

# DICOM Conformance Statement

## Philips MicroDose SI L50 9.0 P5



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Document Number: ICAP-PF.0024122

Date: 24-May-2016

# 1. DICOM Conformance Statement Overview

Philips MicroDose is a FFDM (Full Field Digital Mammography) modality. It consists of a mammography stand and an acquisition workstation. The application on the acquisition workstation, the Philips MicroDose application, controls the stand and displays the acquired images. The Quality Assurance check is done on the acquisition workstation. The acquired images are stored locally on the acquisition workstation and can be sent to remote DICOM nodes as mammography images.

**Table 1: Network Services**

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Print Management			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Transfer			
Digital Mammography X-Ray Image Storage - Pres. SOP	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
Digital Mammography X-Ray Image Storage - Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Mammography CAD SR Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
Workflow Management			
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No
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

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## 3. Introduction

### 3.1. Revision History

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

**Table 2: Revision History**

Document Version	Date of Issue	Status	Description
00	24-May-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).

## 3.4. Definitions, Terms and Abbreviations

**Table 3: 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
CT	Computed Tomography
DA	Date
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DS	Decimal String (16 bytes maximum)
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FD	Floating Point Double
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
IS	Integer String (12 bytes maximum)
LO	Long String (64 characters maximum)
LT	Long Text (10240 characters maximum)
MG	Digital Mammography X-Ray Image (DICOM IOD name)
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SH	Short String (16 characters maximum)
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
SQ	Sequence of Items
ST	Short Text (1024 characters maximum)
TM	Time
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
UL	Unsigned Long (4 bytes fixed)
US	Unsigned Short
VM	Value Multiplicity
VR	Value Representation
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

Application data flow diagrams for the following applications are explained in the below sections.

1) **Philips MicroDose L50** is an acquisition workstation for Mammogram DICOM images. It provides (among other things) the following features:

- Print images
- Query a Radiology Information System (RIS) for a modality worklist
- Send information to a RIS regarding Performed Procedure Steps
- Send and commit images to a DICOM archive

Philips MicroDose L50 contains four different Application Entities (AE), Print SCU, Storage SCU, MWL SCU and MPPS SCU. Each AE has only one instance.

**Note:** MPPS, Modality Worklist and Storage Commit are not available when Philips MicroDose L50 is used as a stand-alone (offline) system.

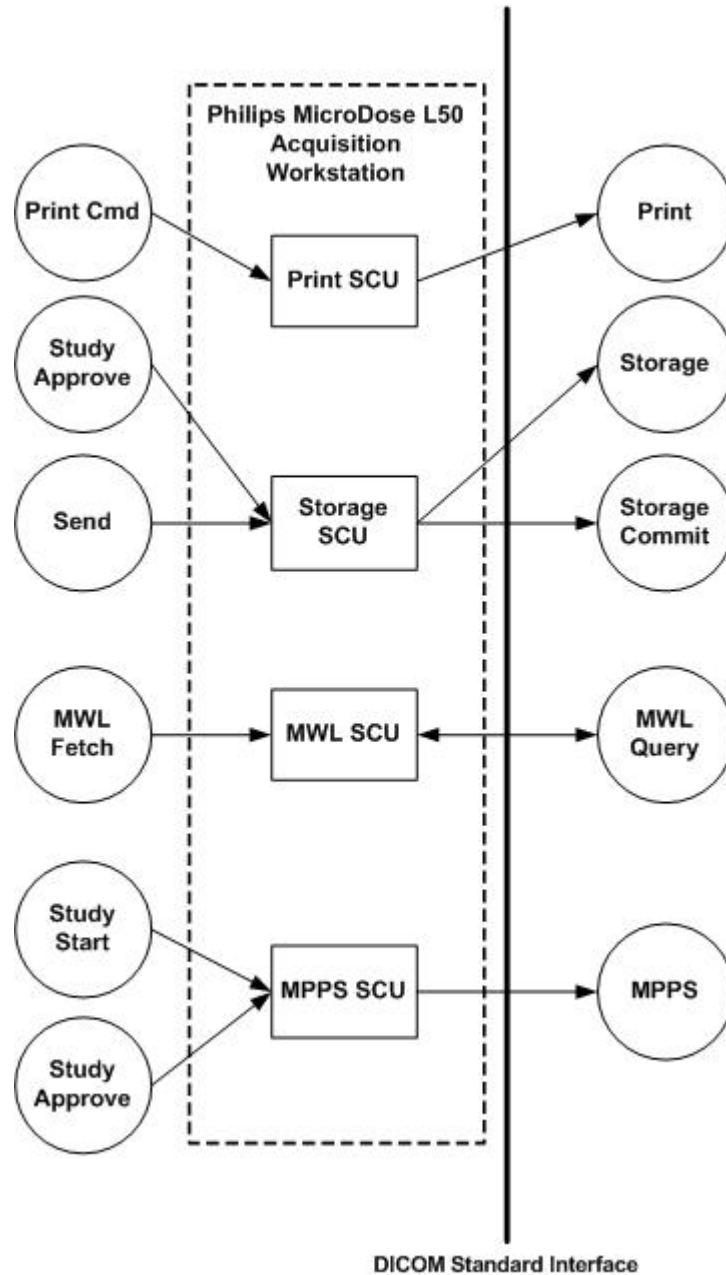


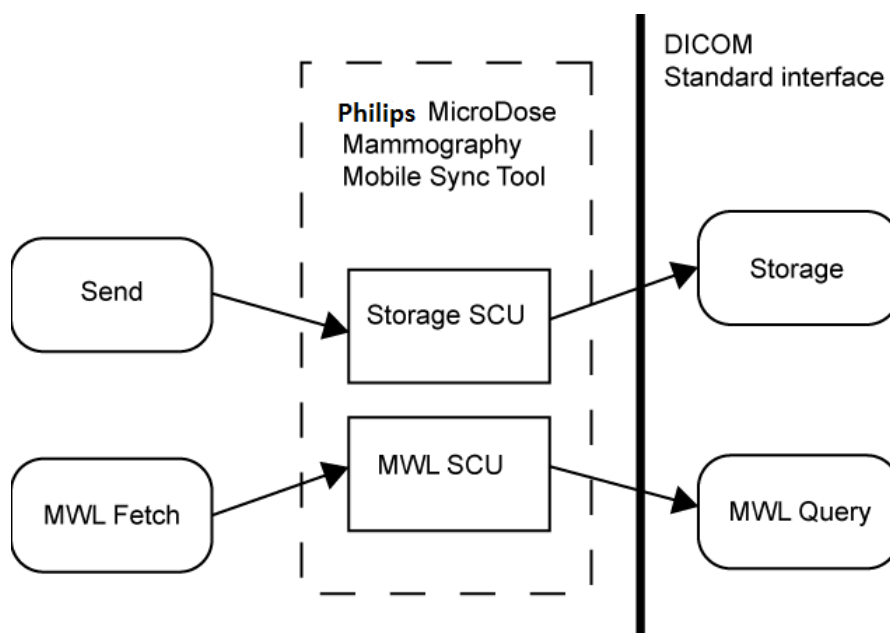
Figure 1: Philips MicroDose L50 Application Flow Diagram

- 2) **MicroDose Mobile Sync Tool:** MicroDose Mobile Sync is used mainly when the Philips MicroDose L50 is used as a stand-alone (off-line) system. E.g. a Mammography Mobile system.

DICOM Modality Worklist data is retrieved from a MWL SCP and stored on a local Disk.  
 Philips MicroDose Application will be configured to read the Worklist data from disk.  
 Acquired Images will be stored on a local storage drive during off-line operation.

MicroDose Mobile Sync is the tool used to transfer Mammogram DICOM images to a remote storage area and retrieve the DICOM Modality worklist data. It provides the following features:

- Send images to a DICOM archive
- Query a Radiology Information System (RIS) for a DICOM Modality Worklist



**Figure 2: MicroDose Mobile Sync Tool Application Flow Diagram**

MicroDose Mobile Sync contains two Application Entities (AE), Storage SCU and MWL SCU. Each AE only has one instance.

Specification of the MicroDose Mobile Sync Application Entities are the same as the MicroDose standard Application Entities as described in Chapter 4.

## 4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

### 4.1.2.1. Functional Definition of MPPS SCU AE

MPPS SCU is the AE responsible for sending Modality Performed Procedure Step to a Performed Procedure step Manager

When a study is started, MPPS N-CREATE is sent with status CREATED. After acquiring images and the user approves the study, MPPS N-SET is sent with status COMPLETED.

When a study is started and no images were acquired but the user wants to inform that the study was not forgotten, a SET MPPS message is sent to the PPS Manager with status DISCONTINUED.

### 4.1.2.2. Functional Definition of MWL SCU AE

MWL handles queries and retrieve requests from a Philips MicroDose L50 user. User can define search criteria and request information from a MWL SCP.

When responses are received from a MWL SCP the user can select examinations and perform them. The images are displayed on the Philips MicroDose L50 as received from the Philips MicroDose L50 Stand during the examination.

### 4.1.2.3. Functional Definition of Print SCU AE

Print SCU is the AE responsible for sending print request to DICOM printers. There is only one Print SCU AE per Philips MicroDose L50.

#### 4.1.2.4. Functional Definition of Storage SCU AE

Storage SCU is the AE responsible for sending images to remote applications. The Philips MicroDose Storage SCU is used for sending images to a DICOM Storage service for long-term storage.

Each time a study is approved in the Philips MicroDose L50, the images that belong to this examination are sent. All sent images are removed by a configurable cleanup schedule.

Furthermore, if the Philips MicroDose L50 is a part of a mobile unit, the MicroDose Mobile Sync Tool performs the actual send. This tool should be configured to the same AE as the Philips MicroDose L50 system itself.

#### 4.1.2.5. Functional Definition of SR SCU AE

SR SCU is the AE responsible for sending Mammography CAD SR images to remote applications.

### 4.1.3. Sequencing of Real World Activities

#### Philips MicroDose L50:

Philips MicroDose L50 will perform operations (Print, Send) on images received from the Philips MicroDose L50 stand. It will add image information regarding generator settings, dose, operator, current patient, date and time etc. It will also apply image improvement algorithms and allow the user to adapt window level settings before the image is sent.

## 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. MPPS SCU 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 4: SOP Classes for MPPS SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	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 5: DICOM Application Context**

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU size that the MPPS SCU AE will use is 32768 bytes (32kB).

**Note:** It is possible to configure the Philips MicroDose application to extend the Modality Performed Procedure Step SOP Class to include optional attributes. The default configuration is to not include optional attributes.

##### 4.2.1.2.2. Number of Associations

The MPPS SCU AE can only handle one association at a time. One MPPS request is finished before the next is started. The Philips MicroDose application selects the MPPS SCP to associate with that corresponds to the worklist definition that was used when the study was received.

**Table 6: Number of associations as an Association Initiator for this AE**

Description	Value
Maximum number of simultaneous associations	1

##### 4.2.1.2.3. Asynchronous Nature

The MPPS SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

##### 4.2.1.2.4. Implementation Identifying Information

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

**Table 7: DICOM Implementation Class and Version for MPPS SCU AE**

Implementation Class UID	1.3.46.670589.51.3.3.25.7.2.0
Implementation Version Name	MD_2_0

**4.2.1.2.5. Communication Failure Handling**

The behavior of the AE during communication failure is summarized in the table 8.

**Table 8: Communication Failure Behavior**

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

**4.2.1.3. Association Initiation Policy**

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

The Application Entity will respond to a received Association rejection as shown in the table 9.

**Table 9: Association Rejection response**

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
2 - rejected-transient	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	
	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not-supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the table 10.

**Table 10: Association Abort Handling**

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	

Source	Reason/Diagnosis	Behavior
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

#### 4.2.1.3.1. (Real-World) Activity – Modality Performed Procedure Step as SCU

##### 4.2.1.3.1.1. Description and Sequencing of Activities

Worklist are defined in the configuration. Only Philips authorized personnel are allowed to do configuration. The definition of a worklist contains information about which MPPS SCP to use for studies received from corresponding MWL SCP. The user selects a worklist and the MPPS SCU AE associates to the MPPS SCP that is specified in the worklist definition.

- MPPS Create is sent when the study is started.
- MPPS Set is sent when the study is approved.

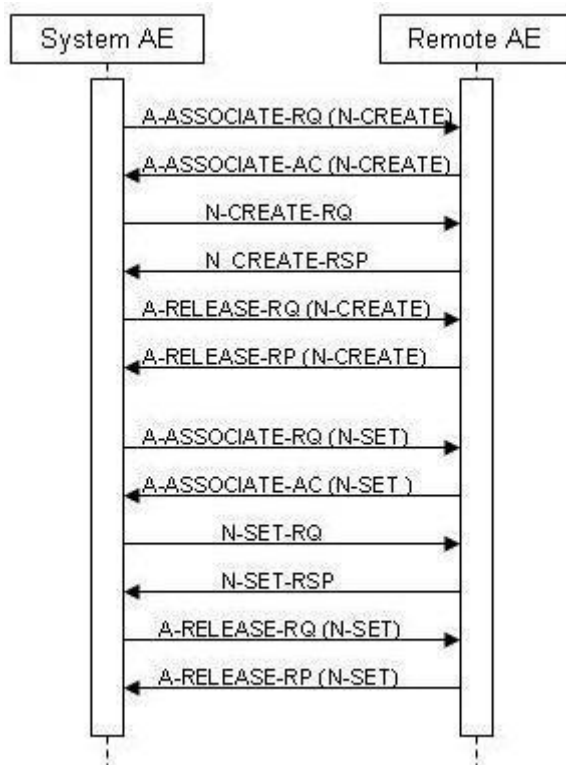


Figure 3: (Real World) Activity - Modality Performed Procedure Step as SCU

##### 4.2.1.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 11.



**Table 11: 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

**4.2.1.3.1.3. SOP Specific Conformance for Modality Performed Procedure Step SOP Class**

The MPPS SCU provides standard conformance to the MPPS SOP class.

