DICOM Conformance Statement

DigitalDiagnost3.2

PHILIPS

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Document Number: ICAP-PF.0019314
Date: 8-February-2016

1   DICOM Conformance Statement Overview

This document is the DICOM Conformance Statement for the Philips Medical Systems DigitalDiagnost 3.2 system.

A table of Supported Networking DICOM Services, (SOP) Classes is provided with roles (User/Provider) and can be found on the next page.

DigitalDiagnost 3.2, which is the third DigitalDiagnost release, is based on the Eleva platform Inc 37.

The figure below shows the position of the DigitalDiagnost 3.2 in a radiology environment.
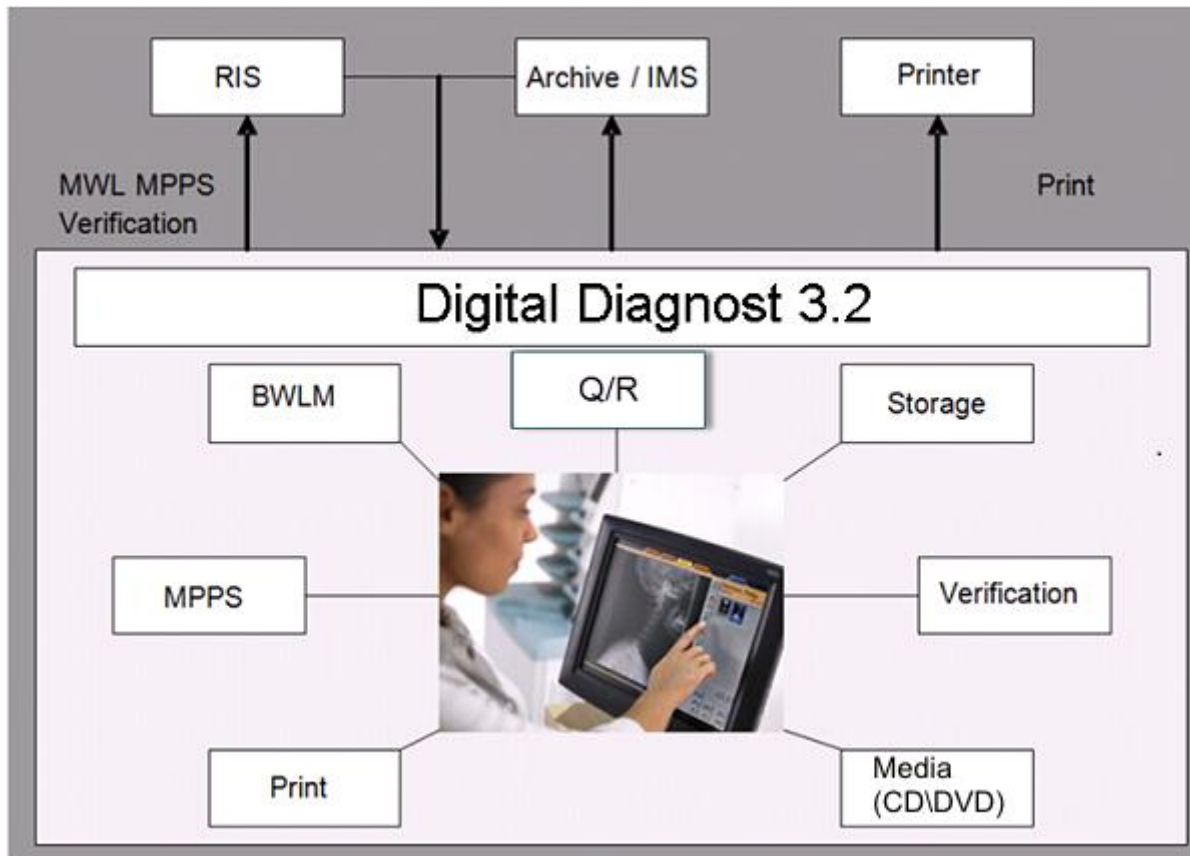

Figure 1 DigitalDiagnost 3.2 in a DICOM network

DigitalDiagnost 3.2 is an embedded modality system for acquiring DICOM images. It provides, among other things, the following features:

- Verification of application level communication.
- Basic Worklist Management (BWLM)
- Storage of images on a remote DICOM System.
- Commitment request for stored images on a remote DICOM system (Push Model)
- Storage of Dose SR instances on a remote DICOM System.
- Study Management per Modality Performed Procedure Step (MPPS).
- Printing of hardcopies on a remote DICOM Printer.
- Storage of images per DICOM Media only on Compact Disc (CD/DVD).
- Query and Retrieve of instances from an external DICOM system (Q/R)

Table 1 Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Viewable
Name	**UID**			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes	No
Print Management				
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	No
>Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No	No
Query/Retrieve				
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No	No
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No	No
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No	No
Transfer				
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Yes	No	No
Workflow Management				
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	No
Storage Commitment Push Model SOP Clsss	1.2.840.10008.1.20.1	Yes	No	No

A table of Supported Media Storage Application Profiles (with roles) is provided

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)	Display Directory (DD)
Compact Disk-Recordable				
General Purpose CD-R Interchange	Yes	No	No	No
DVD				
General Purpose DVD Interchange with JPEG	Yes	No	No	No

2 Table of Contents

3   Introduction

The introduction specifies product and relevant disclaimers as well as any general information that the vendor feels is appropriate.

3.1   Revision History

The revision history provides dates and differences of the different releases.

Table 3: Revision History

Document Version	Date of Issue	Status	Description
00	8-February-2016	Authorized	Final Version

3.2   Audiences

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

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

3.3   Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyse thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4 Definitions, Terms and Abbreviations

Table 3 Definition, Terms and Abbreviations

Abbreviation/Term	Explanation
ANSI	American National Standard Institute
AE	Application Entity
AP	Application Profile
BOT	Basic Offset Table
CD-R	CD-Recordable
CD	Compact Disc
CR	Computed Radiography
CT	Computed Tomography
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
ILE	DICOM Implicit VR Little Endian
DIMSE	DICOM Message Service Element
DICOM	Digital Imaging and Communications in Medicine
DX	Digital X-Ray
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DCR	Dynamic Cardio Review
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HL7	Health Level Seven
HIS	Hospital Information System
IOD	Information Object Definition
MR	Magnetic Resonance
MPPS	Modality Performed Procedure Step
MOD	MODifier
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
QA	Quality Assurance
RIS	Radiology Information System
RT	Radiotherapy
RWA	Real-World Activity
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
SCM	Study Component Management
TCP/IP	Transmission Control Protocol/Internet Protocol
USMF	Ultrasound Multi-frame
US	Ultrasound
UID	Unique Identifier
WLM	Worklist Management

XA	X-Ray Angiographic
XRF	X-Ray Radio fluoroscopic

3.5 References

[DICOM]Digital Imaging and Communications in Medicine, Parts 1 - 20 (NEMA PS 3.1- PS 3.20),

National Electrical Manufacturers Association (NEMA)

NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical ManufacturersAssociation, Rosslyn, VA, USA (available free at http://medical.nema.org/)

4 Networking

This section contains the networking related services (vs. the media related ones).

4.1 Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities.
- A functional description of each Application Entity.
- The sequencing constraints among them.

4.1.1 Application Data Flow

The DigitalDiagnost 3.2 system consists of one single application entity, the DigitalDiagnost 3.2 Application Entity (Eleva AE).

The figure below shows the networking application data flow as a functional overview of the Eleva AE.

It incorporates the following functionality:

- The Eleva AE can be verified by provided SCP and can verify by SCU.
- The Eleva AE can request a worklist by using the Basic Worklist Management service as SCU.
- The Eleva AE can store images by using the Storage service as SCU and use the Storage-Commit SOP-Class perform storage-commit as SCU.
- The Eleva AE can import images by using the Storage service as SCP.
- The Eleva AE can store Dose SR instances by using the Storage service as SCU.
- The Eleva AE can compose the modality performed procedure step by using the Study Management service as SCU.
- The Eleva AE can print images by using the Print Management service as SCU.
- The Eleva AE can Query and retrieve images from a remote DICOM node.
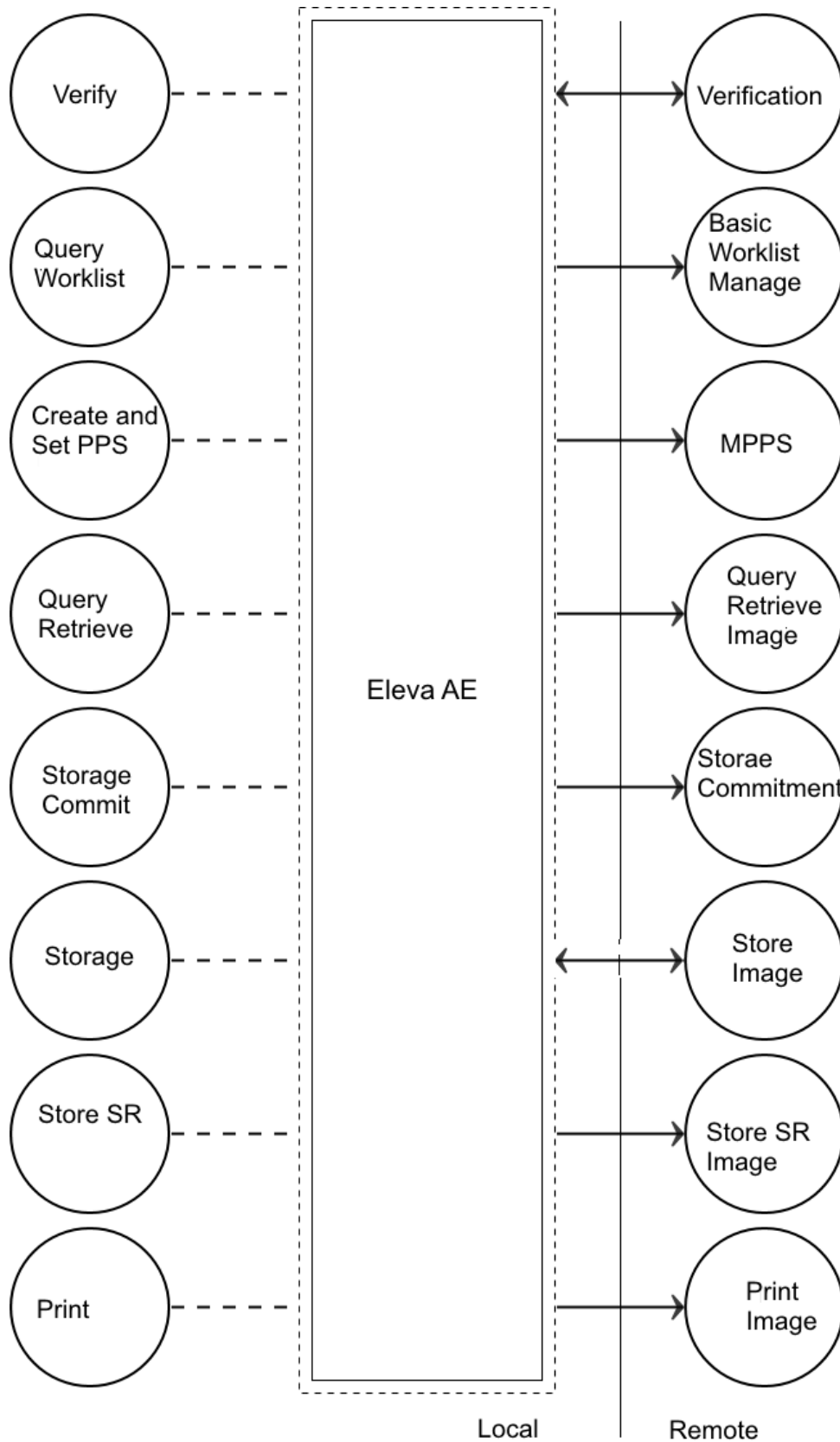
Figure 2 Application Data Flow Diagram

4.1.1 **Functional Definition of Application Entities**

The Eleva AE is the one and only application entity within Digital Diagnost R3.2. It includes the following service classes.

Verification Service Class

The Eleva AE provides the Verification service as SCP.

A remote SCU shall request an association with the Eleva AE for Verification SOP class. After accepting the association the Eleva AE shall receive and respond to the Verification request and release the association when requested.

Basic Worklist Management Service Class

The Eleva AE may use the Basic Worklist Management service as SCU.

Eleva AE shall request an association with the configured remote Basic Worklist Management SCP. After accepting the association the Eleva AE shall send worklist query, wait for response, and then release the association.

The user interface shall be updated with the query results.

Storage Service Class

The Eleva AE may use the Storage service as SCU.

After a performed procedure step the Eleva AE shall store the related images and the created X-Ray DOSE Report to the configured Storage SCP. It shall request an association with the remote Storage SCP for the applicable Storage SOP classes. After accepting the association the Eleva AE shall send the store request, wait for response, and then release the association.

After successful storage the user interface shall be updated accordingly.

After successful storage, if selected, the Eleva AE shall request storage commitment per Storage Commitment service (ref. Storage Commitment Service Class)

Remark: There is no X-RAY DOSE Report created for the following patient types:

- Emergency Patient
- Generator only mode
- Service Mode

Storage Commitment Service Class

The Eleva AE can perform the Storage Commitment service as SCU.

The Eleva AE shall request an association with the selected remote SCP for theStorage Commitment Push Model SOP class. When the association is accepted, theEleva AE shall send the Storage Commitment requests, receive the StorageCommitment responses and act accordingly, and release the association.When the remote commitment actions have been finished, the remote SCP shouldrequest an association with the Eleva AE (still SCU). After accepting theassociation, the Eleva AE shall receive the Storage Commitment reports, andrelease the association when requested.

The Storage Commitment Service can be done synchronously and asynchronously.

A detailed specification of the Storage Commitment is described in section 4.2.1.2.3 (Real-World Activity: Storage Commitment Push Model as SCU).

Remark: Storage Commitment is not requested for the exported DOSE SR Report

Modality Performed Procedure Step Service Class

The Eleva AE may use the Modality Performed Procedure Step as SCU.

Before performing a procedure step the Eleva AE shall request an association with the configured remote MPPS SCP. After accepting the association the Eleva AE shall send a create request, wait for response, and then release the association.

After performing a procedure step the Eleva AE shall request a new association to send a set request, and after response, release the association.Depending on the status of creates and set and the configuration the Eleva AE may perform a retry.The user interface shall be updated with the performed procedure step status.

Basic Grayscale Print Management Meta Class

The Eleva AE may use the Basic Grayscale Print Management service as SCU.

After a performed procedure step the Eleva AE shall print the related images on the configured Printer. It shall request an ssociation with the remote Basic Grayscale Print Management SCP for the applicable Basic Grayscale Print Management SOP class. After accepting the association the Eleva AE shall send the print request, wait for response, and then release the association.

After successful printing the user interface shall be updated accordingly.

4.1.1.1   Funtional Definition of Eleva

The Eleva AE is the one and only application entity within the Eleva WorkSpot. It includes the following service classes.
Verification Service Class
The Eleva AE provides the Verification service as SCP.

A remote SCU shall request an association with the Eleva AE for Verification SOP class. After accepting the association the Eleva AE shall receive and respond to the Verification request and release the association when requested.

Basic Worklist Management Service Class
The Eleva AE may use the Basic Worklist Management service as SCU.

After initiating the worklist query the Eleva AE shall request an association with the configured remote Basic Worklist Management SCP. After accepting the association the Eleva AE shall send the find request, wait for response, and then release the association.

The user interface shall be updated with the query results.

Storage Service Class
The Eleva AE may use the Storage service as SCU.

After a performed procedure step the Eleva AE shall store the related images and Dose SR instances at the configured Storage SCP. It shall request an association with the remote Storage SCP for the applicable Storage SOP classes. After accepting the association the Eleva AE shall send the store request, wait for response, and then release the association.

After successful storage the user interface shall be updated accordingly.

After successful storage, if selected, the Eleva AE shall request storage commitment per Storage Commitment service (ref. Storage Commitment Service Class)

Storage Commitment Service Class
The Eleva AE can perform the Storage Commitment service as SCU.

The Eleva AE shall request an association with the selected remote SCP for the Storage Commitment Push Model SOP class. When the association is accepted, the Eleva AE shall send the Storage Commitment requests, receive the Storage Commitment responses and act accordingly, and release the association.

When the remote commitment actions have been finished, the remote SCP should request an association with the Eleva AE (still SCU). After accepting the association, the Eleva AE shall receive the Storage Commitment reports, and release the association when requested.

The Storage Commitment Service can be done synchronously and asynchronously.

Study Management Service Class
The Eleva AE may use the Study Management service as SCU.

Before performing a procedure step the Eleva AE shall request an association with the configured remote Study Management SCP. After accepting the association the Eleva AE shall send a create request, wait for response, and then release the association.

After performing a procedure step the Eleva AE shall request a new association to send a set request, and after response, release the association.
Depending on the status of creates and set and the configuration the Eleva AE may perform a retry.
The user interface shall be updated with the performed procedure step status.

Basic Grayscale Print Management Meta Class

The Eleva AE may use the Basic Grayscale Print Management service as SCU.

After a performed procedure step the Eleva AE shall print the related images on the configured Printer. It shall request an association with the remote Basic Grayscale Print Management SCP for the applicable Basic Grayscale Print Management SOP class. After accepting the association the Eleva AE shall send the print request, wait for response, and then release the association.

After successful printing the user interface shall be updated accordingly.

4.1.2 Sequencing of Real World Activities

The figure below shows a typical sequence of an examination using a worklist. The user updates the worklist (query Worklist) and then selects and opens an examination. When the user starts the examination (acquiring the first image), the RIS is notified (Create Performed Procedure Step). After the user confirmed each acquisition (image 1-N) per default the image is printer (Print Image). Finally, when closing the examination, the RIS is notified to update the data of the examination (Set Performed Procedure Step) and Image is sent to archive (Store Image).

Note that Print Image will send images to the printer only when enough images were received to fulfill the configured printer format or when the print job is flushed manually.

