DICOM Conformance Statement

DigitalDiagnost C50

PHILIPS

Issued by:

Philips Medical Systems Nederland BV, a Philips Healthcare company,

P.O. Box 10.000
5680 DA Best
The Netherlands

Email: dicom@philips.com
Internet: www.philips.com/dicom

Document Number: ICAP-PF.0023348
Date: 29-March-2016

1   DICOM Conformance Statement Overview

This document is the DICOM Conformance Statement for the Philips Medical Systems DigitalDiagnost C50 system. Supported Networking DICOM Services can be found below in Table 1.

The figure below shows the position of the DigitalDiagnost C50 in a radiology environment.
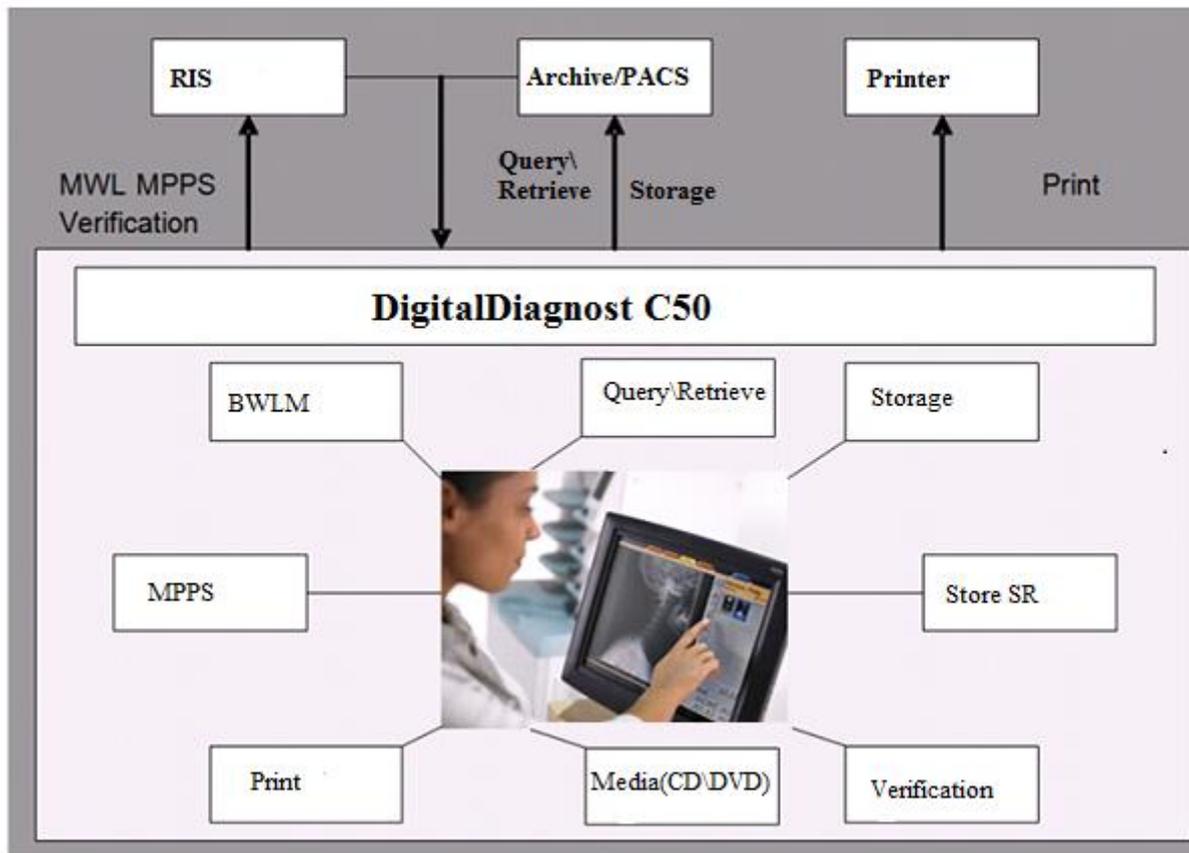
Figure 1 DigitalDiagnost C50 in a DICOM network

DigitalDiagnost C50 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 node.
- Study Management per Modality Performed Procedure Step (MPPS).
- Printing of hardcopies on a remote DICOM Printer.
- Storage of images per DICOM Media on CD/DVD.
- Storage of Dose SR instances on a remote DICOM node.
- Query and Retrieve of instances from an external DICOM node (Q/R).

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	**UID**			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes	N/A
Print Management				
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	N/A
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	N/A
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	N/A
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	N/A
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	N/A
Transfer				
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	No	Yes
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Yes	No	Yes
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No	Yes
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	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
Workflow Management				
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No	N/A
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	N/A
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No	N/A

The services can be specified as a SCU, SCP or as an Option, which means that it is either configurable or that it can be purchased separately.

All the supported Media Services by DigitalDiagnost C50 are shown in the next table.

Table 2: Media Services

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

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	29-March-2016	Authorized	Final Version

3.2   Audience

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 analyze 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). 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 4: Definitions, Terms and Abbreviations

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

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)
 Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America
 Internet: 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, and
- The sequencing constraints among them.

4.1.1   Application Data Flow

The DigitalDiagnost C50 system consists of one single application entity, the 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 verify application level communication by using the verification service as SCU and SCP.
- 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 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 Eleva AE.
- The Eleva AE can Query and retrieve images from a remote DICOM node.
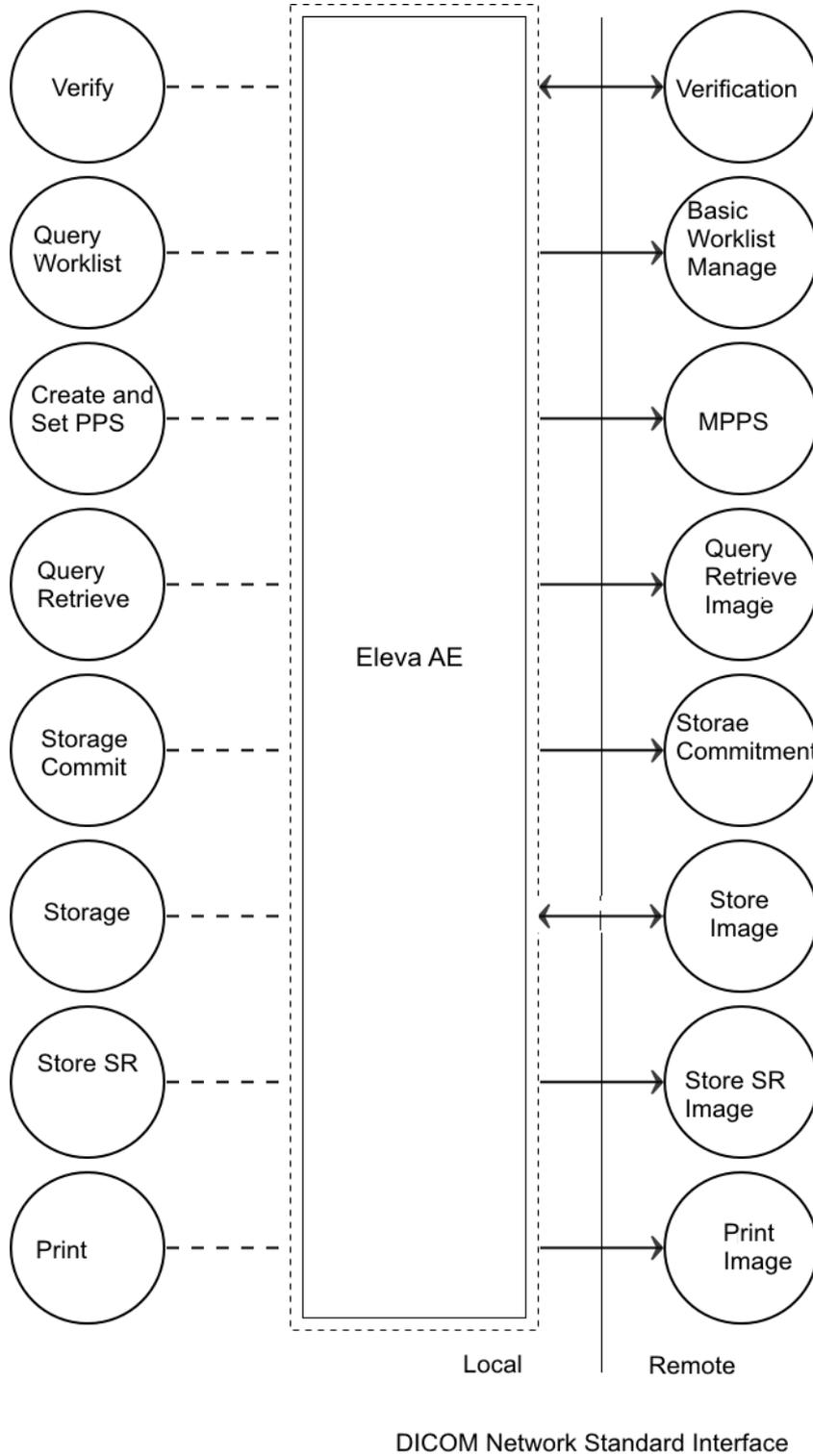
Figure 2 Application Data Flow Diagram

4.1.2 Functional Definition of AE's

This section describes in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions.

4.1.2.1   Functional Definition of Eleva

The Eleva AE is the one and only application entity within the DigitalDiagnost C50. It includes the following service classes.

Verification Service Class

The Eleva AE provides the Verification service as SCP. A remote SCU can request an association with the Eleva AE for Verification SOP class. After accepting the association the Eleva AE can receive and respond to the Verification request and release the association when requested.

Basic Worklist Management Service Class

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

After initiating the worklist query the Eleva AE can request an association with the configured remote Basic Worklist Management SCP. After accepting the association the Eleva AE can send the find request, wait for response, and then release the association. The user interface can be updated with the query results.

Storage Service Class

The Eleva AE can use the Storage service as SCU. After a performed procedure step the Eleva AE can store the related images at the configured Storage SCP. It can request an association with the remote Storage SCP for the applicable Storage SOP classes. After accepting the association the Eleva AE can send the store request, wait for response, and then release the association. After successful storage the user interface can be updated accordingly. After successful storage, if selected, the Eleva AE can 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 can request an association with the selected remote SCP for the Storage Commitment Push Model SOP class. When the association is accepted, the Eleva AE can 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 can receive the Storage Commitment reports, and release 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 4.2.1.3.6 (Real-World Activity: Storage Commitment Push Model as SCU).

Query Retrieve Service Class

The Eleva AE provides the Query/Retrieve service as SCU (Query/Retrieve Image) to query and retrieve images\instances from remote DICOM nodes.

