DICOM
Conformance Statement

DSI R7.1.x

PHILIPS

Issued by:
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Document Number: 7921826
Date: 19 April 2011

DICOM CONFORMANCE STATEMENT OVERVIEW

This Conformance Statement refers to the DSI (Digital Spot Imaging) System in a DICOM Network environment. The DSI exists of an application to retrieve a Worklist from a Radiology Information System (RIS) and transfer Image data to a remote system.

The DSI System is an Radiographic and Fluorography modality and is part of an X-Ray System.

The DSI System provides the following DICOM data exchange features:
Request Worklist / Study Component Management (SCM) functionality
Issue Procedure information to RIS / HIS System
Image acquisition and display
Image review and processing
Image handling, storage and networking,
Administration of patient, physician and examination data.
Copy images from the local database to remote databases.
Can send out images either as raw data or as processed data.

The main application areas are:
- R/F examinations
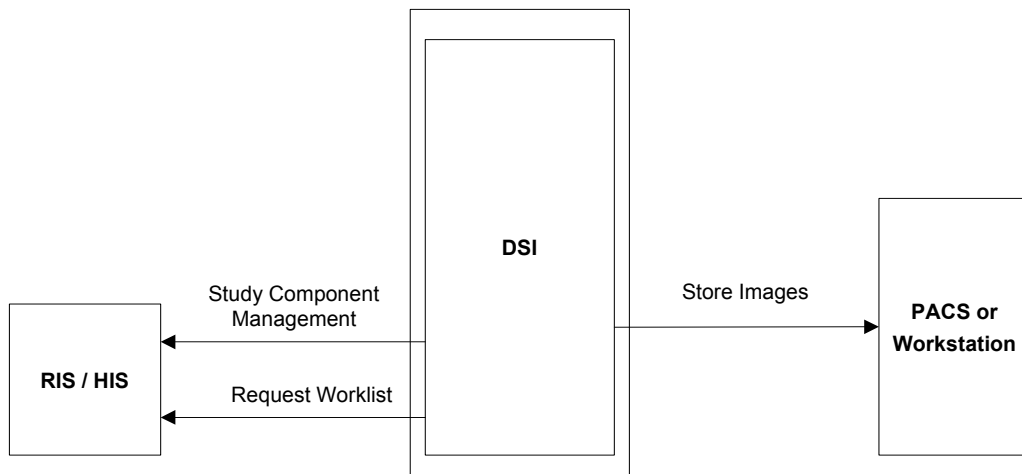- Vascular examinations
- interventional procedures

Figure 1: DSI System in a DICOM Network environment

The DSI system allows the operator also to view, analyze and process the images stored in the database. Some advanced analysis and processing applications are primarily designed for images generated by Philips equipment when sent to the DSI.

This document describes the DICOM conformance of the DSI platform. Application package specific DICOM conformance is described in separate Conformance Statements.

The following Table 1 presents an overview of all network services and the applicable SOP classes as provided by the DSI. where the first column specifies the used SOP Classes as named in PS 3.6 (Ref PS 3.2 Annex A) of the current DICOM Standard.

Table 1: Network Services for the DSI System.

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Storage for the AutoPush Mode (NO Processed)			
X-Ray Specialization	1.3.46.670589.2.3.1.1	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Storage for the NO_ AutoPush Mode			
X-Ray Specialization	1.3.46.670589.2.3.1.1	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Storage for the Processed Mode (RF & SC and SC only) (NO_AutoPush)			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Workflow Management			
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Component Management SOP Class	1.2.840.10008.3.1.2.3.2	Yes	No

Note: The DSI support all SOP Classes with default Transfer Syntaxes ILE.

TABLE OF CONTENTS

1. INTRODUCTION

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

1.1. Revision History

Table 2: Revision History

Document Version	Date of Issue	Author	Description
00	19-04--2011	PCCI/EII - IOCC	Approved DICOM Conformance Statement DSI R7.1.x

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.2. Audience

This Conformance Statement is intended for:
➢ (potential) customers
➢ system integrators of medical equipment
➢ software designers implementing DICOM interfaces
➢ marketing staff interested in system functionality

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

1.3. 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 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 a 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).

1.4.   Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

Table 3: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
ACP	Archiving / Connectivity and Print
ACR	American College of Radiology
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DSI	Digital Spot Imaging
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
GUI	Graphic User Interface
HIS	Hospital Information System
IHE	Integrating the Healthcare Enterprise
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving Communication System
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User

Abbreviation/Term	Explanation
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VFRB	ViewForum Release Bulletin
WLM	Worklist Management

The following terms are used in this document:

Term	Explanation
DSI System.	The Digital Spot Imaging System is a X-ray system, designed to provide faster, more confident diagnoses. It combines a wide application range with revolutionary technology that adapts the system to your way of working.
Image Archive (PACS)	A PACS is a system that provides long term storage of images, Presentation States, Key Image Notes and Evidence Documents [IHE].
Image Display Viewer	The Image Display Viewer is a system that offers browsing of Patients' Studies. In addition, it may support the retrieval and display of selected sets of images, Presentation States, Key Image Notes, and Evidence Documents [IHE].
Department System Scheduler	A department-based information system that provides functions related to the management of orders received from external systems or through the department system's user interface. Upon a defined workflow action, makes procedures available for charge posting. The actor defines the action/event that actually causes charges to post [IHE].
Performed Procedure Step Manager	A system that re-distribute the Modality Performed Procedure Step Information from the Acquisition Modality or image Creator to the Department System Scheduler/Order Filler and Image Manager [IHE].

1.5. References

[DICOM]   Digital Imaging and Communications in Medicine (DICOM), Part 1 – 18
(NEMA PS 3.1 – PS 3.18),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Virginia. 22209, United States of America

[IHE]   Integrating the Healthcare Enterprise
(IHE) Technical Framework Revision 5.4:
Radiological Society of North America (RSNA), Inc.
820 Jorie Boulevard, Oak Brook, IL, United States of America

2. NETWORKING

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

2.1. IMPLEMENTATION MODEL

The implementation model consists of the Application Data Flow Diagram, specifying the relationship between the DSI Application Entity and the "external world".