**4.2.1.3.1.3.1. 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 12: MPPS Request Identifiers for N-CREATE-RQ**

Attribute Name	Tag	VR	Value	Comment
<b>SOP Common Module</b>				
Specific Character Set	0008,0005	CS		Configurable, Default: "ISO_IR 100"
<b>Performed Procedure Step Relationship Module</b>				
Patient ID	0010,0020	LO		Patient ID received from Modality Worklist.
Patient's Birth Date	0010,0030	DA		Patient birth date received from Modality Worklist.
Patient's Name	0010,0010	PN		Name of the patient received from Modality Worklist.
Patient's Sex	0010,0040	CS		Patient sex received from Modality Worklist.
Referenced Patient Sequence	0008,1120	SQ		Empty
Scheduled Step Attributes Sequence	0040,0270	SQ		
>Accession Number	0008,0050	SH		Accession Number received from Modality Worklist.
>Requested Procedure Description	0032,1060	LO		Requested Procedure Description ID received from Modality Worklist.
>Requested Procedure ID	0040,1001	SH		Requested Procedure ID received from Modality Worklist.
>Scheduled Procedure Step Description	0040,0007	LO		Scheduled Procedure Step Description received from Modality Worklist.
>Scheduled Procedure Step ID	0040,0009	SH		Scheduled Procedure Step ID received from Modality Worklist.
>Study Instance UID	0020,000D	UI		Study Instance UID received from Modality Worklist.
>Referenced Study Sequence	0008,1110	SQ		
>Scheduled Protocol Code Sequence	0040,0008	SQ		Copy from MWL.
<b>Performed Procedure Step Information Module</b>				
Performed Location	0040,0243	SH		Empty
Performed Procedure Step Description	0040,0254	LO		Same as Scheduled Step Description.
Performed Procedure Step End Date	0040,0250	DA		Empty
Performed Procedure Step End Time	0040,0251	TM		Empty
Performed Procedure Step ID	0040,0253	SH		Performed Procedure Step ID.
Performed Procedure Step Start Time	0040,0244	DA		Start date of the procedure step.
Performed Procedure Step Start Time	0040,0245	TM		Start time of the procedure step.
Performed Procedure Step Status	0040,0252	CS	IN PROGRESS	"IN PROGRESS"

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Type Description	0040,0255	LO		Empty
Performed Station AE Title	0040,0241	AE		Performed Station AE Title received from configuration.
Performed Station Name	0040,0242	SH		Performed Station Name received from configuration.
Procedure Code Sequence	0008,1032	SQ		Copy from MWL Requested Procedure Code Sequence (0032, 1064)
>Code Value	0008,0100	SH		Copy from MWL.
>Coding Scheme Designator	0008,0102	SH		Copy from MWL.
>Code Meaning	0008,0104	LO		Copy from MWL.
Requested Procedure Code Sequence	0032,1064	SQ		
>Code Value	0008,0100	SH		Copy from MWL.
>Coding Scheme Designator	0008,0102	SH		Copy from MWL.
>Code Meaning	0008,0104	LO		Copy from MWL.
<b>Image Acquisition Results Module</b>				
Modality	0008,0060	CS	MG	"MG"
Study ID	0020,0010	SH		Study ID received from Modality Worklist.
Performed Protocol Code Sequence	0040,0260	SQ		Empty sequence
Performed Series Sequence	0040,0340	SQ		Empty sequence
<b>Radiation Dose Module</b>				
Total Time of Fluoroscopy	0040,0300	US		Empty
Total Number of Exposures	0040,0301	US		Empty
Exposed Area	0040,0303	US		Empty
Entrance Dose in mGy	0040,8302	DS		Empty
Exposure Dose Sequence	0040,030E	SQ		Empty
<b>Billing And Material Management Code Module</b>				
Film Consumption Sequence	0040,0321	SQ		Empty sequence
<b>Extended Dicom and Private attributes</b>				
Organ Dose	0040,0316	DS		Empty or not present if not enabled in configuration.

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

**Table 13: 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
Error			
Failed			
Refused			
Warning			
Pending			
Cancel			

#### 4.2.1.3.1.3.2. 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 14: MPPS Request Identifiers for N-SET-RQ

Attribute Name	Tag	VR	Value	Comment
<b>Performed Procedure Step Information Module</b>				
Performed Procedure Step End Date	0040,0250	DA		End date of the procedure step.
Performed Procedure Step End Time	0040,0251	TM		End time of the procedure step.
Performed Procedure Step Status	0040,0252	CS		"COMPLETED", "DISCONTINUED"
<b>Image Acquisition Results Module</b>				
Performed Series Sequence	0040,0340	SQ		
>Operators' Name	0008,1070	PN		Empty
>Performing Physician's Name	0008,1050	PN		Empty
>Protocol Name	0018,1030	LO		
>Retrieve AE Title	0008,0054	AE		Empty
>Series Description	0008,103E	LO		Performed Series Description.
>Series Instance UID	0020,000E	UI		Performed Series Instance UID.
>Referenced Image Sequence	0008,1140	SQ		
>>Referenced SOP Class UID	0008,1150	UI		SOP Class UID.
>>Referenced SOP Instance UID	0008,1155	UI		SOP Instance UID.
>Referenced Non-Image Composite SOP Instance Sequence	0040,0220	SQ		Empty
<b>Radiation Dose Module</b>				
Entrance Dose in mGy	0040,8302	DS		Total entrance dose in mGy.
Total Number of Exposures	0040,0301	US		Number of exposures.
Exposure Dose Sequence	0040,030E	SQ		
>Filter Material	0018,7050	CS	ALUMINUM	Constant: "ALUMINUM"
>Exposure Time	0018,1150	IS		Exposure Time in ms.
>KVP	0018,0060	DS		kVp
>Radiation Mode	0018,115A	CS		"CONSTANT"
>X-ray Tube Current	0018, 8151	IS		X-Ray Tube Current in $\mu$ A
<b>Extended Dicom and Private attributes</b>				
Organ Dose	0040,0316	DS		Total organ dose or not present if not enabled in configuration.

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

Table 15: 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
Error			
Failed			
Refused			
Warning			
Pending			
Cancel			

#### 4.2.1.4. Association Acceptance Policy

The MPPS SCU AE does not handle incoming associations.

## 4.2.2. MWL SCU AE

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

### 4.2.2.1. SOP Classes

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

**Table 16: SOP Classes for MWL SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No

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

### 4.2.2.2. Association Policies

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

#### 4.2.2.2.1. General

The DICOM standard application context is specified below.

**Table 17: DICOM Application Context**

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU size that the MWL SCU AE will use is 32768 bytes (32kB).

#### 4.2.2.2.2. Number of Associations

The MWL SCU AE can only handle one association at a time. One MWL request is finished before the next is started. The user selects which MWL SCP to associate with by selecting worklist definition.

**Table 18: Number of associations as an Association Initiator for this AE**

Description	Value
Maximum number of simultaneous associations	1

#### 4.2.2.2.3. Asynchronous Nature

The MWL SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

#### 4.2.2.2.4. Implementation Identifying Information

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

**Table 19: DICOM Implementation Class and Version for MWL SCU AE**

Implementation Class UID	1.3.46.670589.51.3.3.25.7.2.0
Implementation Version Name	MD_2_0

#### 4.2.2.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the table 20.

**Table 20: Communication Failure Behavior**

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

#### 4.2.2.3. Association Initiation Policy

The Application Entity will respond to a received Association rejection as shown in the table 21.

**Table 21: Association Rejection response**

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
2 - rejected-transient	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	
	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not-supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
		1 - no-reason-given	
	2 - DICOM UL service-provider (ACSE related function)	2 - protocol-version-not-supported	
		1 - temporary-congestion	
	3 - DICOM UL service-provider (Presentation related function)	2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the table 22.

**Table 22: Association Abort Handling**

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

#### 4.2.2.3.1. (Real-World) Activity – Modality worklist as SCU

##### 4.2.2.3.1.1. Description and Sequencing of Activities

Worklist are defined in the configuration. Only Philips authorized personnel are allowed to do configuration. The definition of a worklist contains information about which MWL SCP to use and also search criteria. The user selects a worklist and the MWL SCU AE associates to the MWL SCP that is specified in the worklist definition.

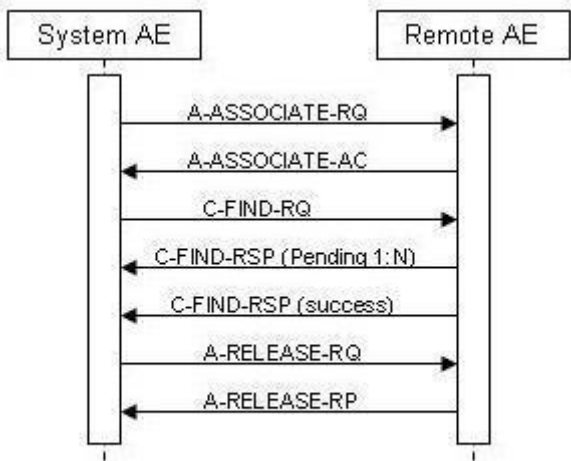


Figure 4: (Real World) Activity - Modality Worklist as SCU

4.2.2.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 23.

Table 23: 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

4.2.2.3.1.3. SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

The MWL SCU provides standard conformance to the MWL SOP class.

4.2.2.3.1.3.1. 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 o 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 24: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
<b>Patient Identification Module</b>									
Other Patient IDs	0010,1000	LO							
Patient ID	0010,0020	LO		X		X			
Patient's Name	0010,0010	PN		X		X			
<b>Patient Demographic Module</b>									
Patient's Age	0010,1010	AS							
Patient's Birth Date	0010,0030	DA		X					
Patient's Sex	0010,0040	CS		X		X			
<b>Patient Medical Module</b>									
Additional Patient History	0010,21B0	LT							
Medical Alerts	0010,2000	LO							
Patient State	0038,0500	LO		X					
<b>Scheduled Procedure Step Module</b>									
Scheduled Procedure Step Sequence	0040,0100	SQ							
>Modality	0008,0060	CS	X	X				Single Value	
>Scheduled Performing Physician's Name	0040,0006	PN						Single Value	
>Scheduled Procedure Step Description	0040,0007	LO		X		X			
>Scheduled Procedure Step ID	0040,0009	SH		X		X			
>Scheduled Procedure Step Location	0040,0011	SH		X					
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X		X		Single Value	
>Scheduled Procedure Step Start Time	0040,0003	TM	X	X		X		Single Value	
>Scheduled Station AE Title	0040,0001	AE	X	X				Single Value	
>Scheduled Station Name	0040,0010	SH		X				Single Value	
>Scheduled Protocol Code Sequence	0040,0008	SQ		X					
>>Code Value	0008,0100	SH		X					
>>Coding Scheme Designator	0008,0102	SH		X					
>>Code Meaning	0008,0104	LO		X					
<b>Requested Procedure Module</b>									
Reference Study Sequence	0008,1110	SQ		X					
>Referenced SOP Class UID	0008,1150	UI		X					
>Referenced SOP Instance UID	0008,1155	UI		X					
Requested Procedure Description	0032,1060	LO		X					
Requested Procedure Code Sequence	0032,1064	SQ		X					
>Code Value	0008,0100	SH		X					
>Coding Scheme Designator	0008,0102	SH		X					
>Code Meaning	0008,0104	LO		X					
Requested Procedure ID	0040,1001	SH		X		X			
Study Instance UID	0020,000D	UI		X					
<b>Imaging Service Request Module</b>									
Accession Number	0008,0050	SH		X		X			
Referring Physician's Name	0008, 0090	PN							



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

**Table 25: 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
Error			
Failed			
Refused			
Warning			
Pending			
Cancel			

#### 4.2.2.4. Association Acceptance Policy

The MWL SCU AE does not handle incoming associations.

### 4.2.3. Print SCU AE

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

#### 4.2.3.1. SOP Classes

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

**Table 26: SOP Classes for Print SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No

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

#### 4.2.3.2. Association Policies

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

##### 4.2.3.2.1. General

The DICOM standard application context is specified below.

**Table 27: DICOM Application Context**

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU size that the Print SCU AE will use is 32768 bytes (32kB).

##### 4.2.3.2.2. Number of Associations

The Print SCU AE can only handle one association at a time.

##### 4.2.3.2.3. Asynchronous Nature

The Print SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

##### 4.2.3.2.4. Implementation Identifying Information

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

**Table 28: DICOM Implementation Class and Version for Print SCU AE**

Implementation Class UID	1.3.46.670589.51.3.3.25.7.2.0
Implementation Version Name	MD_2_0

##### 4.2.3.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the table 29.

**Table 29: Communication Failure Behavior**

Exception	Behavior
ARTIM Timeout	The Association setup fails, and using A-ABORT and the command is marked as failed. The reason is logged and reported to the user.
Association aborted	The Print Image job is marked as Failed.
Association Time-Out SCU	The Association is Released.
Network reply Time-Out	The Association is Released.