When the last image of an examination is received the print job will be flushed automatically.
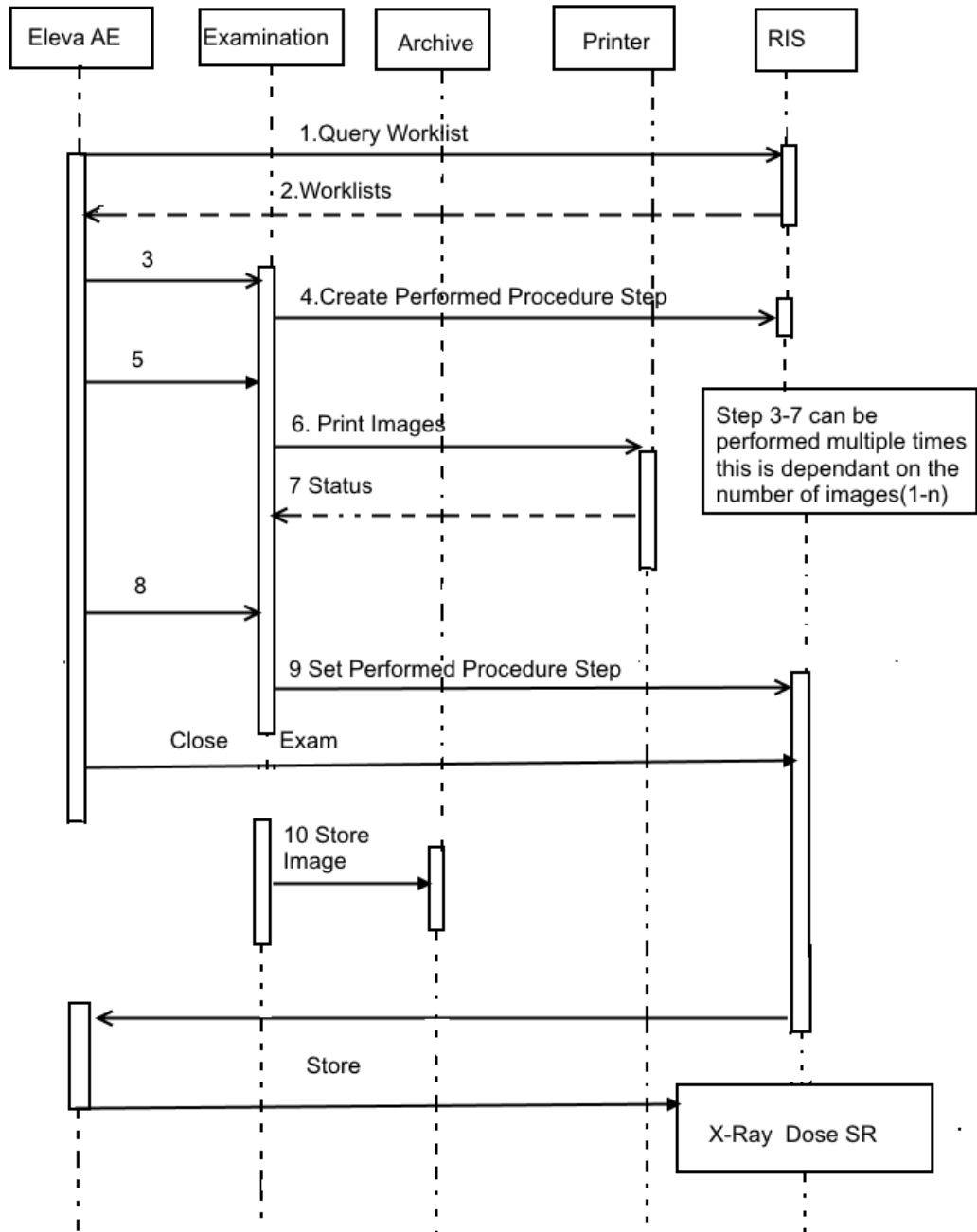
Figure 3 Sequence of an examination
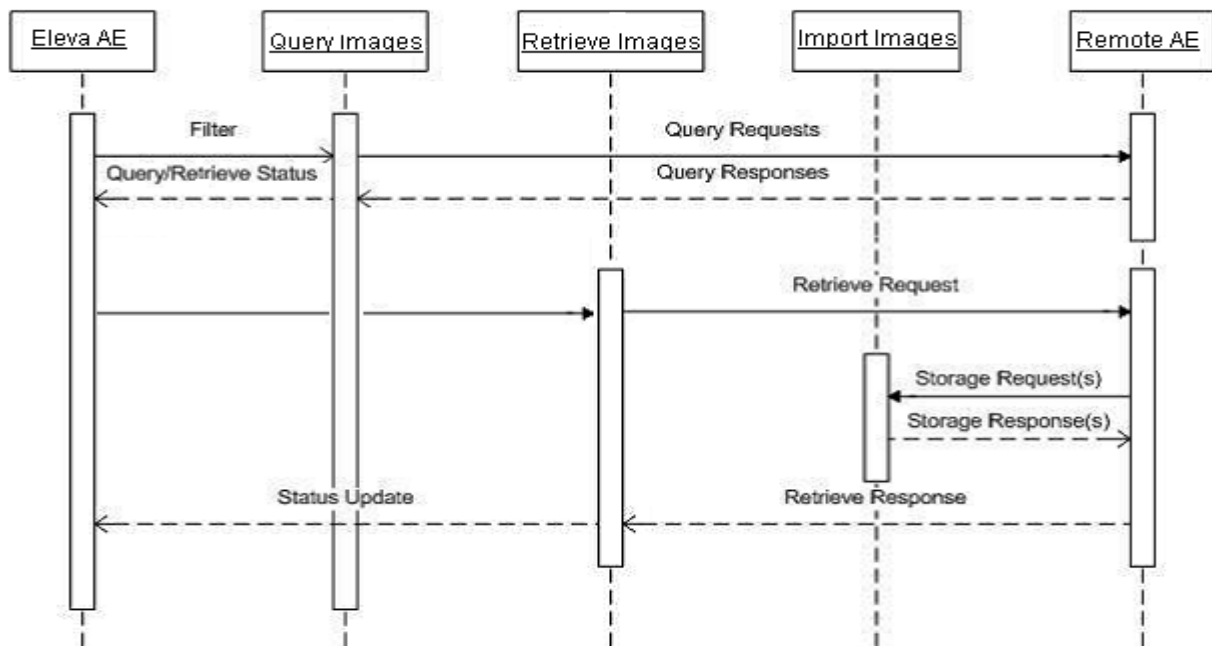
Figure 4 Sequence of Query/Retrieve

Query Retrieve is only possible on patients available in worklist on Eleva. One can not perform Q&R on any patient. The Q7R is always limited to selected patient in worklist of Eleva.

4.2 AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1 AE Specification of

Detail of this specific Application Entity is specified in this section.

4.2.1.1   SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 4 SOP Classes for Application Entity

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
>Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes

X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Storage Commitment Push Model SOP Clsss	1.2.840.10008.1.20.1	Yes	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.1.2   Association Policies

4.2.1.2.1.1.1   General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 5 DICOM Application Context

Property	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2   Number of Associations

The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified.

Table 6: Number of Associations as an Association Initiator for Eleva

Maximum number of simultaneous associations	2

Table 7: Number of Associations as an Association Acceptor for Eleva

Maximum number of simultaneous associations	1

4.2.1.2.3   Asynchronous Nature

If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

Table 8: Asynchronous Nature as an Association Initiator for Eleva

Maximum number of outstanding asynchronous transactions	0

4.2.1.2.4   Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 9: Implementation Identifying Information

Property	Value
Implementation Class UID	1.3.46.670589.30.37.0
Implementation Version Name	PMS_ELEVA_37.0

4.2.1.2.5   Communication Failure Handling

The behavior of the AE during communication failure is summarized in next table.

Table 10: Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3   Association Initiation Policy

This section describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 11: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT _permanent, 1: REJECT_SOURCE_dul_user, 1: REJECT_REASON _no_reason_given)
		2 – application-context-name-not-supported	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT _permanent, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON _application_context_not_support)
		3 – calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT _permanent, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON _calling_aetitle_not_recognized)
		7 – called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT _permanent, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON _called_aetitle_not_recognized)
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	Association is not established. The following error is logged. Error: UserRecoverable: impl.dicom.access.PEER: Associationrejected by peer (1: REJECT_RESULT _permanent, 2: REJECT_SOURCE _dul_provider (acse), 1: REJECT_REASON _no_reason_given)
		2 – protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_ protocol-version-not-supported)
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_ temporary-congestion)
		2 – local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer (1: REJECT_RESULT_permanent, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_ local-limit-exceeded)

Result	Source	Reason/Diagnosis	Behavior
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 1: REJECT_REASON _no_reason_given)
		2 – application-context-name-not-supported	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 2: REJECT_REASON _application_context_not_support)
		3 – calling-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 3: REJECT_REASON _calling_aetitle_not_recognized)
		7 – called-AE-title-not-recognized	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 1: REJECT_SOURCE_dul_user, 7: REJECT_REASON _called_aetitle_not_recognized)
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 2: REJECT_SOURCE _dul_provider (acse), 1: REJECT_REASON _no_reason_given)
		2 – protocol-version-not-supported	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 2: REJECT_SOURCE_dul_provider (acse), 2: REJECT_REASON_ protocol-version-not-supported)
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 1: REJECT_REASON_ temporary-congestion)
		2 – local-limit-exceeded	Association is not established. The following error is logged. Association rejected by peer (2: REJECT_RESULT_transient, 3: REJECT_SOURCE_dul_provider (presentation), 2: REJECT_REASON_application_context_not_support)

The behavior of the AE on receiving an association abort is summarized in next table

Table 12: DICOM Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (0: ABORT_SOURCE_dul_user, 0: ABORT_REASON_not_specified).
2 – DICOM UL service-provider	0 – reason-not-specified	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 0: ABORT_REASON_not_specified).

Source	Reason/Diagnosis	Behavior
	1 – unrecognized-PDU	When received, theEleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu).
	2 – unexpected-PDU	When received, theEleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 2: ABORT_REASON_unexpected_pdu).
	4 – unrecognized-PDU parameter	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 4: ABORT_REASON _unrecognized_pdu_parameter).
	5 – unexpected-PDU parameter	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 5: ABORT_REASON _unexpected_pdu_parameter).
	6 – invalid-PDU-parameter value	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 6: ABORT_REASON _invalid_pdu_parameter).

The behavior of the AE during DICOM communication failure is summarized in next table.

Table 13: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.1   (Real-World) Activity - Find as SCU

4.2.1.3.1.1   Description and Sequencing of Activities
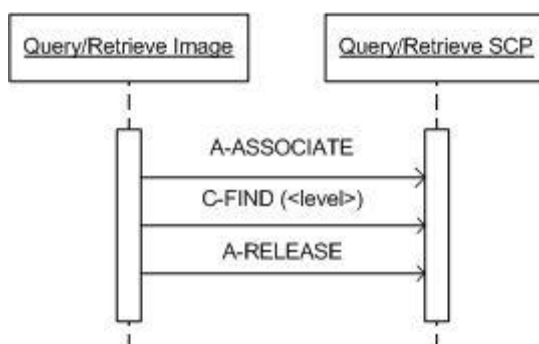
Figure 5 Data Flow Diagram – FIND as SCU

4.2.1.3.1.2 Proposed Presentation Contexts

Table 14 Proposed Presentation Contexts for (Real-World) Activity Find as SCU

Presentation Context Table						
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**	
Name	**UID**	**Name**	**UID**			
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None	
		Explicit VR Little Endian	1.2.840.10008.1.2.1			
		Explicit VR Big Endian	1.2.840.10008.1.2.2			
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None	
		Explicit VR Little Endian	1.2.840.10008.1.2.1			
		Explicit VR Big Endian	1.2.840.10008.1.2.2			

4.2.1.3.1.3 SOP Specific Conformance for SOP Classes

4.2.1.3.1.3.1 SOP Specific Conformance for Patient Root QR Information Model - FIND SOP Class

4.2.1.3.1.3.1.1 Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-SCU

Table 15 C-FIND-RQ Dataset Specification.

Patient Root QR Information Model - FIND SOP Class				
Attribute Name	**Tag**	**VR**	**Type of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS	Single Value	Patient, Study, Series
Patient Level Attributes For The Patient Root Query/Retrieve Information Model				
Patient's Name	0010,0010	PN	Single Value, Universal, WildCard	
Patient ID	0010,0020	LO	Single Value, Universal, WildCard	
Patient's Birth Date	0010,0030	DA	Single Value, Universal	
Other Patient Ids	0010,1000	LO	Single Value, Universal, WildCard	
Study Level Keys For The Patient Root Query/Retrieve Information Model				
Study Date	0008,0020	DA	Universal, Range	
Study Time	0008,0030	TM	Universal	
Accession Number	0008,0050	SH	Universal	
Study Instance UID	0020,000D	UI	Universal	
Study ID	0020,0010	SH	Universal	
Series Level Attributes For The Patient Root Query/Retrieve Information Model				
Modality	0008,0060	CS	Universal	
Series Instance UID	0020,000E	UI	Universal	
Series Number	0020,0011	IS	Universal	
Body Part Examined	0018,0015	CS	Universal	

4.2.1.3.1.3.2   SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

4.2.1.3.1.3.2.1   Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

Table 16 C-FIND-RQ Dataset Specification.

Attribute Name	Tag	VR	Type of Matching	Comment
Study Root QR Information Model - FIND SOP Class				
Query/Retrieve Level	0008,0052	CS	Single Value	Study, Series
Study Level Keys For The Study Root Query/Retrieve Information Model				
Study Date	0008,0020	DA	Range, Universal	
Study Time	0008,0030	TM	Universal	
Accession Number	0008,0050	SH	Universal	
Study Description	0008,1030	LO	Universal	
Patient's Name	0010,0010	PN	Single Value, Universal, WildCard	
Patient ID	0010,0020	LO	Single Value, Universal, WildCard	
Patient's Birth Date	0010,0030	DA	Single Value, Universal	
Other Patient Ids	0010,1000	LO	Universal	
Study Instance UID	0020,000D	UI	Universal	
Study ID	0020,0010	SH	Universal	
Series Level Attributes For The Studyt Root Query/Retrieve Information Model				
Modality	0008,0060	CS	Universal	
Series Instance UID	0020,000E	UI	Universal	
Series Number	0020,0011	IS	Universal	
Body Part Examined	0018,0015	CS	Universal	

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 17: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final identifier is supplied	Successful completion of the query.

4.2.1.3.2   (Real-World) Activity - Image Export

4.2.1.3.2.1   Description and Sequencing of Activities
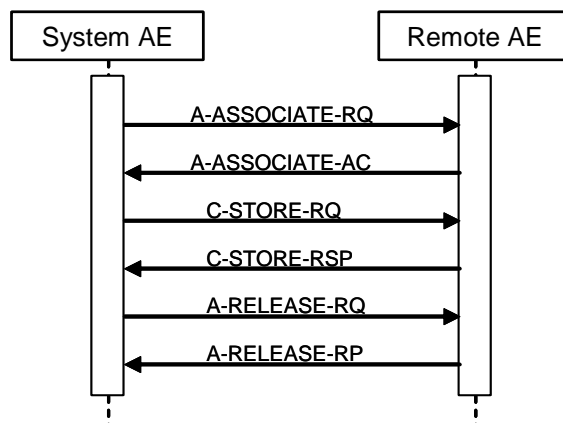
Figure 6: (Real World) Activity - Image Export

4.2.1.3.2.2   Proposed Presentation Contexts

Table 18 Proposed Presentation Contexts for (Real-World) Activity Image Export

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.3 Real-World) Activity – Structured Dose Report Export

4.2.1.3.3.1 Description and Sequencing of Activities
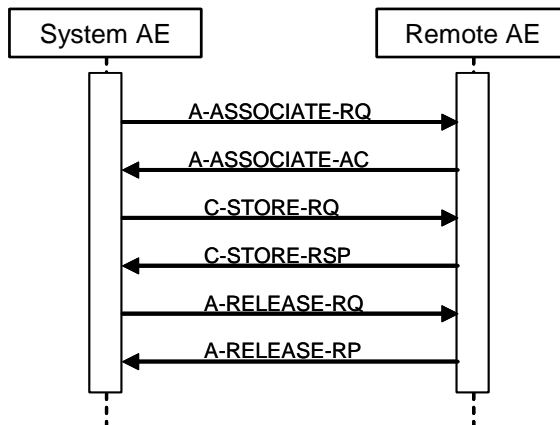
Figure 6: (Real World) Activity – Structured Dose Report Export

The ELEVA AE will request an association with the remote Storage SCP for the applicable Storage SOP classes. After accepting the association, the ELEVA AE will sends the store request, wait for response, and then release the association. The store response status may be inspected on the UI.

4.2.1.3.3.2 Proposed Presentation Contexts

Table 19: Proposed Presentation Contexts for (Real-World) Activity – Image Export

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
X-Ray Radiation Dose SR SOP Class	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.3.3 SOP Specific Conformance for Storage SOP Classes

Behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

Table 20: C-STORE-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Storage is complete	UI status is updated
Refused	A700	Out of resources	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful
Error	A900	Data set does not match SOP class	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful.
	C000	Cannot understand	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful.

Service Status	Code	Further Meaning	Behavior
Warning	B000	Coercion of data elements	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful.
	B006	Elements discarded	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful
	B007	Data set does not match SOP class	The association is released. On receiving error in C-STORE RSP messages store operation is unsuccessful.

The status can be inspected via the user interface.

Table 22: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.4 (Real-World) Activity – Storage Commitment Push Model as SCU

4.2.1.3.4.1 Description and Sequencing of Activities
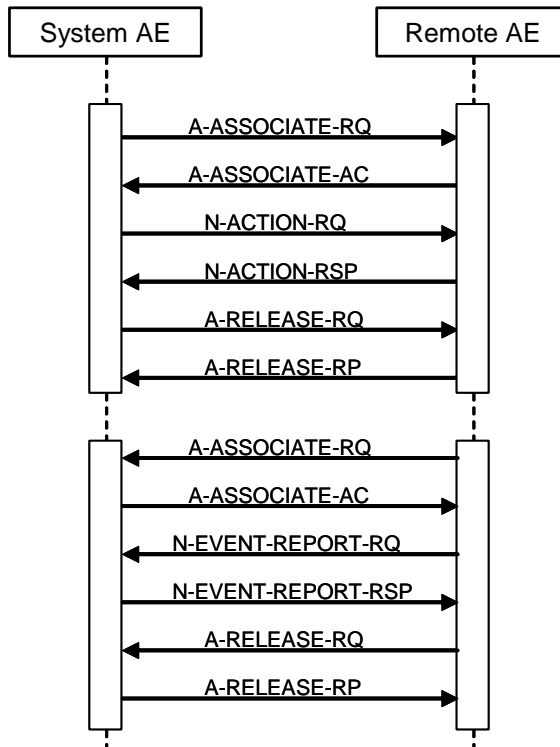
Figure 7: (Real World) Activity – Storage Commitment Push Model as SCU within separate associations (asynchronous)
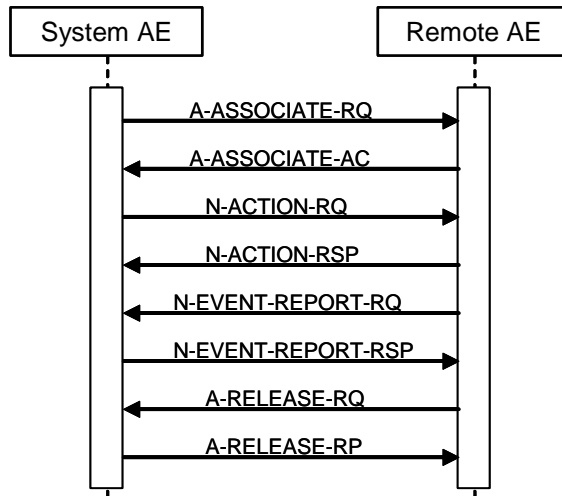
Figure 8: (Real World) Activity – Synchronous Storage Commitment Push Model as SCU within one association (synchronous)

System AE will attempt to initiate a new association when requested to commit the images that were stored on a remote device, which supports the storage Commitment Service.This can be as Synchronous storage commitmentor as Asynchronous storage commitment.

This RWA may be initiated in two ways.

- Manually in the viewer, after clicking the Store button the ELEVA AE will store the selected images at the selected Storage SCP.

- Automatically during an examination, images are sent automatically when exam was close succefuly.

The associated real world activity for the N-ACTION is a storage commitment request to the remote storage device.

The associated real world activity for the N-EVENT-REPORT operation is the completion of the storage commitment by the remote device.

Depending on the status of the store the ELEVA AE may queue store requests for retries. The queued store requests can be cancelled from the UI.

A remote node supporting Storage Commitment can be confgured on eleva as Archive. After exporting images to this archive node, eleva request for storage commitment of each of the stored images.Until a succesful Storage commitment response is recieved for archive, the images cannot be deleted on eleva.The status of commitment is available on image info panel.

4.2.1.3.4.2   Proposed Presentation Contexts

Table 213: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model AS SCU

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

4.2.1.3.4.2.1   SOP Specific Conformance for Storage Commitment Push Model SOP Class

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
Behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

4.2.1.3.4.2.2   Dataset Specific Conformance for Storage Commitment Push Model N-ACTION SCU

This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 22: Storage Commitment Attribute for N-ACTION-RQ

Attribute Name	Tag	Comment
Storage Commitment Module		
Transaction UID	0008,1195	
Referenced SOP Sequence	0008,1199	
>Referenced SOP Class UID	0008,1150	
>Referenced SOP Instance UID	0008,1155	

Table 23: N-ACTION-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Storage is complete	UI status is updated
Refused	A7xx	Out of resources	The association is released. The reason is logged. The user is informed.
Error	A9xx	Data set does not match SOP class	The association is released. The reason is logged. The user is informed.
	Cxxx	Cannot understand	The association is released. The reason is logged. The user is informed.
Warning	B000	Coercion of data elements	The association is released. The reason is logged. The user is informed.
	B006	Elements discarded	The association is released. The reason is logged. The user is informed.