2.1.1. Application Data Flow Diagram

The DSI contains one Application Entity able to export DICOM images and handle Modality Worklists. The related Implementation Model is shown in Figure 2.
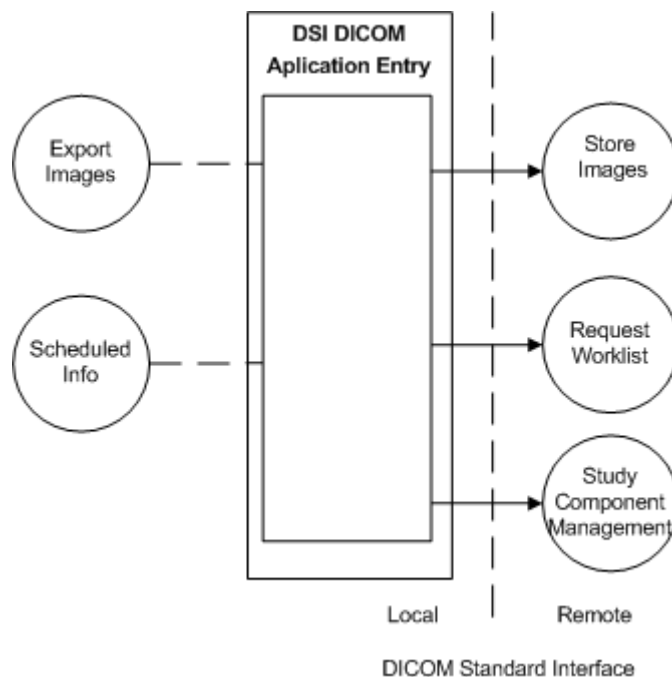
Figure 2. Networking Application Data Flow Diagram of the DSI

As documented in the PS 3.4, the arrows in the diagram on the previous page have the following meanings:

- An arrow pointing to the right indicates the local application entity initiates an association.

The DSI DICOM Export transfers a complete examination to a remote DICOM node. The transfer of a subset of images in an examination is possible. During the DICOM store operation it is possible to perform a cancel operation on the store.

Image data to be transferred are instances of the DICOM X-Ray Radiofluoroscopic (RF) or Secondary Capture (SC) classes.

The following cases can be distinguished:

- The system is configured to supports both RF and SC classes.
  Result will be that all fluoroscopy and exposure images are exported as RF images and all other images (like external video) as SC images.
- If the system is configured to support SC class only, than all images are exported as SC images.
- If SCP system doesn't support RF images, the images are exported as SC images.

2.2. Functional definition of Application Entities

2.2.1. DSI DICOM AE

The DSI DICOM Application Entity acts as a Service Class User (SCU) of the Storage Service Class. After invoking it will open an Association to the remote system. For each image to be transported a retrieve action from the DSI storage will take place followed by the conversion to a DICOM message to be transferred to the remote system.

The DSI DICOM Application Entity acts also as a Service Class User (SCU) of the Basic Worklist Management Service Class and the Study Component Management Service Class. After invoking it will open an Association to the remote system (usually a RIS) to request for the up-to-date modality Worklist.

2.2.1.1. Functional Definition of the DSI

The DSI includes the following service classes.

Storage Service Class
The DSI DICOM AE can perform the Storage service as SCP.

A remote SCU shall request an association with the DSI DICOM AE for Storage SOP classes. After accepting the association, the DSI DICOM AE shall receive the Storage requests, store the data in the local database, send the applicable Storage responses, and release the association when requested.

The DSI DICOM AE can perform the Storage service as SCU, triggered by operator or retrieve request).

The DSI DICOM AE shall request an association with the selected remote SCP for all applicable Storage SOP classes. When the association is accepted, the DSI DICOM AE shall send the Storage requests (including data from local database), receive the Storage responses and act accordingly, and release the association.

Worklist Service Class
The DSI DICOM AE RIS Application Entity acts as a Service Class User (SCU) for Worklist and SCM (Study Component Management).

2.3. Sequencing of Real World Activities

The Request for Worklist should be done first, before a Study Component Management (SCM) can be created.

Then the generated images may be exported. However, export of DICOM images is also possible without the Worklist and Study Component Management activities.
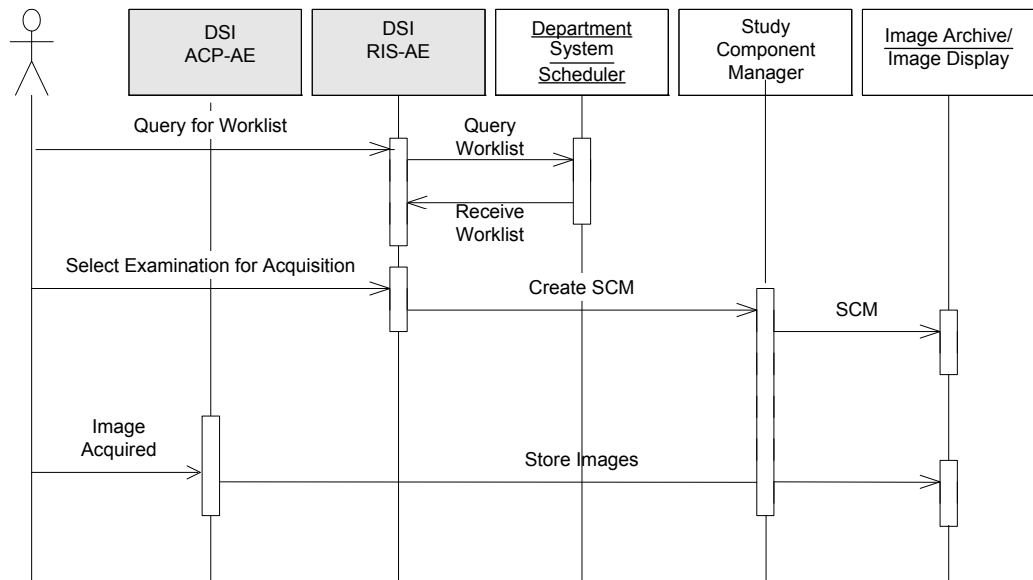
Figure 3. Sequencing of the Real Word Activities of the DSI System.

Examinations, identified with a new UID, are created inside the DSI RIS-AE as result of Worklist Management or on manual scheduling by the clinical user. Once an examination (an equivalent to the DICOM Procedure Step) is created, the clinical user can select this examination for acquisition.

The administration Patient information, put in by the clinical user, and the worklist patient information will be sent together to the DSI ACP-AE.
A Examination, selection for acquisition is synchronized between the DSI RIS-AE and the DSI ACP-AE. Once an acquisition has started, the SCM CREATED messages are sent from the DSI RIS-AE to the RIS.
Acquired images from the DSI ACP-AE and related data from the clinical user are added to the examination.