#### 4.2.3.3. Association Initiation Policy

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

The Application Entity will respond to a received Association rejection as shown in the table 30.

**Table 30: Association Rejection response**

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
2 - rejected-transient	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	
	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not-supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the table 31.

**Table 31: Association Abort Handling**

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

#### 4.2.3.3.1. (Real-World) Activity – Print Management as SCU

##### 4.2.3.3.1.1. Description and Sequencing of Activities

The Philips MicroDose user chooses an image to print by selecting corresponding icon image and then issues the print command. Then the Print SCU AE is activated, acts as an SCU and initiates an association with a remote AE that is supporting DICOM Print

Management as SCP (a DICOM printer). Philips MicroDose associates to the AE specified in the configuration. Philips authorized personnel can only do configuration.

The Print SCU AE supports the mandatory SOP classes, which are defined under the Basic Grayscale Print Management Meta SOP Class. No optional SOP classes are supported.

The Print SCU AE uses the following DIMSE Service Elements:

**Table 32: DIMSE Service Elements**

SOP Class	DIMSE Service Element
Basic Film Session SOP Class	N-CREATE, N-DELETE
Basic Film Box SOP Class	N-CREATE, N-DELETE, N-ACTION
Basic Grayscale Image Box SOP Class	N-SET
Printer SOP Class	N-GET

N-EVENT-REPORT is not supported.

Immediately after establishing an association, the Print SCU AE will execute an N-GET on the Printer SOP Class. This operation can be configured into two modes, one for fetching all available printer attributes and one for fetching a minimal set of printer attributes.

If configured to fetch all attributes, the following attributes will be requested:

**Table 33: Attributes available when fetching all attributes**

Attribute	Tag	Optional according to standard
Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	NO
Printer Name	(2110,0030)	YES
Manufacturer	(0008,0070)	YES
Manufacturer Model Name	(0008,1090)	YES
Device Serial Number	(0018,1000)	YES
Software Versions	(0018,1020)	YES
Date Of Last Calibration	(0018,1200)	YES
Time Of Last Calibration	(0018,1201)	YES

**Table 34: Attributes available when fetching minimum set of attributes**

Attribute	Tag	Optional according to standard
Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	YES
Printer Name	(2110,0030)	YES

If the Printer Status tag is returned as NORMAL, the print job will continue immediately.

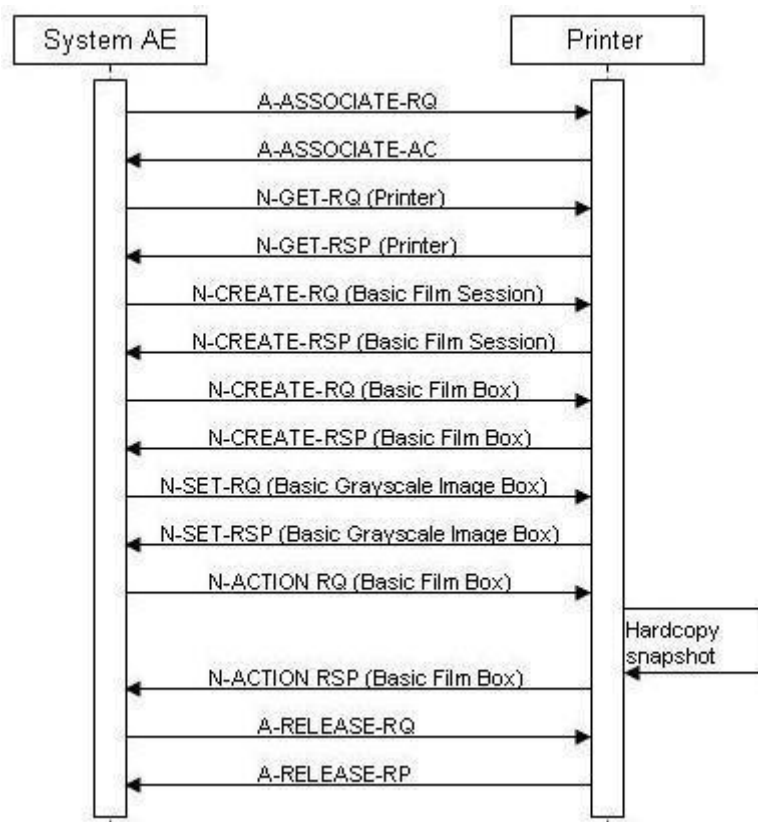


Figure 5: (Real World) Activity - Print Management as SCU

#### 4.2.3.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 35.

**Table 35: Proposed Presentation Contexts for (Real-World) Activity – Print Management As SCU**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9			SCU	None
>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
>Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
>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
>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

This section specifies each IOD created (including private IOD's).

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
VNAPCV	The attribute is present under specified condition – if present then its Value is Not Always Present

(attribute sent zero length if condition applies and no value is present)

ANAEV The attribute is present under specified condition – if present then it will not have any 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

#### 4.2.3.3.1.3. SOP Specific Conformance for Basic Film Session 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.

##### 4.2.3.3.1.3.1. Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

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

**Table 36: Basic Film Session Presentation Module**

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Copies	2000,0010	IS	1	ANAPCV	CONFIG	1
Print Priority	2000,0020	CS	MED	ANAPCV	CONFIG	MED
Medium Type	2000,0030	CS	BLUE FILM	ANAPCV	CONFIG	BLUE FILM
Film Destination	2000,0040	CS	MAGAZINE	ANAPCV	CONFIG	MAGAZINE

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

**Table 37: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Film session successfully created	The print job continues.

##### 4.2.3.3.1.3.2. Dataset Specific Conformance for Basic Film Session SOP Class N-DELETE-SCU

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 38: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.

##### 4.2.3.3.1.4. 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.

**4.2.3.3.1.4.1. Dataset Specific Conformance for Printer SOP Class N-EVENT-REPORT-SCP**

Not applicable.

**4.2.3.3.1.4.2. Dataset Specific Conformance for Printer SOP Class N-GET-SCU**

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

**Table 39: Printer Module**

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ANAPCV	AUTO, CONFIG	
Manufacturer's Model Name	0008,1090	LO		ANAPCV	AUTO, CONFIG	
Device Serial Number	0018,1000	LO		ANAPCV	AUTO, CONFIG	
Software Version(s)	0018,1020	LO		ANAPCV	AUTO, CONFIG	
Date of Last Calibration	0018,1200	DA		ANAPCV	AUTO, CONFIG	
Time of Last Calibration	0018,1201	TM		ANAPCV	AUTO, CONFIG	
Printer Status	2110,0010	CS		ALWAYS	AUTO, CONFIG	
Printer Status Info	2110,0020	CS		ALWAYS	AUTO, CONFIG	
Printer Name	2110,0030	LO		ANAPCV	AUTO, CONFIG	

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

**Table 40: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.

**4.2.3.3.1.5. 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.

**4.2.3.3.1.5.1. Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU**

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

**Table 41: 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		STANDARD\1,1
Film Orientation	2010,0040	CS	PORTRAIT	ANAPCV	CONFIG	PORTRAIT
Film Size ID	2010,0050	CS	14INX17IN	ANAPCV	CONFIG	14INX17IN
Magnification Type	2010,0060	CS		ANAPCV	CONFIG	
Smoothing Type	2010,0080	CS		ANAPCV	CONFIG	



Border Density	2010,0100	CS	BLACK	ANAPCV	CONFIG	BLACK
Empty Image Density	2010,0110	CS	BLACK	ANAPCV	CONFIG	BLACK
Min Density	2010,0120	US		ANAPCV	CONFIG	
Max Density	2010,0130	US		ANAPCV	CONFIG	
Trim	2010,0140	CS	YES	ANAPCV	CONFIG	YES
Configuration Information	2010,0150	ST		ANAPCV	CONFIG	

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

**Table 42: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Film Box successfully created	The print job continues.

#### 4.2.3.3.1.5.2. Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

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 43: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.

#### 4.2.3.3.1.5.3. Dataset Specific Conformance for Basic Film Box SOP Class N-DELETE-SCU

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: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.

#### 4.2.3.3.1.6. SOP Specific Conformance for Basic Grayscale Image 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.

##### 4.2.3.3.1.6.1. 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 45: Image Box Pixel Presentation Module**

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Polarity	2020,0020	CS	NORMAL	ANAPCV	CONFIG	NORMAL

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

**Table 46: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.

#### 4.2.3.4. Association Acceptance Policy

The Print SCU AE does not handle incoming associations.

## 4.2.4. Storage SCU AE

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

### 4.2.4.1. SOP Classes

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

**Table 47: SOP Classes for Storage SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Digital Mammography X-Ray Image Storage - Pres. SOP	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
Digital Mammography X-Ray Image Storage - Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	No

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

### 4.2.4.2. Association Policies

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

#### 4.2.4.2.1. General

The DICOM standard application context is specified below.

**Table 48: DICOM Application Context**

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU-length, which a Storage SCU AE will use, is 32768 bytes (32kB).

#### 4.2.4.2.2. Number of Associations

The Storage SCU AE can only handle one association at a time.

#### 4.2.4.2.3. Asynchronous Nature

The Storage SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

#### 4.2.4.2.4. Implementation Identifying Information

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

**Table 49: DICOM Implementation Class and Version for Storage SCU AE**

Implementation Class UID	1.3.46.670589.51.3.3.25.7.2.0
Implementation Version Name	MD_2_0

#### 4.2.4.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the table 50.

**Table 50: Communication Failure Behavior**

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

**4.2.4.3. Association Initiation Policy**

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

The Application Entity will respond to a received Association rejection as shown in the table 51.

**Table 51: Association Rejection response**

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
2 - rejected-transient	1 - DICOM UL service-user	1 - temporary-congestion	
		2 - local-limit-exceeded	
		1 - no-reason-given	
		2 - application-context-name-not-supported	
	2 - DICOM UL service-provider (ACSE related function)	3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
		1 - no-reason-given	
		2 - protocol-version-not-supported	
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the table 52.

**Table 52: Association Abort Handling**

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

#### 4.2.4.3.1. (Real-World) Activity – Image Export

##### 4.2.4.3.1.1. Description and Sequencing of Activities

Philips MicroDose L50 sends images to one or several DICOM Storage SCP when the user approves an examination or when the user manually sends or resends an image or images in one or several examinations. Philips MicroDose L50 then acts as a Storage SCU AE. The Storage SCU AE will then initiate an association with the remote AE, hopefully supporting DICOM Storage as SCP.

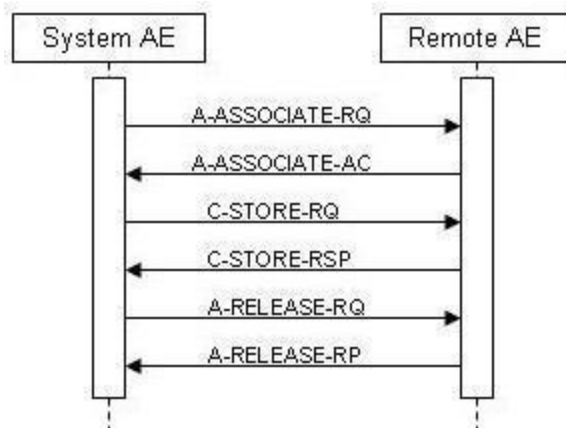


Figure 6: (Real World) Activity - Image Export

**Note:** If annotations have been made in the images on the AWS, this information will be exported as Standard Grayscale Presentation State if the receiving side supports such (see section 8.4 for details), otherwise the annotations will be ignored and thus lost.

##### 4.2.4.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 53.

Table 53: 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		
Digital Mammography X-Ray Image Storage - Pres. SOP	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray Image Storage - Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

##### 4.2.4.3.1.3. SOP Specific Conformance for Storage SOP Classes

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

##### 4.2.4.3.1.3.1. Dataset Specific Conformance for C-STORE-RQ

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

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

Table 54: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful stored	
Failure	A7xx	Refused: Out of Resources	
	A9xx	Error: Data Set does not match SOP Class	
	Cxxx	Error: cannot understand	
Warning	B000	Coercion of Data Elements	
	B007	Data Set does not match SOP Class	
	B006	Elements Discarded	

#### 4.2.4.3.2. (Real-World) Activity – Storage Commitment Push Model AS SCU

##### 4.2.4.3.2.1. Description and Sequencing of Activities

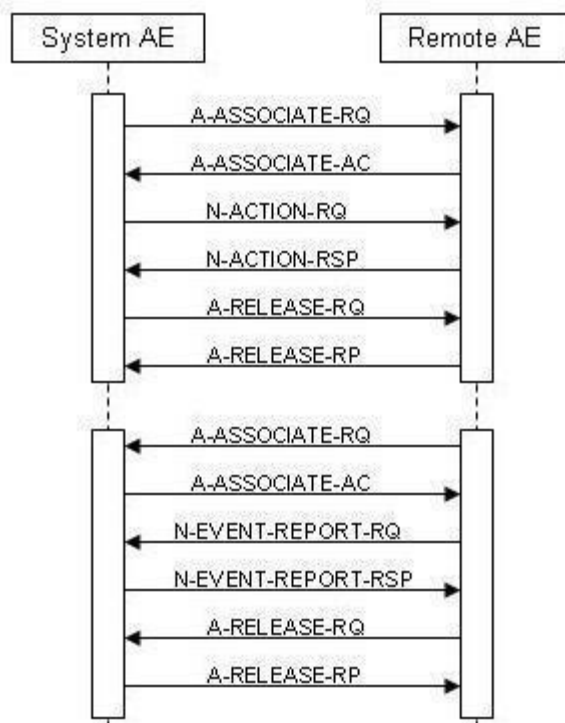


Figure 7: (Real World) Activity - Storage Commitment Push Model as SCU

##### 4.2.4.3.2.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 55.

**Table 55: 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

**4.2.4.3.2.3. SOP Specific Conformance for Storage Commitment Push Model SOP Class**

Storage Commitment can be used when images are sent from Philips MicroDose and the remote DICOM archive supports Storage Commitment as SCP.