Study Management Service Class

The Eleva AE can use the Study Management service as SCU. Before performing a procedure step the Eleva AE can request an association with the configured remote Study Management SCP. After accepting the association the Eleva AE can send a create request, wait for response, and then release the association. After performing a procedure step the Eleva AE can 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 can perform a retry. The user interface can be updated with the performed procedure step status.

Basic Grayscale Print Management Meta Class

The Eleva AE can use the Basic Grayscale Print Management service as SCU. After a performed procedure step the Eleva AE can print the related images on the configured Printer. It can 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 can send the print request, wait for response, and then release the association. After successful printing the user interface can be updated accordingly.

4.1.3 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 sent to archive (Store Image) and printer (Print Image) simultaneously. Finally, when closing the examination, the RIS is notified to update the data of the examination (Set Performed Procedure Step).

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.
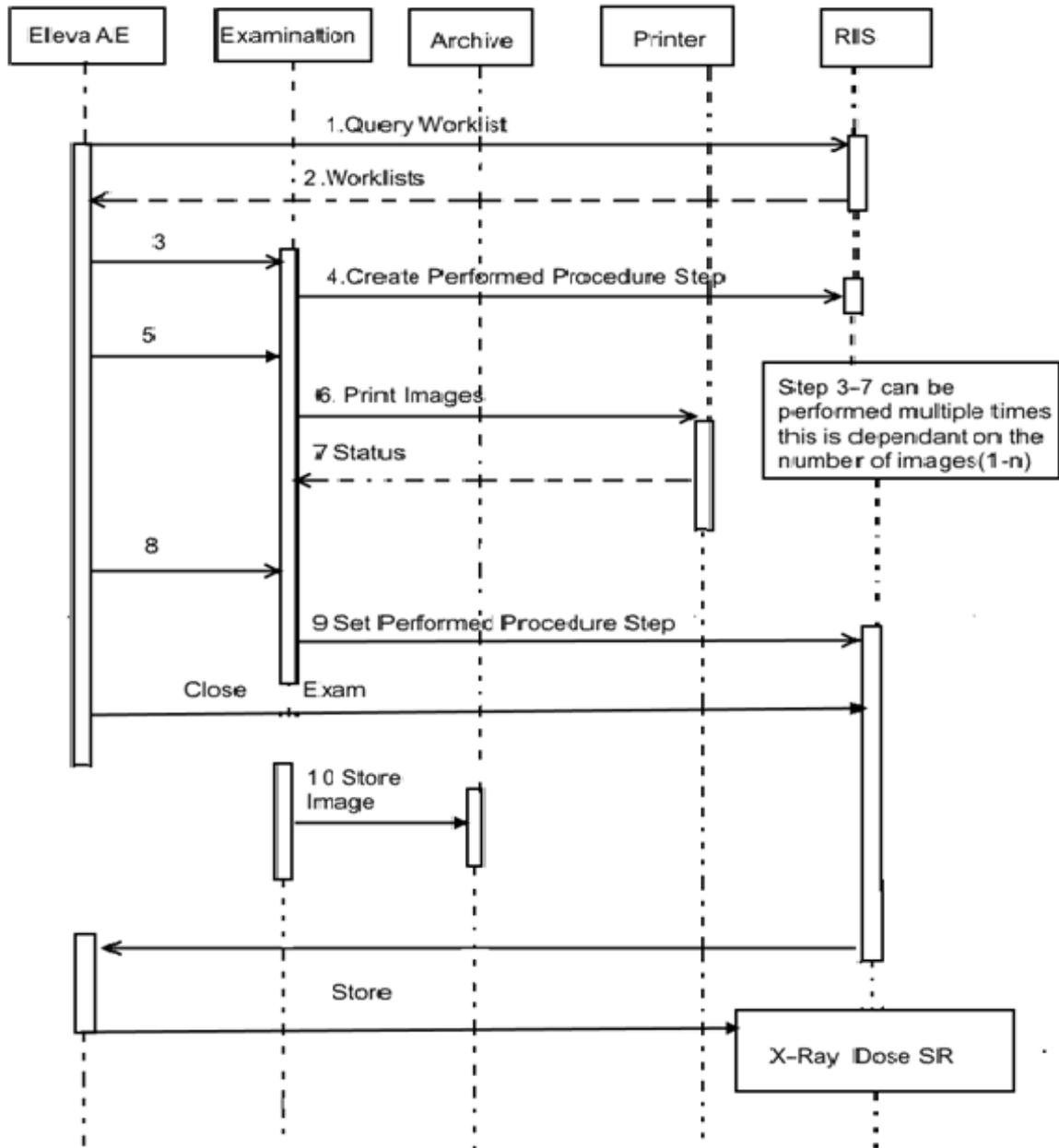
Figure 3 Sequence of an examination

4.1.3.1　　Sequencing of Query/Retrieve Activity
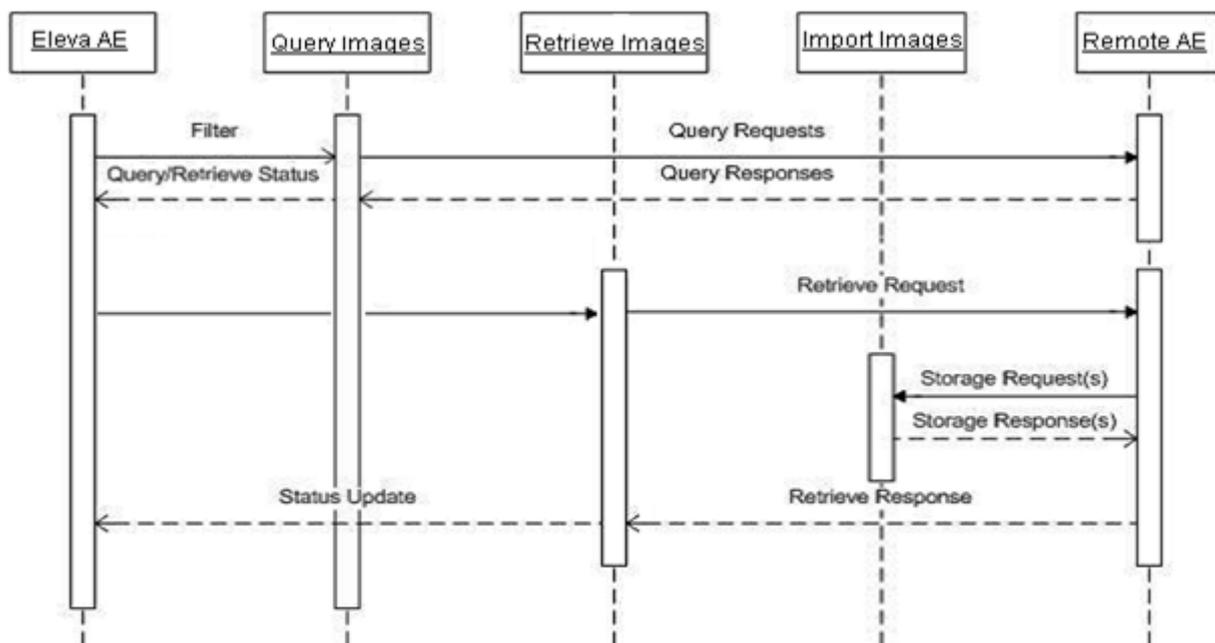
Figure 3 Sequence of Query\Retrieve

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 Eleva AE

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 5: SOP Classes for Eleva

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	Yes	No
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No
X-Ray Radiation Dose SR SOP Class	1.2.840.10008.5.1.4.1.1.88.67	Yes	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	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
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

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

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1   General

The DICOM standard application context is specified below.

Table 6: DICOM Application Context

Description	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 can support as an Initiator or Acceptor is specified here.

Table 7: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	2

Table 8: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	8

4.2.1.2.3   Asynchronous Nature

The implementation supports negotiation of multiple outstanding transactions, along with the maximum number of outstanding transactions supported.

Table 9: Asynchronous nature as an Association Initiator for this AE

Description	Value
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 10: DICOM Implementation Class and Version for Eleva

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 the next table.

Table 11: 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

The behavior of this Application Entity is summarized in the next Table.

Table 12: 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)

Result	Source	Reason/Diagnosis	Behavior
		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 _application_context_not_support)
	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 _no_reason_given)
		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 _application_context_not_support)
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)

Result	Source	Reason/Diagnosis	Behavior
		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_application_context_not_support)
	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_no_reason_given)
		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 the next table.

Table 13: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	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 (initiated abort)	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).
	1 - unrecognized-PDU	When received, the Eleva Workspot terminates the connection with the following log: Association ABORTED by peer (2: ABORT_SOURCE_dul_provider, 1: ABORT_REASON_unrecognized_pdu).

Source	Reason/Diagnosis	Behavior
	2 - unexpected-PDU	When received, the Eleva 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 14: 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 – Verification as SCU

4.2.1.3.1.1 Description and Sequencing of Activities
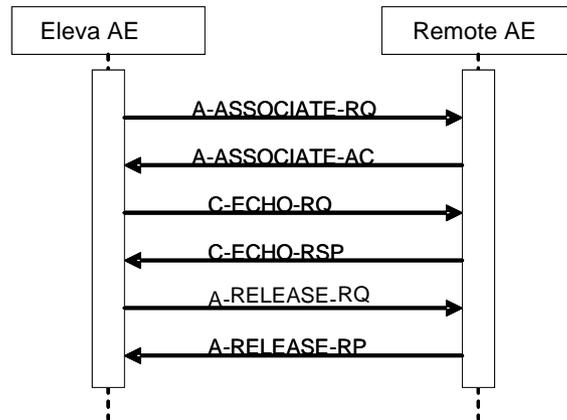
Figure 4 (Real World) Activity - Verification as SCU

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 DICOM Verification Tab for Server Test in the QA menu.

4.2.1.3.1.2 Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 15: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU

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

4.2.1.3.1.3   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.

4.2.1.3.1.3.1   Dataset Specific Conformance for Verification C-ECHO SCU

Not Applicable

Table 16: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g. The SCU has successfully returned all matching information

Table 17: 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).