The composite images acquired are manually / automatic forwarded to the DSI ACP-AE, and can now be used for Viewing or Exporting.

When the clinical user has indicated on the DSI ACP that the examination is finished the Examination will be deleted here, as soon as the manually / automatic export of the images has taken place.

A Study Component Management "**COMPLETED"** message is sent from the DSI RIS-AE to the RIS.

3. AE SPECIFICATIONS

The Digital Spot Imaging Application contains one Application Entity AE.

3.1. DSI DICOM AE

The DSI DICOM Application Entity provides Standard Conformance to the following DICOM 3.0 SOP classes as an SCU specified in Table 1.

Table 4 Supported SOP Classes as SCU by the DSI DICOM AE

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Storage for the NO_ AUTOPUSH Mode			
Specialized X-Ray	1.3.46.670589.2.3.1.1	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Storage for the PROCESSED Mode (RF & SC and SC only) (NO_ AUTOPUSH)			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Storage for the AUTOPUSH Mode			
Specialized X-Ray	1.3.46.670589.2.3.1.1	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Workflow Management			
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Component Management SOP Class	1.2.840.10008.3.1.2.3.2	Yes	No

The DSI DICOM Application Entity does not support DICOM 3.0 SOP classes as a SCP.

3.1.1. Association Establishment Policies

3.1.1.1. General

The maximum PDU size of the DSI is fixed on 28K (is 28672 Bytes). See also the important remark about the PDU size of the remote systems in chapter 6.

3.1.1.2. Number of Associations

The DSI will attempt to establish two Associations at a time. One Association for storage and one to receive the Worklist. DSI does not accept Associations.

3.1.1.3. Asynchronous Nature

The DSI does not support asynchronous operations and will not perform asynchronous window negotiation.

3.1.1.4. Implementation Identifying Information

THE IMPLEMENTATION CLASS UID:	1.3.46.670589.6.1.2.1.1.1
THE IMPLEMENTATION VERSION NAME:	R7.1.x

3.1.2. Association Acceptance Policy

The DSI initiates Associations as a result of the following events:

- The DSI operator requests for DICOM export, see section 3.1.2.1;
- The DSI operator requests for the DSI Worklist, see section 3.1.2.2;
- The DSI operator has selected a Worklist item from the received DSI Worklist (i.e. an examination to perform).

3.1.2.1.   Export from DSI system

3.1.2.1.1. *Associated Real-World Activity*

The DSI operator is able to request for export of one examination or a list of examinations to a remote system. The complete examination or a subset is transferred to the remote system.

The DSI DICOM Export function will be accessible through the DSI F2 Copy page. With the F4 Config page the remote DICOM system is selected from a list of maximum of five configurable nodes.

The current transfer can be aborted by the DSI F2 Cancel function. DSI can't abort during exporting an image, the system will abort the job after the image is export correctly.
After the transfer the Association is released.

3.1.2.1.2. *Proposed Presentation Contexts*
DSI will propose the following presentation contexts:

Table 5 Proposed Presentation Contexts at Image Export

Abstract Syntax Name	UID	Transfer Syntax	UID List	Role	Ext. Neg.
Secondary Capture Image Storage	1.2.840.10008.5.2.1.4.1.1.7	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	None None None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	None None None
X-Ray Specialization	1.3.46.670589.2.3.1.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	None None None

3.1.2.1.3. *SOP Specific Conformance to Storage SOP Classes*
DSI provides standard conformance.

Extended Negotiation is not supported.

During the DICOM export of an exposure or fluoroscopy image as **RF image** the following image processing is performed by DSI: video invert, subtraction, pixel shift.

During the DICOM export of an exposure or fluoroscopy image as **SC image** the following image processing is performed by DSI: video invert, contrast, brightness, edge enhancement, subtraction, pixel shift.
During the DICOM export of an external video image as SC image the following image processing is performed by DSI: video invert, contrast, brightness, edge enhancement.

In case of a subtracted run the DICOM Export first stores the mask image, followed by the subtracted images from that run. No explicit indication is sent with the subtracted images, as to which image was used as the mask image. The image number in the run can be used as an implicit indication.

Other remarks:
- Images shown zoomed on the DSI are exported as normal (i.e. non zoomed) images. Annotations on zoomed images are not sent. DSI annotations on normal images are exported as Image Comments.
- The images are intended for viewing purpose only.
- The compatibility of image data re-imported (by media exchange) of the exported DICOM image data in an earlier stage is not defined.
- DSI logs certain events related to the DICOM export at three different levels, see the service manual of the DSI system.
- Measurement data is not exported during AUTOPUSH Mode.

During the selection and export of an examination, the user interface shows the status:
- Export **flag** examination flagged for DICOM export
- Export **busy** examination being exported
- Export **done** examination exported successfully
- Export **error** while exporting examination
- Export **cancel** export of examination being cancelled
- **Not exported** export of examination cancelled

DSI will stop the transfer of the image data and release the Association as soon as it receives an unsuccessful or warning C-STORE Response status, or when the Association is aborted by the remote system. The reason will logged, the user interface of the DSI console will show the status "Export Error".

If a RIS connection is present, Patient and Study related information will be retrieved by DSI from the RIS and will be put in the image headers of the exported images.

The UID's in the composite images are generated when the related Study, Series and Image are created.
The Image UID's will be different if processing took place.
The Study UID may be retrieved from the RIS via the Worklist.

3.1.2.1.3.1.   .Overview of the applied X-Ray Fluoroscopy (RF) Image IOD

Table 6 gives an overview of the applied optional modules and attributes in the RF images.

Table 6 Applied optional Modules and Attributes of the RF Image IOD

IE	Module	Conditional Attributes	Optional Attributes
Patient	Patient		-
Study	General Study		Study Description
Series	General Series	Laterality.	Series Date, Series Time, Performing Physician's Name, Protocol Name
Equipment	General Equipment		Institution Name, Station Name, Manufacturer's Model name, Device Serial Number, Software Version(s)
Image	General Image Image Pixel Display Shutter (applied optional Module) X-Ray Image X-Ray Acquisition VOI LUT (applied optional Module) SOP Common	Image Date, Image Time, Patient Orientation Shutter Left Vertical Edge, Shutter Right Vertical Edge, Shutter Upper Horizontal Edge, Shutter Lower Horizontal Edge, Center of Circular Shutter, Radius of Circular Shutter. Exposure Window Width	Acquisition Date, Acquisition Time, Acquisition Number, Image Comments - - - Window Center Specific Character Set

The modules selected from the IOD module table of DICOM 3.0 are given in the table below.