The Storage SCU will send the N-ACTION-RQ message and wait for the N-ACTION-RSP. The association will then be closed. An SCP of the same Philips MicroDose will accept and handle the associated N-EVENT-REPORT-RQ with the same Transaction UID.

**4.2.4.3.2.3.1. 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.

The system uses the below Implementation Class UID and version names for receiving the N-EVENT-REPORT-RQ.

**Table 56: Implementation Class and Version for N-EVENT-REPORT-RQ**

Implementation Class UID	1.3.46.670589.51.3.3.25.7.2.0
Implementation Version Name	MD_2_0

**Table 57: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	The status is logged.

**4.2.4.3.2.3.2. Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-ACTION-SCU**

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 58: Status Response**

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	The status is logged.

#### 4.2.4.4. Association Acceptance Policy

The Storage SCU AE does not handle incoming associations.



## 4.2.5. SR SCU AE

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

### 4.2.5.1. SOP Classes

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

**Table 59: SOP Classes for SR Storage SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Mammography CAD SR Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.50	Yes	No

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

### 4.2.5.2. Association Policies

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

#### 4.2.5.2.1. General

The DICOM standard application context is specified below.

**Table 60: DICOM Application Context**

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU size that the SR SCU AE will use is 32768 bytes (32kB).

#### 4.2.5.2.2. Number of Associations

The SR SCU AE can only handle one association at a time. One SR request is finished before the next is started

#### 4.2.5.2.3. Asynchronous Nature

The SR SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

#### 4.2.5.2.4. Implementation Identifying Information

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

**Table 61: DICOM Implementation Class and Version for Storage SCU AE**

Implementation Class UID	1.3.46.670589.51.3.3.25.7
Implementation Version Name	MDSTSCU_2_00

#### 4.2.5.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the table 62.

**Table 62: Communication Failure Behavior**

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

Exception	Behavior
e.g. Failed to connect	

#### 4.2.5.3. Association Initiation Policy

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

The Application Entity will respond to a received Association rejection as shown in the table 63.

**Table 63: Association Rejection response**

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	
		2 - application-context-name-not-supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
2 - rejected-transient	1 - DICOM UL service-user	1 - temporary-congestion	
		2 - local-limit-exceeded	
		1 - no-reason-given	
		2 - application-context-name-not-supported	
	2 - DICOM UL service-provider (ACSE related function)	3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
		1 - no-reason-given	
		2 - protocol-version-not-supported	
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the table 64.

**Table 64: Association Abort Handling**

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

#### 4.2.5.3.1. (Real-World) Activity – SR Export

##### 4.2.5.3.1.1. Description and Sequencing of Activities

Philips MicroDose L50 sends SR to one or several DICOM Storage SCP when the user approves an examination. Philips MicroDose L50 then acts as a Storage SCU AE. The Storage SCU AE will then initiate an association with the remote AE, hopefully supporting DICOM Storage as SCP.

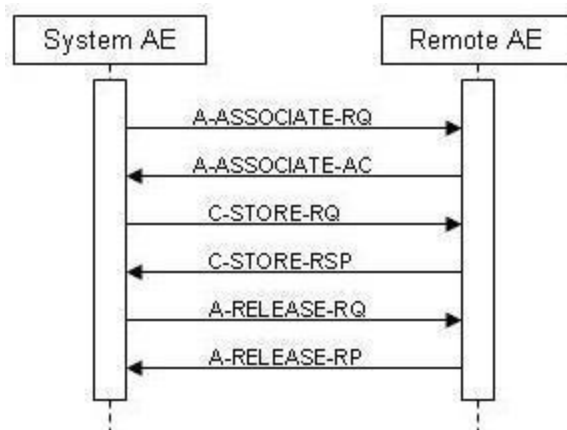


Figure 8: (Real World) Activity - Image Export

#### 4.2.5.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the table 65.

Table 65: 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		
Mammography CAD SR Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.50	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

#### 4.2.5.3.1.3. SOP Specific Conformance for Storage SOP Classes

The SR SCU provides standard conformance to the SOP Classes of the Storage Service Class.

##### 4.2.5.3.1.3.1. Dataset Specific Conformance for C-STORE-RQ

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

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

Table 66: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful stored	
Failure	A7xx	Refused: Out of Resources	
	A9xx	Error: Data Set does not match SOP Class	
	Cxxx	Error: cannot understand	
Warning	B000	Coercion of Data Elements	
	B007	Data Set does not match SOP Class	
	B006	Elements Discarded	

## 4.3. Network Interfaces

### 4.3.1. Physical Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.

TCP/IP is the only protocol stack supported.

Supported physical medium include:

IEEE 802.3-1995, 10BASE-T

IEEE 802.3-1995, 100BASE-TX (Fast Ethernet)

IEEE 802.3, 1000BASE-X (Fiber Optic Gigabit Ethernet).

The TCP/IP Stack as supported by the underlying Operating System.

The API is the WinSock 2 interface as supported by the underlying Operating System.

### 4.3.2. Additional Protocols

#### 1) Supported Communication Stacks:

All AEs described in this conformance statement provide DICOM 3.0 TCP/IP Network Communication Support as defined in part eight of the DICOM Standard.

#### 2) TCP/IP Stack:

The AEs uses the TCP/IP stack built into their respective operating system. For more information about operating systems consult their manuals.

#### 3) Physical Media Support:

All AEs are neutral to the physical medium over which TCP/IP executes. They can e.g. be used with fiber optics, token ring, Ethernet and twisted pair.

#### 4) OSI Stack:

Not applicable.

#### 5) Point-To-Point Stack:

Not applicable.

## 4.4. Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation.

Issues concerning configuration are addressed in this section.

### 4.4.1. AE Title/Presentation Address Mapping

The Philips MicroDose Mobile Sync Tool is configured using the options dialog of the tool itself.

#### 4.4.1.1. Local AE Titles

The local AE title mapping and configuration are specified as:

**Table 67: AE Title configuration table**

Application Entity	Default AE Title	Default TCP/IP Port
Storage SCU	MICRODOSE	N.A
Storage Commitment	MDM_AE	7820
MWL SCU	MICRODOSE	
MPPS SCU	MICRODOSE	
Print SCU	DICOM_PRINT_SCU	

#### 4.4.1.2. Remote AE Title/Presentation Address Mapping

The remote Applications Entity's AE-title, host name and port number are specified the above-mentioned configuration file. Each remote AE is specified in its own section of the file. Default AE title is PRINT\_SERVER\_SCP.

**Note:** The default remote AE title for Storage is: DICOM\_STORAGE.

#### 4.4.2. Parameters

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

**Table 68: Configuration Parameters Table**

Parameter	Configurable	Default Value
<b>General Parameter</b>		
Time-out waiting for acceptance or rejection Response to an Association Open Request (Application Level timeout)	No	
General DIMSE level time-out values (Verification, Storage, Storage Commitment)	No	
Time-out for response to TCP/IP connect request. (Low-level timeout)	No	
Time-out waiting for acceptance of a TCP/IP message over the network (Low-level timeout)	No	
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	
<b>AE Specific Parameters</b>		
Size constraint in maximum object size	No	
Maximum PDU size the AE can receive	No	32768 bytes
Maximum PDU size the AE can send	No	32768 bytes
AE specific DIMSE level time-out values	No	
GUI user readable string for remote AE Titles	No	
<b>Storage Specific Parameters</b>		
Automatic Transfer (ON, OFF)	No	
Export Filter	No	
Confidentiality	No	
Export private Attributes	No	
<b>Storage Commitment Specific Parameters</b>		
Storage Commitment N-Event Timeout	No	
Storage Commitment Retry Count	No	
Storage Commitment N-Action Delay	No	
Storage Commitment Retry Timeout	No	
<b>Basic Worklist Management Specific Parameters</b>		
Date Range	Yes	
Background Query	No	
Wildcard Query	No	
Maximum items Query (Limit before Cancellation)	No	
Query Modality Type	Yes	
<b>Print Management Specific Parameters</b>		
Retries	No	
Delay between retries	No	

## 5. Media Interchange

### 5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

#### 5.1.1. Application Data Flow Diagram

Not applicable.

#### 5.1.2. Functional Definitions of AE's

Not applicable.

#### 5.1.3. Sequencing of Real World Activities

Not applicable.

### 5.2. AE Specifications

Not applicable

### 5.3. Augmented and Private Application Profiles

Not applicable

### 5.4. Media Configuration

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

## 6. Support of Character Sets

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

**Table 69: 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

All AEs supports ISO\_IR 100 extended character set except Print SCU AE.

However, note that all text in the images is passed to the printer in the image data itself. This means that all overlay text appears on the printed medium in the same way as on the screen.

## 7. Security

### 7.1. Security Profiles

Not applicable.

#### 7.1.1. Security use Profiles

Not applicable

#### 7.1.2. Security Transport Connection Profiles

Not applicable

#### 7.1.3. Digital Signature Profiles

Not applicable

#### 7.1.4. Media Storage Security Profiles

Not applicable

#### 7.1.5. Attribute Confidentiality Profiles

Not applicable

#### 7.1.6. Network Address Management Profiles

Not applicable

#### 7.1.7. Time Synchronization Profiles

Not applicable

#### 7.1.8. Application Configuration Management Profiles

Not applicable

#### 7.1.9. Audit Trail Profiles

Not applicable

### 7.2. Association Level Security

Not applicable.

### 7.3. Application Level Security

Not applicable.



## 8. Annexes of application "MicroDose SI L50 9.0 P3"

### 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 shall 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  
ANAPCV          The attribute is present under specified condition – if present then its Value is Not Always Present  
(attribute sent zero length if condition applies and no value is present)  
ANAPEV          The attribute is present under specified condition – if present then it will not have any 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 70: List of created SOP Classes

SOP Class Name	SOP Class UID
Digital Mammography X-Ray Image Storage - Pres. SOP	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage - Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.1.11.1
Mammography CAD SR Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.50

##### 8.1.1.2. Digital Mammography X-Ray Image Storage - Pres. SOP

Table 71: IOD of Created Digital Mammography X-Ray Image Storage - 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	Mammography Series Module	ALWAYS
Series	DX Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	CONDITIONAL
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	Acquisition Context Module	ALWAYS
Image	DX Anatomy Imaged Module	ALWAYS
Image	DX Image Module	ALWAYS
Image	DX Detector Module	ALWAYS
Image	DX Positioning Module	CONDITIONAL
Image	X-Ray Acquisition Dose Module	CONDITIONAL
Image	Mammography Image Module	ALWAYS
Image	Display Shutter Module	CONDITIONAL
Image	VOI LUT Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes (Refer 8.5.1 section for details)	CONDITIONAL

Table 72: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL	Received from MWL.
Patient ID	0010,0020	LO		VNAP	MWL	Received from MWL.
Patient's Birth Date	0010,0030	DA		VNAP	MWL	Received from MWL.
Patient's Sex	0010,0040	CS		VNAP	MWL	Received from MWL.
Other Patient IDs	0010,1000	LO		ANAPCV	MWL	Received from MWL.
Medical Alerts	0010,2000	LO		ANAPCV	MWL	Received from MWL.
Patient Comments	0010,4000	LT		ANAPCV	MWL, USER	Information/comments about the patient.

Table 73: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	Date when study was started.
Study Time	0008,0030	TM		VNAP	AUTO	Time of day when the study was done.
Accession Number	0008,0050	SH		VNAP	MWL	Study accession number. Received from MWL.
Referring Physician's Name	0008,0090	PN		VNAP	COPY, MWL	Received from MWL.
Study Description	0008,1030	LO		ANAPCV	AUTO	Examination code.
Procedure Code Sequence	0008,1032	SQ		ANAPCV	MWL	Copy from MWL Requested Procedure Code Sequence (0032, 1064). Absent if not present from MWL
>Code Value	0008,0100	SH		ALWAYS	MWL	From MWL.
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	From MWL.
>Code Meaning	0008,0104	LO		ALWAYS	MWL	From MWL.
Referenced Study Sequence	0008,1110	SQ		ANAPCV	COPY, MWL	Referenced Study Sequence. From MWL. Empty if not preset
>Referenced SOP Class UID	0008,1150	UI		ANAP	MWL	From MWL.
>Referenced SOP Instance UID	0008,1155	UI		ANAP	MWL	From MWL.
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Instance UID of study to which image belong.
Study ID	0020,0010	SH		VNAP	MWL	From a configurable tag from MWL. Default from (0040,1001)

Table 74: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAPCV	MWL	Received from MWL.