4.2.1.3.2   (Real-World) Activity – FIND as SCU

4.2.1.3.2.1   Description and Sequencing of Activities
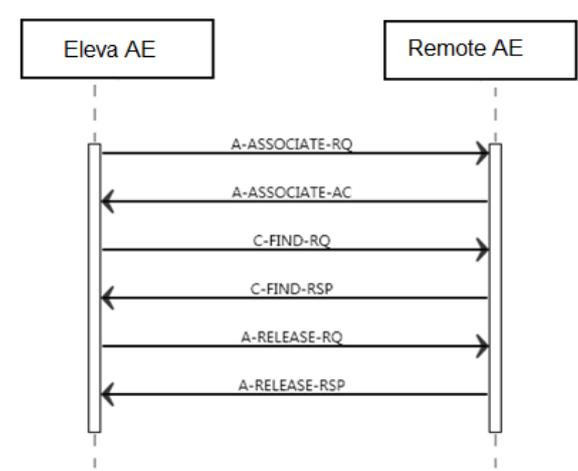
Figure 5 (Real World) Activity – FIND as SCU

4.2.1.3.2.2   Proposed Presentation Contexts

Table 18: 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		

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

4.2.1.3.2.3.1   Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-SCU
Table 19 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	

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

4.2.1.3.2.4.1   Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU
Table 20 C-FIND-RQ Dataset Specification

Study Root QR Information Model - FIND SOP Class				
Attribute Name	**Tag**	**VR**	**Type of Matching**	**Comment**
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 Study 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	

Table 21 Status Response

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

4.2.1.3.3   (Real-World) Activity - MOVE as SCU

##### 4.2.1.3.3.1   Description and Sequencing of Activities
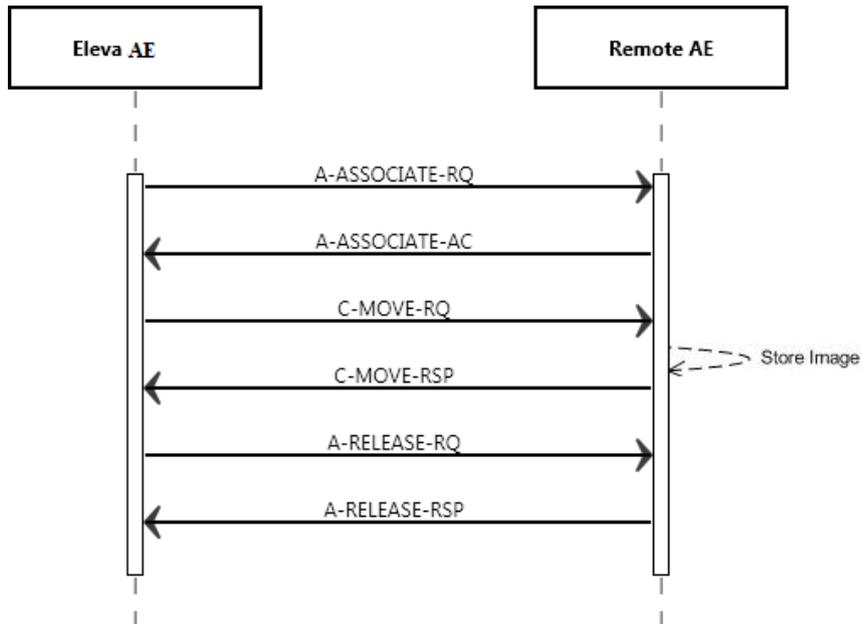
Figure 6 (Real World) Activity – MOVE as SCU

4.2.1.3.3.2   Proposed Presentation Contexts

Table 22: 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		

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

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

Table 23: 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

Table 24: Status Response

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

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

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

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

Table 25: Status Response

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

4.2.1.3.4 (Real-World) Activity – Modality worklist As SCU
4.2.1.3.4.1 Description and Sequencing of Activities
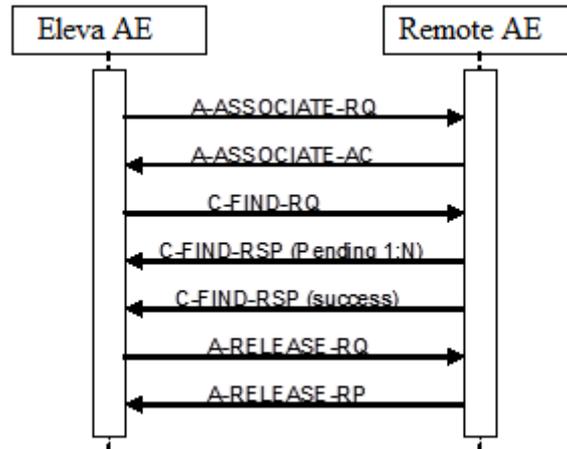
Figure 7 (Real World) Activity - Modality worklist As SCU

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 requests an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE sends the broad query find request, wait for response, and then release the association.

This RWA can be initiated in two ways.

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

After clicking the Patient Query button - entering and confirming the matching key values - the ELEVA AE requests an association with the configured remote Basic Worklist Management SCP. When the association is accepted the ELEVA AE sends the patient query find request, wait for response, and then release the association.

Optionally the Broad Query can 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.

4.2.1.3.4.1.1   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 26: Proposed Presentation Contexts for (Real-World) Activity – Modality worklist As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.4.2   SOP Specific Conformance for Modality Worklist Information Model - FIND 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.

4.2.1.3.4.2.1   Dataset Specific Conformance for Modality Worklist Information Model - FIND SOP Class C-FIND-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
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 as matching key can be used.
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 this Worklist attribute is included into all object Instances created during performance of the related 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 27: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Patient Identification Module									
Medical Record Locator	0010,1090	LO							
Other Patient IDs	0010,1000	LO		X		X			
Other Patient Names	0010,1001	PN							
Patient ID	0010,0020	LO	X	X	X	X		Single Value, Universal	
Patient's Birth Name	0010,1005	PN							
Patient's Mother's Birth Name	0010,1060	PN							
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							
Confidentiality Constraint on Patient Data Description	0040,3001	LO							
Country of Residence	0010,2150	LO							
Ethnic Group	0010,2160	SH		X		X			
Military Rank	0010,1080	LO							
Occupation	0010,2180	SH		X		X			
Patient Comments	0010,4000	LT		X		X			
Patient Address	0010,1040	LO							
Patient's Birth Date	0010,0030	DA		X		X			
Patient's Birth Time	0010,0032	TM							
Patient Religious Preference	0010,21F0	LO							
Patient's Sex	0010,0040	CS		X		X		Single Value	
Patient's Size	0010,1020	DS		X		X			
Patient Telephone Numbers	0010,2154	SH							
Patient's Weight	0010,1030	DS		X		X			
Region of Residence	0010,2152	LO							
Patient's Insurance Plan Code Sequence	0010,0050	SQ							
Patient Medical Module									
Additional Patient History	0010,21B0	LT		X		X			
Allergies	0010,2110	LO		X		X			
Last Menstrual Date	0010,21D0	DA							
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							
Special Needs	0038,0050	LO		X					

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Visit Identification Module									
Admission ID	0038,0010	LO							
Institution Address	0008,0081	ST							
Institution Name	0008,0080	LO							
Visit Status Module									
Current Patient Location	0038,0300	LO		X					
Patient's Institution Residence	0038,0400	LO							
Visit Comments	0038,4000	LT							
Visit Status ID	0038,0008	CS							
Visit Relationship Module									
Referenced Patient Sequence	0008,1120	SQ							
>Referenced SOP Class UID	0008,1150	UI							
>Referenced SOP Instance UID	0008,1155	UI							
Institution Name	0008,0080	LO							
Visit Admission Module									
Admitting Date	0038,0020	DA							
Admitting Time	0038,0021	TM							
Referring Physician Address	0008,0092	ST							
Referring Physician's Name	0008,0090	PN				X			
Referring Physician Telephone Numbers	0008,0094	SH							
Route of Admissions	0038,0016	LO							
Admitting Diagnoses Code Sequence	0008,1084	SQ							
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Modality	0008,0060	CS	X	X	X			Single Value, Universal	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			
>Scheduled Procedure Step ID	0040,0009	SH		X					
>Scheduled Procedure Step Location	0040,0011	SH		X		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		X			
>Scheduled Station AE Title	0040,0001	AE	X	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							
>>Code Value	0008,0100	SH							

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
>>Coding Scheme Designator	0008,0102	SH							
>>Coding Scheme Version	0008,0103	SH							
Requested Procedure Module									
Requested Procedure Description	0032,1060	LO		X		X			
Requested Procedure ID	0040,1001	SH	X	X	X			Single Value, Universal	
Study Date	0008,0020	DA							
Study Instance UID	0020,000D	UI		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 Meaning	0008,0104	LO		X					
>Code Value	0008,0100	SH		X					
Patient Transports Arrangements	0040,1004	LO							
Requested Procedure Priority	0040,1003	SH							
>Coding Scheme Designator	0008,0102	SH		X					
>Coding Scheme Version	0008,0103	SH		X					
Imaging Service Request Module									
Accession Number	0008,0050	SH	X	X	X	X		Single Value, Universal	
Imaging Service Request Comments	0040,2400	LT							
Issue Date of Imaging Service Request	0040,2004	DA							
Reason for the Imaging Service Request (retired)	0040,2001	LO		X					
Requesting Physician	0032,1032	PN		X					
Requesting Service	0032,1033	LO							
Module: Additional Attributes Module (O)									
Institution Code Sequence	0008,0082	SQ		X				Universal	
Admitting Diagnoses Description	0008,1080	LO		X				Universal	
Referenced Visit Sequence	0008,1125	SQ		X				Universal	
Patient's Age	0010,1010	AS							
Referenced Patient Alias Sequence	0038,0004	SQ							
Issuer Of Admission ID (retired)	0038,0011	LO							
Reason for The Requested Procedure	0040,1002	LO							
Requested Procedure Location	0040,1005	LO							
Placer Order Number/Procedure(retired)	0040,1006	SH							
Filler Order Number/Procedure (retired)	0040,1007	SH							
Confidentiality Code	0040,1008	LO							
Reporting Priority	0040,1009	SH							
Issue Time Of Imaging Service	0040,2005	TM							

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Request									
Order Entered By	0040,2008	PN							
Order Enterer Location	0040,2009	SH							
Order Callback Phone Number	0040,2010	SH							
Placer Order Number / Imaging Service Request	0040,2016	LO							
Filler Order Number / Imaging Service Request	0040,2017	LO							
Names Of Intended Recipients Of Results	0040,1010	PN							
Requested Procedure Comments	0040,1400	LT							

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

Table 28: Status Response

Service Status	Error 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. The user is displayed the message "no RIS connection available. Please confirm."
	A900	Failed – Identifier does not match SOP class	The association is released. The reason is logged. The user is displayed the message "no RIS connection available. Please confirm."
	Cxxx	Failed – Unable to process	The association is released. The reason is logged. The user is displayed the message "no RIS connection available. Please confirm."
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 29: 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. The user is displayed the message "no RIS connection available. Please confirm."
Association aborted	The command is marked as failed. The reason is logged and reported to the user. The user is displayed the message "no RIS connection available. Please confirm."