Table 7 Applied Modules in the RF IOD

Information Entity	Module
Patient	Patient
Study	General Study
Series	General Series
Equipment	General Equipment
Image	General Image Image Pixel Display Shutter X-Ray Image X-Ray Acquisition VOI LUT SOP Common

The details of these applied modules are given in the tables in Annex 8.

3.1.2.1.3.2. Overview of the applied Secondary Capture (SC) Image IOD

Table 8 gives an overview of the applied optional modules and attributes in the SC images.

Table 8 Applied optional Modules and Attributes of the SC Image IO

IE	Module	Conditional Attributes	Optional Attributes

IE	Module	Conditional Attributes	Optional Attributes
Patient	Patient		-
Study	General Study		Study Description
Series	General Series	Laterality	Series Date, Series Time, Performing Physician's Name, Protocol Name
Equipment	SC Equipment		Secondary Capture Device Manufacturer, Secondary Capture Device Manufacturer's Model Name, Secondary Capture Software Version(s)
Image	General Image Image Pixel SC Image SOP Common	Image Date, Image Time, Patient Orientation.	Acquisition Date, Acquisition Time, Acquisition Number, Image Comments - Date of Secondary Capture, Time of Secondary Capture Specific Character Set

The modules selected from the IOD module table of DICOM 3.0 are given in the table below.

Table 9 Applied Modules in the SC IOD

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

The details of these applied modules are given in the tables in the ANNEX 8.

3.1.2.2. Request for a Modality Worklist
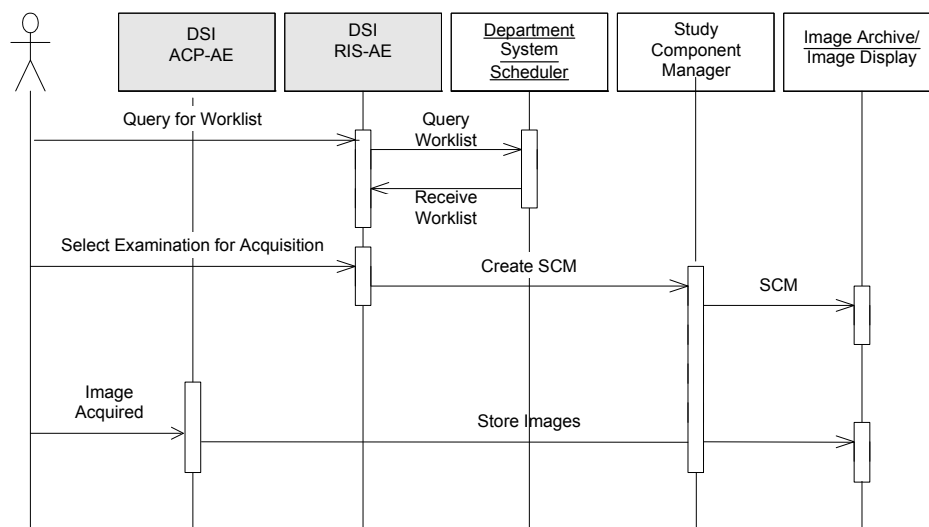
Figure 4. Sequencing of the Real Word Activities of the DSI System.

3.1.2.2.1. Associated Real-World Activity

This DSI function will be triggered at request of the operator. An Association will be set-up to the pre-configured remote system (the RIS). After receiving the Worklist the Association is released.

3.1.2.2.2. Proposed Presentation Contexts

DSI will propose the following presentation contexts:

Table 10 Proposed Presentation Contexts for Request for Modality Worklist

Abstract Syntax Name	UID	Transfer Syntax	UID List	Role	Ext. Neg.
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	None None None

3.1.2.2.3. SOP Specific Conformance to Modality Worklist Management

DSI provides standard conformance.

No optional Matching keys are supported (i.e. no optional Matching Keys will be present in the C-FIND Requests).

No optional Return Keys are supported (i.e. no optional Return Keys will be present in the C-FIND Requests).

If more than 42 Worklist items are received (via C-FIND Responses) as result of a worklist request, DSI will cancel the request by sending a C-CANCEL-FIND Request.

The status of the C-FIND Responses (Success, Refused, Error, Warning) is logged. Only general status messages are displayed on the user interface, like: "RIS not responding" and "No patient available from RIS".

The following non-printable characters (Hexa-decimal coded) are not supported in the received Worklist data:

- 00H through 1FH,
- 7FH
- 80H through 9FH,
- A0H, A6H, A8H, A9H, ADH, AEH, AFH
- B1H, B4H, B8H, B9H, BEH
- C0H, C1H, C2H, C3H, C8H, CAH, CBH, CCH, CDH, CEH, CFH
- D0H. D2H, D3H, D4H, D5H, D9H, DAH, DBH, DDH, DEH
- E3H
- F0H, F5H, FDH, FEH

If one or more of these non-printable characters are present in the strings of received Worklist data, the string is not accepted. If non-printable characters are present in the Patient Name or if this attribute is empty, the worklist entry is not accepted. In case the Patient Name only contains spaces, this Worklist entry and all succeeding Worklist entries will be skipped.

DSI is able to retrieve the modality Worklist from a RIS. This is done at request of the operator. From the received list a selection of one Worklist item is made; the examination to be performed.
After selecting a Worklist item, the RIS is informed about this creation of the study component.
The DSI can only display a maximum of 42 patients in the worklist. When the system receive more then 42 patients in the worklist the system acts as a FIFO system (First In First Out), so information about the first patient in the worklist is lost.

This chapter specifies in detail the applied attributes in the **C-FIND** Service Element of this supported SOP Class.