Table 75: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Description	0008,103E	LO		ANAPCV	AUTO	Special label for the image. If the image shall be labeled, one of the configurable labels is selected. If no label is selected, this tag is empty.
Operators' Name	0008,1070	PN		ANAPCV	USER	Name of the operator.
Body Part Examined	0018,0015	CS	Breast	ANAPCV	AUTO	"Breast"
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Series UID.
Series Number	0020,0011	IS		VNAP	AUTO	
Request Attributes Sequence	0040,0275	SQ		ANAPCV	MWL	Worklist information received from Modality Worklist.
>Requested Procedure Description	0032,1060	LO		ANAPCV	MWL	From MWL. Requested Procedure Description.
>Scheduled Procedure Step Description	0040,0007	LO		ANAPCV	MWL	From MWL. Examination code.
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL	From MWL.
>>Code Value	0008,0100	SH		ALWAYS	MWL	From MWL.
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	From MWL.
>>Code Meaning	0008,0104	LO		ALWAYS	MWL	From MWL.
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	From MWL. Examination ID.
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	From MWL. Procedure ID.
Performed Procedure Step ID	0040,0253	SH		ANAPCV	COPY	Same as Scheduled Procedure Step ID. Not present if Scheduled Procedure Step ID is not present.
Performed Procedure Step Description	0040,0254	LO		ANAPCV	AUTO, COPY	Same as Scheduled Step Description. Not present if Scheduled Step Description is not present.

Table 76: Mammography Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	MG	ALWAYS	FIXED	Constant, "MG"
Request Attributes Sequence	0040,0275	SQ		ANAPCV	MWL	Worklist information received from Modality Worklist.
>Requested Procedure Description	0032,1060	LO		ANAPCV	MWL	Requested Procedure Description ID received from Modality Worklist.
>Scheduled Procedure Step Description	0040,0007	LO		ANAPCV	MWL	From MWL. Examination code.
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	From MWL. Examination ID.
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	From MWL. Procedure ID.

Table 77: DX Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation Intent Type	0008,0068	CS	FOR PRESENTATION	ALWAYS	AUTO	Constant: "FOR PRESENTATION"
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAPCV		
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO, COPY	SOP Class UID of original image.
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO, COPY	SOP Instance UID of original image.

Table 78: Frame of Reference Module

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

Table 79: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	FIXED	Constant, "Philips Medical Systems"
Institution Name	0008,0080	LO		ANAPCV	CONFIG	Configurable. Empty by default.
Institution Address	0008,0081	ST		ANAPCV	CONFIG	Configurable. Empty by default.
Station Name	0008,1010	SH	MicroDose	ANAPCV	CONFIG	Configurable, "MicroDose"
Institutional Department Name	0008,1040	LO		ANAPCV	CONFIG	Configurable. Empty by default.
Manufacturer's Model Name	0008,1090	LO	L50	ANAPCV	FIXED	Name of the model.
Device Serial Number	0018,1000	LO		ANAPCV	FIXED	Serial number.
Software Version(s)	0018,1020	LO	9.0	ANAPCV	FIXED	Software versions.
Pixel Padding Value	0028,0120	US/SS		ANAP	AUTO	Single pixel value or one limit (inclusive) of a range of pixel values used in an image to pad to rectangular format or to signal background that may be suppressed.

Table 80: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAPCV	AUTO	Date when this image was acquired.
Content Date	0008,0023	DA		ANAPCV	AUTO	Date when this image was acquired.
Acquisition Time	0008,0032	TM		ANAPCV	AUTO	Time when this image was acquired.
Content Time	0008,0033	TM		ANAPCV	AUTO	Time when this image was acquired.
Source Image Sequence	0008,2112	SQ		ANAPCV	AUTO	
>Spatial Locations Preserved	0028,135A	CS		ANAPCV	AUTO	Spatial location preserved.
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	SOP Class UID of original image.
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	SOP Instance UID of original image.
Patient Orientation	0020,0020	CS		ANAPCV	AUTO	Patient direction of the rows and columns of the image.
Image Comments	0020,4000	LT		ANAPCV	AUTO	Comments on an individual image.
Quality Control Image	0028,0300	CS	YES	ANAPCV	AUTO, COPY	"YES" Present only in phantom images.
Referenced Image Sequence	0008,1140	SQ		ANAPCV	AUTO	Only present if there is a reference to spectral FOR PROCESSING image. If 0008,0068 specifies FOR PRESENTATION, this sequence specifies reference to spectral FOR PROCESSING image.
>Purpose of Reference Code Sequence	0040,A170	SQ		VNAP	AUTO	Only present if there is a reference to spectral FOR PROCESSING image.
>>Code Value	0008,0100	SH	121340	ANAPCV	AUTO	121340
>>Coding Scheme Designator	0008,0102	SH	DCM	ANAPCV	AUTO	DCM
>>Code Meaning	0008,0104	LO	Spectral filtered image	ANAPCV	AUTO	Constant: "Spectral filtered image"
>Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	SOP Class UID of spectral FOR PROCESSING image.
>Referenced SOP Instance UID	0008,1155	UI		ANAP	AUTO	SOP Instance UID of spectral FOR PROCESSING image.

Table 81: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	Number of rows in the image.
Columns	0028,0011	US		ALWAYS	AUTO	Number of columns in the image.
Bits Allocated	0028,0100	US		ALWAYS	AUTO	Number of bits allocated for each pixel.
Bits Stored	0028,0101	US		ALWAYS	AUTO	Number of bits stored for each pixel.
High Bit	0028,0102	US		ALWAYS	AUTO	Most significant bit for pixel sample data.
Pixel Representation	0028,0103	US		ALWAYS	AUTO	Data representation of the pixel samples. Constant, "0" (= unsigned integer)
Smallest Image Pixel Value	0028,0106	US/SS		ANAPCV	AUTO	The minimum actual pixel value Encountered in this image.
Largest Image Pixel Value	0028,0107	US/SS		ANAPCV	AUTO	The maximum actual pixel value Encountered in this image.
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 82: Acquisition Context Module

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

Table 83: DX Anatomy Imaged Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Laterality	0020,0062	CS	L, R	ALWAYS		Laterality of body part, "R" or "L"
Anatomic Region Sequence	0008,2218	SQ		VNAP	AUTO	Anatomic region
>Code Value	0008,0100	SH	T-04000	ALWAYS	AUTO	Constant: "T-04000"
>Coding Scheme Designator	0008,0102	SH	SRT	ALWAYS	AUTO	Constant: "SRT"
>Code Meaning	0008,0104	LO	Breast	ALWAYS	AUTO	Constant: "Breast"

Table 84: DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY	ANAPCV	AUTO	"ORIGINAL\PRIMARY"
Patient Orientation	0020,0020	CS		ANAP	AUTO	Patient direction of the rows and columns of the image.
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	Constant, "1"
Photometric Interpretation	0028,0004	CS	MONOCHROME1	ALWAYS	FIXED	Constant, "MONOCHROME1"
Bits Allocated	0028,0100	US		ALWAYS	AUTO	Number of bits allocated for each pixel.
Bits Stored	0028,0101	US		ALWAYS	AUTO	Number of bits stored for each pixel.
High Bit	0028,0102	US		ALWAYS	AUTO	Most significant bit for pixel sample data.
Pixel Representation	0028,0103	US		ALWAYS	AUTO	Data representation of the pixel samples. Constant, "0" (= unsigned integer)
Burned In Annotation	0028,0301	CS		ANAPCV	AUTO	
Pixel Intensity Relationship	0028,1040	CS	LIN, LOG	ALWAYS	FIXED	"LIN" or "LOG" depending on image processing type.
Pixel Intensity Relationship Sign	0028,1041	SS	1	ALWAYS	FIXED	Constant, "1"
Window Center	0028,1050	DS		ANAP	AUTO, COPY	
Window Width	0028,1051	DS		ANAP	AUTO, COPY	
Rescale Intercept	0028,1052	DS	0	ALWAYS	FIXED	Constant, "0"
Rescale Slope	0028,1053	DS	1	ALWAYS	FIXED	Constant, "1"

Rescale Type	0028,1054	LO	US	ALWAYS	FIXED	Constant, "US"
Window Center & Width Explanation	0028,1055	LO		ANAPCV	AUTO	
Lossy Image Compression	0028,2110	CS	00	ANAPCV	FIXED	Constant, "00"
Presentation LUT Shape	2050,0020	CS	INVERSE	ANAPCV	FIXED	Constant, "INVERSE"

Table 85: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	CONFIG	Configurable, "0.05\0.05"
Detector Type	0018,7004	CS	DIRECT	VNAP	FIXED	Constant, "DIRECT"
Detector Configuration	0018,7005	CS	SLOT	ANAPCV	FIXED	Constant, "SLOT"
Detector ID	0018,700A	SH		ANAPCV	AUTO, COPY	Detector ID. Empty if no detector ID is present.
Date of Last Detector Calibration	0018,700C	DA		ANAPCV	AUTO	Date of last detector calibration.
Time of Last Detector Calibration	0018,700E	TM		ANAPCV	AUTO	Time of last detector calibration.
Detector Element Physical Size	0018,7020	DS	0.05\0.05	ANAPCV	FIXED	Constant, "0.05\0.05"
Detector Element Spacing	0018,7022	DS	0.05\0.05	ANAPCV	FIXED	Constant, "0.05\0.05"

Table 86: DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ANAPCV	CONFIG	Configurable, "660.0"
Distance Source to Patient	0018,1111	DS		ANAPCV	CONFIG	Configurable, "640.5"
Estimated Radiographic Magnification Factor	0018,1114	DS		ANAPCV	CONFIG	Configurable by configuring (0018,1111) and (0018,1110). Defined as "Distance Source To Detector" / "Distance Source To Patient"
Body Part Thickness	0018,11A0	DS		ANAPCV	AUTO	Thickness of compressed breast in mm.
Compression Force	0018,11A2	DS		ANAPCV	AUTO	Compression force in Newton.
Positioner Type	0018,1508	CS	MAMMOGRAPHIC	VNAP	FIXED	Constant, "MAMMOGRAPHIC"
Positioner Primary Angle	0018,1510	DS		ANAPCV	AUTO	Positioner primary angle.
View Position	0018,5101	CS		ANAPCV	AUTO, COPY	Radiographic view of the image relative to the imaging subject's orientation, e.g MLO.  Consistent with View Code Sequence (0054,0220)

Table 87: X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ANAPCV	AUTO	Peak kV value.
Exposure Time	0018,1150	IS		ANAPCV	AUTO	Exposure time in ms
X-ray Tube Current	0018,1151	IS		ANAPCV	AUTO	X-ray Tube Current in mA.
Exposure	0018,1152	IS		ANAPCV	AUTO	Exposure expressed in mAs.
Exposure in μAs	0018,1153	IS		ANAPCV	AUTO	Exposure expressed in μAs.
Anode Target Material	0018,1191	CS	TUNGSTEN	ANAPCV	FIXED	Constant, "TUNGSTEN"
Body Part Thickness	0018,11A0	DS		ANAPCV	AUTO	Thickness of compressed breast in mm.
Relative X-ray Exposure	0018,1405	IS		ANAPCV	AUTO	Glandular dose in mGy
Filter Material	0018,7050	CS	ALUMINUM	ANAPCV	FIXED	Constant, "ALUMINUM"
Organ Dose	0040,0316	DS		ANAPCV	AUTO	Glandular dose in dGy
Organ Exposed	0040,0318	CS	Breast	ANAPCV	FIXED	Constant: "BREAST"
Entrance Dose in mGy	0040,8302	DS		ANAPCV	AUTO	Entrance dose in mGy



Table 88: Mammography Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Laterality	0020,0062	CS	L, R	ALWAYS	AUTO	Laterality of body part, "R" or "L"
Breast Implant Present	0028,1300	CS	YES, NO	ANAPCV	AUTO	"YES" if implant is present, else "NO".
Partial View	0028,1350	CS	YES, NO	ANAPCV	AUTO	"NO" if partial view is not selected. "YES" if partial view is selected.
Partial View Description	0028,1351	ST		ANAPCV	AUTO, COPY	Present only if 0028,1350 is set to "YES". Free text description of the portion of the breast captured in a partial view image.
Partial View Code Sequence	0028,1352	SQ		ANAPCV	AUTO, COPY	Present only if 0028,1350 is set to "YES". Sequence that describes the portion or section of the breast captured in a partial view image. One or two items may be present.
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Code Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	
View Code Sequence	0054,0220	SQ		ANAPCV	AUTO, COPY	
>View Modifier Code Sequence	0054,0222	SQ		ANAPCV	AUTO	
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	
Anatomic Region Sequence	0008,2218	SQ		ALWAYS	AUTO	Anatomic region
>Code Value	0008,0100	SH	T-04000	ALWAYS	AUTO	Constant: "T-04000"
>Coding Scheme Designator	0008,0102	SH	SRT	ALWAYS	AUTO	Constant: "SRT"
>Code Meaning	0008,0104	LO	Breast	ALWAYS	AUTO	Constant: "Breast"

Table 89: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS		ANAPCV	AUTO, COPY	If present, "RECTANGULAR"
Shutter Left Vertical Edge	0018,1602	IS		ANAP	AUTO, COPY	Left vertical edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".
Shutter Right Vertical Edge	0018,1604	IS		ANAP	AUTO, COPY	Right vertical edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".
Shutter Upper Horizontal Edge	0018,1606	IS		ANAP	AUTO, COPY	Upper horizontal edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".

Table 90: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
VOI LUT Function	0028,1056	CS	SIGMOID, LINEAR	ANAPCV	AUTO	"", "LINEAR", "SIGMOID" or might not be present. Assume linear VOI LUT function if this tag is not present or if the value is empty.