Service Status	Code	Further Meaning	Behavior
	B007	Data set does not match SOP class	The association is released. The reason is logged. The user is informed.

Table 24: DICOM Command Communication Failure Behavior

Exception	Behavior
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.4.2.3   Dataset Specific Conformance for Storage Commitment Push Model N-EVENT-REPORT SCP

This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 25: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using AP-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.5   (Real-World) Activity - Modality Performed Procedure Step as SCU
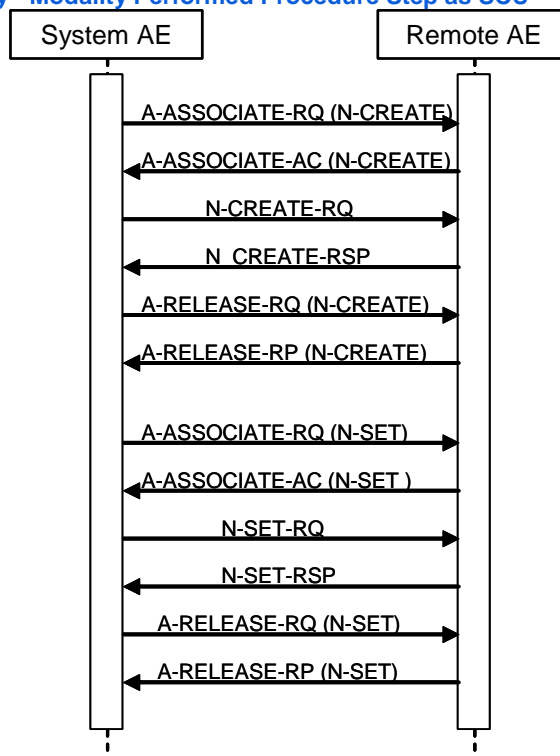
Figure 9 (Real World) Activity - Modality Performed Procedure Step As SCU

4.2.1.3.5.1 Description and Sequencing of Activities

Description of Activities

A DigitalDiagnost 3.2 "Examination" is regarded equivalent to a DICOM Procedure Step. It is scheduled or manually entered before an acquisition is taken, and performed by taking acquisitions. If scheduled by the RIS, one Examination is the result of one Scheduled Procedure Step. Since an examination may not be re-opened after having been closed, and each examination workflow context is enclosed in one MPPS, one examination may result in in more than one N-SET instances that happens in case of appending an image for existing examination which is already closed.

After the image for a Scheduled Procedure Step has been acquired, the system sets the MPPS status of the related examination to "IN PROGRESS" and generates an initial MPPS IN PROGRESS message. The system does not generate intermediate MPPS IN PROGRESS messages for subsequent acquisitions of this Scheduled Procedure Step instance.

After finishing the appropriate acquisition(s), the system will change the MPPS status of the related examination to "COMPLETED" and generate an MPPS N-SET-COMPLETED message.
DigitalDiagnost 3.2 also generates MPPS messages for unscheduled examinations.

The MPPS COMPLETED message will list the UID's of all related DICOM archived images and the format of (optionally) generated direct prints.

After abandoning or discontinuing a procedure step, the operator may set the MPPS status of the related examination to "DISCONTINUED" and the system generates a MPPS DICONTINUED message. The reason for abandoning or discontinuing a procedure step is unspecified.

The operator may interchange the performed sequence order of scheduled procedure steps.

MPPS messages may interleave. Depending on the application workflow optimization by the user, an MPPS sequence like this may come up:

MPPS / SOP Instance UID 1: N-CREATE (IN PROGRESS)
MPPS / SOP Instance UID 2: N-CREATE (IN PROGRESS)
MPPS / SOP Instance UID 3: N-CREATE (IN PROGRESS)
...
MPPS / SOP Instance UID 2: N-SET (COMPLETED)
MPPS / SOP Instance UID 1: N-SET (COMPLETED)
MPPS / SOP Instance UID 3: N-SET (COMPLETED)

(i.e.: running multiple procedure steps 'in parallel').

Sequencing of Activities

After storing a performed procedure step the ELEVA AE shall request an association with the configured remote Study Management SCP. After accepting the association the ELEVA AE shall send a Create request, wait for response, and then release the association.

4.2.1.3.5.2 Proposed Presentation Contexts

Table 26 Proposed Presentation Contexts for (Real-World) Activity Modality Performed Procedure Step as SCU

Presentation Context Table						
Abstract Syntax		**Transfer Syntax**			**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**			
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2		SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1			

		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.5.3   SOP Specific Conformance for SOP Classes

4.2.1.3.5.3.1   SOP Specific Conformance for Modality Performed Procedure Step SOP Class

When acquiring the first image of a Scheduled or Unscheduled Procedure Step, DigitalDiagnost 3.2 generates a MPPS IN PROGRESS message.

DigitalDiagnost 3.2 does not generate intermediate IN PROGRESS (N-SET) messages and does not support the Performed Procedure Step Exception Management Option. DigitalDiagnost 3.2 has no Billing Code Tables and does not support the Performed Procedure Step Billing and Material Management Option, except default values for Medium Type (2000,0030) and Film Size ID (2010,0050), if optional Local Print is configured.

Assisted Acquisition Protocol Setting Option

ELEVA AE by default derives the specific acquisition protocol from the Scheduled Protocol Code Sequence Items. Any single Item results in an Examination.

ELEVA AE supports 3 more (configurable) mapping relations, as shown below:

- Examination is selected from Scheduled Protocol Code Items->Code Value (0040,0008) (default)
- Examination is selected from Scheduled Procedure Step Description (0040,0007)
- Examination is selected from Requested Procedure Code Items->Code Value (0032,1064)
- Examination is selected from Requested Procedure Description (0032,1060)

ELEVA AE does not evaluate the attributes Coding Scheme Version (0008,0103), Coding Scheme Designator (0008,0102), Code Meaning (0008,0104), but only the Code Value (0008,0100), for mapping the examination settings. I.e. ELEVA AE expects that any used Code Value is unique (unambiguous) within a given RIS domain.

Restrictions Depending on Number of Scheduled Protocol Code Items

It is highly recommended that the Scheduled Procedure Step contains only 1 Item in the Scheduled Protocol Code Sequence.

If the Scheduled Procedure Step contains <n> items in the Scheduled Protocol Code Sequence, the Scheduled Procedure Step is split into <n> examinations, where any single examination shows only 1 of the Scheduled Protocol Code Items, but all the other attributes are the same.

When such an examination is returned back via MPPS, also the Performed Protocol Code Sequence will show only 1 item. If all <n> Scheduled Procedure Step Code Items are performed, <n> MPPS instances will be sent back to the RIS, and the sum of all Performed Protocol Code Items will be <n>.

4.2.1.3.5.3.1.1   Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-SET-SCU

Table 29 MPPS Request Identifiers for N-SET-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step Status	0040,0252	CS	COMPLETED or DISCONTINUED	
Performed Procedure Step Description	0040,0254	LO		
Procedure Code Sequence	0008,1032	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Code Meaning	0008,0104	LO		
Radiation Dose Module				
Image and Fluoroscopy Area Dose Product	0018,115E	DS		Not accumulating: re-processed images, non-digital images. Not sent in case of appended MPPS instances.

Attribute Name	Tag	VR	Value	Comment
Total Time of Fluoroscopy	0040,0300	US		
Total Number of Exposures	0040,0301	US		Not accumulating: re-processed images, non-digital images. Not sent in case of appended MPPS instances.
Entrance Dose	0040,0302	US		Note 1
Exposure Dose Sequence	0040,030E	SQ		
>KVP	0018,0060	DS		
>Exposure Time	0018,1150	IS		
>Radiation Mode	0018,115A	CS		
>X-Ray Tube Current in uA	0018,8151	DS		
>Comments on Radiation Dose	0040,0310	ST		Note 1
Entrance Dose in mGy	0040,8302	DS		
Image Acquisition Results Module				
Performed Protocol Code Sequence	0040,0260	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Code Meaning	0008,0104	LO		
Performed Series Sequence	0040,0340	SQ		
>Protocol Name	0018,1030	LO		Copied from Performed Protocol Code Sequence - Item code Value.
>Series Instance UID	0020,000E	UI		
>Retrieve AE Title	0008,0054	AE		
>Series Description	0008,103E	LO		
>Performing Physician's Name	0008,1050	PN		
>Operators' Name	0008,1070	PN		
>Referenced Image Sequence	0008,1140	SQ		
>>Referenced SOP Class UID	0008,1150	UI		
>>Referenced SOP Instance UID	0008,1155	UI		
>Referenced Non-Image Composite SOP Instance Sequence	0040,0220	SQ		
Billing And Material Management Code Module				
Film Consumption Sequence	0040,0321	SQ		
>Medium Type	2000,0030	CS		
>Film Size ID	2010,0050	CS		
>Number of Films	2100,0170	IS		

Note 1: Attribute only present in case MPPS extended mode is enabled in MPPS node configuration.

Table 30: N-SET-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association is released.
Failure	0110	Processing failure – performed procedure step object may no longer be updated	The reason is logged.
	xxxx	(any other failure)	The reason is logged.

Table 31: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using AP-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.5.3.1.2   Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

Table 32: MPPS Request Identifiers for N-CREATE-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Station AE Title	0040,0241	AE	Eleva	Value can be configured
Performed Procedure Step Start Date	0040,0244	DA		Start of the examination
Performed Procedure Step Start Time	0040,0245	TM		Start of the examination
Performed Procedure Step Status	0040,0252	CS		
Performed Procedure Step ID	0040,0253	SH		
Performed Station Name	0040,0242	SH		EMPTY
Performed Location	0040,0243	SH		EMPTY
Performed Procedure Step End Date	0040,0250	DA		Finish of the examination
Performed Procedure Step End Time	0040,0251	TM		Finish of the examination
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Type Description	0040,0255	LO		
Procedure Code Sequence	0008,1032	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Code Meaning	0008,0104	LO		
Radiation Dose Module				
Image and Fluoroscopy Area Dose Product	0018,115E	DS		Not sent in case of appended MPPS Instances
Total Time of Fluoroscopy	0040,0300	US		
Total Number of Exposures	0040,0301	US		
Entrance Dose	0040,0302	US		Note 1
Exposure Dose Sequence	0040,030E	SQ		
Entrance Dose in mGy	0040,8302	DS		Note 1
SOP Common Module				
Specific Character Set	0008,0005	CS		Optional
Performed Procedure Step Relationship Module				
Patient's Name	0010,0010	PN		
Patient ID	0010,0020	LO		
Issuer of Patient ID	0010,0021	LO		
Patient's Birth Date	0010,0030	DA		
Patient's Sex	0010,0040	CS		
Scheduled Step Attributes Sequence	0040,0270	SQ		
>Study Instance UID	0020,000D	UI		
>Accession Number	0008,0050	SH		
>Requested Procedure Description	0032,1060	LO		

Attribute Name	Tag	VR	Value	Comment
>Scheduled Procedure Step Description	0040,0007	LO		
>Scheduled Procedure Step ID	0040,0009	SH		
>Requested Procedure ID	0040,1001	SH		
>Referenced Study Sequence	0008,1110	SQ		
>>Referenced SOP Class UID	0008,1150	UI		
>>Referenced SOP Instance UID	0008,1155	UI		
>Scheduled Protocol Code Sequence	0040,0008	SQ		
>>Code Value	0008,0100	SH		
>>Coding Scheme Designator	0008,0102	SH		
>>Code Meaning	0008,0104	LO		
Referenced Patient Sequence	0008,1120	SQ		
Image Acquisition Results Module				
Modality	0008,0060	CS	DX	
Study ID	0020,0010	SH		
Performed Protocol Code Sequence	0040,0260	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Code Meaning	0008,0104	LO		
Performed Series Sequence	0040,0340	SQ		
Billing And Material Management Code Module				
Film Consumption Sequence	0040,0321	SQ		

Note 1: Attribute only present in case MPPS extended mode is enabled.

Table 33: N-CREATE-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The SCP has successfully received the modality performed procedure step create request. Log entry.
Failure	0213	Resource limitation	The command is reported to the user as failed. The reason is logged. After a configured period of time the storage will be retried up to a configured number of times.
	xxxx	Any failure accept	The command is reported to the user as failed. The reason is logged. No retry.

Table 34: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using AP-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.6 (Real-World) Activity - Modality Worklist as SCU

4.2.1.3.6.1 Description and Sequencing of Activities
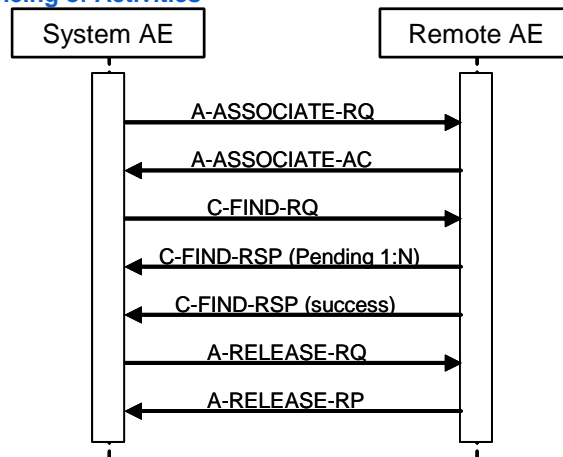
Figure 10 (Real World) Activity - Modality worklist As SCU

For each Broad or specific Worklist request, an association towards the Basic Worklist Management SCP is established and a C-FIND request is transmitted. The Broad query can be configured with a combination of the Matching Keys:

- Scheduled Station AE Title
- Scheduled Procedure Step Start Date
- Modality

Each of the matching keys is optional. The association will be closed on reception of the last C-FIND response. The Worklist Query result is displayed in the Patient List. The query is interruptible if it was triggered by the user.

After clicking the Query Worklist button the ELEVA AE shall request an association with the configured remote Basic Worklist Management SCP.When the association is accepted the ELEVA AE shall send the broad query find request, wait for response, and then release the association.

This RWA may be initiated in two ways.

After clicking the Patient button at the patient list screen the ELEVA AE shall request an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE shall send the patient query find request, wait for response, and then release the association.Worklist request identifier for Patient Query are shown in Table 36.

After clicking button for updating patient list the ELEVA AE shall request an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE shall send the Broad Query find request, wait for response, and then release the association.Worklist request identifier for Broad Query are shown in Table 39.

Optionally the Broad Query may also be performed automatically in the system background. The time interval between subsequent background queries is configurable. Manual and automatic background queries are serialized and do not interfere with another.

4.2.1.3.6.2 Proposed Presentation Contexts

Table 275 Proposed Presentation Contexts for (Real-World) Activity Modality Worklist as SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None

| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

4.2.1.3.6.3   SOP Specific Conformance for SOP Classes

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
Behavior of an Application Entity SOP class is summarized as shown in next Tables. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

4.2.1.3.6.3.1   SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

4.2.1.3.6.3.1.1   Dataset Specific Conformance for Modality Worklist Information (Patient Query) - C-FIND-SCU

After clicking the Patient button at the patient list screen the ELEVA AE shall request an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE shall send the patient query find request, wait for response, and then release the association.Worklist request identifier for Patient Query are shown in Table 36.

The table below should be read as follows:

Attribute Name:	Attributes supported to build a Modality Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.
M:	Matching Keys for (automatic) Worklist Update.
R:	Return Keys. An "X" will indicate that Modality will supply this attribute as Return Key with zero length for Universal Matching.
Q:	Interactive Query Key. An "X" will indicate that this attribute as matching key can be used.
D:	Displayed Keys. An "X" indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD:	An "X" indicates that the value of this Worklist attribute will be used in the created Instances of this Performed Procedure Step.
Type of matching:	The following types of matching exists: Single Value Matching List of UID Matching Wild Card Matching Range Matching Sequence Matching Universal Matching

Table 36Worklist Request Identifier (Patient Query).

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Patient Identification Module									
Medical Record Locator	0010,1090	LO		X					
Other Patient IDs	0010,1000	LO		X					
Other Patient Names	0010,1001	PN		X					
Patient ID	0010,0020	LO			X	X	X	Single Value,Universal	
Patient's Birth Name	0010,1005	PN		X					
Patient's Mother's Birth Name	0010,1060	PN		X					
Patient's Name	0010,0010	PN	X		X	X	X	Single Value,Universal, WildCard	
Issuer of Patient ID	0010,0021	LO		X					
Patient Demographic Module									
Branch of Service	0010,1081	LO		X					
Confidentiality Constraint on Patient Data Description	0040,3001	LO		X					
Country of Residence	0010,2150	LO		X					
Ethnic Group	0010,2160	SH		X		X			

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Military Rank	0010,1080	LO		X					
Occupation	0010,2180	SH		X		X			
Patient Comments	0010,4000	LT		X		X			
Patient's Address	0010,1040	LO		X					
Patient's Age	0010,1010	AS		X					
Patient's Birth Date	0010,0030	DA		X		X			
Patient's Birth Time	0010,0032	TM		X					
Patient's Religious Preference	0010,21F0	LO		X					
Patient's Sex	0010,0040	CS		X		X			
Patient's Size	0010,1020	DS		X		X			
Patient's Telephone Numbers	0010,2154	SH		X					
Patient's Weight	0010,1030	DS		X		X			
Region of Residence	0010,2152	LO		X					
Patient's Insurance Plan Code Sequence	0010,0050	SQ		X					
>Code Meaning	0008,0104	LO		X					
>Code Value	0008,0100	SH		X					
>Coding Scheme Designator	0008,0102	SH		X					
>Coding Scheme Version	0008,0103	SH		X					
>Context Group Extension Creator UID	0008,010D	UI		X					
>Context Group Local Version	0008,0107	DT		X					
>Context Group Version	0008,0106	DT		X					
>Mapping Resource	0008,0105	CS		X					
Patient Medical Module									
Additional Patient History	0010,21B0	LT		X		X			
Allergies	0010,2110	LO		X		X			
Last Menstrual Date	0010,21D0	DA		X					
Medical Alerts	0010,2000	LO		X		X			
Patient State	0038,0500	LO		X		X			
Pregnancy Status	0010,21C0	US		X		X			
Smoking Status	0010,21A0	CS		X					
Special Needs	0038,0050	LO		X					
Visit Identification Module									
Admission ID	0038,0010	LO		X					
Institution Address	0008,0081	ST		X					
Institution Name	0008,0080	LO		X					
Issuer of Admission ID Sequence	0038,0014	SQ		X					
>Local Namespace Entity ID	0040,0031	UT		X					
>Universal Entity ID	0040,0032	UT		X					
>Universal Entity ID Type	0040,0033	CS		X					
Issuer of Service Episode ID Sequence	0038,0064	SQ		X					
>Local Namespace Entity ID	0040,0031	UT		X					
>Universal Entity ID	0040,0032	UT		X					
>Universal Entity ID Type	0040,0033	CS		X					
Visit Status Module									
Current Patient Location	0038,0300	LO		X					
Patient's Institution Residence	0038,0400	LO		X					
Visit Comments	0038,4000	LT		X					
Visit Status ID	0038,0008	CS		X					