Table 11 Modality Worklist Information Model - Patient Identification Module

Attribute Name	VR	Tag	Note
Patient's Name	PN	0010,0010	-
Patient ID	LO	0010,0020	-

Table 12 Modality Worklist Information Model - Patient Demographic Module

Attribute Name	VR	Tag	Note
Patient's Birth Date	DA	0010,0030	-
Patient's Sex	CS	0010,0040	-

Table 13 Modality Worklist Information Model - Scheduled Procedure Step Module

Attribute Name	VR	Tag	Note
Scheduled Procedure Step Sequence	SQ	0040,0100	-
> Modality	CS	0008,0060	Can be used as matching key. (RF)
> Scheduled Station AE Title	AE	0040,0001	Can be used as matching key.
> Scheduled Procedure Step Start Time	TM	0040,0003	-
> Scheduled Performing Physician's Name	PN	0040,0006	-
> Scheduled Procedure Step Description	LO	0040,0007	-
> Scheduled Procedure Step ID	SH	0040,0009	-

Table 14 Modality Worklist Information Model - Requested Procedure Module

Attribute Name	VR	Tag	Note
Study Instance UID	UI	0020,000D	-
Requested Procedure Code Sequence	SQ	0032,1064	Default : EMPTY

Table 15 Modality Worklist Information Model - Imaging Service Request Module

Attribute Name	VR	Tag	Note
Accession Number	SH	0008,0050	
Referring Physician's Name	PN	0008,0090	

3.1.2.3.   Create a Study Component

3.1.2.3.1.   *Associated Real-World Activity*
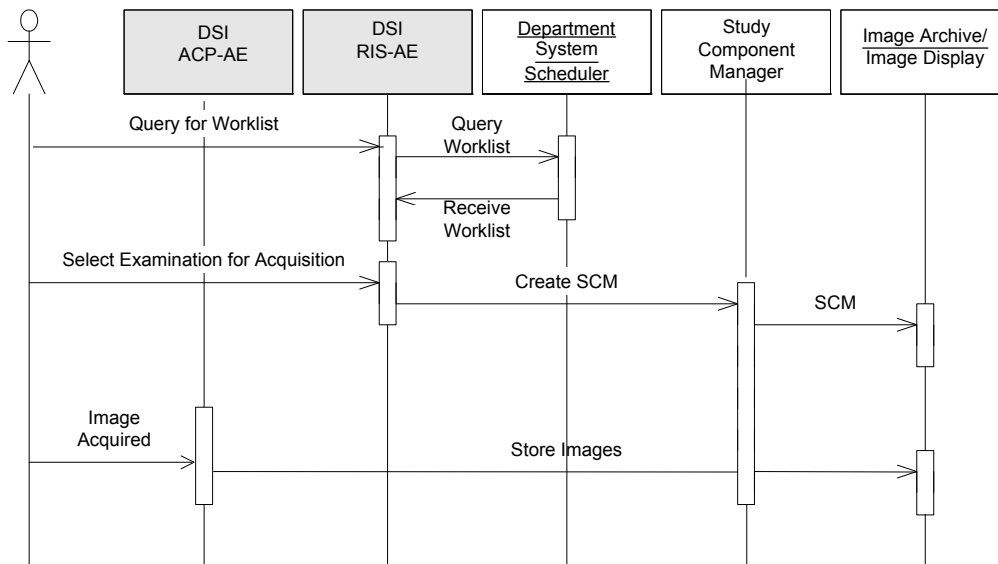
A DSI "Examination" is regarded equivalent to a DICOM Procedure Step.

If scheduled by the RIS, an Examination is the result of a Scheduled Procedure Step.
An SCM message with **N-CREATE** is sent when one Examination is scheduled by the clinical user.

This DSI function will be triggered when a Worklist item is selected, i.e. a Study Component will be created. An Association will be set-up to the pre-configured remote system (usually a RIS). After informing the remote system about the created Study Component, the Association is released.

3.1.2.3.2.   *Proposed Presentation Contexts*

DSI will propose the following presentation contexts:

Table 16 Proposed Presentation Contexts for Create a Study Component

Abstract Syntax Name	UID	Transfer Syntax	UID List	Role	Ext. Neg.
Study Component Management SOP Class	1.2.840.10008.3.1.2.3.2	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	None None None

3.1.2.3.3.   *SOP Specific Conformance to Study Component Management*
DSI provides standard conformance.

Only the N-CREATE Service Element is used (as SCU), so no use of the N-GET and N-SET Service Elements.

No optional attributes are applied in the N-CREATE Service Element. The Specific Character Set (conditional in DICOM) will always be present.

The status of the DIMSE Responses (Success, Refused, Error, Warning) is logged. No status messages are displayed on the user interface.

This chapter specifies in detail the applied attributes in the **N-CREATE** Service Element of this supported SOP Class.

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

Table 17 Study Component Management SOP Class - Study Component Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		EMPTY	AUTO	Always EMPTY
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 18 Study Component Management SOP Class - Study Component Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Study Sequence	0008,1110	SQ		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI	Applied Value(s): 1.2.840.10008.3.1.2.3.1	ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	Value from Study Instance UID in C-FIND Response of Modality Worklist.

Table 19 Study Component Management SOP Class -Study Component Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	Applied Value: RF	ALWAYS	AUTO	-
Study Description	0008,1030	LO		EMPTY	AUTO	Always EMPTY
Study Component Status ID	0032,1055	CS	Applied Value(s): COMPLETED	ALWAYS	AUTO	-

Table 20 Study Component Management SOP Class - Sop Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	Applied Value: ISO_IR 100	ALWAYS	AUTO	-

3.1.3. Association Acceptance Policy

DSI does not accept Associations.

4. COMMUNICATION PROFILES

4.1.   Physical Network Interface

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

The DSI System supports a single network interface: Ethernet ISO 8802-3.
With standard supported physical medium include:

➢   IEEE 802.3 10BASE-TX
➢   IEEE 802.3 100BASE-TX (Fast Ethernet)

5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

Below the mapping table is given between the UI Elements and the DICOM Attributes.

Table 21 Mappings between UI Elements and DICOM attributes

UI Element	DICOM NAME	Service
Patient	Patient's Name	RIS and Export
	Patient's Birth Date	RIS and Export
	Patient's Sex	RIS and Export
	Patient ID	RIS and Export
Exam	Scheduled Procedure Step Description	RIS
	Study Description	Export
	Protocol Name	Export
Physician's Name	Referring Physician's Name	RIS
	Referring Physician's name	Export
	Performing Physician's Name	Export

6. CONFIGURATION

The configuration of a DSI system is done by means of a configuration program. It is intended to be used by Philips service engineers only.

6.1.   AE Title/Presentation Address mapping

6.1.1.   Local AE Titles and Presentation Addresses

The local (so of DSI itself) Application Entity Title, local System Name and local (System) IP Address are selected by the service configuration program.

6.1.1.1.   Local AE Title

The DSI exits of one Application Entity title and one IP address for the DSI ACP AE. At installation the Customer Support Engineer can change the DSI ACP AE host name. The DSI ACP AE listens on **port 3010** (default**).**

Table 22 AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
DSI ACP AE	<IP host name DSI ACP>	3010 *

Note: * Not configurable.