4.2.1.3.5 (Real-World) Activity – Modality Performed Procedure Step as SCU

4.2.1.3.5.1 Description and Sequencing of Activities
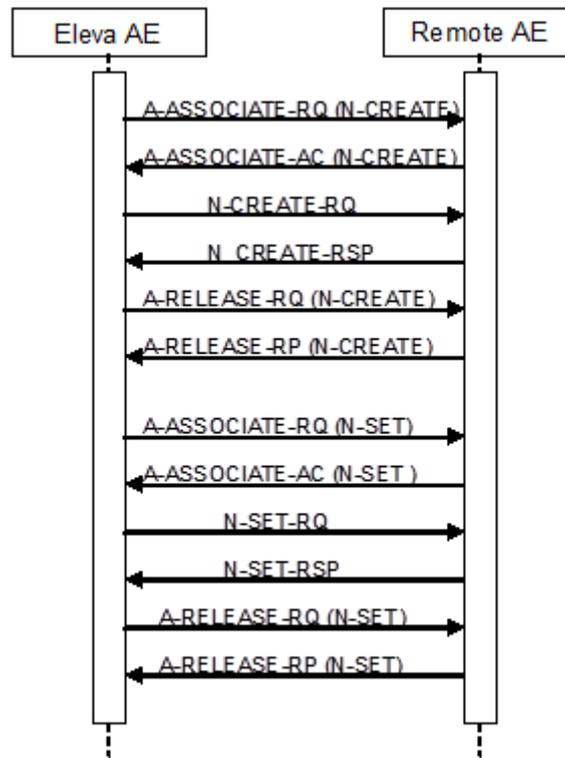
Figure 8 (Real World) Activity - Modality Performed Procedure Step as SCU

A DigitalDiagnost C50 "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 cannot be re-opened after having been closed, and each examination workflow context is enclosed in one MPPS, one examination can result in 0:1 MPPS instances. However, image archiving after the examination's closure leads to 1:n MPPS instances per examination (append case).

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-FINAL message.
DigitalDiagnost C50 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 can 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 can interchange the performed sequence order of scheduled procedure steps.

MPPS messages can interleave. Depending on the application workflow optimization by the user, an MPPS sequence like this can 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 can request an association with the configured remote Study Management SCP. After accepting the association the ELEVA AE can send a Create request, wait for response, and then release the association.

4.2.1.3.5.2   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 30: Proposed Presentation Contexts for (Real-World) Activity – Modality Performed Procedure Step As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.5.3   SOP Specific Conformance for Modality Performed Procedure Step SOP Class

When acquiring the first image of a Scheduled or Unscheduled Procedure Step, DigitalDiagnost C50 generates a MPPS IN PROGRESS message.
DigitalDiagnost C50 does not generate intermediate IN PROGRESS (N-SET) messages and does not support the Performed Procedure Step Exception Management Option. DigitalDiagnost C50 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   Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

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

Table 31: MPPS Request Identifiers for N-CREATE-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Relationship Module				
Patient ID	0010,0020	LO		
Patient's Birth Date	0010,0030	DA		
Patient's Name	0010,0010	PN		
Patient's Sex	0010,0040	CS		
Scheduled Step Attributes Sequence	0040,0270	SQ		
>Accession Number	0008,0050	SH		
>Requested Procedure Description	0032,1060	LO		
>Requested Procedure ID	0040,1001	SH		
>Scheduled Procedure Step Description	0040,0007	LO		
>Scheduled Procedure Step ID	0040,0009	SH		
>Study Instance UID	0020,000D	UI		
>Referenced Study Sequence	0008,1110	SQ		
>Scheduled Protocol Code Sequence	0040,0008	SQ		
Issuer of Patient ID	0010,0021	LO		
Referenced Patient Sequence	0008,1120	SQ		
>Referenced SOP Class UID	0008,1150	UI		
>Referenced SOP Instance UID	0008,1155	UI		
Performed Procedure Step Information Module				
Performed Location	0040,0243	SH		EMPTY
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Step End Date	0040,0250	DA		End date of the examination
Performed Procedure Step End Time	0040,0251	TM		End time of the examination
Performed Procedure Step ID	0040,0253	SH		
Performed Procedure Step Start Date	0040,0244	DA		Start Date of the examination
Performed Procedure Step Start Time	0040,0245	TM		Start Time of the examination
Performed Procedure Step Status	0040,0252	CS		
Performed Procedure Type Description	0040,0255	LO		
Performed Station AE Title	0040,0241	AE		
Performed Station Name	0040,0242	SH		EMPTY
Procedure Code Sequence	0008,1032	SQ		
Image Acquisition Results Module				
Modality	0008,0060	CS		
Study ID	0020,0010	SH		
Performed Protocol Code Sequence	0040,0260	SQ		
Performed Series Sequence	0040,0340	SQ		
Radiation Dose Module				
Entrance Dose	0040,0302	US		

Attribute Name	Tag	VR	Value	Comment
Image and Fluoroscopy Area Dose Product	0018,115E	DS		Not sent in case of appended MPPS Instances
Total Number of Exposures	0040,0301	US		
Total Time of Fluoroscopy	0040,0300	US		
Exposure Dose Sequence	0040,030E	SQ		
Billing And Material Management Code Module				
Billing Procedure Step Sequence	0040,0320	SQ		
Film Consumption Sequence	0040,0321	SQ		

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

Table 32: Status Response

Service Status	Error 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 33: 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.

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

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

Table 34: MPPS Request Identifiers for N-SET-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step Status	0040,0252	CS		
Image Acquisition Results Module				
Performed Series Sequence	0040,0340	SQ		
>Operators' Name	0008,1070	PN		N-Values
>Performing Physician's Name	0008,1050	PN		
>Protocol Name	0018,1030	LO		Copied from Performed protocol Code Sequence - Item code value
>Retrieve AE Title	0008,0054	AE		
>Series Description	0008,103E	LO		
>Series Instance UID	0020,000E	UI		
>Referenced Image Sequence	0008,1140	SQ		
>>Referenced SOP Class UID	0008,1150	UI		
>>Referenced SOP Instance UID	0008,1155	UI		

Attribute Name	Tag	VR	Value	Comment
>Referenced Non-Image Composite SOP Instance Sequence	0040,0220	SQ		
Radiation Dose Module				
Entrance Dose	0040,0302	US		
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.
Total Number of Exposures	0040,0301	US		Not accumulating: re-processed images, non-digital images. Not sent in case of appended MPPS instances.
Total Time of Fluoroscopy	0040,0300	US		
Exposure Dose Sequence	0040,030E	SQ		
>Radiation Mode	0018,115A	CS		
Billing And Material Management Code Module				
Billing Procedure Step Sequence	0040,0320	SQ		
Film Consumption Sequence	0040,0321	SQ		

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

Table 35: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation	The association is released.
Failed	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 36: 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 – Image Export

4.2.1.3.6.1 Description and Sequencing of Activities
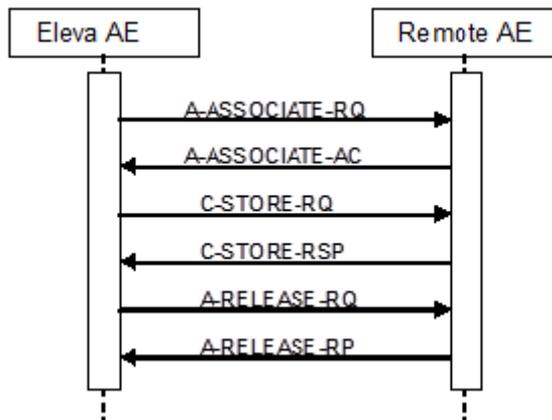

Figure 9 (Real World) Activity - Image Export

Export means that DigitalDiagnost C50 stores images without Storage Commitment.

This RWA can 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, after clicking the Confirm button the ELEVA AE will automatically store the related images of the performed procedure step at the configured Storage SCP.

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 send the store request, wait for response, and then release the association. The store response status can be inspected on the UI.

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

4.2.1.3.6.2　Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 37: 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**		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	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		
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	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		
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		

By default, all images are DICOM Stored according to the SOP Class Digital XRay. CR Image attributes that are undefined for DX Images are stored in private attributes.
As a configurable choice, Images can be stored as Computed Radiology SOP Class. This capability is required to be compatible with installed radiology equipment. DX Image attributes that are undefined for CR Images are then stored in private attributes.
Another choice can be DICOM Stored according to Secondary Capture SOP Class. This capability is required to be compatible with installed radiology equipment. Optionally only the attributes defined for Secondary Capture Images or all attributes are stored
For DICOM CR images there is a constraint that a change in position, detector, body part or laterality implies a new series. This has been relaxed for DX images through the use of the 'DX Anatomy Imaged' and 'DX Positioning' Modules, which define attributes at image level. The DX Image IOD is used in two SOP Classes as defined in the DICOM Standard, a SOP Class for storage of images intended for Presentation, and a SOP Class for storage of images intended for further Processing before presentation.
These are distinguished by their SOP Class UID and by the Enumerated Value of the mandatory Attribute in the DX Series Module, Presentation Intent Type (0008,0068). It is possible to export / store one single image first as a DICOM CR and secondly as a DICOM DX object, therefore the SOP Instance UIDs of both DICOM image instances have to be different.

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

1. The Series Number can start with 1 for the first Series of every Study Instance, identified by StudyInstanceUID.
2. The Series Number can increase by 1 for every new Series Instance within the same Study Instance, by the timely order, the Series Instances are created.
3. The Image Number can start with 1 for every new Series Instance.
4. The Image Number can increase by 1 for every new Image Instance within the same SeriesInstance, by the timely order, the Images are exported.

For DX SOP Class is in the DICOM Standard defined:
The Digital X-Ray (DX) Image Information Object Definition specifies an image that has been created by a digital projection radiography imaging device.
Notes:
▪ This includes but is not limited to: chest radiography, linear and multi-directional tomography, orthopantomography and skeletal radiography. Acquisition of image data can include but is not limited to: CCD-based sensors, stimulable phosphor imaging plates, amorphous selenium, and scintillation based amorphous silicon and secondary capture of film-based images.
▪ Specific IODs are defined for intra-oral radiography and mammography that further specialize the DX IOD.

A DX image can consist of the result of a single X-Ray exposure, in order to ensure that the anatomical and orientation attributes are meaningful for the image, permitting safe annotation, appropriate image processing and appropriate dissemination.
Notes:
▪ The requirement for the DigitalDiagnost C50 specifically deprecates the common film/screen and Computed Radiography practice of making multiple exposures on different areas of a cassette or plate by using lead occlusion between exposures. Such acquisitions could be separated and transformed into multiple DX images during an appropriate quality assurance step by an operator.
  ▪ The requirement for the DigitalDiagnost C50 does not deprecate the acquisition of multiple paired structures during a single exposure, provided that they can be described by the relevant orientation attributes. For example, an AP or PA projection of both hands side by side is typically obtained in a single exposure, and can be described by a Patient Orientation (0020,0020) of R\H or L\H since both hands are in the same traditional Anatomical Position.