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Visit Admission Module									
Admitting Date	0038,0020	DA		X					
Admitting Time	0038,0021	TM		X					
Referring Physician's Address	0008,0092	ST		X					
Referring Physician's Name	0008,0090	PN		X					
Referring Physician's Telephone Numbers	0008,0094	SH		X					
Route of Admissions	0038,0016	LO		X					
Admitting Diagnoses Code Sequence	0008,1084	SQ		X					
>Code Meaning	0008,0104	LO		X					
>Code Value	0008,0100	SH		X					
>Coding Scheme Designator	0008,0102	SH		X					
>Coding Scheme Version	0008,0103	SH		X					
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Comments on the Scheduled Procedure Step	0040,0400	LT		X					
>Modality	0008,0060	CS	X		X			Single Value,Universal	SOP Classes: CR, DX, OT, US, MG, RF, XA, PX, NM
>Pre-Medication	0040,0012	LO		X					
>Requested Contrast Agent	0032,1070	LO		X					
>Scheduled Performing Physician's Name	0040,0006	PN		X					
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X		
>Scheduled Procedure Step End Date	0040,0004	DA		X					
>Scheduled Procedure Step End Time	0040,0005	TM		X					
>Scheduled Procedure Step ID	0040,0009	SH		X			X		
>Scheduled Procedure Step Location	0040,0011	SH		X					
>Scheduled Procedure Step Start Date	0040,0002	DA	X		X	X		Single Value,Universal	Value: All, Today, Tomorrow, Yesterday
>Scheduled Procedure Step Start Time	0040,0003	TM		X		X			
>Scheduled Procedure Step Status	0040,0020	CS		X					
>Scheduled Station AE Title	0040,0001	AE	X		X			Single Value,Universal	
>Scheduled Station Name	0040,0010	SH		X					
>Scheduled Protocol Code Sequence	0040,0008	SQ		X					
>>Code Meaning	0008,0104	LO		X					
>>Code Value	0008,0100	SH		X					
>>Coding Scheme Designator	0008,0102	SH		X					
>>Coding Scheme Version	0008,0103	SH		X					
Requested Procedure Module									
Requested Procedure Description	0032,1060	LO		X		X			
Requested Procedure ID	0040,1001	SH			X		X	Single Value,Universal	
Study Date	0008,0020	DA		X					
Study Instance UID	0020,000D	UI		X					

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Referenced Study Sequence	0008,1110	SQ		X					
>Referenced SOP Class UID	0008,1150	UI		X					
>Referenced SOP Instance UID	0008,1155	UI		X					
Requested Procedure Code Sequence	0032,1064	SQ		X					
>Code Meaning	0008,0104	LO		X					
>Code Value	0008,0100	SH		X					
>Coding Scheme Designator	0008,0102	SH		X					
>Coding Scheme Version	0008,0103	SH		X					
>Context Group Extension Creator UID	0008,010D	UI		X					
>Context Group Local Version	0008,0107	DT		X					
>Context Group Version	0008,0106	DT		X					
>Mapping Resource	0008,0105	CS		X					
Imaging Service Request Module									
Accession Number	0008,0050	SH			X	X	X	Single Value,Universal	
Imaging Service Request Comments	0040,2400	LT		X					
Issue Date of Imaging Service Request	0040,2004	DA		X					
Reason for the Imaging Service Request (retired)	0040,2001	LO		X					
Referring Physician's Name	0008,0090	PN		X					
Requesting Physician	0032,1032	PN		X					
Requesting Service	0032,1033	LO		X					

Table 287: C-FIND-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete	The Worklist is updated.
Failure	A700	Refused – Out of resources	The association is released. The reason is logged.
	A900	Failed – Identifier does not match SOP class	The association is released. The reason is logged.
	Cxxx	Failed – Unable to process	The association is released. The reason is logged.
Cancel	FE00	Matching terminated due to Cancel request	The association is released. The reason is logged.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Worklist job continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Worklist job continues.

Table 298: DICOM Command Communication Failure Behavior

Exception	Behavior
RIS query timeout (default 240 seconds)	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.6.3.2   Patient and Study Merge

The ELEVA AE looks in its internal database for a Study with the same Study Instance UID (0020, 000D) as given in the Scheduled Procedure Step.

The Patient identifying attributes are DICOM 'Patient ID' (0010,0020) together with DICOM 'Issuer of Patient ID' (0010,0021). If a Patient with matching identifying attributes was found, attributes are updated for the internal Patient based on the attributes as given in the Scheduled Procedure Step. The update for the Patient attributes can be disabled in PSC tool (Configuration->Network->External nodes-> Worklist management (WLM) ->Patient information reconciliation).

A Patient is secured from changes if it is

1) selected for acquisition or

2) at least one image was already acquired.

A new Study with a Study Instance UID as given in the Scheduled Procedure Step is created.

If a Study Instance UID match was found, all Patient attributes as given in the Scheduled Procedure Step are updated in the internal database for the parent patient of this study. Study attributes are updated for the internal study based on the attributes as given in the Scheduled Procedure Step.

4.2.1.3.6.3.3   Scheduled Procedure Step (= Examination) Merge

If the ELEVA AE's internal database contains no SPS with Scheduled Procedure Step ID (0040, 0009) identifying an incoming Scheduled Procedure Step, it creates a new one and creates a corresponding Examination referencing this Scheduled Procedure Step ID.

If the ELEVA AE's internal database contains already an SPS with the Scheduled Procedure Step ID (0040, 0009) identifying an incoming Scheduled Procedure Step, the behavior depends on the corresponding Examination state.

If the Examination is still "scheduled", the SPS attributes are compared to the attributes sent with the most recent WLM query. If at least one attribute differs, the scheduled Examination is deleted and re-scheduled. Manual changes the user might have performed on this Examination are lost.

If the Examination has already started, no changes are performed, and the potential changes of the incoming Scheduled Procedure Step are disregarded.

4.2.1.3.6.3.4   Dataset Specific Conformance for Modality Worklist (Broadcast Query) C-FIND SCU

After clicking button for updating patient list the ELEVA AE shall request an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE shall send the Broad Query find request, wait for response, and then release the association.Worklist request identifier for Broad Query are shown in Table 39

The table below should be read as follows:

Attribute Name:	Attributes supported to build a Modality Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.
M:	Matching Keys for (automatic) Worklist Update.
R:	Return Keys. An "X" will indicate that this attribute can be used as Matching Key for Universal Matching.
Q:	Interactive Query Key. An "X" will indicate that this attribute as matching key can be used.
D:	Displayed Keys. An "X" indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD:	An "X" indicates that the value of this Worklist attribute will be used in the created Instances of this Performed Procedure Step.
Type of matching:	The following types of matching exists:
	Single Value Matching
	List of UID Matching
	Wild Card Matching
	Range Matching
	Sequence Matching
	Universal Matching

Table 39: Worklist Request Identifier(Broadcast Query)

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
SOP Common Module									
Specific Character Set	0008,0005	CS							
Patient Identification Module									
Patient's Name	0010,0010	PN		X		X			Last name, First name, Prefix, Middle name, Suffix
Patient ID	0010,0020	LO		X		X			
Issuer of Patient ID	0010,0021	LO		X					
Other Patient IDs	0010,1000	LO		X					
Patient Demographic Module									
Patient's Birth Date	0010,0030	DA		X		X			
Patient's Sex	0010,0040	CS		X		X			
Patient's Age	0010,1010	AS		X					
Patient's Size	0010,1020	DS		X					
Patient's Weight	0010,1030	DS		X		X			
Ethnic Group	0010,2160	SH		X					
Occupation	0010,2180	SH		X		X			
Patient Comments	0010,4000	LT		X					
Confidentiality Constraint on Patient Data Description	0040,3001	LO		X					
Patient Medical Module									
Medical Alerts	0010,2000	LO		X		X			
Allergies	0010,2110	LO		X					
Additional Patient History	0010,21B0	LT		X					
Pregnancy Status	0010,21C0	US		X		X			
Special Needs	0038,0050	LO		X					
Patient State	0038,0500	LO		X					
Visit Status Module									
Current Patient Location	0038,0300	LO		X					
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Modality	0008,0060	CS	X					Single Value,Universal	
>Requested Contrast Agent	0032,1070	LO		X					
>Scheduled Station AE Title	0040,0001	AE	X					Single Value,Universal	
>Scheduled Procedure Step Start Date	0040,0002	DA	X					Single Value,Universal	
>Scheduled Procedure Step Start Time	0040,0003	TM		X					
>Scheduled Procedure Step End Date	0040,0004	DA		X					
>Scheduled Procedure Step End Time	0040,0005	TM		X					
>Scheduled Performing Physician's Name	0040,0006	PN		X		X			
>Scheduled Procedure Step Description	0040,0007	LO		X					
>Scheduled Procedure Step ID	0040,0009	SH		X					

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
>Scheduled Station Name	0040,0010	SH		X					
>Scheduled Procedure Step Location	0040,0011	SH		X					
>Pre-Medication	0040,0012	LO		X					
>Scheduled Procedure Step Status	0040,0020	CS		X					
>Comments on the Scheduled Procedure Step	0040,0400	LT		X					
>Scheduled Protocol Code Sequence	0040,0008	SQ		X					
>>Code Value	0008,0100	SH		X					
>>Coding Scheme Designator	0008,0102	SH		X					
>>Coding Scheme Version	0008,0103	SH		X					
>>Code Meaning	0008,0104	LO		X					
Requested Procedure Module									
Study Instance UID	0020,000D	UI		X					
Requested Procedure Description	0032,1060	LO		X					
Requested Procedure ID	0040,1001	SH		X					
Reason for the Requested Procedure	0040,1002	LO		X					
Requested Procedure Priority	0040,1003	SH		X					
Patient Transport Arrangements	0040,1004	LO		X					
Names of Intended Recipients of Results	0040,1010	PN		X					
Requested Procedure Comments	0040,1400	LT		X					
Referenced Study Sequence	0008,1110	SQ		X					
>Referenced SOP Class UID	0008,1150	UI		X					
>Referenced SOP Instance UID	0008,1155	UI		X					
Requested Procedure Code Sequence	0032,1064	SQ		X					
>Code Value	0008,0100	SH		X					
>Coding Scheme Designator	0008,0102	SH		X					
>Coding Scheme Version	0008,0103	SH		X					
>Code Meaning	0008,0104	LO		X					
Imaging Service Request Module									
Accession Number	0008,0050	SH		X		X			
Referring Physician's Name	0008,0090	PN		X		X			
Requesting Physician	0032,1032	PN		X		X			
Requesting Service	0032,1033	LO		X					
Reason for the Imaging Service Request (RETIRED)	0040,2001	LO		X					
Issue Date of Imaging Service Request	0040,2004	DA		X					
Imaging Service Request Comments	0040,2400	LT		X					

Table 30: C-FIND-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete	The Worklist is updated.
Failure	A700	Refused – Out of resources	The association is released. The reason is logged.

Service Status	Code	Further Meaning	Behavior
	A900	Failed – Identifier does not match SOP class	The association is released. The reason is logged.
	Cxxx	Failed – Unable to process	The association is released. The reason is logged.
Cancel	FE00	Matching terminated due to Cancel request	The association is released. The reason is logged.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Worklist job continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Worklist job continues.

Table 41: DICOM Command Communication Failure Behavior

Exception	Behavior
RIS query timeout (default 240 seconds)	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.6.3.5   Dataset Specific Conformance for Modality Worklist Information Model - FIND C-CANCEL SCU

This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 42: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using AP-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.3.7   (Real-World) Activity - Move as SCU

4.2.1.3.7.1   Description and Sequencing of Activities
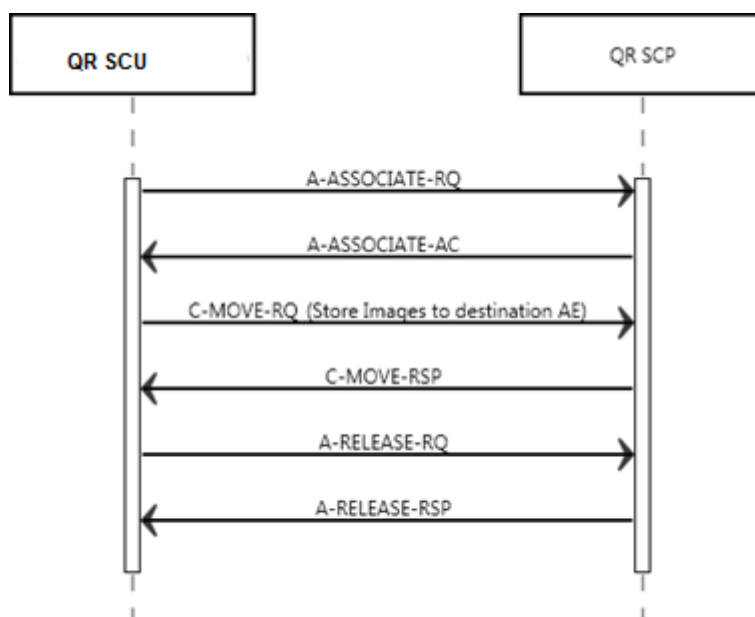
Figure 11 Data Flow Diagram – MOVE as SCU

4.2.1.3.7.2   Proposed Presentation Contexts

Table 43 Proposed Presentation Contexts for (Real-World) Activity Move as SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.7.3 SOP Specific Conformance for SOP Classes

4.2.1.3.7.3.1 SOP Specific Conformance for Patient Root QR Information Model - MOVE SOP Class

4.2.1.3.7.3.1.1 Dataset Specific Conformance for Patient Root QR Information Model - MOVE SOP Class C-MOVE-SCU

Details regarding the Dataset Specific response behavior will be reported in this section.

Table 44 C-MOVE-RQ Dataset Specification.

Patient Root QR Information Model - MOVE SOP Class			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	Series

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 45 Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No failures	Successful completion of the retrieve; also storage warnings may have occurred.

4.2.1.3.7.3.2 SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

4.2.1.3.7.3.2.1 Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-SCU

Table 46 C-MOVE-RQ Dataset Specification.

Study Root QR Information Model - MOVE SOP Class			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	Series

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 47 Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No failures	Successful completion of the retrieve; also storage warnings may have occurred.
Failure	A900	Identifier does not match SOP Class	Retrieval is terminated
Cancel	FE00	Sub-operations terminated due to Cancel indication	Retrieval is terminated
Warning	B000	Sub-operations complete – One or more failures	Retrieval is terminated

4.2.1.3.8 (Real-World) Activity - Print Management as SCU

4.2.1.3.8.1 Description and Sequencing of Activities
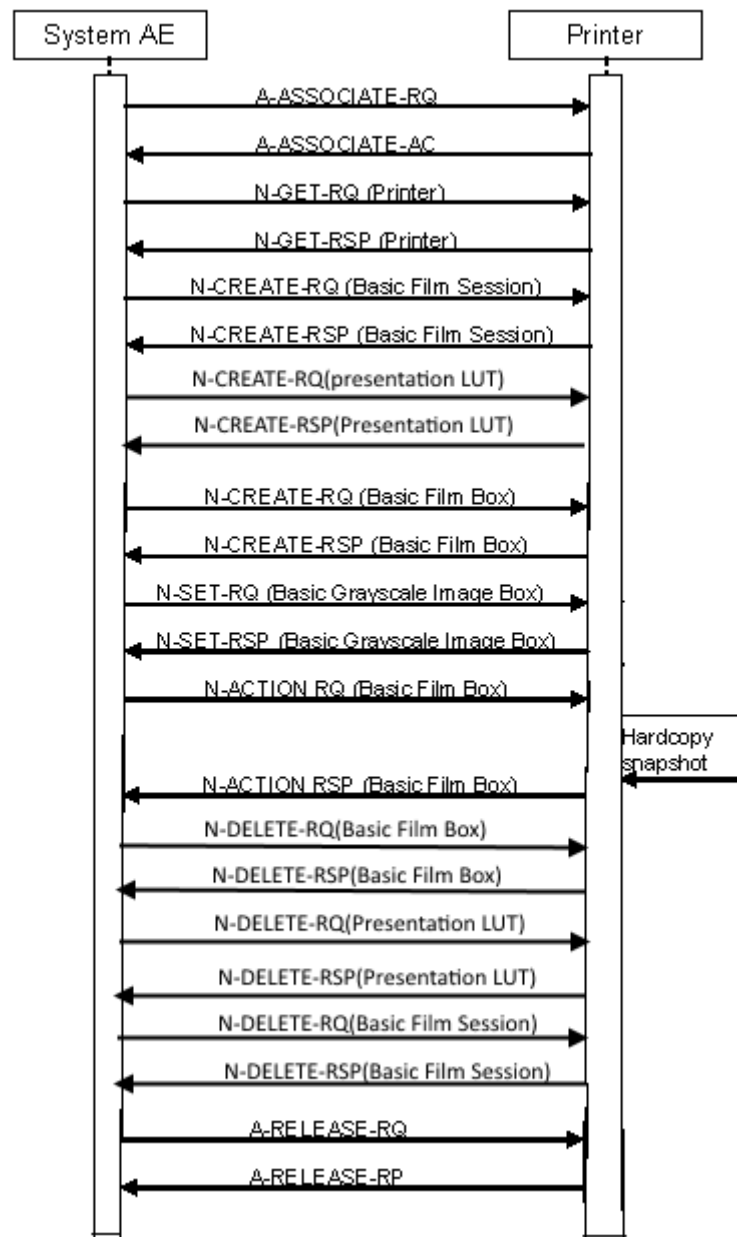
Figure 12 (Real World) Activity - Print Management As SCU

The Eleva AE cannot handle any N-EVENT-REPORT messages.

A print job (film session) comprises one single film box with one single image (that is composed of 1...N modality images).

The print component in DigitalDiagnost 3.2 supports a highly automated print from acquisition operation mode, which does not interrupt the clinical acquisition workflow.

Supplementary to that is the manual print operation mode that is to be used as advanced interactive print preview and as reprint facility.

There shall be two modes of configuration for automatic printing: auto and auto print with user check.

In auto print mode conflicting and incomplete print jobs are either printed "as is" or must be manually corrected and confirmed.

In Auto print with user check mode all automatically started print jobs have to be confirmed manually.

The behavior of the print GUI on entry is dependent on the configuration not on the workflow context.

The three different print modes are:

- No auto print jobs active: Screen is empty.
- Auto print configured: All incomplete pages and conflict jobs are seen for that patient.
- Auto print with user check configured: All current print jobs are seen for thatpatient.

By Manual Printing the basic composition of films is possible with click and point functions.

By Auto Print the operation mode the handling of conflicts between configuration and operation is configurable. This means:

If the collimation and thus the image is larger as originally configured it can be configured if the image shall be cut, scaled or the print job with the conflict shall be manually corrected and confirmed.

If the operator omits one of the routine views configured and a page is thus left half-filled it can be configured if the page is going to be printed half-filled, if a layout suitable for the number of available images is chosen instead or if the page must be manually changed and confirmed.

In case of a manual check configured conflict jobs are sent to the print GUI and handled like the Auto print with user check. Outstanding jobs are shown to the user by:

- An icon in the patient list at every affected patient / study
- User guidance giving patient name of unprinted film at the time the film ready to be printed

By Auto print with user check all print jobs are sent to the Print UI for checking first.

The user is not forced to go there, but outstanding jobs are shown to the user by:

- An icon in the patient list at every affected patient / study
- User guidance giving patient name of unprinted film at the time the film ready to be printed

Depending on the response status of set and the configuration the Eleva AE may perform a retry.