6.1.2.   Remote AE Titles and Presentation Addresses

All remote applications to be selected as image export destination or as Worklist supplier are configurable for the following items:

- The Application Entity Title of the remote application.
- The IP Address and Port Number at which the remote application should accept Association requests.
- The Remote Host Name (i.e. System name) of the system on which the remote application resides.
- The Remote Host Name is used in the remote DICOM system list with the F4 Config page.

6.2.   Configurable parameters

Configurable parameters are:

- The PDU size of DSI (i.e. the maximum allowed size of PDU messages received by DSI) is fixed on 28KBytes.
  For optimal performance of the communication DSI - remote system, it is advised to configure the PDU size on the remote system as large as possible: unlimited and 64KBytes are preferred (in that order). PDU size of 32KBytes on the remote system should not be taken due to an implementation restriction of DSI.
- The "Hospital Name" (configurable) is mapped on "Institution Name".

- The "System Name" (configurable) is mapped on "Station Name".

7. SUPPORT OF EXTENDED CHARACTER SETS

The DSI supports the Extended Character Set "ISO_IR 100" (Latin alphabet No 1, supplementary set) for the Image Export function.

From the Extended Character Set "ISO_IR 100", the following NON-printable characters (Hexa-decimal coded) are NOT supported in the received Worklist data:

- 00H through 1FH,
- 7FH
- 80H through 9FH,
- A0H, A6H, A8H, A9H, ADH, AEH, AFH
- B1H, B4H, B8H, B9H, BEH
- C0H, C1H, C2H, C3H, C8H, CAH, CBH, CCH, CDH, CEH, CFH
- D0H. D2H, D3H, D4H, D5H, D9H, DAH, DBH, DDH, DEH
- E3H
- F0H, F5H, FDH, FEH

8. ANNEX

8.1.   IOD CONTENTS

This section specifies each IOD to be exported by the DSI. This can take place as UNPROCESSED RAW data and PROCESSED data as RF and SC.
If the remote system does not support the import of a specific Image Storage SOP Class, the DSI will convert (if configured to do so) these images and sends them via the SC Image SOP Class.

The following tables give a detailed overview of all supported attributes of the Supported Storage SOP Classes.

The list of possible values are given (if applicable). The situation that an attribute is present conditionally/optionally or that an attribute may contain a zero length value, is indicated too. Conditions and Defined/Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.

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. Created Secondary Capture Image Storage SOP Class (Processed / NO AutoPush)

The following tables give a detailed overview of all supported attributes of the create SC Storage SOP Class. The lists of possible values are given. The situation that an attribute is present conditionally/optionally or that an attribute may contain a zero length value, is indicated too. Conditions and Defined/Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables below.

Table 23: SC Image Storage SOP Class - Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO/ USER	Received from RIS or Entered by Operator
Patient ID	0010,0020	LO		VNAP	AUTO/ USER	Received from RIS or Entered by Operator
Patient's Birth Date	0010,0030	DA		VNAP	AUTO/ USER	Received from RIS or Entered by Operator
Patient's Sex	0010,0040	CS	F,M,O,	ALWAYS	AUTO/ USER	Received From RIS or Entered by Operator. Default O.

Table 24: SC Image Storage SOP Class - General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	-
Study Time	0008,0030	TM		ALWAYS	AUTO	-
Accession Number	0008,0050	SH		VNAP	AUTO	Zero length if not received from RIS
Referring Physician's Name	0008,0090	PN		VNAP	AUTO	Zero length if not received from RIS
Study Description	0008,1030	LO		VNAP	AUTO	Zero length if not received from RIS.
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Generated at the creation of the study or received from RIS.
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 25: SC Image Storage SOP Class - General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-

Performing Physicians' Name	0008,1050	PN		VNAP	AUTO/ USER	Received from RIS, entered by user or is empty if not known. Exported only first 3 characters of name.
Protocol Name	0018,1030	LO		VNAP	AUTO/ USER	Received from RIS, entered by user or is empty if not known. Exported only first 6 characters of name.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Generated at creation of the series
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		ALWAYS	AUTO	Always zero length value.
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	Always zero length value.
Performed Procedure Step Description	0040,0254	LO		ALWAYS	AUTO	Always zero length value.

Table 26: SC Image Storage SOP Class – General Equipment Module (O)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-

Table 27: SC Image Storage SOP Class – SC Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	RF	ALWAYS	AUTO	-
Conversion Type	0008,0064	CS	DV	ALWAYS	AUTO	(Digitized Video)
Secondary Capture Device Manufacturer	0018,1016	LO	Philips Medical Systems	ALWAYS	AUTO	-
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO	Digital Imaging	ALWAYS	AUTO	-
Secondary Capture Device Software Version(s)	0018,1019	LO		ALWAYS	FIXED	-

Table 28: SC Image Storage SOP Class – SC Image Module (M)

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

Table 29: SC Image Storage SOP Class - General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	-
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS		ALWAYS	AUTO	Always zero length value.
Image Comments	0020,4000	LT		ANAP	USER	Contains also the DI image annotations on normal (i.e. non zoomed) images in the format -- (x,y) text --. This attribute is not present if not entered by user and if no annotations are present.

Table 30: SC Image Storage SOP Class - Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	-
Row	0028,0010	US	1024, 512	ALWAYS	AUTO	--
Columns	0028,0011	US	1024, 512	ALWAYS	AUTO	-
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	-
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	-
High Bit	0028,0102	US	7	ALWAYS	AUTO	-
Pixel Representation	0028,0103	US	0x0000=0	ALWAYS	AUTO	-
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	-

Table 31: SC Image Storage SOP Class – VOI LUT Module (O)

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

| Window Width | 0028,1051 | DS | | ALWAYS | AUTO | - |

Table 32: SC Image Storage SOP Class – SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-

8.1.2. Created RF Image Storage SOP Class (Processed / NO AutoPush)

The following tables give a detailed overview of all supported attributes of the XRF Storage SOP Class for the Processed Mode with or without Overlays. The list of possible values are given. The situation that an attribute is present conditionally / optionally or that an attribute may contain a zero length value, is indicated too. Conditions and Defined / Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables below.

Table 33: XRF Image Storage SOP Class -Patiënt Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO /USER	Received From RIS or Entered by Operator.
Patient ID	0010,0020	LO		VNAP	AUTO /USER	Received From RIS or Entered by Operator
Patient's Birth Date	0010,0030	DA		VNAP	AUTO /USER	Received From RIS or Entered by Operator
Patient's Sex	0010,0040	CS	F,M,O	ALWAYS	AUTO /USER	Received From RIS or Entered by Operator, default O

Table 34: XRF Image Storage SOP Class -General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	From system
Study Time	0008,0030	TM		ALWAYS	AUTO	From system
Accession Number	0008,0050	SH		ALWAYS	AUTO	Zero length if not received from RIS.