4.2.1.3.6.3   SOP Specific Conformance for Storage 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.

4.2.1.3.6.3.1   Dataset Specific Conformance for C-STORE-RQ

Table 38: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful stored	
Refused	A7xx	Out of resources	The association is released. The reason is logged.
Error	A9xx	Error: Data Set does not match SOP Class	The association is released. The reason is logged.
	Cxxx	Error: cannot understand	The association is released. The reason is logged.
Warning	B000	Coercion of Data Elements	The association is released. The reason is logged.
	B007	Data Set does not match SOP Class	The association is released. The reason is logged.
	B006	Elements Discarded	The association is released. The reason is logged.

Table 39: 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.

4.2.1.3.7 (Real-World) Activity – Structured Dose Report Export

4.2.1.3.7.1 Description and Sequencing of Activities
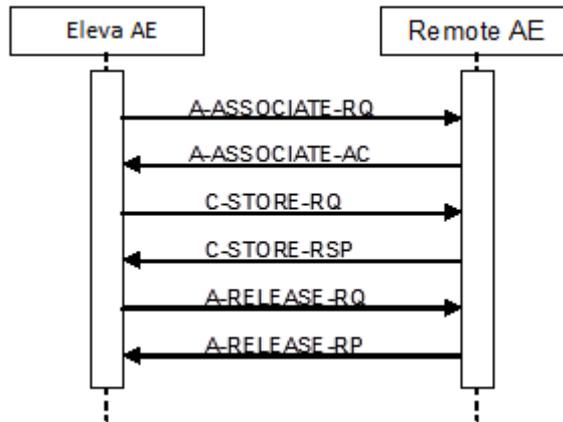
Figure 10: (Real World) Activity – Structured Dose Report Export

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 can be inspected on the UI.

4.2.1.3.7.2 Proposed Presentation Contexts

Table 40: 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		

4.2.1.3.7.3 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 41: 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

Service Status	Code	Further Meaning	Behavior
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.
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 42: 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.

4.2.1.3.8   (Real-World) Activity – Storage Commitment Push Model AS SCU

4.2.1.3.8.1   Description and Sequencing of Activities
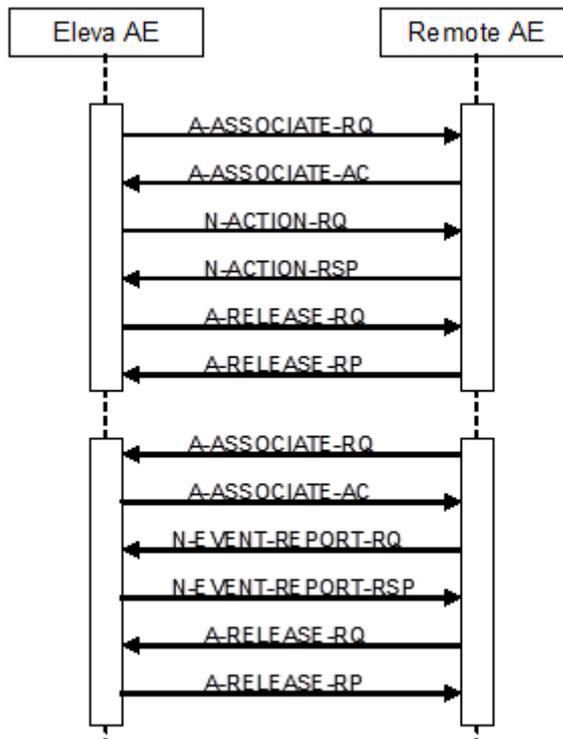
Figure 11 (Real World) Activity – Storage Commitment Push Model as SCU within separate associations (asynchronous)
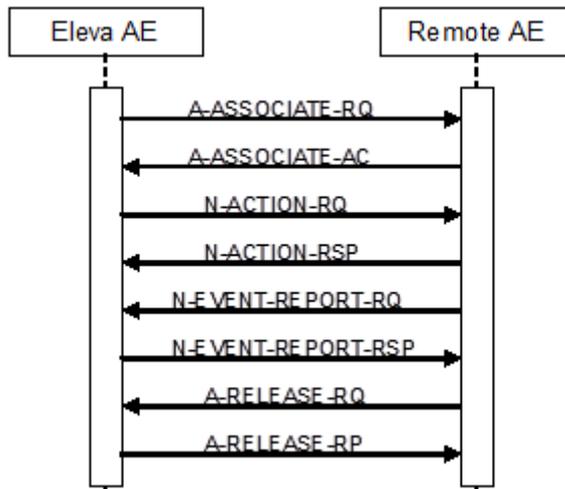
Figure 12 (Real World) Activity – Synchronous Storage Commitment Push Model as SCU within one association (synchronous)

Archive means that DigitalDiagnost C50 stores images with Storage Commitment (both synchronous and asynchronous can be configured).
This RWA can 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, after clicking the Confirm button the ELEVA AE will automatically store the related images of the performed procedure step at the configured Storage SCP.

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 send the store request, wait for response, and then release the association. The store response status can be inspected on the UI. The transferred image cannot be deleted from the system until the Storage Commit N-Event is received.

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

When an archive supports DICOM Storage Commitment, this system can be configured for it. For each image that is sent to this node, also a Storage Commitment Request is sent. The image is delete-protected until the Storage Commit Response has been received. The current status is shown in the Image Info Panel.

4.2.1.3.8.2   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 43: 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		

4.2.1.3.8.3   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.

4.2.1.3.8.3.1   Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-EVENT-REPORT-SCP

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 44: 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.

4.2.1.3.8.3.2   Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-ACTION-SCU

Table 45: 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 46: Status Response

Service Status	Error 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.
	B007	Data set does not match SOP class	The association is released. The reason is logged. The user is informed.

Table 47: DICOM Command Communication Failure Behavior

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

4.2.1.3.9 (Real-World) Activity – Print Management as SCU

4.2.1.3.9.1 Description and Sequencing of Activities
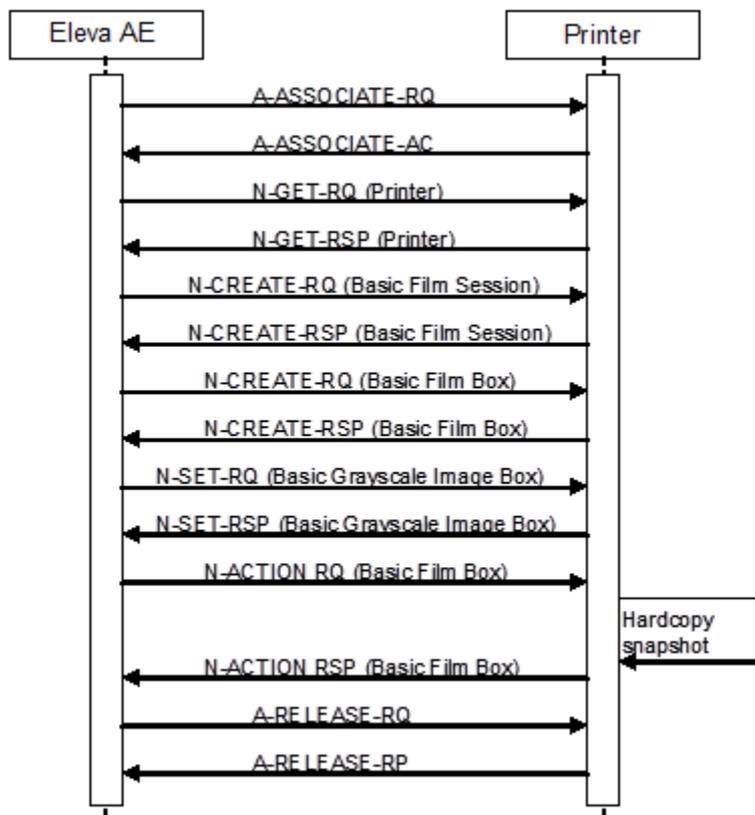
**Figure 13 (Real World) Activity - Print Management as SCU**

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 C50 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 can be two modes of configuration for automatic printing: auto and easy print.

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

In easy print 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.
- Easy print configured: All current print jobs are seen for that patient.

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

To allow for more automation, auto-arranging (AA) is required.

AA takes the configured defaults (2x1P 14x17) and loads the images automatically.

User can make multiple selections of images or all images select/deselect and pressed "arrange". Images are taken for AA in the order they have been selected, if this is relevant for the

Templates if ALL images are selected, then they are taken in order from top left to lower right in rows.

After AA the result can be modified manually.

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 can be cut, scaled or the print job with the conflict can 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 Easy Print. 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 Easy Print 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 can perform a retry.

4.2.1.3.9.2   Proposed Presentation Contexts

The presentation contexts are defined in the next table.

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	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	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	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	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	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	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

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

4.2.1.3.9.4   SOP Specific Conformance for Basic Film Session SOP Class of the Basic Grayscale Print Management Meta SOP Class

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

Table 49: Basic Film Session Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Print Priority	2000,0020	CS	HIGH	ALWAYS	AUTO	
Medium Type	2000,0030	CS	Blue Film ,Clear Film	ALWAYS	USER	
Film Destination	2000,0040	CS	PROCESSOR	ALWAYS	AUTO	
Film Session Label	2000,0050	LO	Philips Medical Systems	ANAP	AUTO	

The behavior of the Eleva AE for status responses in N-CREATE-SCU are summarized in next Table.

Table 50: Status Responses for N-CREATE-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Error	0106	Invalid Attribute Value	The user gets the message that the Print job is failed. Unable to connect to the printer.
	0105		The user gets the message that the Print job is failed. Unable to connect to the printer.
Warning	0116	Any Warning	The print job continues and the status is logged.

4.2.1.3.9.5   SOP Specific Conformance for Printer SOP Class of the Basic Grayscale Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.9.5.1   Dataset Specific Conformance for Printer SOP Class N-GET-SCU

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

Printer SOP Attribute Support:

An overview of the applied attributes in the applied Service Elements of the supported SOP Classes is presented in the next Tables. The tables use a number of abbreviations. The abbreviations used in the "Presence of …" column are:

ALWAYS   Always Present
NEVER   Never Present

The abbreviations used in the "Source" column:

USER   the attribute value source is from User input
AUTO   the attribute value is generated automatically.

Table 51: Printer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	AUTO	-
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	-
Date of Last Calibration	0018, 1200	DA		ALWAYS	AUTO	
Time of Last Calibration	0018, 1201	TM		ALWAYS	AUTO	
Printer Status	2110,0010	CS	FAILURE, NORMAL	ALWAYS	AUTO	Polling is not supported.
Printer Status Info	2110,0020	CS	FILM JAM, RECEIVER FULL, SUPPLY EMPTY, SUPPLY LOW	ALWAYS	AUTO	-
Printer Name	2110,0030	LO		ALWAYS	AUTO	-

The behavior of the Eleva AE for status responses in N-GET-RQ are given in the next Table.