Table 91: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	CONFIG	Configurable, Default: "ISO_IR 100"
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	1.2.840.10008.5.1.4.1.1.1.2

SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	SOP Instance UID.
Instance Number	0020,0013	IS		VNAP	AUTO	

### 8.1.1.3. Digital Mammography X-Ray Image Storage - Proc. SOP

**Table 92: IOD of Created Digital Mammography X-Ray Image Storage - Proc. 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	Mammography Series Module	ALWAYS
Series	DX Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	CONDITIONAL
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	Acquisition Context Module	ALWAYS
Image	DX Anatomy Imaged Module	ALWAYS
Image	DX Image Module	ALWAYS
Image	DX Detector Module	ALWAYS
Image	DX Positioning Module	CONDITIONAL
Image	X-Ray Acquisition Dose Module	CONDITIONAL
Image	Mammography Image Module	ALWAYS
Image	Display Shutter Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes (Refer 8.5.1 section for details)	CONDITIONAL

**Table 93: Patient Module**

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL	Received from MWL.
Patient ID	0010,0020	LO		VNAP	MWL	Received from MWL.
Patient's Birth Date	0010,0030	DA		VNAP	MWL	Received from MWL.
Patient's Sex	0010,0040	CS		VNAP	MWL	Received from MWL.
Other Patient IDs	0010,1000	LO		ANAPCV	MWL	Received from MWL.
Medical Alerts	0010,2000	LO		ANAPCV	MWL	Received from MWL.
Patient Comments	0010,4000	LT		ANAPCV	MWL, USER	Information/comments about the patient.

**Table 94: General Study Module**

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	Date when study was started.
Study Time	0008,0030	TM		VNAP	AUTO	Time of day when the study was done.
Accession Number	0008,0050	SH		VNAP	MWL	Study accession number. Received from MWL.
Referring Physician's Name	0008,0090	PN		VNAP	COPY, MWL	Received from MWL.
Study Description	0008,1030	LO		ANAPCV	AUTO	Examination code.
Procedure Code Sequence	0008,1032	SQ		ANAPCV	MWL	Copy from MWL Requested Procedure Code Sequence (0032, 1064). Absent if not present from MWL



>Code Value	0008,0100	SH		ALWAYS	MWL	From MWL.
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	From MWL.
>Code Meaning	0008,0104	LO		ALWAYS	MWL	From MWL.
Referenced Study Sequence	0008,1110	SQ		ANAPCV	COPY, MWL	Referenced Study Sequence. From MWL. Empty if not preset
>Referenced SOP Class UID	0008,1150	UI		ANAP	MWL	From MWL.
>Referenced SOP Instance UID	0008,1155	UI		ANAP	MWL	From MWL.
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Instance UID of study to which image belong.
Study ID	0020,0010	SH		VNAP	MWL	From a configurable tag from MWL. Default from (0040,1001)

Table 95: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAPCV	MWL	Received from MWL.

Table 96: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Description	0008,103E	LO		ANAPCV	AUTO	Special label for the image. If the image shall be labeled, one of the configurable labels is selected. If no label is selected, this tag is empty.
Operators' Name	0008,1070	PN		ANAPCV	USER	Name of the operator.
Body Part Examined	0018,0015	CS	Breast	ANAPCV	AUTO	"Breast"
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Series UID.
Series Number	0020,0011	IS		VNAP	AUTO	
Request Attributes Sequence	0040,0275	SQ		ANAPCV	MWL	Worklist information received from Modality Worklist.
>Requested Procedure Description	0032,1060	LO		ANAPCV	MWL	From MWL. Requested Procedure Description.
>Scheduled Procedure Step Description	0040,0007	LO		ANAPCV	MWL	From MWL. Examination code.
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL	From MWL.
>>Code Value	0008,0100	SH		ALWAYS	MWL	From MWL.
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	From MWL.
>>Code Meaning	0008,0104	LO		ALWAYS	MWL	From MWL.
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	From MWL. Examination ID.
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	From MWL. Procedure ID.
Performed Procedure Step ID	0040,0253	SH		ANAPCV	COPY	Same as Scheduled Procedure Step ID. Not present if Scheduled Procedure Step ID is not present.
Performed Procedure Step Description	0040,0254	LO		ANAPCV	AUTO, COPY	Same as Scheduled Step Description. Not present if Scheduled Step Description is not present.

Table 97: Mammography Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	MG	ALWAYS	FIXED	Constant, "MG"
Request Attributes Sequence	0040,0275	SQ		ANAPCV	MWL	Worklist information received from Modality Worklist.
>Requested Procedure Description	0032,1060	LO		ANAPCV	MWL	Requested Procedure Description ID received from Modality Worklist.
>Scheduled Procedure Step Description	0040,0007	LO		ANAPCV	MWL	From MWL. Examination code.
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	From MWL. Examination ID.
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	From MWL. Procedure ID.

Table 98: DX Series Module

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

Table 99: Frame of Reference Module

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

Table 100: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	FIXED	Constant, "Philips Medical Systems"
Institution Name	0008,0080	LO		ANAPCV	CONFIG	Configurable. Empty by default.
Institution Address	0008,0081	ST		ANAPCV	CONFIG	Configurable. Empty by default.
Station Name	0008,1010	SH	MicroDose	ANAPCV	CONFIG	Configurable, "MicroDose"
Institutional Department Name	0008,1040	LO		ANAPCV	CONFIG	Configurable. Empty by default.
Manufacturer's Model Name	0008,1090	LO	L50	ANAPCV	FIXED	Name of the model.
Device Serial Number	0018,1000	LO		ANAPCV	FIXED	Serial number.
Software Version(s)	0018,1020	LO	9.0	ANAPCV	FIXED	Software versions.

Table 101: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAPCV	AUTO	Date when this image was acquired.
Content Date	0008,0023	DA		ANAPCV	AUTO	Date when this image was acquired.
Acquisition Time	0008,0032	TM		ANAPCV	AUTO	Time when this image was acquired.
Content Time	0008,0033	TM		ANAPCV	AUTO	Time when this image was acquired.
Patient Orientation	0020,0020	CS		ANAPCV	AUTO	Patient direction of the rows and columns of the image.
Image Comments	0020,4000	LT		ANAPCV	AUTO	Comments on an individual image.
Quality Control Image	0028,0300	CS	YES	ANAPCV	AUTO, COPY	"YES" Present only in phantom images.

Table 102: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	Number of rows in the image.
Columns	0028,0011	US		ALWAYS	AUTO	Number of columns in the image.
Bits Allocated	0028,0100	US		ALWAYS	AUTO	Number of bits allocated for each pixel.
Bits Stored	0028,0101	US		ALWAYS	AUTO	Number of bits stored for each pixel.
High Bit	0028,0102	US		ALWAYS	AUTO	Most significant bit for pixel sample data.
Pixel Representation	0028,0103	US		ALWAYS	AUTO	Data representation of the pixel samples. Constant, "0" (= unsigned integer)

Smallest Image Pixel Value	0028,0106	US /SS		ANAPCV	AUTO	The minimum actual pixel value Encountered in this image.
Largest Image Pixel Value	0028,0107	US /SS		ANAPCV	AUTO	The maximum actual pixel value Encountered in this image.
Pixel Data	7FE0,0010	O W/ OB		ANAP	AUTO	

Table 103: Acquisition Context Module

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

Table 104: DX Anatomy Imaged Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Laterality	0020,0062	CS		ALWAYS		Laterality of body part, "R" or "L"
Anatomic Region Sequence	0008,2218	SQ		VNAP	AUTO	Anatomic region
>Code Value	0008,0100	SH	T-04000	ALWAYS	AUTO	Constant: "T-04000 "
>Coding Scheme Designator	0008,0102	SH	SRT	ALWAYS	AUTO	Constant: "SRT"
>Code Meaning	0008,0104	LO	Breast	ALWAYS	AUTO	Constant: "Breast"

Table 105: DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY	ANAPCV	AUTO	"ORIGINAL\PRIMARY"
Patient Orientation	0020,0020	CS		ANAP	AUTO	Patient direction of the rows and columns of the image.
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	Constant, "1"
Photometric Interpretation	0028,0004	CS	MONOCHROME1	ALWAYS	FIXED	Constant, "MONOCHROME1"
Bits Allocated	0028,0100	US		ALWAYS	AUTO	Number of bits allocated for each pixel.
Bits Stored	0028,0101	US		ALWAYS	AUTO	Number of bits stored for each pixel.
High Bit	0028,0102	US		ALWAYS	AUTO	Most significant bit for pixel sample data.
Pixel Representation	0028,0103	US		ALWAYS	AUTO	Data representation of the pixel samples. Constant, "0" ( = unsigned integer)
Burned In Annotation	0028,0301	CS		ANAPCV	AUTO	
Pixel Intensity Relationship	0028,1040	CS	LIN, LOG	ALWAYS	FIXED	"LIN" or "LOG" depending on image processing type.
Pixel Intensity Relationship Sign	0028,1041	SS	1	ALWAYS	FIXED	Constant, "1"
Rescale Intercept	0028,1052	DS	0	ALWAYS	FIXED	Constant, "0"
Rescale Slope	0028,1053	DS	1	ALWAYS	FIXED	Constant, "1"
Rescale Type	0028,1054	LO	US	ALWAYS	FIXED	Constant, "US"
Lossy Image Compression	0028,2110	CS	00	ANAPCV	FIXED	Constant, "00"
Presentation LUT Shape	2050,0020	CS	INVERSE	ANAPCV	FIXED	Constant, "INVERSE"

Table 106: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	CONFIG	Configurable, "0.05\0.05"
Detector Type	0018,7004	CS	DIRECT	VNAP	FIXED	Constant, "DIRECT"
Detector Configuration	0018,7005	CS	SLOT	ANAPCV	FIXED	Constant, "SLOT"
Detector ID	0018,700A	SH		ANAPCV	AUTO, COPY	Detector ID. Empty if no detector ID is present.
Date of Last Detector Calibration	0018,700C	DA		ANAPCV	AUTO	Date of last detector calibration.
Time of Last Detector Calibration	0018,700E	TM		ANAPCV	AUTO	Time of last detector calibration.

Detector Element Physical Size	0018,7020	DS	0.05\0.05	ANAPCV	FIXED	Constant, "0.05\0.05"
Detector Element Spacing	0018,7022	DS	0.05\0.05	ANAPCV	FIXED	Constant, "0.05\0.05"

Table 107: DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ANAPCV	CONFIG	Configurable, "660.0"
Distance Source to Patient	0018,1111	DS		ANAPCV	CONFIG	Configurable, "640.5"
Estimated Radiographic Magnification Factor	0018,1114	DS		ANAPCV	CONFIG	Configurable by configuring (0018,1111) and (0018,1110). Defined as "Distance Source To Detector" / "Distance Source To Patient"
Body Part Thickness	0018,11A0	DS		ANAPCV	AUTO	Thickness of compressed breast in mm.
Compression Force	0018,11A2	DS		ANAPCV	AUTO	Compression force in Newton.
Positioner Type	0018,1508	CS	MAMMOGRAPHIC	VNAP	FIXED	Constant, "MAMMOGRAPHIC"
Positioner Primary Angle	0018,1510	DS	0	ANAPCV	AUTO	Positioner primary angle.
View Position	0018,5101	CS		ANAPCV	AUTO, COPY	Radiographic view of the image relative to the imaging subject's orientation, e.g MLO.  Consistent with View Code Sequence (0054,0220)

Table 108: X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ANAPCV	AUTO	Peak kV value.
Exposure Time	0018,1150	IS		ANAPCV	AUTO	Exposure time in ms
X-ray Tube Current	0018,1151	IS		ANAPCV	AUTO	X-ray Tube Current in mA.
Exposure	0018,1152	IS		ANAPCV	AUTO	Exposure expressed in mAs.
Exposure in μAs	0018,1153	IS		ANAPCV	AUTO	Exposure expressed in μAs.
Anode Target Material	0018,1191	CS	TUNGSTEN	ANAPCV	FIXED	Constant, "TUNGSTEN"
Body Part Thickness	0018,11A0	DS		ANAPCV	AUTO	Thickness of compressed breast in mm.
Relative X-ray Exposure	0018,1405	IS		ANAPCV	AUTO	Glandular dose in mGy
Filter Material	0018,7050	CS	ALUMINUM	ANAPCV	FIXED	Constant, "ALUMINUM"
Organ Dose	0040,0316	DS		ANAPCV	AUTO	Glandular dose in dGy
Organ Exposed	0040,0318	CS	Breast	ANAPCV	FIXED	Constant: "BREAST"
Entrance Dose in mGy	0040,8302	DS		ANAPCV	AUTO	Entrance dose in mGy

Table 109: Mammography Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Laterality	0020,0062	CS	L, R	ALWAYS	AUTO	Laterality of body part, "R" or "L"
Breast Implant Present	0028,1300	CS	YES, NO	ANAPCV	AUTO	"YES" if implant is present, else "NO".
Partial View	0028,1350	CS	YES, NO	ANAPCV	AUTO	"NO" if partial view is not selected. "YES" if partial view is selected.
Partial View Description	0028,1351	ST		ANAPCV	AUTO, COPY	Present only if 0028,1350 is set to "YES". Free text description of the portion of the breast captured in a partial view image.
Partial View Code Sequence	0028,1352	SQ		ANAPCV	AUTO, COPY	Present only if 0028,1350 is set to "YES". Sequence that describes the portion or section of the breast captured in a partial view image. One or two items may be present.
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Code Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	

View Code Sequence	0054,0220	SQ		ANAPCV	AUTO, COPY	
>View Modifier Code Sequence	0054,0222	SQ		ANAPCV	AUTO	
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	
Anatomic Region Sequence	0008,2218	SQ		ALWAYS	AUTO	Anatomic region
>Code Value	0008,0100	SH	T-04000	ALWAYS	AUTO	Constant: "T-04000"
>Coding Scheme Designator	0008,0102	SH	SRT	ALWAYS	AUTO	Constant: "SRT"
>Code Meaning	0008,0104	LO	Breast	ALWAYS	AUTO	Constant: "Breast"

Table 110: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS		ANAPCV	AUTO, COPY	If present, "RECTANGULAR"
Shutter Left Vertical Edge	0018,1602	IS		ANAP	AUTO, COPY	Left vertical edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".
Shutter Right Vertical Edge	0018,1604	IS		ANAP	AUTO, COPY	Right vertical edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".
Shutter Upper Horizontal Edge	0018,1606	IS		ANAP	AUTO, COPY	Upper horizontal edge of display shutter. Present only if 0018,1600 is set to "RECTANGULAR".