Referring Physician's Name	0008,0090	PN		ALWAYS	AUTO	Zero length if not received from RIS.
Study Description	0008,1030	LO		ALWAYS	AUTO/ USER	Received from RIS or entered by user.
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Generated at the creation of the study or received from RIS.
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 35: XRF Image Storage SOP Class -General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	From system
Series Time	0008,0031	TM		ALWAYS	AUTO	From system
Modality	0008,0060	CS	Applied Value(s): RF	ALWAYS	AUTO	-
Performing Physician's Name	0008,1050	PN		ALWAYS	AUTO/ USER	Received from RIS, entered by user or is empty if not known. Only the first 3 chars exported.
Protocol Name	0018,1030	LO		ALWAYS	AUTO	Filled with the Exam type, limited to a maximum of 6 characters. Received from RIS , or entered by the user. Only the first 6 chars exported. Default zero length
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		ALWAYS	AUTO	Always zero length.
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	Always zero length.
Performed Procedure Step Description	0040,0254	LO		ALWAYS	AUTO	Always zero length.

Table 36: XRF Image Storage SOP Class -General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Hospital Name
Station Name	0008,1010	SH		ALWAYS	CONFIG	Local system ID

Manufacturer's Model Name	0008,1090	LO	Digital Imaging	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	-

Table 37: XRF Image Storage SOP Class -General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	-
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS		ALWAYS	AUTO	Always zero length value.
Image Comments	0020,4000	LT		ANAP	USER	Contains also the DI image annotations on normal (i.e. non zoomed) images in the format -- (x,y) text --. This attribute is not present if not entered by user and if no annotations are present.

Table 38: XRF Image Storage SOP Class -Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US	Applied Value(s): 1024, 512	ALWAYS	AUTO	-
Columns	0028,0011	US	Applied Value(s): 1024, 512	ALWAYS	AUTO	-
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	-

Table 39: XRF Image Storage SOP Class - Display Shutter Module (O)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	CIRCULAR RECTANGULAR	ALWAYS	USER	-
Shutter Left Vertical Edge	0018,1602	IS		ANAPC	USER	-

Shutter Right Vertical Edge	0018,1604	IS		ANAPC	USER	-
Shutter Upper Horizontal Edge	0018,1606	IS		ANAPC	USER	-
Shutter Lower Horizontal Edge	0018,1608	IS		ANAPC	USER	-
Center of Circular Shutter	0018,1610	IS		ANAPC	USER	-
Radius of Circular Shutter	0018,1612	IS		ANAPC	USER	-
Shutter Presentation Value	0018,1622	US	0x0000=0	ALWAYS	AUTO	-

Table 40: XRF Image Storage SOP Class -X-ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	FIXED	-
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	-
Photometric Interpretation	0028,0004	CS	MONOCHROME 2	ALWAYS	FIXED	-
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	-
Bits Stored	0028,0101	US	8	ALWAYS	FIXED	-
High Bit	0028,0102	US	7	ALWAYS	FIXED	-
Pixel Representation	0028,0103	US	0000H	ALWAYS	FIXED	-
Pixel Intensity Relationship	0028,1040	CS	DISP	ALWAYS	FIXED	-

Table 41: XRF Image Storage SOP Class -X-ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ALWAYS	AUTO	Always zero length value.
Exposure Time	0018,1150	IS		ANAP	AUTO	Required if Exposure (0018,1152) is not present.
X-Ray Tube Current	0018,1151	IS		ANAP	AUTO	Required if Exposure (0018,1152) is not present.
Exposure	0018,1152	IS		ALWAYS	AUTO	Required if either Exposure Time (0018,1150) or X-RayTube Current (0018,1151) are not present. Default Always zero length value.

Radiation Setting	0018,1155	CS	GR, SC	ALWAYS	AUTO	SC = low dose exposure generally corresponding to fluoroscopic settings (e.g. preparation for diagnostic quality image acquisition); GR = high dose for diagnostic quality image acquisition (also called digital spot or cine);

Table 42: XRF Image Storage SOP Class -VOI LUT Module (O)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	AUTO	This attribute is related to the DSI Contrast / Brightness.
Window Width	0028,1051	DS		ALWAYS	AUTO	This Attribute is related to the DSI Contrast / Brightness.

Table 43: XRF Image Storage SOP Class -SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	Applied Value(s): ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	Applied Value(s): 1.2.840.10008.5.1.4.1.1.12.2	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-

8.1.3. Created RAW Image Storage SOP Class (Processed / NO AutoPush)

This section specifies each IOD created by the DSI for the UnProcessed / No AutoPush Mode.

If private Presentation State information exists, in RAW mode, then the DSI will be send the Presentation State object with the Presentation Label " AS AQUIRED".

The following tables give a detailed overview of all supported attributes of the Specialized PMS X-Ray Storage SOP Class and the create Grayscale Softcopy Presentation State Storage SOP Class.
Each Specialized PMS X-Ray image has his own Grayscale Softcopy Presentation State image.

8.1.3.1. Created Softcopy Presentation SOP class (Processed / NO AutoPush)

The following tables give a detailed overview of all supported attributes of the Grayscale Softcopy Presentation State image.

Table 44: IOD of Created Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Curve	Displayed Area Module	ALWAYS
	Presentation Series Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
	Presentation State Relationship Module	ALWAYS
	Softcopy Presentation LUT Module	ALWAYS
	Softcopy VOI LUT Module	CONDITIONAL
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	Display Shutter Module	CONDITIONAL
	Presentation State Shutter Module	ALWAYS
	SOP Common Module	ALWAYS
Graphical Module	Graphic Layer Module	CONDITIONAL
	Graphic Annotation Module	CONDITIONAL

Table 45: Displayed Area Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS	AUTO	-
>Displayed Area Top Left Hand Corner	0070,0052	SL	1, 1	ALWAYS	AUTO	-
>Displayed Area Bottom Right Hand Corner	0070,0053	SL	512, 512 1024,1024	ALWAYS	AUTO	-
> Presentation Size Mode	0070,0100	CS	SCALE TO FIT	ALWAYS	AUTO	-
> Presentation Pixel Spacing	0070,0101	DS		ANAPEV	AUTO	If Presentation Size Mode (0070,0100) is specified as SCALE TO FIT, the specified area shall be displayed as large as possible within the available area on the display or window, i.e. magnified or minified if necessary to fit the display or window space available.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
> Presentation Pixel Aspect Ratio	0070,0102	IS	1, 1	ANAPEV	AUTO	Required if Presentation Pixel Spacing (0070,0101) is not present.