Table 52: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Error	Xxxx	Any error	The association is aborted using A-ABORT. The print job will keep resubmitting the failed sheets until the error is solved or the retry time-out is exceeded.
Warning	Xxxx	Any warning	The print job continues and the warning is logged.

4.2.1.3.9.5.2   SOP Specific Conformance for Presentation LUT SOP Class

4.2.1.3.9.5.2.1   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	AUTO	

4.2.1.3.9.6   SOP Specific Conformance for Basic Film Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.9.6.1   Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU
Table 53: Basic Film Box Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Display Format	2010,0010	ST	STANDARD\1,1	ALWAYS	AUTO	
Film Orientation	2010,0040	CS	PORTRAIT, LANDSCAPE	ALWAYS	USER	User is able to select Portrait or Landscape orientation on the C50 UI. However, during the print job only one of them will be used. If needed, rendering will take care of the rotation of the image to be printed.
Film Size ID	2010,0050	CS	10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN, A3, A4	ALWAYS	USER	
Magnification Type	2010,0060	CS	NONE	ALWAYS	AUTO	
Max Density	2010,0130	US		ALWAYS	AUTO	
Trim	2010,0140	CS		ANAP	AUTO	
Configuration Information	2010,0150	ST	LUT=0,9	ANAP	AUTO	
Illumination	2010,015E	US		ANAP	AUTO	
Reflected Ambient Light	2010,0160	US		ANAP	AUTO	

Table 54: Basic Film Box Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Film Session Sequence	2010,0500	SQ		ALWAYS		
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	

Table 55: Printer Status Responses Handling behaviors

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Error	0106	Attribute Value out of Range	The user gets the message that the Print job is failed. Unable to connect to the printer.
	0105	Not defined	The user gets the message that the Print job is failed. Unable to connect to the printer.
Warning	0116	Attribute Value out of Range	The print job continues and the warning is logged.

4.2.1.3.9.6.2   Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU
The behavior of the ACP-AE for status responses in N-ACTION response are shown in the following Table.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Film Box Successfully created	The print job continues.
Error	0119	Not defined	The association is aborted using A-ABORT and the print job is marked as failed. The failure reason is logged.

Service Status	Error Code	Further Meaning	Behavior
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	The print job continues and the warning is logged.

4.2.1.3.9.6.3   Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

Not Applicable

4.2.1.3.9.7   SOP Specific Conformance for Basic Grayscale Image Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

Not Applicable

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

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

Table 56: Image Box Pixel Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Box Position	2020,0010	US		ALWAYS	AUTO	
Polarity	2020,0020	CS		ANAP	AUTO	
Basic Grayscale Image Sequence	2020,0110	SQ		ALWAYS	AUTO	
>Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
>Photometric Interpretation	0028,0004	CS	MONOCHROME1, MONOCHROME2	ALWAYS	CONFIG	
>Rows	0028,0010	US		ALWAYS	IMPLICIT	Depending on the selected printer type and film size.
>Columns	0028,0011	US		ALWAYS	IMPLICIT	Depending on the selected printer type and film size.
>Bits Allocated	0028,0100	US	16, 8	ALWAYS	AUTO	
>Bits Stored	0028,0101	US	12, 8	ALWAYS	IMPLICIT	
>High Bit	0028,0102	US	11, 7	ALWAYS	AUTO	
>Pixel Representation	0028,0103	US	0x0000	ALWAYS	AUTO	
>Pixel Data	7FE0,0010	OW/ OB		ALWAYS	AUTO	

4.2.1.3.9.7.2   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 57: 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.

Service Status	Code	Further Meaning	Behavior
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 58: 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).

4.2.1.3.10   (Real-World) Activity – Verification as SCP

4.2.1.3.10.1   Description and Sequencing of Activities
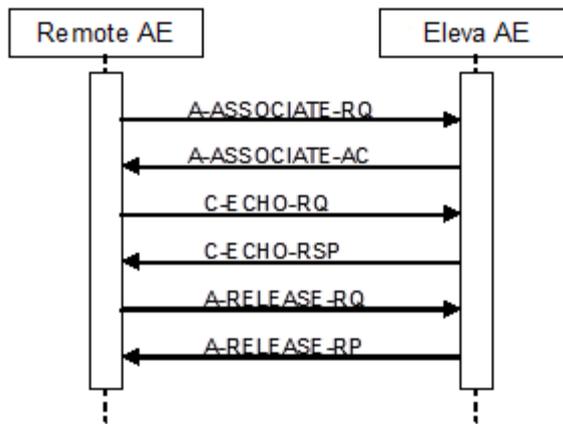
Figure 14 (Real World) Activity - Verification as SCP

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

4.2.1.3.10.2   Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 59: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

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

4.2.1.3.10.3   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 60: C-ECHO-RSP Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Verification is complete	The DigitalDiagnost C50 has successfully received the verification request.

Table 61: 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.

4.3 Network Interfaces

4.3.1 Physical Network Interfaces

The DigitalDiagnost C50 provides DICOM 3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM 3.0 Standard. The DigitalDiagnost C50 system supports ISO 8802-3 10BASE-T and 100Base-TX Ethernet.

4.3.2 Additional Protocols

Not applicable

4.3.3 IPv4 and IPv6 Support

DigitalDiagnost C50 supports both IPv4 and IPv6 connections.

4.4 Configuration

Any implementation's DICOM conformance can 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 can be described in this section.

4.4.1.1 Local AE Titles

The local AE title mapping and configuration are specified as:

Table 62: AE Title configuration table

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.

4.4.2 Parameters

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

Table 63: Configuration Parameters Table

Parameter	Configurable	Default Value
General Parameters		
Maximum PDU receive size	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
Host Port	No	3010
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 Interchange

5.1 Implementation model

The implementation model can 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 C50 system consists of one single application entity only: the ELEVA Application Entity.
Next figure shows the Media Interchange application data flow as a functional overview of the Eleva AE.
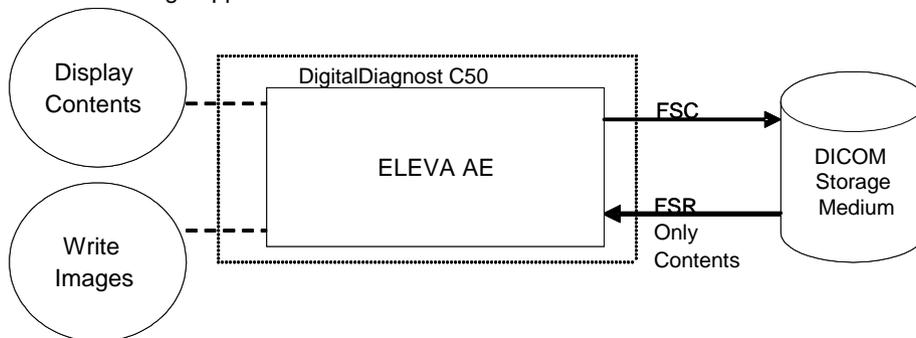
Figure 15 Media Interchange Application Data Flow Diagram

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

5.1.2 Functional Definitions of AE's

The ELEVA AE is the one and only application entity within the DigitalDiagnost C50. 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/FSU).

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.

The ELEVA AE will compile the DICOMDIR and any required DICOM images into a CD/DVD session image; this CD session image will be written to CD/DVD.

5.2 AE Specifications

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

5.2.1 Eleva 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).

Table 64: AE Eleva related Application Profiles, RWA activities and roles

Supported Application Profile	Identifier	Real-World Activities	Roles
General Purpose CD-R Interchange	STD-GEN-CD	Update File-read	FSR
		Create File-set	FSC
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Update File-Read	FSR
		Create File-set	FSC

5.2.1.1   File Meta Information for the Eleva

Table 65: File Meta Information for the Eleva

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 - Create File-set

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

5.2.1.2.1.1   Media Storage Application Profile

The Eleva AE supports the RWA - Create File-SET for the STD-GEN-CD Application Profile and the General Purpose DVD Interchange with JPEG Application Profile.

5.2.1.2.1.1.1   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 66: 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
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1

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

Table 67: 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.

<div align="center">**Table 68: AE Media Store SOP Class**</div>

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 can 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.

<div align="center">**Table 69: Supported attributes in the DICOMDIR**</div>

DICOM Tag	Description
0002,0000	Meta Element Group Length
0002,0001	File Meta Information Version
0002,0002	Media Storage SOP Class UID
0002,0003	Media Storage SOP Instance UID
0002,0010	Transfer Syntax UID
0002,0012	Implementation Class UID
0002,0013	Implementation Version Name
File Set and Directory Information	
0004,1130	File Set ID
0004,1200	Offset Of The First Directory Record Of The Root Directory Entity
0004,1202	Offset Of The Last Directory Record Of The Root Directory Entity
0004,1212	File Set Consistency Flag
0004,1220	Directory Record Sequence
Patient Level	
0004,1400	Offset Of The Next Directory Record
0004,1410	Record In Use Flag
0004,1420	Offset Of Referenced Lower Level Directory Entity
0004,1430	Directory Record Type
0010,0010	Patients Name
0010,0020	Patient ID
Study Level	
0004,1400	Offset Of The Next Directory Record
0004,1410	Record In Use Flag
0004,1420	Offset Of Referenced Lower Level Directory Entity
0004,1430	Directory Record Type
0008,0020	Study Date
0008,0030	Study Time
0008,0050	Accession Number
0008,1030	Study Description
0020,000d	Study Instance UID

DICOM Tag	Description
0020,0010	Study ID
Series Level	
0004,1400	Offset Of The Next Directory Record
0004,1410	Record In Use Flag
0004,1420	Offset Of Referenced Lower Level Directory Entity
0004,1430	Directory Record Type
0008,0060	Modality
0008,103e	Series Description
0018,0015	Body Part Examined
0018,1030	Protocol Name
0020,000e	Series Instance UID
0020,0011	Series Number
Image Level	
0004,1400	Offset Of The Next Directory Record
0004,1410	Record In Use Flag
0004,1420	Offset Of Referenced Lower Level Directory Entity
0004,1430	Directory Record Type
0004,1500	Referenced File ID
0004,1510	Referenced SOP Class UID In File
0004,1511	Referenced SOP Instance UID In File
0004,1512	Referenced Transfer Syntax UID In File
0008,0008	Image Type
0008,0016	SOP Class UID
0008,0018	SOP Instance UID
0020,0013	Instance Number
0028,0010	Rows
0028,0011	Columns

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
SOP Instance UID	0008,0016	New UID
Accession Number	0008,0050	New ID
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]
Performing Physician's Name	0008,1050	[empty]
Operators' Name	0008,1070	[empty]
Patient Name	0010,0010	New string