4.2.1.3.8.2 Proposed Presentation Contexts
Table 48 Proposed Presentation Contexts for (Real-World) Activity Print Management as SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
> Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.8.3   SOP Specific Conformance for SOP Classes

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
Behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

4.2.1.3.8.3.1   SOP Specific Conformance for Basic Film Session SOP Class

4.2.1.3.8.3.1.1   Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Table 49 N-CREATE-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Number of Copies	2000,0010	IS		ALWAYS		
Print Priority	2000,0020	CS		ALWAYS		
Medium Type	2000,0030	CS		ALWAYS		
Film Destination	2000,0040	CS		ALWAYS		
Film Session Label	2000,0050	LO		ANAP		

4.2.1.3.8.3.2   SOP Specific Conformance for Presentation LUT SOP Class

4.2.1.3.8.3.2.1   Dataset Specific Conformance for Presentation LUT SOP Class N-CREATE-SCU

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS		

4.2.1.3.8.3.3   SOP Specific Conformance for Basic Film Box SOP Class

4.2.1.3.8.3.3.1   Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Table 50 N-CREATE-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Image Display Format	2010,0010	ST		ALWAYS		
Film Orientation	2010,0040	CS		ALWAYS		
Film Size ID	2010,0050	CS		ALWAYS		
Magnification Type	2010,0060	CS		ALWAYS		
Max Density	2010,0130	US		ALWAYS		
Trim	2010,0140	CS		ANAP		
Configuration Information	2010,0150	ST		ALWAYS		
Referenced Film Session Sequence	2010,0500	SQ		ALWAYS		
>Referenced SOP	0008,1150	UI		ALWAYS		

Class UID						
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		

4.2.1.3.8.3.4 SOP Specific Conformance for Basic Grayscale Image Box SOP Class

4.2.1.3.8.3.4.1 Dataset Specific Conformance for Basic Grayscale Image Box SOP Class N-SET-SCU

Table 51 N-SET-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Image Box Position	2020,0010	US		ALWAYS		
Polarity	2020,0020	CS		ALWAYS		
Basic Grayscale Image Sequence	2020,0110	SQ		ALWAYS		
>Samples Per Pixel	0028,0002	US		ALWAYS		
>Photometric Interpretation	0028,0004	CS		ALWAYS		
>Rows	0028,0010	US		ALWAYS		
>Columns	0028,0011	US		ALWAYS		
>Bits Allocated	0028,0100	US		ALWAYS		
>Bits Stored	0028,0101	US		ALWAYS		
>High Bit	0028,0102	US		ALWAYS		
>Pixel Representation	0028,0103	US		ALWAYS		
>Pixel Data	7FE0,0010	OW/OB		ALWAYS		

4.2.1.3.8.3.5 SOP Specific Conformance for Basic Grayscale Print Management Meta SOP Class

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
Behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

Table 52 DICOM Command Response Status Handling Behavior for Grayscale Print Management Meta Sop Class

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Failure	xxxx	Any failure	In the AutoPrint mode a GUI is invoked. The status panel of this GUI displays a message based on the 'Further Meaning'. The warning or failure response of a print request that is invoked by the Manual Print Composer GUI will be displayed by a pop-up window (if the user has not closed the GUI before the printer status was delivered).
Warning	xxxx	Any warning	In the AutoPrint mode a GUI is invoked. The status panel of this GUI displays a message based on the 'Further Meaning'. The warning or failure response of a print request that is invoked by the Manual Print Composer GUI will be displayed by a pop-up window (if the user has not closed the GUI before the printer status was delivered).

The behavior of the AE during communication failure is summarized next table.

Table 53 DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the command is marked as failed. The reason is logged. After a maximum number of retries the user is notified via pop-up (in preview mode only).
Association aborted	The command is marked as failed. The reason is logged. After a maximum number of retries the user is notified via pop-up (in preview mode only).
Failed to connect	Log entry. After a maximum number of retries the user is notified via pop-up (in preview mode only).

4.2.1.3.9 (Real-World) Activity - Verification as SCU
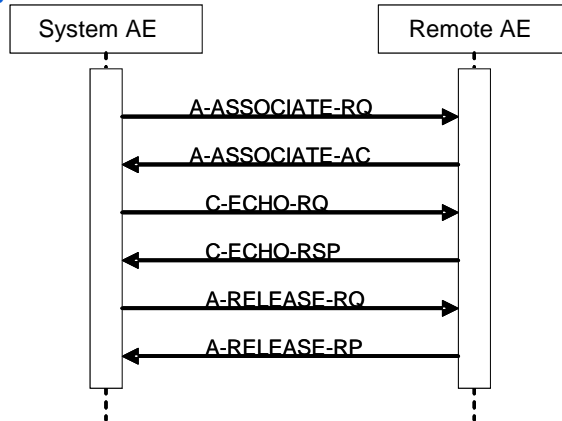
Figure 13 (Real World) Activity - Verification as SCU

The ELEVA AE can initiate associations to remote systems to verify application level communication using the C-ECHO command. This can be done using the Test management Tab for Service Test in the PSC.

4.2.1.3.9.1 Description and Sequencing of Activities

4.2.1.3.9.2 Proposed Presentation Contexts

Table 54 Proposed Presentation Contexts for (Real-World) Activity Verification as SCU

Presentation Context Table						
Abstract Syntax		**Transfer Syntax**			**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**			
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2		SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1			
		Explicit VR Big Endian	1.2.840.10008.1.2.2			

4.2.1.3.9.3 SOP Specific Conformance for SOP Classes

4.2.1.3.9.3.1 SOP Specific Conformance for Verification SOP Class

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
Behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

Table 55 DICOM Command Response Status Handling Behavior for Grayscale Print Management Meta Sop Class

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is complete	The DigitalDiagnost 3.2 has successfully received the verification request response.

4.2.1.3.9.3.1.1 Dataset Specific Conformance for Verification SOP Class C-ECHO-SCU
Not Applicable.

4.2.1.4   Association Acceptance Policy

4.2.1.4.1   (Real-World) Activity - Verification as SCP
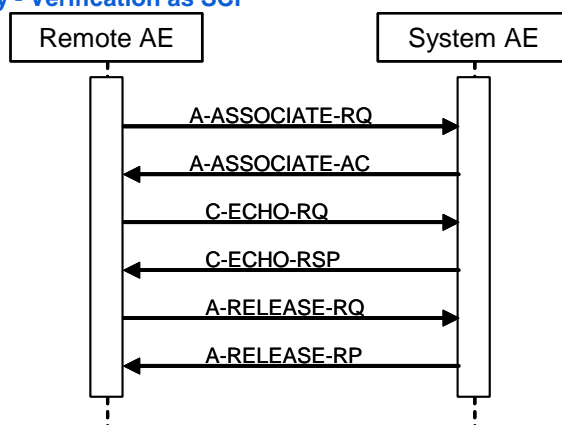
Figure 14 (Real World) Activity - Verification as SCP

The ELEVA AE accepts associations from systems that wish to verify application level communication using the C-ECHO command.

4.2.1.4.1.1   Description and Sequencing of Activities

4.2.1.4.1.2   Accepted Presentation Contexts

Table 56 Accepted Presentation Contexts for (Real-World) Activity Verification as SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.4.1.3   SOP Specific Conformance for SOP Classes

4.2.1.4.1.3.1   SOP Specific Conformance for Verification SOP Class

This section includes the SOP specific behavior for the verification SOP Class, i.e. error codes, error and exception handling, time-outs, etc. This behavior is summarized in the tables below. The standard as well as the manufacturer specific status codes and their corresponding behavior are specified.

Table 57 C-ECHO-RSP Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is complete	The DigitalDiagnost 3.2 has successfully received the verification request.

Table 58 DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using AP-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The command is marked as failed. The reason is logged and reported to the user.

4.2.1.4.1.3.1.1 Dataset Specific Conformance for Verification SOP Class C-ECHO-SCP
Not Applicable

4.2.1.4.2 (Real-World) Activity – Image Import

4.2.1.4.2.1 Description and Sequencing of Activities
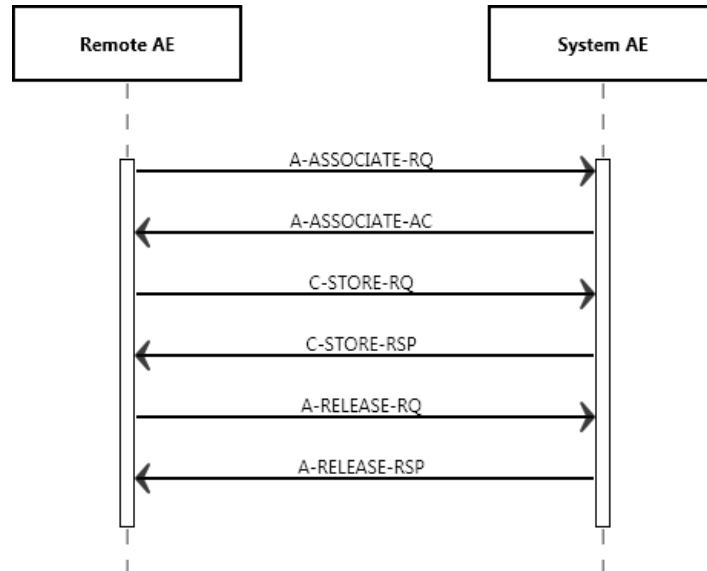
Figure 15 (Real World) Activity - Image Import

4.2.1.4.2.2 Accepted Presentation Contexts

Table 59 Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.3 Network Interfaces

4.3.1 Physical Network Interfaces

The DigitalDiagnost 3.2 provides DICOM 3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM 3.0 Standard.

The DigitalDiagnost 3.2 system supports ISO 8802-3 1GB Ethernet.

4.3.2 Additional Protocols

No additional protocols are used.

4.3.3 IPv4 and IPv6 Support

The DigitalDiagnost 3.2supports both IPv4 and IPv6 networks communication.

4.4 Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration is addressed in this section.

4.4.1 AE Title/Presentation Address Mapping

An important installation issue is the translation from AE title to presentation address. How this is to be performed shall be described in this section.

4.4.1.1 Local AE Titles

The local AE title mapping and configuration are specified as:

Table 60 AE Title Configuration

Application Entity	Default AE Title	Default TCP/IP Port
ELEVA AE	Eleva	3010

4.4.1.2 Remote AE Title/Presentation Address Mapping

All remote applications to be selected as destination (SCP) are configurable for the following items:

The Application Entity Title of the remote application.
The Presentation Address of where the remote application should accept association requests.

4.4.1.2.1

4.4.2 Parameters

The specification of important operational parameters, their default value and range (if configurable) is specified here.

Table 61 Configuration Parameters table

Parameter	Configurable	Default Value
General Parameters		
Maximum PDU receivesize	No	-
Maximum PDU send size	Yes	16384
Maximum number of simultaneous associations	Yes	2
ARTIM Timeout Specifies the time in seconds of the ARTIM (Association Request/Reject/Release Timer). Allowed values: 0: unlimited waiting time 0 < n: real time in seconds	Yes	20 [seconds]

Parameter	Configurable	Default Value
Automatic Association Timeout Specifies the association inactivity timeout in seconds after which the association is closed automatically. Allowed values: -1: immediate timeout 0: unlimited waiting time 0 < n: real time in seconds	Yes	0 [unlimited]
Transfer Syntax support: ILE, ELE, EBE	Yes	ILE, ELE, EBE
Storage Specific Parameters		
Automatic export to a configurable destination	Yes	-
Storage Commitment Specific Parameters		
Storage Commit Max Reply Waiting Time Specifies the time in seconds that is waited for a storage commitment event report message. After this time the association will be terminated Allowed values: -1: immediate timeout 0: unlimited waiting time 0 < n: real time in seconds	Yes	-1 [asynchronous]
Basic Worklist Management Specific Parameters		
RIS query timeout Specifies the time after which the query is automatically aborted Allowed values: 1- 300 minutes	Yes	240 seconds
Background broad query time interval Specifies the time until the background query will be repeated. Allowed values: 0: no broad query 0 < n: real time in minutes	Yes	0 [no broad query]
Print Management Specific Parameters		
Automatic print to a configurable destination	Yes	-

5 Media Interfaces

5.1 Implementation Model

The implementation model shall identify the DICOM Application Entities in a specific implementation and relate the Application Entities to Real-World Activities.

5.1.1 Application Data Flow Diagram

The DigitalDiagnost 3.2 system consists of one single application entity only: the DigitalDiagnost 3.2 Application Entity.

Next figure shows the Media Interchange application data flow as a functional overview of the Eleva AE.
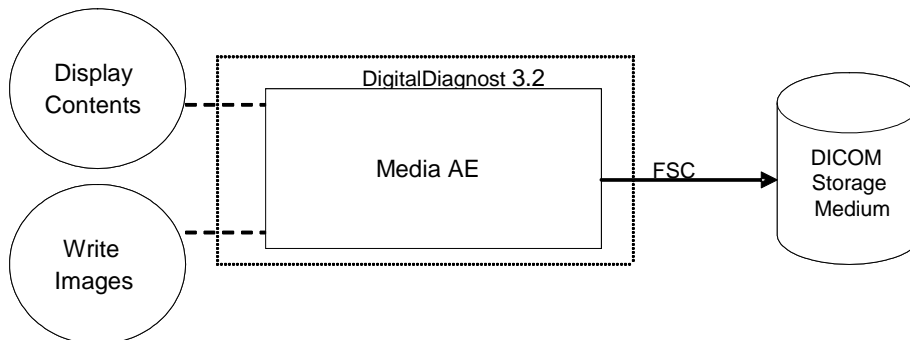
Figure 16: Media Interchange Application Data Flow Diagram

The ELEVA AE will act as a FSC when writing the selected images in a patient folder onto the CD-R/DVD medium.

5.1.2 Functional Definition of AEs

This section shall describe in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions.
The ELEVA AE is the one and only application entity within the DigitalDiagnost 3.2. It includes the following service class.

Media Storage Service Class
The ELEVA AE can perform the Media Storage service as SCU, with capabilities for RWA Create File-Set (as FSC).

5.1.3 Sequencing of Real World Activities

Write images can be initiated by selecting a proper export destination, selecting requested images and clicking the export button.

Whenever a CD-R/DVD has to be written the ELEVA AE first tries to read the DICOMDIR. The ELEVA AE will compile the updated DICOMDIR and any required DICOM images into a CD/DVD session image; this CD/DVD session image will be written to CD-R/DVD.

5.2 AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

5.2.1 Media Storage Media – Specification

The Eleva AE provides Standard Conformance to the DICOM Media Storage Service and File Format ([DICOM] PS 3.10) and the Media Storage Application Profiles STD-GEN-CD ([DICOM] PS 3.11), STD-GEN-DVD-JPEG for creation.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in next table.

Table 61 AE Media Storage related Application Profiles, Real-World Activities and Roles

Supported Application Profile	Identifier	Real-World Activities	Roles
General Purpose CD-R Interchange	STD-GEN-CD	Create File-set	FSC
General Purpose Interchange on DVD-RAM Media	STD-GEN-DVD-RAM	Create File-set	FSC

5.2.1.1   File Meta Information for the Media Storage
In the file Meta information that pertains to the Application Entity the Source Application Entity Title is set to "PMS_ELEVA_37.0"

Table 62 Implementation Identifying Information

Property	Value
Implementation Class UID:	1.3.46.670589.30.37.0
Implementation Version Name:	PMS_ELEVA_37.0

5.2.1.2   Real World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

5.2.1.2.1   RWA - Read File-set

This Media Application Entity has a File-set Reader functionality which is described here.

5.2.1.2.1.1   Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.

5.2.1.2.1.1.1   Options

The options used in the Application Profile are specified in detail in this section.
If there are no options used in the Application Profile, this section may be omitted by writing "Not applicable".

5.2.1.2.2   RWA - Create File-set

When an image transfer to CD-R is initiated then the Eleva AE acts as an FSC using the interchange option to export SOP Instances from the local database to a CD-R/DVD medium.

5.2.1.2.2.1   Media Storage Application Profile

The Eleva AE supports the RWA - Create File-SET for the STD-GEN-CD and STD-GEN-DVD-JPEG Application Profiles.

5.2.1.2.2.1.1   Options

The DICOMDIR file will be created on the CD-R/DVD medium when new images are written. In case some attributes are not present in an image but are specified as mandatory in the DICOMDIR definition in DICOM Media, a generated value will filled in.

The Eleva AE can write created image to media of the following listed SOP Classes

Table 63: AE related storage SOP Classes for Media

SOP Class Name	SOP Class UID
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage - Presentation SOP Class	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - Processing SOP Class	1.2.840.10008.5.1.4.1.1.1.1.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

The Eleva AE can write created image to media with the following listed Transfer Syntax.

Table 64: AE related Transfer Syntax for Media

Transfer Syntax	UID List
Explicit VR Little Endian	1.2.840.10008.1.2.1

The Eleva AE can write created image to media with the following listed Media Storage SOP Class.

Table 65: AE Media Store SOP Class

Media Storage SOP Class Name	Media Storage SOP Class UID
Media Storage Directory Storage	1.2.840.10008.1.3.10

It is possible to Store one single image first as a DICOM CR object and secondly as a DICOM DX object, therefore the "SOP Instance UIDs" and "Referenced SOP Instance UIDs" of both DICOM image instances have to be different.

The Numbering Scheme shall support 'Hanging Protocols' of PACS systems & Viewing Stations, in case of the CR as well as the DX model:

The Series Number starts with 1 for the first Series of every Study Instance, identified by Study Instance UID.

The "Series Number" increases by 1 for every new Series Instance within the same Study Instance, by the timely order, the Series Instances are created.

Every Stored image gets also a unique "Series Instance UID" and "Media Storage SOP Instance UID".

The Image Number starts with 1 for every new Series Instance.

The Image Number increases by 1 for every new Image Instance within the same Series Instance, by the timely order, the Images are created.

5.2.1.2.3   RWA - Update File-set

This Media Application Entity has a File-set Updater functionality which is described here.

5.2.1.2.3.1   Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.

5.2.1.2.3.1.1   Options

The options used in the Application Profileare specified in detail in this section.

If there are no options used in the Application Profile, this section may be omitted by writing "Not applicable".

5.3 Augmented and Private Application Profiles

Eleva does not support any augmented or private application profiles.

5.4 Media Configuration

When creating a CD with anonymous patient data, the following attributes are changed.

Attribute	Tag	Change to
Media Storage SOP Instance UID	0002,0003	New UID
Referenced SOP Instance UID in File	0004,1511	New UID
SOP Instance UID	0008,0018	New UID
Accession Number	0008,0050	[empty]
Institution Name	0008,0080	[empty]
Institution Address	0008,0081	[empty]
Referring Physician's Name	0008,0090	[empty]
Station Name	0008,1010	[empty]

Attribute	Tag	Change to
Study Description	0008,1030	[empty]
Series Description	0008,103E	[empty]
Institutional Department Name	0008,1040	[empty]
Performing Physician's Name	0008,1050	[empty]
Operators' Name	0008,1070	[empty]
Patient Name	0010,0010	[empty]
Patient ID	0010,0020	New ID
Patient's Birth Date	0010,0030	[empty]
Patient's Sex	0010,0040	[empty]
Other Patient IDs	0010,1000	[empty]
Patient's Size	0010,1020	[empty]
Patient's Weight	0010,1030	[empty]
Device Serial Number	0018,1000	New ID
Study Instance UID	0020,000D	New UID
Series Instance UID	0020,000E	New UID
Study ID	0020,0010	New ID
Requesting Physician	0032,1032	[empty]
Request Attributes Sequence	0040,0270	[empty sequence]
Requested Procedure ID	0040,1001	New ID

6 Support of Character Sets

Table 52 Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 100	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646

7 Security

7.1 Security Profiles

DigitalDiagnost 3.2 conforms to the IHE Basic Security Integration Profile.

DigitalDiagnost 3.2 allows the use of either a conventional (non-secure) DICOM communication or a secure DICOM communication based on the Transport Layer Security (TLS) protocol. If configured DigitalDiagnost 3.2supports the following security measures:

Secure authentication of a node

Integrity and confidentiality of transmitted data

Confidentiality of data on DICOM Media

Generation of audit trail records access control and user authentication

7.1.1 Security use Profiles

Not applicable.

7.1.2 Security Transport Connection Profiles

DigitalDiagnost 3.2 conforms to the Basic TLS Secure Transport Connection Profile.

DigitalDiagnost 3.2 initiates TLS Connections and accepts TLS Connections with Storage Commitment. TLS ports are configurable.

DigitalDiagnost 3.2 provides a service accessible tool to configure private keys and certificates of the local and remote DICOM nodes.

Secure communication is a "mode of operation" of DigitalDiagnost 3.2 supported by the implementation of the DICOM Basic TLS Secure Transport Connection Profile. This functionality will be used by the nodes that can authenticate each other before they exchange DICOM information. For secure communication the TLS protocol v1.0 is used which provides message authentication, integrity, and confidentiality. Confidentiality is optional and can be controlled by the encryption settings.