Table 111: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ANAP	CONFIG	Configurable, Default: "ISO_IR 100"
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.1.2.1	ALWAYS	AUTO	1.2.840.10008.5.1.4.1.1.1.2.1
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	SOP Instance UID.
Instance Number	0020,0013	IS		VNAP	AUTO	

#### 8.1.1.4. Grayscale Softcopy Presentation State Storage SOP Class

Table 112: IOD of Created Grayscale Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Series	Presentation Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
Presentation State	Presentation State Relationship Module	ALWAYS
Presentation State	Displayed Area Module	ALWAYS
Presentation State	Graphic Annotation Module	CONDITIONAL
Presentation State	Graphic Layer Module	CONDITIONAL
Presentation State	Modality LUT Module	CONDITIONAL
Presentation State	Softcopy VOI LUT Module	CONDITIONAL
Presentation State	Softcopy Presentation LUT Module	ALWAYS
Presentation State	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes	CONDITIONAL

Table 113: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL	Received from MWL.
Patient ID	0010,0020	LO		VNAP	MWL	Received from MWL.
Patient's Birth Date	0010,0030	DA		VNAP	MWL	Received from MWL.
Patient's Sex	0010,0040	CS		VNAP	MWL	Received from MWL.
Other Patient IDs	0010,1000	LO		ANAPCV	MWL	Received from MWL.
Medical Alerts	0010,2000	LO		ANAPCV	MWL	Received from MWL.

Table 114: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	Date when study was started.
Study Time	0008,0030	TM		VNAP	AUTO	Time of day when the study was done.
Accession Number	0008,0050	SH		VNAP	MWL	Study accession number. Received from MWL.
Referring Physician's Name	0008,0090	PN		VNAP	COPY, MWL	Empty
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Instance UID of study to which image belong.
Study ID	0020,0010	SH		VNAP	MWL	From a configurable tag from MWL. Default from (0040,1001)

Table 115: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Series UID.
Series Number	0020,0011	IS		VNAP	AUTO	
Request Attributes Sequence	0040,0275	SQ		ANAPCV	MWL	Worklist information received from Modality Worklist.
>Scheduled Procedure Step Description	0040,0007	LO		ANAPCV	MWL	Requested Procedure Description ID received from Modality Worklist.
>Scheduled Procedure Step ID	0040,0009	SH		ANAPCV	MWL	From MWL. Examination code.
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	From MWL. Examination ID.
				ANAP	MWL	From MWL. Procedure ID.

Table 116: Presentation Series Module

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

Table 117: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	FIXED	Constant, "Philips Medical Systems"

Table 118: Presentation State Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation Creation Date	0070,0082	DA		ALWAYS		
Presentation Creation Time	0070,0083	TM		ALWAYS		
Content Label	0070,0080	CS		ALWAYS		
Content Description	0070,0081	LO		VNAP		
Content Creator's Name	0070,0084	PN		VNAP		

Table 119: Presentation State Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		ALWAYS		
>Referenced Image Sequence	0008,1140	SQ				
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
>Series Instance UID	0020,000E	UI				

Table 120: Displayed Area Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS		
>Referenced Image Sequence	0008,1140	SQ		ANAP		
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
>Displayed Area Top Left Hand Corner	0070,0052	SL		ALWAYS		
>Displayed Area Bottom Right Hand Corner	0070,0053	SL		ALWAYS		
>Presentation Size Mode	0070,0100	CS		ALWAYS		
>Presentation Pixel Aspect Ratio	0070,0102	IS		ANAP		

Table 121: Graphic Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Annotation Sequence	0070,0001	SQ		ALWAYS		
>Referenced Image Sequence	0008,1140	SQ		ANAP		
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
>Graphic Layer	0070,0002	CS		ALWAYS		
>Text Object Sequence	0070,0008	SQ		ANAP		
>>Anchor Point Annotation Units	0070,0004	CS		ANAP		
>>Unformatted Text Value	0070,0006	ST		ALWAYS		
>>Anchor Point	0070,0014	FL		ANAP		
>>Anchor Point Visibility	0070,0015	CS		ANAP		
>Graphic Object Sequence	0070,0009	SQ		ANAP		
>>Graphic Annotation Units	0070,0005	CS		ALWAYS		
>>Graphic Dimensions	0070,0020	US		ALWAYS		
>>Number of Graphic Points	0070,0021	US		ALWAYS		
>>Graphic Data	0070,0022	FL		ALWAYS		
>>Graphic Type	0070,0023	CS		ALWAYS		
>>Graphic Filled	0070,0024	CS		ANAP		

Table 122: Graphic Layer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Layer Sequence	0070,0060	SQ		ALWAYS		
>Graphic Layer	0070,0002	CS		ALWAYS		
>Graphic Layer Order	0070,0062	IS		ALWAYS		



Table 123: Modality LUT Module

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

Table 124: Softcopy VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Softcopy VOI LUT Sequence	0028,3110	SQ		ALWAYS		
>Referenced Image Sequence	0008,1140	SQ		ANAP		
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
>Window Center	0028,1050	DS		ANAP		
>Window Width	0028,1051	DS		ANAP		
>VOI LUT Function	0028,1056	CS		ANAPCV		

Table 125: Softcopy Presentation LUT Module

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

Table 126: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP		
SOP Class UID	0008,0016	UI		ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Instance Number	0020,0013	IS		ANAPCV		

#### 8.1.1.5. Mammography CAD SR Storage SOP Class

Table 127: IOD of Created Mammography CAD SR SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	SR Document Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Document	SR Document General Module	ALWAYS
Document	SOP Common Module	ALWAYS
	(Refer section 8.5.1 for details)	

Table 128: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	MWL	From MWL.
Patient ID	0010,0020	LO		VNAP	MWL	From MWL.
Patient's Birth Date	0010,0030	DA		VNAP	MWL	From MWL.
Patient's Sex	0010,0040	CS		VNAP	MWL	From MWL.



Table 129: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	COPY	Copied from source image header
Study Time	0008,0030	TM		VNAP	COPY	Copied from source image header
Accession Number	0008,0050	SH		VNAP	MWL	From MWL.
Referring Physician's Name	0008,0090	PN		VNAP	MWL	From MWL.
Study Description	0008,1030	LO		ANAPCV	COPY	Copied form images
Study Instance UID	0020,000D	UI		ALWAYS	COPY	Copied from source image header
Study ID	0020,0010	SH		VNAP	COPY	Copied form images

Table 130: SR Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	SR	ALWAYS	AUTO	Constant: SR
Series Description	0008,103E	LO		ANAPCV	FIXED	Constant "AWS Mammography CAD"
Referenced Performed Procedure Step Sequence	0008,1111	SQ		VNAP	AUTO	Empty
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	

Table 131: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	FIXED	Constant: "Philips Medical Systems"
Institution Name	0008,0080	LO		ANAPCV	CONFIG	
Institution Address	0008,0081	ST		ANAPCV	CONFIG	
Station Name	0008,1010	SH	MICRODOSE	ANAPCV	CONFIG	
Manufacturer's Model Name	0008,1090	LO	L50	ANAPCV	AUTO	
Device Serial Number	0018,1000	LO		ANAPCV	AUTO	
Software Version(s)	0018,1020	LO	9.0	ANAPCV	COPY	Copied from source image header

Table 132: SR Document General Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	Date of document generation
Content Time	0008,0033	TM		ALWAYS	AUTO	Time of document generation

Table 133: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	AUTO	Constant "ISO_IR 100"
Instance Creation Date	0008,0012	DA		ANAPCV	AUTO	Date of instance creation
Instance Creation Time	0008,0013	TM		ANAPCV	AUTO	Time of instance creation
Instance Creator UID	0008,0014	UI		ANAPCV	AUTO	1.3.46.670589.51.3.3.25.7
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	1.2.840.10008.5.1.4.1.1.88.50
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	

### 8.1.2. Usage of Attributes from Received IOD

The following table lists the functionality supported by this application.

### 8.1.3. Attribute Mapping

Table 134: Attribute mapping during Modality Workflow

Name	WLM tag	MPPS Create tag	MPPSSet tag	Image IOD tag
Accession Number	0008,0050	0008,0050	-	0008,0050
>Modality	0040,0100 >0008,0060	0008,0060	-	0008,0060
>Referenced SOP Class UID	0008,1110 >0008,1150	0008,1110	0008,1150	0008,1110 >0008,1150
>Referenced SOP Instance UID	0008,1110 >0008,1155	-	0008,1155	0008,1110 >0008,1155
Patient's Name	0010,0010	0010,0010	-	0010,0010
Patient ID	0010,0020	0010,0020	-	0010,0020
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
Patient's Age	0010,1010	-	-	0010,1010
Medical Alerts	0010,2000	-	-	0010,2000
Requested Procedure Description	0032,1060	0032,1060	-	>0032,1060
>Scheduled Procedure Step Description	0040,0100 >0040,0007	0040,0007	-	>0040,0007
>Scheduled Protocol Code Sequence	0040,0100 >0040,0008	0040,0008	-	>0040,0008
>Scheduled Procedure Step ID	0040,0100 >0040,0009	0040,0009	-	>0040,0009
Requested Procedure ID	0040,1001	0040,1001	-	>0040,1001
Referring Physician's Name	0008,0090	-	-	0008,0090
Study Instance UID	0020,000D	0020,000D	-	0020,000D

#### 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

MicroDose L50 can optionally create and store, upon completion of the study, a Mammography CAD SR object.

#### MAMMOGRAPHY CAD SR IOD TEMPLATES

The templates that comprise the Mammography CAD SR are interconnected as indicated in the figure below:

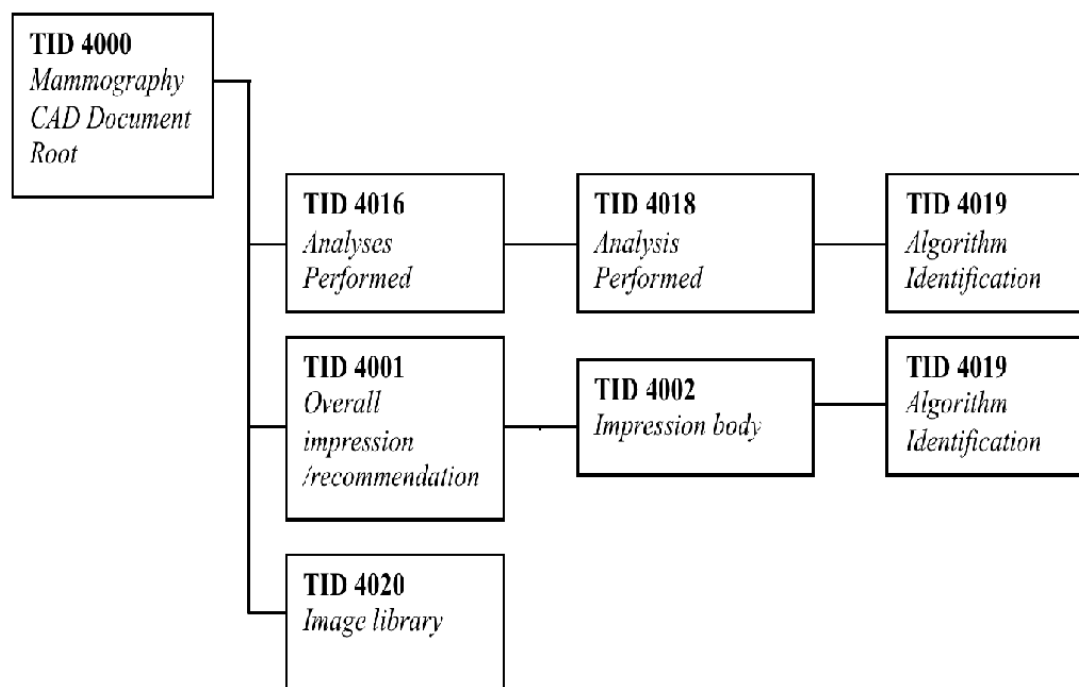


Figure 9: Mammography CAD SR IOD Template Structure

This section describes the content of all the templates used in the Mammography CAD Structure Reporting.