Attribute	Tag	Change to
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	0
Patient's Weight	0010,1030	0
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	[empty]
Requesting Physician	0032,1032	"xxxxxxx"
Requested Procedure ID	0040,1001	"xxxxxxx"

6 Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 70: 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 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859

7 Security

7.1 Security Profiles

DigitalDiagnost C50 conforms to the IHE Basic Security Integration Profile. DigitalDiagnost C50 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 C50 supports 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 C50 conforms to the Basic TLS Secure Transport Connection Profile. DigitalDiagnost C50 initiates TLS Connections and accepts TLS Connections with Storage Commitment. TLS ports are configurable. DigitalDiagnost C50 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 C50 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 C50 can 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)

DigitalDiagnost C50 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 not tampered with
  - that the client certificate is in the list of trusted certificates
  - that the client certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
  - that the client certificate has the correct purpose (at least the Client Authentication purpose)
- The client verifies
  - that the server certificate is a X.509 certificate which is not tampered with
  - that the server certificate is in the list of trusted certificates
  - that the server certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
  - that the server certificate has the correct purpose (at least Server Authentication purpose)

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 C50.
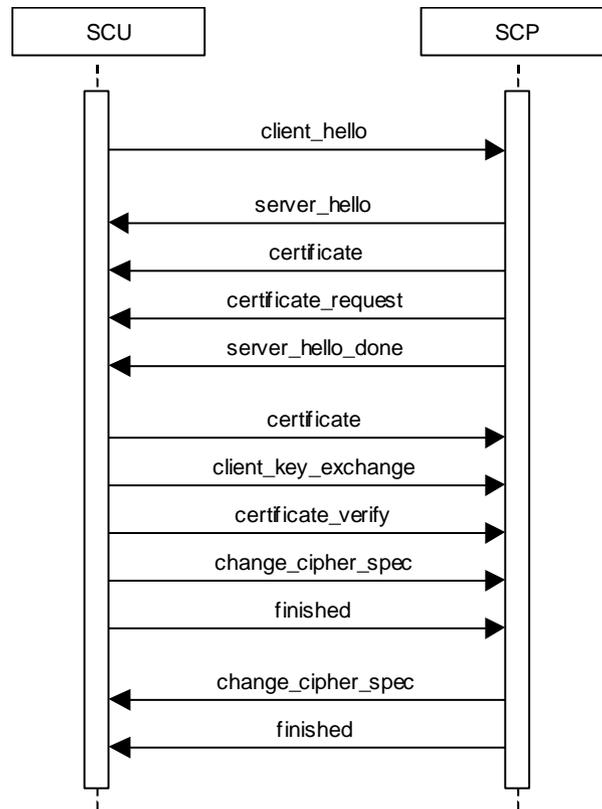
Figure 16 Message flow of TLS handshake

7.1.3 Digital Signature Profiles

Not applicable

7.1.4 Media Storage Security Profiles

Not applicable

7.1.5 Attribute Confidentiality Profiles

DigitalDiagnost C50 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 7163 lists the protected attributes as defined in [DICOM], Part 15. It can contain attributes which are currently not part of images created by DigitalDiagnost C50. 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 C50.
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 71: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Replacement Value
Instance Creator UID	0008,0014	anon UID
SOP Instance UID	0008,0016	anon UID
Accession Number	0008,0050	anon string
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	anon string
Patient ID	0010,0020	anon string
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	"0"
Patient's Weight	0010,1030	"0"
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	empty
Frame of Reference UID	0020,0052	anon UID
Image Comments	0020,4000	empty
Requesting Physician	0032,1032	"xxxxxxx"
Requested Procedure ID	0040,1001	"xxxxxxx"
UID	0040,A124	anon UID
Content Sequence	0040,A730	empty

Attribute Name	Tag	Replacement Value
Storage Media File-set UID	0088,0140	anon UID

No attributes or attribute values are inserted.

7.1.6 Network Address Management Profiles

Not applicable

7.1.7 Time Synchronization Profiles

DigitalDiagnost C50 conforms to the Basic Time Synchronization Profile as NTP Client. DigitalDiagnost C50 does support secure transactions.

7.1.8 Application Configuration Management Profiles

Not applicable

7.1.9 Audit Trail Profiles

DigitalDiagnost C50 creates audit messages according to the IHE Basic Security Integration Profile. These messages can contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository:

- Application Activity (when DigitalDiagnost C50 starts or shuts down).
- Begin Transferring DICOM Instances (when an examination is being transferred from the DigitalDiagnost C50 to a remote network node).
- DICOM Instances Transferred (when an examination is transferred from the DigitalDiagnost C50 to a remote network node).
- DICOM Instances Accessed (Study is created, modified, accessed, or deleted).
- User Authentication (when the user logs in or logs out).
- SecurityAlert (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

7.3 Application Level Security

DigitalDiagnost C50 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 C50.
- Firewall or router protections to ensure that DigitalDiagnost C50 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.
- A local Antivirus client should be installed to protect against malicious software.

Other network security procedures such as automated intrusion detection can be appropriate in some environments.
Additional security features can be established by the local security policy and are beyond the scope of this conformance statement.

8 Annexes of application "Eleva"

8.1 IOD Contents

8.1.1 Created SOP Instance

This section specifies each IOD created by this application.

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not can be specified.

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 72: 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
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Digital X-Ray Image Storage - For Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Proc. SOP	1.2.840.10008.5.1.4.1.1.1.1.1
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 73: IOD of Created Computed Radiography Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS

Series		CR Series Module	ALWAYS
Equipment		General Equipment Module	ALWAYS
Image		General Image Module	ALWAYS
Image		Image Pixel Module	ALWAYS
Image		Display Shutter Module	ALWAYS
Image		CR Image Module	ALWAYS
Image		Modality LUT Module	ALWAYS
Image		VOI LUT Module	ALWAYS
Image		SOP Common Module	ALWAYS
Image		Overlay Plane Module	ALWAYS

Table 74: 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		ALWAYS	AUTO, MWL	
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	
Ethnic Group	0010,2160	SH		ANAP	AUTO	
Patient Comments	0010,4000	LT		ANAP	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	

Table 75: 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, MWL	
Study ID	0020,0010	SH		VNAP	AUTO, MWL	

Table 76: 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 77: 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 Physician's Name	0008,1050	PN		ANAP	MPPS, USER	
Operators' Name	0008,1070	PN		ALWAYS	MPPS, USER	

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

Table 78: 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 79: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	
Institution Name	0008,0080	LO		ALWAYS	CONFIG	
Institution Address	0008,0081	ST		ALWAYS	CONFIG	
Station Name	0008,1010	SH		ALWAYS	CONFIG	
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	
Device Serial Number	0018,1000	LO		ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO	1.0.0	ALWAYS	AUTO	
Spatial Resolution	0018,1050	DS		ALWAYS	AUTO	

Table 80: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: ORIGINAL, Value 2: PRIMARY	ALWAYS	AUTO	
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Acquisition Number	0020,0012	IS		ANAP	AUTO	
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Patient Orientation	0020,0020	CS		VNAP	AUTO	
Quality Control Image	0028,0300	CS		ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS	00	ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS	AUTO	

Table 81: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	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	10, 12, 15	ALWAYS	AUTO	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	9, 11, 14	ALWAYS	AUTO	When Parameter "Increase virtual depth for PACS" is enabled values are : 15,12,10
Pixel Representation	0028,0103	US	0000	ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 82: 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 83: CR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Acquisition Device Processing Description	0018,1400	LO		ANAP	AUTO	
Relative X-ray Exposure	0018,1405	IS		ANAP	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME 2	ALWAYS	AUTO	

Table 84: Modality LUT Module

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

Table 85: VOI LUT Module

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

Table 86: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	AUTO	
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	

Table 87: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS	AUTO	
Overlay Columns	6000,0010	US		ALWAYS	AUTO	
Overlay Type	6000,0040	CS		ALWAYS	AUTO	
Overlay Origin	6000,0040 SS			ALWAYS	AUTO	
Overlay Bits Allocated	6000,0100	US		ALWAYS	AUTO	
Overlay Bit Position	6000,0102	US		ALWAYS	AUTO	
Overlay Data	6000,3000	OW		ALWAYS	AUTO	

8.1.1.3   Secondary Capture Image Storage SOP Class

Table 88: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SC Image Module	ALWAYS
Image	VOI LUT Module	ALWAYS
Image	SOP Common Module	ALWAYS

Table 89: 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		ALWAYS	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	
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	

Table 90: 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, MWL	

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

Table 91: Patient Study Module

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

Table 92: 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		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MPPS, USER	
Performing Physician's Name	0008,1050	PN		ANAP	MPPS, USER	
Operators' Name	0008,1070	PN		ALWAYS	MPPS, USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	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		VNAP	MPPS, USER	
Protocol Name	0018,1030	LO		ALWAYS	MWL, USER	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO, MPPS	
Series Number	0020,0011	IS		ALWAYS	AUTO, MPPS	
Laterality	0020,0060	CS		VNAP	CONFIG	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO, MPPS	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO, MPPS	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO, MPPS	
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO, MPPS	

Table 93: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	
Institution Name	0008,0080	LO		ALWAYS	CONFIG	
Institution Address	0008,0081	ST		ALWAYS	CONFIG	
Station Name	0008,1010	SH		ALWAYS	CONFIG	
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	
Device Serial Number	0018,1000	LO		ANAP	CONFIG	
Software Version(s)	0018,1020	LO	1.0.0	ALWAYS	AUTO	
Spatial Resolution	0018,1050	DS		ALWAYS	AUTO	

Table 94: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	

| Conversion Type | 0008,0064 | CS | | ALWAYS | AUTO | |

Table 95: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: ORIGINAL, Value 2: PRIMARY	ALWAYS	AUTO	
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Quality Control Image	0028,0300	CS		ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	USER	

Table 96: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		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	10, 12, 15	ALWAYS	CONFIG	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	9, 11, 14	ALWAYS		
Pixel Representation	0028,0103	US	0000	ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 97: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ALWAYS	AUTO	
Time of Secondary Capture	0018,1014	TM		ALWAYS	AUTO	

Table 98: VOI LUT Module

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

Table 99: SOP Common Module

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

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

Table 100: IOD of Created Digital X-Ray Image Storage - For Pres. SOP Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Series	DX Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	Acquisition Context Module	ALWAYS
Image	Display Shutter Module	CONDITIONAL
Image	DX Anatomy Imaged Module	ALWAYS
Image	DX Image Module	ALWAYS
Image	X-Ray Collimator Module	CONDITIONAL
Image	DX Detector Module	
Image	DX Positioning Module	CONDITIONAL
Image	X-Ray Acquisition Dose Module	CONDITIONAL
Image	VOI LUT Module	CONDITIONAL
Image	SOP Common Module	ALWAYS

Table 101: 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, 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	
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	

