	(0040,0270) (0020,0010)	(0040,0270) is Scheduled Step Attribute Sequence (0020,0010) is Study ID
		APPEND	SRC_INSTANCE	(0040,0275) (0020,0010)	SRC_INSTANCE	(0040,0270) (0020,0010)	
Accession Number	(0008,0050)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	(0040,0270)	(0040,0270) is Scheduled Step Attribute Sequence
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	(0040,0270)	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	(0040,0270)	

Attribute Name in Image/MPPS	Tag	Scenario	Image		MPPS		Comments
			Value Source	Destination	Value Source	Destination	
Referring Physician's Name	(0008,0090)	SCHEDULED	MWL; USER	TOP			Attribute not mapped in MPPS
		UNSCHEDULED	USER	TOP			
		APPEND	SRC_INSTANCE	TOP			
Patient Name	(0010,0010)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	TOP	
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	TOP	
Patient ID	(0010,0020)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	TOP	
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	TOP	
Other Patient ID	(0010,1000)	SCHEDULED	MWL	TOP			Attribute not mapped in MPPS
		APPEND	SRC_INSTANCE	TOP			
Patient Birth Date	(0010,0030)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	TOP	
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	TOP	
Patient Sex	(0010,0040)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	TOP	
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	TOP	
Breast Implant Present	(0028,1300)	SCHEDULED	MWL; USER	TOP			Attribute not mapped in MPPS
		UNSCHEDULED	USER	TOP			
		APPEND	SRC_INSTANCE	TOP			
Operator Name	(0008,1070)	SCHEDULED	MWL; USER	TOP	SRC_INSTANCE	(0040,0340)	(0040,0340) is Performed Series Sequence
		UNSCHEDULED	USER	TOP	SRC_INSTANCE	(0040,0340)	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	(0040,0340)	
Study ID	(0020,0010)	SCHEDULED	MWL (0040,1001)	TOP	SRC_INSTANCE	TOP	(0040,1001) is Requested Procedure ID
		UNSCHEDULED	GENERATED	TOP	SRC_INSTANCE	TOP	
		APPEND	SRC_INSTANCE	TOP	SRC_INSTANCE	TOP	
Study Description	(0008,1030)	SCHEDULED	MWL (0032,1060)	TOP			Attribute not mapped in MPPS
		UNSCHEDULED	USER	TOP			
		APPEND	SRC_INSTANCE	TOP			

E Code Set Usage

The Senographe Pristina is using the SNOMED RT codes for the data it generates. However, it can display images that are using either the SNOMED RT or the SNOMED CT codes and properly display their view names.