Table 135: Used Templates for Mammography CAD Structure Reporting

Template Name	Template ID
MAMMOGRAPHY CAD DOCUMENT ROOT	TID 4000
LANGUAGE OF CONTENT ITEM AND DESCENDANTS	TID 1204
CAD ANALYSES PERFORMED	TID 4016
CAD ANALYSIS PERFORMED	TID 4018
CAD ALGORITHM IDENTIFICATION	TID 4019
MAMMOGRAPHY CAD OVERALL IMPRESSION/RECOMMENDATION	TID 4001
MAMMOGRAPHY CAD IMPRESSION/RECOMMENDATION BODY	TID 4002
CAD IMAGE LIBRARY ENTRY	TID 4020

### 8.3.2.1. TID 4000 MAMMOGRAPHY CAD DOCUMENT ROOT

Table 136: MAMMOGRAPHY CAD DOCUMENT ROOT

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV(111036, DCM, "Mammography CAD Report")	1	M		
2	>	HAS CONCEPT MOD	INCLUDE	DTID (1204) Language of Content Item and Descendants	1	M		
3	>	CONTAINS	CONTAINER	EV(111028, DCM, "Image Library")	1	M		
4	>>	CONTAINS	INCLUDE	DTID (4020) CAD Image Library Entry	1-n	M		\$ImageLaterality = DCID (6022) Side, \$ImageView = DCID (4014)

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
								View for Mammography, \$ImageViewMod = DCID (4015) View Modifier for Mammography
5	>	CONTAINS	INCLUDE	DTID (4001) Mammography CAD Overall Impression / Recommendation"	1	M		
6	>	CONTAINS	CODE	EV(111064, DCM, "Summary of Detections")	1	M		DCID (6042) Status of Results = 111225, DCM, "Not Attempted"
7								
8	>	CONTAINS	CODE	EV(111065, DCM, "Summary of Analyses")	1	M		DCID (6042) "Status of Results" = 111222, DCM, "Succeeded"
9	>>	INFERRED FROM	INCLUDE	DTID (4016) CAD Analyses Performed	1	MC	Shall be present unless the value of (111065, DCM, "Summary of Analyses") is (111225, DCM, "Not Attempted")	\$AnalysisCode = DCID (6043) Types of Mammography CAD Analysis

### 8.3.2.2. TID 1204 LANGUAGE OF CONTENT ITEM AND DESCENDANTS

Table 137: LANGUAGE OF CONTENT ITEM AND DESCENDANTS

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		HAS CONCEPT MOD	CODE	(121049,DCM,"Language of Content Item and Descendants")	1	M		DCID(5000) = (en, RFC3066, „English")
2	>	HAS CONCEPT MOD	CODE	(121046,DCM,"Country of Language")	1	U		DCID(5001) = (US, ISO3166_1, „UNITED STATES")

### 8.3.2.3. TID 4016 CAD ANALYSES PERFORMED

Table 138: CAD ANALYSES PERFORMED

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV(111062, DCM, "Successful Analyses")	1	MC	Shall be present only if value of parent is (111222, DCM, "Succeeded") or (111223, DCM, "Partially Succeeded")	
2	>	CONTAINS	INCLUDE	DTID (4018) CAD Analysis Performed	1-n	M		\$AnalysisCode=\$AnalysisCode
3			CONTAINER	EV(111024, DCM, "Failed Analyses")	1	MC	Shall be present only if value of parent is (111224, DCM, "Failed") or (111223, DCM, "Partially Succeeded")	
4	>	CONTAINS	INCLUDE	DTID (4018) CAD Analysis Performed	1-n	M		\$AnalysisCode=\$AnalysisCode

**8.3.2.4. TID 4018 CAD ANALYSIS PERFORMED****Table 139: CAD ANALYSIS PERFORMED**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CODE	EV(111004, DCM, "Analysis Performed")	1	M		\$AnalysisCode
2	>	HAS PROPERTIES	INCLUDE	DTID (4019) CAD Algorithm Identification	1	M		
3	>	HAS PROPERTIES	IMAGE		1-n	MC	At least one of row 3, 4, 5 or 6 shall be present	
4	>	R-HAS PROPERTIES	IMAGE		1-n	MC	At least one of row 3, 4, 5 or 6 shall be present	Shall reference IMAGE content item(s) in the (111028, DCM, "Image Library")
5	>	HAS PROPERTIES	UIDREF	EV(112002,DCM,"Series Instance UID")	1-n	MC	At least one of row 3, 4, 5 or 6 shall be present	
6	>	HAS PROPERTIES	SCCOORD	EV(111030, DCM, "Image Region")	1-n	MC	At least one of row 3, 4, 5 or 6 shall be present	
7	>>	SELECTED FROM	IMAGE		1	MC	XOR Row 8	
8	>>	R-SELECTED FROM	IMAGE		1	MC	XOR Row 7	Shall reference an IMAGE content item in the (111028, DCM, "Image Library")
9	>		INCLUDE	DTID (4023) CAD Operating Points	1	U		

**8.3.2.5. TID 4019 CAD ALGORITHM IDENTIFICATION****Table 140: CAD ALGORITHM IDENTIFICATION**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			TEXT	EV(111001, DCM, "Algorithm Name")	1	M		IPK
2			TEXT	EV (111003, DCM, "Algorithm Version")	1	M		IPK version
3			TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		

**8.3.2.6. TID 4001 MAMMOGRAPHY CAD OVERALL IMPRESSION/RECOMMENDATION****Table 141: MAMMOGRAPHY CAD OVERALL IMPRESSION/RECOMMENDATION**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CODE	EV (111017, DCM, "CAD Processing and Findings Summary")	1	M		DCID (6047) CAD Processing and Findings Summary = (111242, DCM, "All algorithms succeeded; with findings")
2	>	HAS PROPERTIES	INCLUDE	DTID (4002) Mammography CAD Impression/Recommendation Body	1	U		
3	>	INFERRED	INCLUDE	DTID (4003)	1-n	MC	Shall be present if 1 or more	

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
	FROM		Mammography CAD Individual Impression/Recommendation			(111059, DCM, "Single Image Finding") or (111015, DCM, "Composite Feature") content items are reported.	

### 8.3.2.7. TID 4002 MAMMOGRAPHY CAD IMPRESSION/RECOMMENDATION BODY

Table 142: MAMMOGRAPHY CAD IMPRESSION/RECOMMENDATION BODY

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		CODE	EV (111005, DCM, "Assessment Category")	1-n	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present.	DCID (6026) Mammography Assessment
2	> HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	U		DCID (6022) Side
3		CODE	EV (111023, DCM, "Differential Diagnosis/Impression")	1-n	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present.	DCID (6002) Change Since Last Mammogram or Prior Surgery
4	> HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	U		DCID (6022) Side
5		TEXT	EV (111033, DCM, "Impression Description")	1	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present.	=Volumetric assessment impression
6		CODE	EV (111053, DCM, "Recommended Follow-up")	1-n	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present.	DCID (6028) Mammography Recommended Follow-up
7	> HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	U		DCID (6022) Side
8		NUM	EV (111055, DCM, "Recommended Follow-up Interval")	1	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present. May be present only if (111054, DCM, "Recommended Follow-up Date") is not present.	UNITS = DCID (6046) Units of Follow-up Interval; Values = Integer $\geq 0$ , where 0 = immediate follow-up
9		DATE	EV (111054, DCM, "Recommended Follow-up Date")	1	MC	At least one of rows 1, 3, 5, 6, 8, 9 shall be present. May be present only if (111055, DCM, "Recommended Follow-up Interval") is not present.	Shall be later than date of exam
10		NUM	EV (111013, DCM, "Certainty of impression")	1	UC	May be present only if (111005, DCM, "Assessment Category"), (111023, DCM, "Differential Diagnosis/Impression") or (111033, DCM, "Impression Description") is present.	UNITS = EV (%), UCUM, "Percent" Values = 0 – 100
11		INCLUDE	DTID (4019) CAD Algorithm Identification	1-n	M		
12		NUM	DCID (6142) Calculated Value	1-n	U		= (112191, DCM, "Breast Tissue Density"), (112193, DCM, "Volume of breast") or (112192, DCM, "Volume of

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
								parenchymal tissue"),
13	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	U		DCID (6022) Side
14	>	HAS CONCEPT MOD	CODE	EV (121401, DCM, "Derivation")	1	M		DCID (6140) Calculation Methods
15	>	INFERRED FROM	TEXT	EV (112034, DCM, "Calculation Description")	1	U		

### 8.3.2.8. TID 4020 CAD IMAGE LIBRARY ENTRY

Table 143: CAD IMAGE LIBRARY ENTRY

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			IMAGE		1	M		
2	>	HAS ACQ CONTEXT	CODE	EV(111027, DCM, "Image Laterality")	1	MC	Shall be present if (0020,0062) is in the Image Instance	\$ImageLaterality
3	>	HAS ACQ CONTEXT	CODE	EV (111031, DCM, "Image View")	1	MC	Shall be present if (0054,0220) is in the Image Instance	\$ImageView
4	>>	HAS CONCEPT MOD	CODE	EV (111032, DCM, "Image View Modifier")	1-n	MC	Shall be present if (0054,0222) is in the Image Instance	\$ImageViewMod
5	>	HAS ACQ CONTEXT	TEXT	EV (111044, DCM, "Patient Orientation Row")	1	MC	Shall be present if (0020,0020) is in the Image Instance	
6	>	HAS ACQ CONTEXT	TEXT	EV (111043, DCM, "Patient Orientation Column")	1	MC	Shall be present if (0020,0020) is in the Image Instance	
7	>	HAS ACQ CONTEXT	DATE	EV (111060, DCM, "Study Date")	1	MC	Shall be present if (0008,0020) is in the Image Instance	
8	>	HAS ACQ CONTEXT	TIME	EV (111061, DCM, "Study Time")	1	MC	Shall be present if (0008,0030) is in the Image Instance	
9	>	HAS ACQ CONTEXT	DATE	EV (111018, DCM, "Content Date")	1	MC	Shall be present if (0008,0023) is in the Image Instance	
10	>	HAS ACQ CONTEXT	TIME	EV (111019, DCM, "Content Time")	1	MC	Shall be present if (0008,0033) is in the Image Instance	
11	>	HAS ACQ CONTEXT	NUM	EV (111026, DCM, "Horizontal Pixel Spacing")	1	MC	Shall be present if (0018,1164) or (0028,0030) is in the Image Instance	UNITS = EV (um, UCUM, "micrometer")
12	>	HAS ACQ CONTEXT	NUM	EV (111066, DCM, "Vertical Pixel Spacing")	1	MC	Shall be present if (0018,1164) or (0028,0030) is in the Image Instance	UNITS = EV (um, UCUM, "micrometer")
13	>	HAS ACQ CONTEXT	NUM	EV (112011, DCM, "Positioner Primary Angle")	1	UC	May be present if (0018,1510) is in the Image Instance	
14	>	HAS ACQ CONTEXT	NUM	EV (112012, DCM, "Positioner Secondary Angle")	1	UC	May be present if (0018,1511) is in the Image Instance	

### 8.3.3. Private code definitions

Not applicable.

## 8.4. Grayscale Image consistency

If annotations have been made in the images on the AWS, this information will be exported as DICOM Standard Grayscale Presentation State if the Storage SCP supports this. The presentation states modules contain the following information generated from the AWS settings and annotations.

Table 144: AWS settings and annotations

Module	AWS correspondence	Note
Presentation State	-	Label: MICRODOSE, Description: MICRODOSE Default setting
Mask	-	Not used
Display Shutter	-	Not used
Bitmap Display Shutter	-	Not used
Overlay Plane	-	Not used
Overlay/Curve Activation	-	Not used
Displayed Area	Zoom	The display area is always sent as "SCALE TO FIT"
Graphic Annotation	All graphic annotations and measurements	We always use annotation units "PIXEL", i.e. image relative coordinates
Spatial Transformation	-	Not used
Graphic Layer	-	One single layer (0)
Modality LUT	-	Copied from original image
Softcopy VOI LUT	-	Copied from original image
Softcopy Presentation LUT	-	Always use "INVERSE"

## 8.5. Standard Extended/Specialized/Private SOPs

Table 145: List of created SOP Classes

SOP Class Name	SOP Class UID
Digital Mammography X-Ray Image Storage - Pres. SOP	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage - Proc. SOP	1.2.840.10008.5.1.4.1.1.1.2.1
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.1.1
Mammography CAD SR Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.50

### 8.5.1. Standard Extended/Specialized/Private SOP Instance

#### 8.5.1.1. Digital Mammography X-Ray Image Storage - Pres. SOP

Table 146: Extended DICOM and private attributes for Digital Mammography X-Ray Image Storage - Pres. SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Table Height	0018,1130	DS				

#### 8.5.1.2. Digital Mammography X-Ray Image Storage - Proc. SOP

Table 147: Extended DICOM and private attributes for Digital Mammography X-Ray Image Storage - Proc. SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Table Height	0018,1130	DS				

#### 8.5.1.3. Grayscale Softcopy Presentation State Storage SOP Class

Table 148: Extended DICOM and private attributes for Grayscale Softcopy Presentation State Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Requesting Physician	0032,1032	PN				



#### 8.5.1.4. Mammography CAD SR Storage SOP Class

Table 149: Extended DICOM and private attributes for Mammography CAD SR Storage SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Table Height	0018,1130	DS				

## 8.6. Private Transfer Syntaxes

Not applicable.