Table 102: 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	MPPS, AUTO	

Table 103: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	MWL, USER	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
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 104: General Series Module

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

Table 105: 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		
>Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
>Referenced SOP Instance UID	0008,1155	UI	1.2.840.10008.3.1.2.3.3	ANAP	AUTO	

Table 106: 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	CONFIG	
Institution Address	0008,0081	ST		ANAP	CONFIG	
Station Name	0008,1010	SH		ANAP	CONFIG	
Institutional Department Name	0008,1040	LO		ANAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	
Device Serial Number	0018,1000	LO		ANAP	CONFIG	
Software Version(s)	0018,1020	LO	1.0.0	ANAP	AUTO	
Spatial Resolution	0018,1050	DS		ANAP	AUTO	

Table 107: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: ORIGINAL, Value 2: PRIMARY	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		VNAP	AUTO	
Quality Control Image	0028,0300	CS		ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS	00	ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ANAP	AUTO	

Table 108: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO	
Bits Stored	0028,0101	US	10, 12, 15	ALWAYS	CONFIG	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	9, 11, 14	ALWAYS		
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	

Table 109: Acquisition Context Module

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

Table 110: 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		ALWAYS	AUTO	

Table 111: DX Anatomy Imaged Module

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

Table 112: DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: ORIGINAL, Value 2: PRIMARY	ALWAYS	AUTO	
Acquisition Device Processing Description	0018,1400	LO		ANAP	AUTO	
Patient Orientation	0020,0020	CS		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	10, 12, 15	ALWAYS	CONFIG	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	9, 11, 14	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 Centre	0028,1051	DS	Value 1: 2047.0	ANAP	AUTO	
Window Width	0028,1051					
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	
Rescale Type	0028,1054	LO		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS	00	ALWAYS	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ALWAYS	AUTO	

Table 113: X-Ray Collimator Module

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

Table 114: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Exposure Index	0018,1411	DS		ANAP	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	
Detector Type	0018,7004	CS		VNAP	AUTO	
Field of View Origin	0018,7030	DS		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	
Field of View Horizontal Flip	0018,7034	CS		ANAP	AUTO	
Detector Mode	0018,7008	LT		VNAP	AUTO	
Detector ID	0018,700A	SH		ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
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		VNAP	AUTO	
Detector Manufacturer Name	0018,702A	LO	Philips	VNAP	AUTO	
Detector Manufacturer's Model Name	0018,702B	LO		VNAP	AUTO	

Table 115: DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Positioner Type	0018,1508	CS		VNAP	AUTO	
View Position	0018,5101	CS		ANAP	AUTO	

Table 116: X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image and Fluoroscopy Area Dose Product	0018,115E	DS		ANAP	AUTO	
Relative X-ray Exposure	0018,1405	IS		ANAP	AUTO	
Exposure Index	0018,1411	DS		ANAP	AUTO	
Entrance Dose	0040,0302	US		ANAP	AUTO	

Table 117: VOI LUT Module

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

Table 118: 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	ANAP	AUTO	
SOP Instance UID	0008,0018	UI		ANAP	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

Table 119: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS	AUTO	
Overlay Columns	6000,0010	US		ALWAYS	AUTO	
Overlay Type	6000,0040	CS		ALWAYS	AUTO	
Overlay Origin	6000,0040	SS		ALWAYS	AUTO	
Overlay Bits Allocated	6000,0100	US		ALWAYS	AUTO	
Overlay Bit Position	6000,0102	US		ALWAYS	AUTO	
Overlay Data	6000,3000	OW		ALWAYS	AUTO	

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

Table 120: IOD of Created Digital X-Ray Image Storage - For Proc. SOP Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	
Study	General Study Module	
Study	Patient Study Module	
Series	General Series Module	
Series	DX Series Module	
Equipment	General Equipment Module	
Image	General Image Module	
Image	Image Pixel Module	
Image	Acquisition Context Module	
Image	Display Shutter Module	
Image	DX Anatomy Imaged Module	
Image	X-Ray Collimator Module	
Image	DX Detector Module	
Image	DX Positioning Module	
Image	X-Ray Acquisition Dose Module	
Image	X-Ray Generation Module	
Image	SOP Common Module	

Table 121: 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		ALWAYS	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	
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL, USER	

Table 122: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	MPPS	
Study Time	0008,0030	TM		ALWAYS	MPPS	
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		
Study ID	0020,0010	SH		ALWAYS	AUTO, MPPS	

Table 123: 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 124: General Series Module

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

Table 125: 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 PROCESSING	ALWAYS	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
>Referenced SOP Instance UID	0008,1155	UI	1.2.840.10008.3.1.2.3.3	ANAP	AUTO	

Table 126: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Position Reference Indicator	0020,1040	LO		VNAP		

Table 127: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: ORIGINAL, Value 2: PRIMARY	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		VNAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Quality Control Image	0028,0300	CS		ALWAYS	AUTO	
Burned In Annotation	0028,0301	CS		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS	00	ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS	IDENTITY	ANAP	AUTO	

Table 128: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP		
>Patient Orientation	0020,0020	CS		ANAP		
Irradiation Event UID	0008,3010	UI		ANAP		
Instance Number	0020,0013	IS		VNAP	AUTO	
Quality Control Image	0028,0300	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP		

Table 129: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO	
Bits Stored	0028,0101	US	10, 12, 15	ALWAYS	CONFIG	When Parameter "Increase virtual depth for PACS" is enabled values are : 16,13,11
High Bit	0028,0102	US	9, 11, 14	ALWAYS		
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	

Table 130: Acquisition Context Module

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

Table 131: 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 132: DX Anatomy Imaged Module

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

Table 133: X-Ray Collimator Module

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

Table 134: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Exposure Index	0018,1411	DS		ANAP	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	
Detector Type	0018,7004	CS		VNAP	AUTO	
Field of View Origin	0018,7030	DS		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	
Field of View Horizontal Flip	0018,7034	CS		ANAP	AUTO	
Detector Mode	0018,7008	LT		VNAP	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		VNAP	AUTO	
Detector Manufacturer Name	0018,702A	LO	Philips	VNAP	AUTO	
Detector Manufacturer's Model Name	0018,702B	LO		VNAP	AUTO	
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Exposure Index	0018,1411	DS		ANAP	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	
Detector Type	0018,7004	CS		VNAP	AUTO	
Field of View Origin	0018,7030	DS		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	
Field of View Horizontal Flip	0018,7034	CS		ANAP	AUTO	
Detector Mode	0018,7008	LT		VNAP	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		VNAP	AUTO	
Detector Manufacturer Name	0018,702A	LO	Philips	VNAP	AUTO	
Detector Manufacturer's Model Name	0018,702B	LO		VNAP	AUTO	
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Exposure Index	0018,1411	DS		ANAP	AUTO	
Detector Temperature	0018,7001	DS		ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Detector Type	0018,7004	CS		VNAP	AUTO	
Field of View Origin	0018,7030	DS		ANAP	AUTO	
Field of View Rotation	0018,7032	DS		ANAP	AUTO	

Table 135: DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Positioner Type	0018,1508	CS		VNAP	AUTO	
View Position	0018,5101	CS		ANAP	AUTO	

Table 136: X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image and Fluoroscopy Area Dose Product	0018,115E	DS		ANAP		
Relative X-ray Exposure	0018,1405	IS		ANAP		
Entrance Dose	0040,0302	US		ANAP		

Table 137: SOP Common Module

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

Table 138: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS	AUTO	
Overlay Columns	6000,0010	US		ALWAYS	AUTO	
Overlay Type	6000,0040	CS		ALWAYS	AUTO	
Overlay Origin	6000,0040	SS		ALWAYS	AUTO	
Overlay Bits Allocated	6000,0100	US		ALWAYS	AUTO	
Overlay Bit Position	6000,0102	US		ALWAYS	AUTO	
Overlay Data	6000,3000	OW		ALWAYS	AUTO	

8.1.2 Usage of Attributes from Received IOD

The DigitalDiagnost C50 has only an export side. The modality cannot read/view images from a CD or by import.

8.1.3 Attribute Mapping

Table 139: Attribute mapping during Modality Workflow

Name	BWLM Tag	MPPS		Image IOD Tag
		Create Tag	Set 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

Name	BWLM Tag	MPPS		Image IOD Tag
		Create Tag	Set Tag	
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	-	-
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

8.1.4 Coerced/Modified fields

Not Applicable

8.2 Data Dictionary of Private Attributes

Not Applicable

8.3 Coded Terminology and Templates

Not Applicable

8.3.1 Context Groups

Not Applicable

8.3.2 Template Specifications

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:
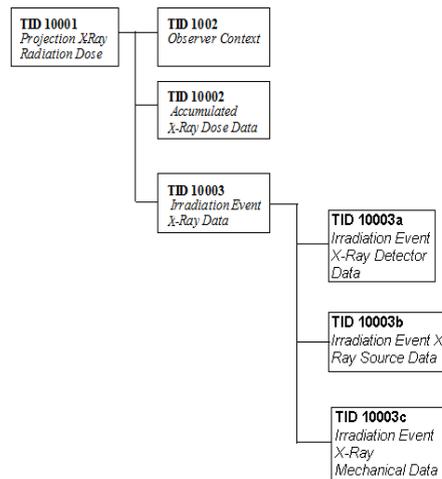
Figure 1 X-Ray Radiation Dose SR IOD Template Structure

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	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	No
>	CONTAINS	X-Ray Mechanical Data Available	CODE	1	ALWAYS	No
>	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 10003a Irradiation 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 10003b Irradiation 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 10003c Irradiation 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 | I 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 C50
>	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

Not Applicable

8.4   Grayscale Image consistency

The monitor of DigitalDiagnost C50 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 C50 provides calibration tools to adapt to this device to afford grayscale image consistency. The calibration takes into account ambient luminance and light box luminance.

8.5   Standard Extended/Specialized/Private SOPs

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 Pres. SOP	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Proc. 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

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
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		VNAP	AUTO	
Filter Material	0018,7050	CS		VNAP	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

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		VNAP	MWL/USER	
Allergies	0010,2110	LO		VNAP	MWL/USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/USER	
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 uAs	0018,1153	IS		ANAP	AUTO	
Radiation Setting	0018,1155	CS		VNAP	AUTO	
Image and Fluoroscopy Area Dose Product	0018,115E	DS		VNAP	AUTO	
Grid	0018,1166	CS		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	
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	
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/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	

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

Table 153: Addition of standard and private attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		VNAP	MWL/USER	
Allergies	0010,2110	LO		VNAP	MWL/USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/USER	
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	
Requested Procedure Code Sequence	0032,1064	SQ			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	
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	
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

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		VNAP	MWL/USER	
Allergies	0010,2110	LO		VNAP	MWL/USER	
Pregnancy Status	0010,21C0	US		VNAP	MWL/USER	
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	
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