DigitalDiagnost 3.2 may communicate using the following Cipher Suites:

 TLS_RSA_WITH_NULL_SHA (Node authentication without encryption)
 TLS_RSA_WITH_AES_128_CBC_SHA (Node authentication with encryption)
 TLS_RSA_WITH_3DES_EDE_CBC_SHA

DigitalDiagnost 3.2 supports X.509 certificates. The following TLS Certification checks will be done (TLS Handshake). The machine (either server or client) that will send its certificate will:
Choose the certificate according to Common Name (CN) value in the Subject-field. This name is case-sensitive. All present certificates should have unique CN names.

The server verifies that

- The client certificate is a X.509 certificate which is valid.
- The Client Authentication (CA) of the client certificate is in the list of trusted certificates.
- The client certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
- The client certificate has the correct purpose (at least the Client Authentication purpose),If the purpose is specified.

The client verifies that

- The server certificate is a X.509 certificate which valid.
- The Client Authentication (CA) of the client certificate is in the list of trusted certificates.
- The server certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
- The server certificate has the correct purpose (at least Server Authentication purpose),If the purpose is specified.

No verification is done on:
- Revocation of certificates
- Limiting the connection to a limited set of IP-addresses

Node authentication with or without encryption is only possible when both nodes have:
- An access to their own private keys
- An access to a copy of the certificate of the other node containing its public key

Figure below presents the message flow of TLS handshake supported by DigitalDiagnost 3.2.
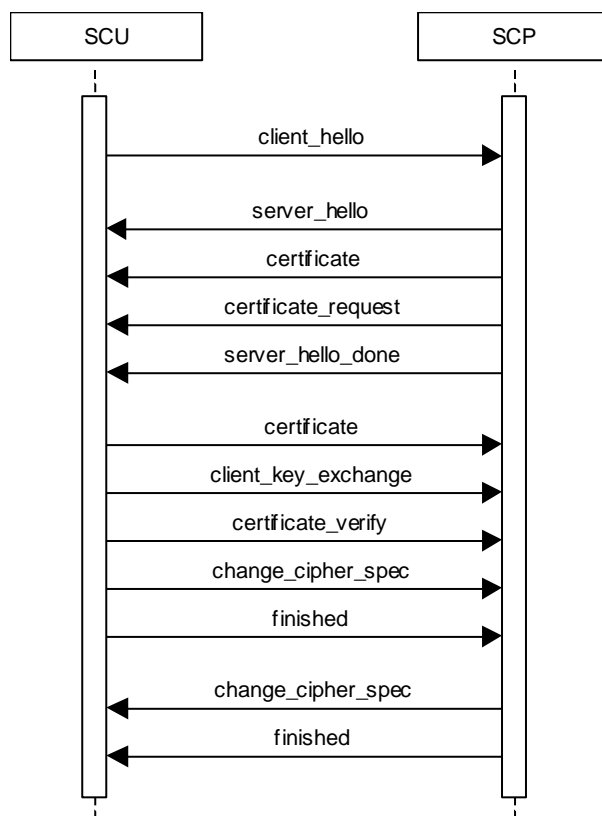
Figure 17 Message flow of TLS handshake

7.1.3 Digital Signature Profiles
Not applicable.

7.1.4 Media Storage Security Profiles
Not applicable.

7.1.5 Attribute Confidentiality Profiles

DigitalDiagnost 3.2 conforms to the Basic Application Level Confidentiality Profile as de-identifier.De-identified SOP Instances will be created on DICOM Media if specified by the user.
No instances of the Encrypted Attributes Data Set are created. No Transfer Syntaxes are supported for encoding/decoding of Encrypted Attributes Data Sets.
Table lists the protected attributes as defined in [DICOM], Part 15. It may contain attributes which are currently not part of images created by DigitalDiagnost 3.2. The terms used to describe the replacement value can be read as follows:

empty   The attribute will have a value of zero length.
n. a.   Not applicable, the attribute is not contained in the standard IOD of DigitalDiagnost 3.2
anon string
The original value is mapped onto a string with a length of max 12 characters UID using the procedure described below.anon UID
The original value is mapped onto a syntactically valid DICOM UID using the procedure described below.

The above mentioned mapping procedure works as follows:
- The original value is taken as a string of arbitrary length.
- This string is mapped onto a 16-byte value using MD5 hash.
- From this value only the first 8 bytes are used further.
To create an anon string these first 8 bytes are mapped onto a 12 characters long string using base 64.
To create an anon UID the 8 bytes are read as two integers which are used together with the Implementation Class UID and the device serial number to create a valid DICOM UID: (ImplClassUID).(DevSerialNu).2.Integer(byte[0-3]).Integer(byte[4-7])

MD5 hash makes practically sure that different strings are mapped to different 16-byte values. So the whole procedure ensures that the relationship between SOP Instances by the means of their UIDs remains consistent.

Table 67: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Replacement Value
Instance Creator UID	0008,0014	anon UID
SOP Instance UID	0008,0018	anon UID
Accession Number	0008,0050	empty
Institution Name	0008,0080	empty
Institution Address	0008,0081	empty
Referring Physician's Name	0008,0090	empty
Station Name	0008,1010	empty
Study Description	0008,1030	empty
Series Description	0008,103E	empty
Institutional Department Name	0008,1040	empty
Physician(s) of Record	0008,1048	empty
Performing Physicians' Name	0008,1050	empty
Name of Physician(s) Reading Study	0008,1060	empty
Operators' Name	0008,1070	empty
Admitting Diagnoses Description	0008,1080	empty
Referenced SOP Instance UID	0008,1155	anon UID
Derivation Description	0008,2111	empty
Patient's Name	0010,0010	empty
Patient ID	0010,0020	anon ID
Patient's Birth Date	0010,0030	empty
Patient's Birth Time	0010,0032	empty
Patient's Sex	0010,0040	empty
Other Patient Ids	0010,1000	empty
Other Patient Names	0010,1001	empty
Patient's Age	0010,1010	empty
Patient's Size	0010,1020	empty
Patient's Weight	0010,1030	empty
Ethnic Group	0010,2160	empty
Occupation	0010,2180	empty
Additional Patient's History	0010,21B0	empty
Patient Comments	0010,4000	empty
Device Serial Number	0018,1000	anon string
Protocol Name	0018,1030	empty
Study Instance UID	0020,000D	anon UID
Series Instance UID	0020,000E	anon UID
Study ID	0020,0010	anon string
Frame of Reference UID	0020,0052	anon UID
Image Comments	0020,4000	empty
Requesting Physician	0032,1032	empty
Requested Attributes Sequence	0040,0275	empty Sequence
Requested Procedure ID	0040,1001	anon ID
UID	0040,A124	anon UID
Content Sequence	0040,A730	empty
Storage Media File-set UID	0088,0140	anon UID

7.1.6 Network Address Management Profiles
Not applicable.

7.1.7 Time Synchronization Profiles

DigitalDiagnost 3.2 conforms to the Basic Time Synchronization Profile as NTP Client.
DigitalDiagnost 3.2 does support secure transactions.

7.1.8 Application Configuration Management Profiles

Not applicable.

7.1.9 Audit Trail Profiles

DigitalDiagnost 3.2 creates audit messages according to the IHE Basic Security Integration Profile. These messages may contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository:

Application Activity (when DigitalDiagnost 3.2 starts or shuts down).
Begin Transferring DICOM Instances (when an examination is being transferred from the DigitalDiagnost 3.2 to a remote network node).
DICOM Instances Transferred (when an examination is transferred from the DigitalDiagnost 3.2 to a remote network node).
DICOM Instances Accessed (Study is accessed, or deleted).User Authentication (when the user logs in or logs out).
Security Alert (when an authentication of a secure node during TLS negotiation fails, e.g. due to an invalid certificate and configuration and other changes).
Export (when printing job is started or export on media e.g. CD, DVD).

7.2 Association Level Security

Not Applicable

7.3 Application Level Security

DigitalDiagnost 3.2 does not support any specific application level security measures.

The Application which gives access to Patient records and DICOM communication requires Login with Username and Password.

The system is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to DigitalDiagnost 3.2.
- Firewall or router protections to ensure that DigitalDiagnost 3.2 only has network access to approved external hosts and services.
- Any communication with external hosts outside the locally secured environment can be configured to use secure network channels.
- Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8 Eleva

8.1 IOD Contents

8.1.1 Created SOP Instances

This section specifies each IOD created by this application and specifies the content for each IOD created (including private IODs). For each attribute in the IOD the following information is supplied:

- Attribute name
- Tag
- VR – Value representation
- Value - specifies possible values
- Presence of value - specifies if attribute is always present or only under specific conditions
- Source of value - specifies the source of the value
- Comment - gives additional information on the attribute

Abbreviations used in the IOD tables for the column "Presence of Module" are:

ALWAYS	The module is always present.
CONDITIONAL	The module is used under specified condition.

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value.
EMPTY	The attribute is always present without any value. (attribute sent zero length)
VNAP	The attribute is always present and its Value is Not Always Present. (attribute sent zero length if no value is present)
ANAP	The attribute is present under specified condition – if present then it will always have a value.

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically.
CONFIG	The attribute value source is a configurable parameter.
COPY	The attribute value source is another SOP instance.
FIXED	The attribute value is hard-coded in the application.
IMPLICIT	The attribute value source is a user-implicit setting.
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step.
MWL	The attribute value source is a Modality Worklist.
USER	The attribute value source is explicit user input.

8.1.1.1 List of Created SOP Classes

Table 68 List of Created SOP Classes

SOP Class Name	SOP Class UID
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage - For Presentation. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing. SOP	1.2.840.10008.5.1.4.1.1.1.1.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

8.1.1.2 Computed Radiography Image Storage SOP Class

Table 69 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always

	Patient Study Module	User Option
Series	General Series Module	Always
	CR Series Module	Always
Equipment	General Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	Display Shutter Module	Always
	CR Image Module	Always
	Overlay Plane	User Option
	Graphic Annotation Module	User Option
	Displayed Area Module	User Option
	Modality LUT Module	Always
	VOI LUT Module	Always
	SOP Common Module	Always

Table 70 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL,USER	
Patient ID	0010,0020	LO		VNAP	MWL,AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL,USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL,USER	
Patient's Sex	0010,0040	CS	F, M, O	VNAP	MWL,USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL,USER	
Patient Comments	0010,4000	LT		ANAP	AUTO	
Ethnic Group	0010,2160	SH		ANAP		

Table 71 General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study Date	0008,0020	DA		VNAP	AUTO	
Study Time	0008,0030	TM		VNAP	AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Referring Physician's Name	0008,0090	PN		VNAP	MWL	
Study ID	0020,0010	SH		VNAP	MWL	
Study Description	0008,1030	LO		ANAP	AUTO/ MWL	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ANAP	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ANAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		ALWAYS	MWL	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>Code Meaning	0008,0104	LO		ALWAYS	MWL	

Table 72 Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Size	0010,1020	DS		ANAP	MWL, USER	
Patient's Age	0010,1010	AS		ANAP		
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	

Additional Patient History	0010,21B0	LT		ANAP	MWL, USER	

Table 73 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Modality	0008,0060	CS	CR	ALWAYS	CONFIG	
Series Description	0008,103ᴱ	LO		ANAP	MPPS,USER	
Performing Physicians' Name	0008,1050	PN		ANAP	MPPS,USER	
Operators' Name	0008,1070	PN		ANAP	MPPS,USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
Body Part Examined	0018,0015	CS		ANAP		
Protocol Name	0018,1030	LO		ANAP		
Series Instance UID	0020,000ᴱ	UI		ALWAYS		
Series Number	0020,0011	IS		VNAP		
Laterality	0020,0060	CS		ANAP		
Performed Procedure Step Start Date	0040,0244	DA		ANAP		
Performed Procedure Step Start Time	0040,0245	TM		ANAP		
Performed Procedure Step ID	0040,0253	SH		ANAP		
Performed Procedure Step Description	0040,0254	LO		ANAP		

Table 74 CR Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Body Part Examined	0018,0015	CS		VNAP	MPPS,USER	
View Position	0018,5101	CS		VNAP	AUTO	

Table 75 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP		
Institution Name	0008,0080	LO		ANAP		
Institution Address	0008,0081	ST		ANAP		
Station Name	0008,1010	SH		ANAP		
Institutional Department Name	0008,1040	LO		ANAP		
Manufacturer's Model Name	0008,1090	LO	DigitalDiagnost	ANAP		
Device Serial Number	0018,1000	LO		ANAP		
Software Versions	0018,1020	LO	3.2.0	ANAP		
Spatial Resolution	0018,1050	DS		ANAP		

Table 76 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP	AUTO	
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	

Content Time	0008,0033	TM		ANAP	AUTO	
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	USER	
Quality Control Image	0028,0300	CS		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 77 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO	
Bits Stored	0028,0101	US	12	ALWAYS	AUTO	
High Bit	0028,0102	US	11	ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 78 Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS		ALWAYS	AUTO	
Vertices of the Polygonal Shutter	0018,1620	IS		ANAP	AUTO	

Table 79 CR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ANAP	AUTO	
Distance Source to Detector	0018,1110	DS		ANAP	AUTO	
Distance Source to Patient	0018,1111	DS		ANAP	AUTO	
Exposure Time	0018,1150	IS		ANAP	AUTO	
Exposure	0018,1152	IS		ANAP	AUTO	
Exposure in µAs	0018,1153	IS		ANAP	AUTO	
Imager Pixel Spacing	0018,1164	DS		ANAP	AUTO	
Acquisition Device Processing Description	0018,1400	LO		ANAP	AUTO	
Relative X-Ray Exposure	0018,1405	IS		ANAP	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Pixel Spacing	0028,0030	DS		ANAP	AUTO	

Table 80 Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS		
Overlay Columns	6000,0011	US		ALWAYS		
Overlay Type	6000,0040	CS		ALWAYS		
Overlay Origin	6000,0050	SS		ALWAYS		

Overlay Bits Allocated	6000,0100	US		ALWAYS		
Overlay Bit Position	6000,0102	US		ALWAYS		
Overlay Data	6000,3000	OW		ALWAYS		

Table 81 Graphic Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Annotation Sequence	0070,0001	SQ		ALWAYS		
>Graphic Layer	0070,0002	CS		ALWAYS		
>Text Object Sequence	0070,0008	SQ		ALWAYS		
>>Anchor Point Annotation Units	0070,0004	CS		ALWAYS		
>>Unformatted Text Value	0070,0006	ST		ALWAYS		
>>Bounding Box Top Left Hand Corner	0070,0010	FL		ALWAYS		
>>Bounding Box Bottom Right Hand Corner	0070,0011	FL		ALWAYS		
>>Anchor Point	0070,0014	FL		ALWAYS		
>>Anchor Point Visibility	0070,0015	CS		ALWAYS		

Table 82 Displayed Area Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS		
>Displayed Area Top Left Hand Corner	0070,0052	SL		ALWAYS		
>Displayed Area Bottom Right Hand Corner	0070,0053	SL		ALWAYS		

Table 83 Modality LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS		ANAP	AUTO	
Rescale Slope	0028,1053	DS		ANAP	AUTO	
Rescale Type	0028,1054	LO	US	ANAP	AUTO	

Table 84 VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		ANAP	AUTO	

Table 325 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.1"	ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

8.1.1.3 Digital X-Ray Image Storage - For Presentation SOP

Table 86 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	User Option
Series	General Series Module	Always
	DX Series Module	Always
Frame of Reference	Frame Of Reference Module	Always
Equipment	General Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	DX Anatomy Imaged Module	Always
	DX Image Module	Always
	DX Detector Module	Always
	X-Ray Collimator	User Option
	DX Positioning Module	User Option
	X-Ray Acquisition Dose Module	User Option
	X-Ray Generation Module	User Option
	X-Ray Grid Module	User Option
	Acquisition Context Module	Always
	SOP Common Module	Always

Table 87 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL, USER	
Patient ID	0010,0020	LO		VNAP	MWL, AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL ,USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	AUTO	
					MWL, USER	

Table 88 General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	
Study Time	0008,0030	TM		VNAP	AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study Description	0008,1030	LO		ANAP	MWL,	

					USER	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH		VNAP	AUTO	

Table 89 Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	MWL, USER	
Patient's Size	0010,1020	DS		ANAP	MWL, USER	
Patient's Weight	0010,1030	DS		ANAP	MWL, USER,	
Additional Patient History	0010,21B0	LT		ANAP	MWL, USER	

Table 90 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Modality	0008,0060	CS	DX	ALWAYS	CONFIG	
Series Description	0008,103^E	LO		ANAP	MWL, USER	
Performing Physicians' Name	0008,1050	PN		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		ANAP	MWL, USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
Body Part Examined	0018,0015	CS		ANAP	MWL, USER	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Series Instance UID	0020,000^E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Laterality	0020,0060	CS		ANAP	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	

Table 91 DX Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	DX	ALWAYS	CONFIG	
Presentation Intent Type	0008,0068	CS	FOR PRESENTATION	ALWAYS	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	

Table 92 Frame Of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	
Position Reference Indicator	0020,1040	LO		VNAP	AUTO	

Table 93 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Institution Address	0008,0081	ST		ANAP	AUTO	
Station Name	0008,1010	SH		ANAP	AUTO	
Institutional Department Name	0008,1040	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	DigitalDiagnost	ANAP	AUTO	
Device Serial Number	0018,1000	LO		ANAP	AUTO	
Software Versions	0018,1020	LO	3.2.0	ANAP	AUTO	
Spatial Resolution	0018,1050	DS		ANAP	AUTO	

Table 94 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP	AUTO	
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	
Content Time	0008,0033	TM		ANAP	AUTO	
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	AUTO	
Quality Control Image	0028,0300	CS		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 95 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 96 DX Anatomy Imaged Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Anatomic Region Sequence	0008,2218	SQ		VNAP	AUTO	
Image Laterality	0020,0062	CS		ALWAYS	AUTO	

Table 97 DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY	ALWAYS	AUTO	
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO	
Bits Stored	0028,0101	US	15, 12, 10	ALWAYS	CONFIG	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	14, 11, 9	ALWAYS	AUTO	When Parameter "Increase virtual depth for PACS" is enabled values are : 15,12,10
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	CONFIG	
Pixel Intensity Relationship	0028,1040	CS	LOG	ALWAYS	AUTO	
Pixel Intensity Relationship Sign	0028,1041	SS	1	ALWAYS	AUTO	
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		ANAP	AUTO	
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	
Rescale Type	0028,1054	LO	US	ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS	00	ALWAYS	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS	AUTO	

Table 98 DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	
Detector Type	0018,7004	CS		VNAP	AUTO	
Detector Mode	0018,7008	LT		ANAP	AUTO	
Detector ID	0018,700A	SH		ANAP	AUTO	
Date of Last Detector Calibration	0018,700C	DA		ANAP	AUTO	
Time of Last Detector Calibration	0018,700E	TM		ANAP	AUTO	
Detector Time Since Last Exposure	0018,7012	DS		ANAP	AUTO	
Detector Manufacturer Name	0018,702A	LO		ANAP	AUTO	
Detector Manufacturer's Model Name	0018,702B	LO		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	
Field of View Horizontal Flip	0018,7034	CS		ANAP	AUTO	
Pixel Spacing	0028,0030	DS		ANAP	AUTO	

Table 99 X-Ray Collimator

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Collimator Shape	0018,1700	CS	RECTANGULAR	ALWAYS	AUTO	
Collimator Left Vertical Edge	0018,1702	IS		ALWAYS	AUTO	
Collimator Right Vertical Edge	0018,1704	IS		ALWAYS	AUTO	
Collimator Upper Horizontal Edge	0018,1706	IS		ALWAYS	AUTO	
Collimator Lower Horizontal Edge	0018,1708	IS		ALWAYS	AUTO	

Table 100DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ANAP	AUTO	
Distance Source to Patient	0018,1111	DS		ANAP	AUTO	
Estimated Radiographic Magnification Factor	0018,1114	DS		ANAP	AUTO	
Positioner Type	0018,1508	CS		VNAP	AUTO	

Table 101 X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ANAP	AUTO	
Distance Source to Detector	0018,1110	DS		ANAP	AUTO	
Distance Source to Patient	0018,1111	DS		ANAP	AUTO	
Exposure Time	0018,1150	IS		ANAP	AUTO	
Exposure	0018,1152	IS		ANAP	AUTO	
Exposure in µAs	0018,1153	IS		ANAP	AUTO	
Image and Fluoroscopy Area Dose Product	0018,115E	DS		ANAP	AUTO	
Relative X-Ray Exposure	0018,1405	IS		ANAP	AUTO	
Exposure Time in µS	0018,8150	DS		ANAP	AUTO	
Entrance Dose	0040,0302	US		ANAP	AUTO	
Entrance Dose in mGy	0040,8302	DS		ANAP	AUTO	

Table 102 X-Ray Generation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Exposure Time	0018,1150	IS		ANAP	AUTO	
Exposure	0018,1152	IS		ANAP	AUTO	
Exposure in µAs	0018,1153	IS		ANAP	AUTO	
Exposure Control Mode Description	0018,7062	LT		ANAP	AUTO	
Exposure Time in µS	0018,8150	DS		ANAP	AUTO	

Table 103 X-Ray Grid Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Grid	0018,1166	CS	RECIPROCATING	ANAP		

Table 104 Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		VNAP	AUTO	

Table 105 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.1.1	ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Instance Number	0020,0013	IS		ANAP		

8.1.1.4   Digital X-Ray Image Storage - For Processing SOP

Table 106 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	User Option
Series	General Series Module	Always
	DX Series Module	Always
Equipment	General Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	DX Anatomy Imaged Module	Always
	DX Image Module	Always
	DX Detector Module	Always
	X-Ray Grid Module	User Option
	Acquisition Context Module	Always
	SOP Common Module	Always

Table 107 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL, USER	
Patient ID	0010,0020	LO		VNAP	MWL, AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL ,USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	AUTO	

Table 108 General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP		
Study Time	0008,0030	TM		VNAP		
Accession Number	0008,0050	SH		VNAP		
Referring Physician's Name	0008,0090	PN		VNAP		
Study Description	0008,1030	LO		ANAP		
Study Instance UID	0020,000D	UI		ALWAYS		

| Study ID | 0020,0010 | SH | | VNAP | | |

Table 109 Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP		
Patient's Size	0010,1020	DS		ANAP		
Patient's Weight	0010,1030	DS		ANAP		
Additional Patient History	0010,21B0	LT		ANAP		

Table 110 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP		
Series Time	0008,0031	TM		ANAP		
Modality	0008,0060	CS	DX	ALWAYS		
Series Description	0008,103ᴱ	LO		ANAP		
Performing Physicians' Name	0008,1050	PN		ANAP		
Operators' Name	0008,1070	PN		ANAP		
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP		
>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
Body Part Examined	0018,0015	CS		ANAP		
Protocol Name	0018,1030	LO		ANAP		
Series Instance UID	0020,000ᴱ	UI		ALWAYS		
Series Number	0020,0011	IS		VNAP		
Laterality	0020,0060	CS		ANAP		
Performed Procedure Step Start Date	0040,0244	DA		ANAP		
Performed Procedure Step Start Time	0040,0245	TM		ANAP		
Performed Procedure Step ID	0040,0253	SH		ANAP		
Performed Procedure Step Description	0040,0254	LO		ANAP		

Table 111 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP		
Institution Name	0008,0080	LO		ANAP		
Institution Address	0008,0081	ST		ANAP		
Station Name	0008,1010	SH		ANAP		
Institutional Department Name	0008,1040	LO		ANAP		
Manufacturer's Model Name	0008,1090	LO	DigitalDiagnost	ANAP		
Device Serial Number	0018,1000	LO		ANAP		
Software Versions	0018,1020	LO	3.2.0	ANAP		
Spatial Resolution	0018,1050	DS		ANAP		

Table 112 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP		
Acquisition Date	0008,0022	DA		ANAP		
Content Date	0008,0023	DA		ANAP		
Acquisition Time	0008,0032	TM		ANAP		
Content Time	0008,0033	TM		ANAP		
Irradiation Event UID	0008,3010	UI		ANAP		
Instance Number	0020,0013	IS		VNAP		
Patient Orientation	0020,0020	CS		ANAP		
Quality Control Image	0028,0300	CS		ANAP		
Burned In Annotation	0028,0301	CS		ANAP		
Lossy Image Compression	0028,2110	CS		ANAP		
Presentation LUT Shape	2050,0020	CS		ANAP		

Table 113 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS		
Photometric Interpretation	0028,0004	CS	MONOCHROME1	ALWAYS		
Rows	0028,0010	US		ALWAYS		
Columns	0028,0011	US		ALWAYS		
Bits Allocated	0028,0100	US		ALWAYS		
Bits Stored	0028,0101	US		ALWAYS		
High Bit	0028,0102	US		ALWAYS		
Pixel Representation	0028,0103	US		ALWAYS		
Pixel Data	7FE0,0010	OW/OB		ANAP		

Table 114 DX Anatomy Imaged Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Anatomic Region Sequence	0008,2218	SQ		VNAP		
Image Laterality	0020,0062	CS		ALWAYS		

Table 115 DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	
Detector Type	0018,7004	CS		VNAP	AUTO	
Detector Mode	0018,7008	LT		ANAP	AUTO	
Detector ID	0018,700A	SH		ANAP	AUTO	
Date of Last Detector Calibration	0018,700C	DA		ANAP	AUTO	
Time of Last Detector Calibration	0018,700E	TM		ANAP	AUTO	
Detector Time Since Last Exposure	0018,7012	DS		ANAP	AUTO	
Detector Manufacturer Name	0018,702A	LO		ANAP	AUTO	
Detector Manufacturer's Model Name	0018,702B	LO		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	
Field of View Horizontal Flip	0018,7034	CS		ANAP	AUTO	

Pixel Spacing	0028,0030	DS		ANAP	AUTO	

Table 116 DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY	ALWAYS	AUTO	
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME1	ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO	
Bits Stored	0028,0101	US	15	ALWAYS	CONFIG	
High Bit	0028,0102	US	14	ALWAYS	AUTO	
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	CONFIG	
Pixel Intensity Relationship	0028,1040	CS	LOG	ALWAYS	AUTO	
Pixel Intensity Relationship Sign	0028,1041	SS	1	ALWAYS	AUTO	
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		ANAP	AUTO	
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	
Rescale Type	0028,1054	LO	US	ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS	00	ALWAYS	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS	AUTO	
Patient Orientation	0020,0020	CS	L\F	ALWAYS		

Table 117DX Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	DX	ALWAYS		
Presentation Intent Type	0008,0068	CS	FOR PROCESSING	ALWAYS	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	

Table 118 X-Ray Grid Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Grid	0018,1166	CS	RECIPROCATING	ANAP		

Table 119 Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		VNAP		

Table 120 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.1.1.1	ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Instance Number	0020,0013	IS		ANAP		

8.1.1.5 Secondary Capture Image Storage SOP Class

Table 121 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
Series	General Series Module	Always
Equipment	SC Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	SC Image Module	Always
	SOP Common Module	Always

Table 122 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL/ USER	
Patient ID	0010,0020	LO		VNAP	MWL/ AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL/ USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL /USER	
Patient's Sex	0010,0040	CS		VNAP	MWL/ USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL/ USER	
Patient Comments	0010,4000	LT		ANAP	AUTO	
					MWL/ USER	

Table 123 General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP		
Study Time	0008,0030	TM		VNAP		
Accession Number	0008,0050	SH		VNAP		
Referring Physician's Name	0008,0090	PN		VNAP		
Study Description	0008,1030	LO		ANAP		
Study Instance UID	0020,000D	UI		ALWAYS		
Study ID	0020,0010	SH		VNAP		

Table 124 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP		
Series Time	0008,0031	TM		ANAP		
Modality	0008,0060	CS	CR	ALWAYS		
Series Description	0008,103[E]	LO		ANAP		
Performing Physicians' Name	0008,1050	PN		ANAP		
Operators' Name	0008,1070	PN		ANAP		

Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP		
>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
Body Part Examined	0018,0015	CS		ANAP		
Protocol Name	0018,1030	LO		ANAP		
Series Instance UID	0020,000ᴱ	UI		ALWAYS		
Series Number	0020,0011	IS		VNAP		
Laterality	0020,0060	CS		ANAP		
Performed Procedure Step Start Date	0040,0244	DA		ANAP		
Performed Procedure Step Start Time	0040,0245	TM		ANAP		
Performed Procedure Step ID	0040,0253	SH		ANAP		
Performed Procedure Step Description	0040,0254	LO		ANAP		

Table 125 SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	CR,	ANAP		
Conversion Type	0008,0064	CS	WSD	ALWAYS		

Table 126 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP		
Acquisition Date	0008,0022	DA		ANAP		
Content Date	0008,0023	DA		ANAP		
Acquisition Time	0008,0032	TM		ANAP		
Content Time	0008,0033	TM		ANAP		
Irradiation Event UID	0008,3010	UI		ANAP		
Instance Number	0020,0013	IS		VNAP		
Patient Orientation	0020,0020	CS		ANAP		
Quality Control Image	0028,0300	CS		ANAP		
Burned In Annotation	0028,0301	CS		ANAP		
Lossy Image Compression	0028,2110	CS		ANAP		
Presentation LUT Shape	2050,0020	CS		ANAP		

Table 127 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS		
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS		
Rows	0028,0010	US		ALWAYS		
Columns	0028,0011	US		ALWAYS		
Bits Allocated	0028,0100	US		ALWAYS		
Bits Stored	0028,0101	US		ALWAYS		
High Bit	0028,0102	US		ALWAYS		
Pixel Representation	0028,0103	US		ALWAYS		
Pixel Data	7FE0,0010	OW/OB		ANAP		

Table 128 SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP		
Time of Secondary Capture	0018,1014	TM		ANAP		
Pixel Spacing	0028,0030	DS		ANAP		

Table 129 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Instance Number	0020,0013	IS		ANAP		

8.1.1.6　X-Ray Radiation Dose SR

Table 130 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
Study	Patient Study Module	User Option
Series	SR Document Series Module	Always
Equipment	General Equipment Module	Always
	Enhanced General Equipment Module	Always
Image	SR Document General Module	Always
	SR Document Content Module	Always
	SOP Common Module	Always

Table 131Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL/ USER	
Patient ID	0010,0020	LO		VNAP	MWL/ AUTO	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL/ USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL /USER	
Patient's Sex	0010,0040	CS		VNAP	MWL/ USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL/ USER	
Patient Comments	0010,4000	LT		ANAP	AUTO	
Ethnic Group	0010,2160	SH		ANAP	MWL/ USER	

Table 132 General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment

Study Date	0008,0020	DA		VNAP		
Study Time	0008,0030	TM		VNAP		
Accession Number	0008,0050	SH		VNAP		
Referring Physician's Name	0008,0090	PN		VNAP		
Study Description	0008,1030	LO		ANAP		
Procedure Code SQ	0008,1032	SQ		ANAP		
Study Instance UID	0020,000D	UI		ALWAYS		
Study ID	0020,0010	SH		VNAP		

Table 133 Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	MWL/ USER	
Patient's Size	0010,1020	DS		ANAP	MWL/ USER	
Patient'sWeight	0010,1030	DS		ANAP	MWL/ USER	
Occupation	0010,2180	SH		ANAP	MWL/ USER	
Additional Patient History	0010,21B0	LT		ANAP	MWL/ USER	

Table 134 SR Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Performed Procedure Step Sequence	0008,1111	SQ		VNAP		

Table 135 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP		
Institution Name	0008,0080	LO		ANAP		
Institution Address	0008,0081	ST		ANAP		
Station Name	0008,1010	SH		ANAP		
Institutional Department Name	0008,1040	LO		ANAP		
Manufacturer's Model Name	0008,1090	LO	DigitalDiagnost	ANAP		
Device Serial Number	0018,1000	LO		ANAP		
Software Versions	0018,1020	LO	37.0.310	ANAP		
Spatial Resolution	0018,1050	DS		ANAP		

Table 136 SR Document General Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performed Procedure Code Sequence	0040,A372	SQ		VNAP		

Table 137 SR Document Content Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Measured Value Sequence	0040,A300	SQ		VNAP		

Table 138 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	COPY	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	
Instance Creation Time	0008,0013	TM		ANAP	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.88.67	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

8.1.2 Usage of Attributes from Received IODs

The DigitalDiagnost 3.2 has only an export side. The modality cannot read/view images from a CD.

8.1.3 Attribute Mapping

Table 139: Attribute Mapping during Modality Workflow

Name	BWLM Tag	MPPS Create Tag	MPPS Set Tag	Image IOD Tag
Accession Number	0008,0050	0008,0050	-	0008,0050
Modality	-	0008,0060	-	0008,0060
Referring Physician's Name	0008,0090	-	-	0008,0090
Operators' Name	-	-	0008,1070	0008,1070
Referenced Study Sequence	0008,1110	0008,1110	-	0008,1110
Referenced Image Sequence	-	-	(0008,1140)	-
> Referenced SOP Class UID	-	-	0008,1150	0008,0016
SOP Class UID				
> Referenced SOP Instance UID	-	-	0008,1155	0008,0018
SOP Instance UID				
Patient's Name	0010,0010	0010,0010	-	0010,0010
Patient ID	0010,0020	0010,0020	-	0010,0020
Issuer of Patient ID	0010,0021	0010,0021	-	0010,0021
Patient's Birth Date	0010,0030	0010,0030	-	0010,0030
Patient's Sex	0010,0040	0010,0040	-	0010,0040
Other Patient IDs	0010,1000	0010,1000	-	0010,1000
Medical Alerts	0010,2000	-	-	0010,2000
Allergies	0010,2110	-	-	0010,2110
Ethnic group	0010,2160	-	-	0010,2160
Additional Patient History	0010,21B0	-	-	0010,21B0
Pregnancy Status	0010,21C0	-	-	0010,21C0
Patient Comments	0010,4000	-	-	0010,4000
Protocol Name	-	-	0018,1030	0018,1030
Study Instance UID	0020,000D	0020,000D	-	0020,000D
Series Instance UID			0020,000E	0020,000E
Study ID	-	0020,0010	-	0020,0010
Requesting Service	0032,1033	-	-	0032,1033
Requested Procedure Description	0032,1060	0032,1060	-	-

Name	BWLM Tag	MPPS Create Tag	MPPS Set Tag	Image IOD Tag
Requested Procedure Code Sequence[3]	0032,1064	0008,1032	0008,1032	0008,1032
Performed Procedure Code Sequence				
Special Needs	0038,0050	-	-	0038,0050
Patient State	0038,0500	-	-	0038,0500
Scheduled Procedure Step Description[4]	0040,0007	0040,0007	-	0040,0007
Performed Procedure Step Description		0040,0254	-	0040,0254
Scheduled Protocol Code Sequence[4]	0040,0008	0040,0260	0040,0260	0040,0008
Performed Protocol Code Sequence				0040,0260
Scheduled Procedure Step ID	0040,0009	0040,0009	-	0040,0009
Performed Procedure Step Start Date	-	0040,0244	-	0040,0244
Performed Procedure Step Start Time	-	0040,0245	-	0040,0245
Performed Procedure Step ID	-	0040,0253	-	0040,0253
Requested Procedure ID	0040,1001	0040,1001	-	0040,1001

Note 1: Value accumulated from all performed acquisitions including dropped (repeated) acquisitions.

Note 2: Image related specific value.

Note 3: If procedure is performed as requested.

Note 4: If protocol is performed as scheduled.

8.1.4 Coerced/Modified Fields

8.2 Data Dictionary of Private Attributes
Not Applicable.

8.3 Coded Terminology and Templates

8.3.1 Context Group
Not Applicable.

8.3.2 Template Specifications
Not Applicable

DigitalDiagnost 3.2 can optionally create and store, upon completion of the study, a DICOM X-Ray Radiation DOSE SR object.

X-RAY RADIATION DOSE SR IOD TEMPLATES
The templates that comprise the X-Ray Radiation Dose SR are interconnected as indicated in the figure below:
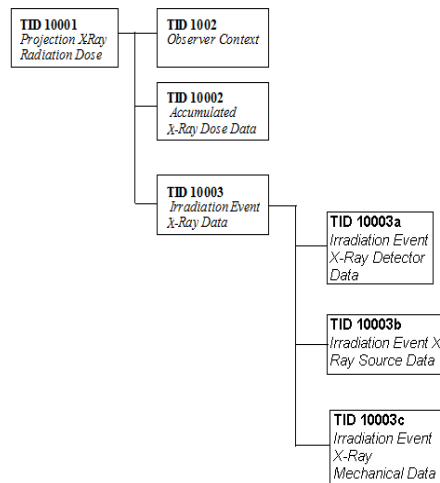
Figure 18 X-Ray Radiation Dose SR IOD Template Structure

This section describes the content of all the templates used in the X-Ray Radiation Dose Reporting SR.

Table 140: Used Templates for X-Ray Radiation Dose Reporting

Template Name	Template ID
Projection X-Ray Radiation Dose	TID 10001
Accumulated X-Ray Dose	TID 10002
Irradiation Event X-Ray Data	TID 10003
Irradiation Event X-Ray Detector Data	TID 10003a
Irradiation Event X-Ray Source Data	TID 10003b
Irradiation Event X-Ray Mechanical Data	TID 10003c
Accumulated Projection X-Ray Dose	TID 10004
Observer Context	TID 1002
Device Observer Identifying Attributes	TID 1004

8.3.2.1.1   TID 10001 Projection X-Ray Radiation Dose

Table 141: Projection X-Ray Radiation Dose

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		X-Ray Radiation Dose Report		1	ALWAYS	
>	HAS CONCEPT MOD	Procedure reported	CODE	1	ALWAYS	Projection X-Ray
>>	HAS CONCEPT MOD	Has Intent	CODE	1	ALWAYS	Diagnostic Intent
>		DTID (1002) Observer Context	INCLUDE	1	ALWAYS	
>	HAS OBS CONTEXT	Scope of Accumulation	CODE	1	ALWAYS	Performed Procedure Step
>>	HAS PROPERTIES	DCID (10001) UID Types	UIDREF	1	ALWAYS	Performed Procedure Step SOP Instance UID
>	CONTAINS	X-Ray Detector Data Available	CODE	1	ALWAYS	No
>	CONTAINS	X-Ray Source Data Available	CODE	1	ALWAYS	Yes

>	CONTAINS	X-Ray Mechanical Data Available	CODE	1	ALWAYS	Yes
>	CONTAINS	DTID (10002) Accumulated X-Ray Dose	INCLUDE	1	ALWAYS	
>	CONTAINS	DTID (10003) Irradiation Event X-Ray Data	INCLUDE	1-n	ALWAYS	
>	CONTAINS	Source of Dose Information	CODE	1	ALWAYS	Automated Data Collection
>	CONTAINS	Comment	TEXT	1	CONDITIONAL	X-Ray Radiation Dose Structured Report related to the Performed Procedure Step

8.3.2.1.2   TID 10002 Accumulated X-Ray Dose

Table 142: Accumulated X-Ray Dose

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	CONTAINS, CONTINUOUS	Accumulated X-Ray Dose Data	CONTAINER	1	ALWAYS	
>>	HAS CONCEPT MOD	Acquisition Plane	CODE	1	ALWAYS	Single Plane
>>	CONTAINS	DTID (10004) Accumulated Projection X-Ray Dose	INCLUDE	1	ALWAYS	

8.3.2.1.3   TID 10003 Irradiation Event X-Ray Data

Table 143: Irradiation Event X-Ray Data

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	CONTAINS, CONTINUOUS	Irradiation Event X-Ray Data	CONTAINER	1	ALWAYS	
>>	HAS CONCEPT MOD	Acquisition Plane	CODE	1	ALWAYS	Single Plane
>>	CONTAINS	DateTime Started	DATETIME	1	ALWAYS	
>>	CONTAINS	Irradiation Event Type	CODE	1	ALWAYS	Stationary Acquisition
>>	CONTAINS	Acquisition Protocol	TEXT	1	CONDITIONAL	= view position
>>	CONTAINS	Anatomical structure	CODE	1	ALWAYS	Value from CID 4031 = Common Anatomic Regions"
>>	CONTAINS	Reference Point Definition	CODE	1	ALWAYS	30cm above Tabletop and 30cm in Front of Image Input Surface
>>	CONTAINS	Irradiation Event UID	UIDREF	1	ALWAYS	
>>	CONTAINS	Dose Area Product	NUM	1	ALWAYS	Units = Gy.m2
>>	CONTAINS	Dose (RP)	NUM	1	ALWAYS	Units = Gy
>>	CONTAINS	KVP	NUM	1-n	CONDITIONAL	Units = kV
>>	CONTAINS	X-Ray Tube Current	NUM	1-n	CONDITIONAL	Units = mA
>>	CONTAINS	Exposure	NUM	1-n	CONDITIONAL	Units = uAs
>>	CONTAINS	Irradiation Duration	NUM	1	CONDITIONAL	Units = seconds
>>	CONTAINS	Distance Source to Reference Point	NUM	1	CONDITIONAL	Units = mm
>>	CONTAINS	Target Region	CODE	1	ALWAYS	Value from CID 4031 Common Anatomic Regions
>	CONTAINS	DCID (10008) Dose Related Distance Measurements	INCLUDE	2	ALWAYS	Fill in fixed values for: - Distance source to detector - Distance source to Isocenter - Distance source to Reference Point
>>	CONTAINS	Anode Target Material	CODE	1	CONDITIONAL	Tungsten or Tungsten compound

8.3.2.1.4   TID 10003aIrradiation Event X-Ray Detector Data

Table 144:Irradiation Event X-Ray Detector Data

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		Exposure Index	NUM	1	CONDITIONAL	Units=no units
		Acquired Image	IMAGE	1-n	CONDITIONAL	

8.3.2.1.5   TID 10003bIrradiation Event X-Ray Source Data

Table 145:Irradiation Event X-Ray Source Data

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>>	CONTAINS	Dose (RP)	NUM	1	CONDITIONAL	Units=Gy
>>	CONTAINS	Reference Point Definition	CODE	1	CONDITIONAL	
>>	CONTAINS	Irradiation Duration	NUM	1	USER DEFINED	Units=s
>>	CONTAINS	KVP	NUM	1-n	ALWAYS	Units=kV
>>	CONTAINS	X-Ray Tube Current	NUM	1	ALWAYS	Units=mA
>>	CONTAINS	Exposure	NUM	1-n	CONDITIONAL	Units= uAs
>>		X-Ray filters	CONTAINER	1-n	USER DEFINED	

8.3.2.1.6   TID 10003cIrradiation Event X-Ray Mechanical Data

Table 146: Irradiation Event X-Ray Source Data

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>>		Dose Related Distance Measurements	NUM	1-n	USER DEFINED	Units=mm

8.3.2.1.7   TID 10004 Accumulated Projection X-Ray Dose

Table 147: Accumulated Projection X-Ray Dose

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>>	CONTAINS	Dose Area Product Total	NUM	1	ALWAYS	Units = Gy.m2
>>	CONTAINS	Dose (RP) Total	NUM	1	ALWAYS	Units = Gy
>>	CONTAINS	Acquisition Dose Area Product Total	NUM	1	ALWAYS	Units = Gy.m2
>>	CONTAINS	Acquisition Dose (RP) Total	NUM	1	ALWAYS	Units = Gy
>>	CONTAINS	Total Acquisition Time	NUM	1	ALWAYS	Units = seconds
>>	CONTAINS	Total Number of Radiographic Frames	NUM	1	ALWAYS	no units
>>	CONTAINS	Reference Point Definition	TEXT	1	ALWAYS	30cm above Tabletop and 30cm in Front of Image Input Surface

8.3.2.1.8   TID 1002 Observer Context

Table 148: Observer Context

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	HAS OBS CONTEXT	Observer Type	CODE	1	CONDITIONAL	Device
	HAS OBS CONTEXT	DTID (1004) Device observer identifying attributes	INCLUDE	1	ALWAYS	

8.3.2.1.9   TID 1004 Device Observer Identifying Attributes

Table 149: Device Observer Identifying Attributes

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	HAS OBS CONTEXT	Device Observer UID	UIDREF	1	ALWAYS	
>	HAS OBS CONTEXT	Device Observer Name	TEXT	1	ALWAYS	Station Name (0008,1010)
>	HAS OBS CONTEXT	Device Observer Manufacturer	TEXT	1	ALWAYS	Manufacturer (0008,0070): Philips Medical Systems
>	HAS OBS CONTEXT	Device Observer Model Name	TEXT	1	ALWAYS	Manufacturer's Model Name (0008,1090): DigitalDiagnost
>	HAS OBS CONTEXT	Device Observer Serial Number	TEXT	1	ALWAYS	Device Serial Number (0018,1000)
>	HAS OBS CONTEXT	Scope of Accumulation	CODE	1	ALWAYS	
>>	HAS PROPERTIES	Performed Procedure Step SOP Instance UID	UIDREF	1	ALWAYS	

8.3.3   Private Code Definitions

8.4   Grayscale Image Consistency

The monitor of DigitalDiagnost 3.2 system can be calibrated according Grayscale Display Function Standard.

The pixel values exported and printed should be interpreted as P-Value. If the export destination or the printer does not support GSDF, DigitalDiagnost 3.2 provides calibration tools to adapt to this device to afford grayscale image consistency. The calibration takes into account ambient luminance and lightbox luminance.

8.5   Standard/Extended/Specialized/Private SOP Classes

Table 150: List of Extended/Specialized/Private created SOP Instance

SOP Class Name	SOP Class UID
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Digital X-Ray Image Storage - For Presentation. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing. SOP	1.2.840.10008.5.1.4.1.1.1.1.1

X-Ray Radiation Dose SR SOP Class	1.2.840.10008.5.1.4.1.1.88.67

8.5.1 Standard Extended/Specialized/Private SOP Instance

The Storage SOP classes are extended to create a standard extended SOP class by addition of standard and private attributes to the created SOP Instances.

8.5.1.1 Computed Radiography Image Storage SOP Class

Table 151: Addition of standard and private attributes for Computed Radiography Image Storage SOP Class

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Medical Alerts	0010,2000	LO		VNAP	MWL/ USER	
Allergies	0010,2110	LO		VNAP	MWL/ USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/ USER	
Image and Fluoroscopy Area Dose Product	0018,115E	DS		VNAP	AUTO	
Grid	0018,1166	CS	RECIPROCATING	VNAP	AUTO	
Filter Material	0018,7050	CS		VNAP	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Requesting Physician	0032,1032	PN		VNAP	MWL/ USER	
Requesting Service	0032,1033	LO		VNAP	MWL/ USER	
Requested Procedure Description	0032,1060	LO		VNAP	MWL/ USER	
Special Needs	0038,0050	LO		VNAP	MWL/ USER	
Patient State	0038,0500	LO		VNAP	MWL/ USER	
Performed Station AE Title	0040,0241	AE		VNAP	MPPS/ AUTO	
Performed Procedure Step End Date	0040,0250	DA		VNAP	MPPS/ AUTO	
Performed Procedure Step End Time	0040,0251	TM		VNAP	MPPS/ AUTO	
Performed Procedure Step Status	0040,0252	CS		VNAP	MPPS/ AUTO	
Total Number of Exposures	0040,0301	US		VNAP	AUTO	
Requested Procedure ID	0040,1001	SH		VNAP	MWL/ USER	
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL/ USER	
Requested Procedure Priority	0040,1003	SH		VNAP	MWL/ USER	
Patient Transport Arrangements	0040,1004	LO		VNAP	MWL/ USER	
Names of Intended Recipients of Results	0040,1010	PN		VNAP	MWL/ USER	
Requested Procedure Comments	0040,1400	LT		VNAP	MWL/ USER	
Reason for the Imaging Service Request (RETIRED)	0040,2001	LO		VNAP	MWL	

Issue Date of Imaging Service Request	0040,2004	DA		VNAP	MWL/ USER	
Imaging Service Request Comments	0040,2400	LT		VNAP	MWL/ USER	
Requested Procedure Code Sequence	0032,1064	SQ		VNAP	MWL	
Exposure Dose Sequence	0040,030E	SQ		VNAP	AUTO	
Film Consumption Sequence	0040,0321	SQ		VNAP	AUTO	

8.5.1.2 Secondary Capture Image Storage SOP Class

Table 152: Addition of standard and private attributes for Secondary Capture Image Storage SOP Class

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Medical Alerts	0010,2000	LO		VNAP	MWL/ USER	
Allergies	0010,2110	LO		VNAP	MWL/ USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/U SER	
KVP	0018,0060	DS		ANAP	AUTO	
Exposure Time	0018,1150	IS		ANAP	AUTO	
Exposure	0018,1152	IS		ANAP	AUTO	
Exposure in uAs	0018,1153	IS		ANAP	AUTO	
Radiation Setting	0018,1155	CS		VNAP	AUTO	
Image and Fluoroscopy Area Dose Product	0018,115E	DS		VNAP	AUTO	
Filter Material	0018,7050	CS		VNAP	AUTO	
Imager Pixel Spacing	0018,1164	DS		VNAP	AUTO	
Acquisition Device Processing Description	0018,1400	LO		VNAP	AUTO	
Relative X-ray Exposure	0018,1405	IS		VNAP	AUTO	
View Position	0018,5101	CS		VNAP	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Requesting Physician	0032,1032	PN		VNAP	MWL/U SER	
Requesting Service	0032,1033	LO		VNAP	MWL/U SER	
Requested Procedure Description	0032,1060	LO		VNAP	MWL/U SER	
Special Needs	0038,0050	LO		VNAP	MWL/ USER	
Patient State	0038,0500	LO		VNAP	MWL/ USER	
Performed Procedure Step End Date	0040,0250	DA		VNAP	MPPS/ AUTO	
Performed Procedure Step End Time	0040,0251	TM		VNAP	MPPS/ AUTO	
Total Number of Exposures	0040,0301	US		VNAP	AUTO	
Entrance Dose	0040,0302	US		VNAP	AUTO	
Requested Procedure ID	0040,1001	SH		VNAP	MWL/ USER	
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL/ USER	
Requested Procedure Priority	0040,1003	SH		VNAP	MWL/ USER	

Patient Transport Arrangements	0040,1004	LO		VNAP	MWL/ USER	
Names of Intended Recipients of Results	0040,1010	PN		VNAP	AUTO	
Requested Procedure Comments	0040,1400	LT		VNAP	MWL	
Reason for the Imaging Service Request (RETIRED)	0040,2001	LO		VNAP	MWL	
Issue Date of Imaging Service Request	0040,2004	DA		VNAP	MWL/U SER	
Imaging Service Request Comments	0040,2400	LT		VNAP	MWL/U SER	
Requested Procedure Code Sequence	0032,1064	SQ		VNAP	MWL	
Exposure Dose Sequence	0040,030E	SQ		VNAP	AUTO	
Film Consumption Sequence	0040,0321	SQ		VNAP	AUTO	

8.5.1.3 Digital X-Ray Image Storage - For Pres. SOP

Table 153: Addition of standard and private attributes for Digital X-Ray Image Storage - For Pres. SOP

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Medical Alerts	0010,2000	LO		VNAP	MWL/USER	
Allergies	0010,2110	LO		VNAP	MWL/USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/ USER	
Detector ID	0018,700A	SH		ANAP	AUTO	
Detector Manufacturer Name	0018,702A	LO		ANAP	AUTO	
Detector Manufacturer Model Name	0018,702B	LO		ANAP	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Requesting Physician	0032,1032	PN		VNAP	MWL/USER	
Requesting Service	0032,1033	LO		VNAP	MWL/USER	
Requested Procedure Description	0032,1060	LO		VNAP	MWL/USER	
Special Needs	0038,0050	LO		VNAP	MWL/USER	
Patient State	0038,0500	LO		VNAP	MWL/USER	
Performed Station AE Title	0040,0241	AE		VNAP	MPPS/AUTO	
Performed Procedure Step End Date	0040,0250	DA		VNAP	MPPS/AUTO	
Performed Procedure Step End Time	0040,0251	TM		VNAP	MPPS/AUTO	
Performed Procedure Step Status	0040,0252	CS		VNAP	MPPS/AUTO	
Total Number of Exposures	0040,0301	US		VNAP	AUTO	
Requested Procedure ID	0040,1001	SH		VNAP	MWL/ AUTO	
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL/ USER	
Requested Procedure Priority	0040,1003	SH		VNAP	MWL	
Patient Transport Arrangements	0040,1004	LO		VNAP	MWL/ USER	
Names of Intended Recipients of Results	0040,1010	PN		VNAP	AUTO	
Requested Procedure Comments	0040,1400	LT		VNAP	MWL	

Reason for the Imaging Service Request (RETIRED)	0040,2001	LO		VNAP	MWL	
Issue Date of Imaging Service Request	0040,2004	DA		VNAP	MWL/ USER	
Imaging Service Request Comments	0040,2400	LT		VNAP	MWL/USER	
Requested Procedure Code Sequence	0032,1064	SQ		VNAP	MWL	
Exposure Dose Sequence	0040,030E	SQ		VNAP	AUTO	
Film Consumption Sequence	0040,0321	SQ		VNAP	AUTO	

8.5.1.4 Digital X-Ray Image Storage - For Proc. SOP

Table 154: Addition of standard and private attributes for Digital X-Ray Image Storage - For Proc. SOP

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Medical Alerts	0010,2000	LO		VNAP	MWL/USER	
Allergies	0010,2110	LO		VNAP	MWL/USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/USER	
Detector ID	0018,700A	SH		ANAP	AUTO	
Detector Manufacturer Name	0018,702A	LO		ANAP	AUTO	
Detector Manufacturer Model Name	0018,702B	LO		ANAP	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Requesting Physician	0032,1032	PN		VNAP	MWL/USER	
Requesting Service	0032,1033	LO		VNAP	MWL/USER	
Requested Procedure Description	0032,1060	LO		VNAP	MWL/USER	
Special Needs	0038,0050	LO		VNAP	MWL/USER	
Patient State	0038,0500	LO		VNAP	MWL/USER	
Performed Station AE Title	0040,0241	AE		VNAP	MPPS/AUTO	
Performed Procedure Step End Date	0040,0250	DA		VNAP	MPPS/AUTO	
Performed Procedure Step End Time	0040,0251	TM		VNAP	MPPS/AUTO	
Performed Procedure Step Status	0040,0252	CS		VNAP	MPPS/AUTO	
Total Number of Exposures	0040,0301	US		VNAP	AUTO	
Requested Procedure ID	0040,1001	SH		VNAP	MWL/AUTO	
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL	
Requested Procedure Priority	0040,1003	SH		VNAP	MWL	
Patient Transport Arrangements	0040,1004	LO		VNAP	MWL/USER	
Names of Intended Recipients of Results	0040,1010	PN		VNAP	AUTO	
Requested Procedure Comments	0040,1400	LT		VNAP	MWL	
Reason for the Imaging Service Request (RETIRED)	0040,2001	LO		VNAP	MWL	
Issue Date of Imaging Service Request	0040,2004	DA		VNAP	MWL/ USER	
Imaging Service Request Comments	0040,2400	LT		VNAP	MWL/USER	
Requested Procedure Code Sequence	0032,1064	SQ		VNAP	MWL	
Exposure Dose Sequence	0040,030E	SQ		VNAP	AUTO	

| Film Consumption Sequence | 0040,0321 | SQ | | VNAP | AUTO | |

8.5.1.5   X-Ray Radiation Dose SR SOP Class

Table 155: Addition of standard and private attributes for X-Ray Radiation Dose SR Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Performing Physician's Name	0008,1050	PN		ANAP	MWL/ AUTO/ USER	
Medical Alerts	0010,2000	LO		ANAP	MWL/ AUTO/ USER	
Allergies	0010,2110	LO		ANAP	MWL/ AUTO/ USER	
Pregnancy Status	0010,21C0	US		ANAP	MWL/ AUTO/ USER	
Image and Fluoroscopy Area Dose Product	0018,115E	DS		ANAP	MWL/ AUTO/ USER	
Requesting Physician	0032,1032	PN		ANAP	MWL/ AUTO/ USER	
Requesting Service	0032,1033	LO		ANAP	MWL/ AUTO/ USER	
Requested Procedure Description	0032,1060	LO		ANAP	MWL/ AUTO/ USER	
Special Needs	0038,0050	LO		ANAP	MWL/ AUTO/ USER	
Patient State	0038,0500	LO		ANAP	MWL/ AUTO/ USER	
Performed Station AE Title	0040,0241	AE		ANAP	MWL/ AUTO/ USER	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	MWL/ AUTO/ USER	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	MWL/ AUTO/ USER	
Performed Procedure End Date	0040,0250	DA		ANAP	MWL/ AUTO/ USER	
Performed Procedure End Time	0040,0251	TM		ANAP	MWL/ AUTO/ USER	
Performed Procedure Step Status	0040,0252	CS		ANAP	MWL/ AUTO/ USER	
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL/ AUTO/ USER	
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL/ AUTO/ USER	
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	MWL/ AUTO/ USER	
>Code Value	0008,0100	SH		ALWAYS	MWL/ AUTO/ USER	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL/ AUTO/ USER	
>Code Meaning	0008,0104	LO		ALWAYS	MWL/ AUTO/ USER	
Total Time of Fluoroscopy	0040,0300	US		ANAP	MWL/ AUTO/ USER	
Total Number of Exposures	0040,0301	US		ANAP	MWL/ AUTO/ USER	
Entrance Dose	0040,0302	US		ANAP	MWL/ AUTO/ USER	
Exposure Dose Sequence	0040,030E	SQ		ANAP	MWL/ AUTO/ USER	

Film Consumption Sequence	0040,0321	SQ		ANAP	MWL/ AUTO/ USER	
Requested Procedure ID	0040,1001	LO		VNAP	MWL/ AUTO/ USER	
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL/ AUTO/ USER	
Requested Procedure Priority	0040,1003	SH		VNAP	MWL/ AUTO/ USER	
Patient Transport Arrangements	0040,1004	LO		VNAP	MWL/ AUTO/ USER	
Names of Intended Recipients of Results	0040,1010	PN		VNAP	MWL/ AUTO/ USER	
Requested Procedure Comments	0040,1400	LT		ANAP	MWL/ AUTO/ USER	
Reason for the Imaging Service Request (retired)	0040,2001	LO		ANAP	MWL/ AUTO/ USER	
Issue Date of Imaging Service Request	0040,2004	DA		ANAP	MWL/ AUTO/ USER	
Imaging Service Request Comments	0040,2400	LT		ANAP	MWL/ AUTO/ USER	
UID	0040,A124	UI		ANAP	MWL/ AUTO/ USER	
Referenced Request Sequence	0040,A370	SQ		ANAP	MWL/ AUTO/ USER	
>Accession Number	0008,0050	SH		ANAP	MWL/ AUTO/ USER	
>Referenced Study Sequence	0008,1110	SQ		ANAP	MWL/ AUTO/ USER	
>Study Instance UID	0020,000D	UI		ANAP	MWL/ AUTO/ USER	
>Requested Procedure Description	0032,1060	LO		ANAP	MWL/ AUTO/ USER	
>Requested Procedure ID	0040,1001	SH		ANAP	MWL/ AUTO/ USER	
>Placer Order Number / Imaging Service Request	0040,2016	LO		ANAP	MWL/ AUTO/ USER	
>Filler Order Number / Imaging Service Request	0040,2017	LO		ANAP	MWL/ AUTO/ USER	
Performed Procedure Code Sequence	0040,A372	SQ		ANAP	MWL/ AUTO/ USER	
>Code Value	0008,0100	SH		ALWAYS	MWL/ AUTO/ USER	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL/ AUTO/ USER	
>Code Meaning	0008,0104	LO		ALWAYS	MWL/ AUTO/ USER	

8.6 Private Transfer Syntaxes
Not Applicable