Table 46: Presentation Series Module (M)

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

Table 47: Presentation State Identification Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Content Label	0070,0080	CS	AS ACQUIRED	ALWAYS	AUTO	-
Content Description	0070,0081	LO		ALWAYS	AUTO	Zero length if unknow
Presentation Creation Date	0070,0082	DA		ALWAYS	AUTO	-
Presentation Creation Time	0070,0083	TM		ALWAYS	AUTO	-
Content Creator's Name	0070,0084	PN		ALWAYS	AUTO	Zero length if unknow

Table 48: Presentation State Relationship Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		ALWAYS	AUTO	-
> Referenced Image Sequence	0008,1140	SQ		ALWAYS	AUTO	-
>> Referenced SOP Class UID	0008,1150	UI	1.3.46.670589.2.3.1.1	ALWAYS	AUTO	-
>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-

Table 49: Softcopy Presentation LUT Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Sequence	2050,0010	SQ		ALWAYS	AUTO	-
>LUT Descriptor	0028,3002	US		ALWAYS	AUTO	-
>LUT Data	0028,3006	US		ALWAYS	AUTO	-

Table 50: Softcopy VOI LUT Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Softcopy VOI LUT Sequence	0028,3110	SQ		ALWAYS	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAPEV	AUTO	-
>Window Center	0028,1050	DS		ALWAYS	AUTO	-
>Window Width	0028,1051	DS		ALWAYS	AUTO	-

Table 51: Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO /USER	Received From RIS or Entered by Operator.
Patient ID	0010,0020	LO		VNAP	AUTO /USER	Received From RIS or Entered by Operator.
Patient's Birth Date	0010,0030	DA		VNAP	AUTO /USER	Received From RIS or Entered by Operator.
Patient's Sex	0010,0040	CS	F,M,O	ALWAYS	AUTO /USER	Received From RIS or Entered by Operator. If not present default O.

Table 52: General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	-
Study Time	0008,0030	TM		ALWAYS	AUTO	-
Accession Number	0008,0050	SH		ALWAYS	AUTO	From RIS or empty if unknown
Referring Physician's Name	0008,0090	PN		ALWAYS	AUTO	From RIS or Empty if unknown
Study Description	0008,1030	LO		ALWAYS	AUTO	From RIS or Empty if unknown
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 53: General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Performing Physician's Name	0008,1050	PN		ANAP	MWL /USER	From RIS or Zero length if unknown. Only the first 3 characters are exported.
Protocol Name	0018,1030	LO		ALWAYS	AUTO	From RIS or Zero length if unknown. Only the first 6 characters are exported.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		EMPTY	AUTO	Always EMPTY
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date.
Performed Procedure Step Start Time	0040,0245	TM		EMPTY	AUTO	Always EMPTY
Performed Procedure Step Description	0040,0254	LO		ALWAYS	USER	Zero length if unknown

Table 54: General equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	CONFIG	-
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Hospital Name
Station Name	0008,1010	SH		ALWAYS	CONFIG	Local system ID
Manufacturer's Model Name	0008,1090	LO	Digital Imaging	ALWAYS	CONFIG	-
Device Serial Number	0018,1000	LO		ALWAYS	CONFIG	-
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	-

Table 55: Presentation State Shutter Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Presentation Value	0018,1622	US	Default : 0x0000=0	ALWAYS	AUTO	Generated by device if display shutter is present

Table 56: Display Shutter Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	CIRCULAR, RECTANGULAR,	ALWAYS	AUTO USER	-
Shutter Left Vertical Edge	0018,1602	IS		ANAPEV	AUTO	-
Shutter Right Vertical Edge	0018,1604	IS		ANAPEV	AUTO	-
Shutter Upper Horizontal Edge	0018,1606	IS		ANAPEV	AUTO	-
Shutter Lower Horizontal Edge	0018,1608	IS		ANAPEV	AUTO	-
Center of Circular Shutter	0018,1610	IS		ANAPEV	AUTO	-
Radius of Circular Shutter	0018,1612	IS		ANAPEV	AUTO	-
Shutter Presentation Value	0018,1622	US	0x0000=0	ANAP	AUTO	-

Table 57: SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.11.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-

Table 58: Graphic Annotation Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Annotation Sequence	0070,0001	SQ		ANAP	USER	-
> Graphic Layer	0070,0002	CS		ALWAYS	USER	GLn, with n=0…m
> Graphic Layer Order	0070,0062	IS		ALWAYS	USER	-
> Text Object Sequence	0070,0008	SQ		ALWAYS	USER	-
>> Unformatted Text Value	0070,0006	ST	mm, degr, %	ALWAYS	USER	-

>> Bounding Box Annotation Units	0070,0003	CS	PIXEL	ANAP	USER	Required if Bounding Box Top Left Hand Corner (0070,0010) or Bounding Box Bottom Right Hand Corner (0070,0011) is present.
>> Anchor Point Annotation Units	0070,0004	CS	PIXEL	ALWAYS	USER	Required if Anchor Point (0070,0014) is present.
>> Bounding Box TLHC	0070,0010	FL		ANAP	USER	- Required if Anchor Point (0070,0014) is not present. May be present otherwise. - Required if Bounding Box Bottom Right Hand Corner (0070,0011) is present.
>> Bounding Box BRHC	0070,0011	FL		ANAP	USER	- Required if Anchor Point (0070,0014) is not present. May be present otherwise. - Required if Bounding Box Top Left Hand Corner (0070,0010) is present.
>> Bounding Box Text Horizontal Justification	0070,0012	CS	LEFT, RIGTH, CENTER	ALWAYS	USER	-
>> Anchor Point	0070,0014	FL		ALWAYS	USER	-
>> Anchor Point Visibility	0070,0015	CS	Y, N	ALWAYS	USER	-
> Graphic Object Sequence	0070,0009	SQ		ANAP	USER	-
>> Graphic Annotation Units	0070,0005	CS	PIXEL	ALWAYS	USER	-
>> Graphic Dimensions	0070,0020	US		ALWAYS	USER	-
>> Number of Graphics Points	0070,0021	US		ALWAYS	USER	-
>> Graphic Data	0070,0022	FL		ALWAYS	USER	-
>> Graphic Type	0070,0023	CS	POLYLINE	ALWAYS	USER	-
>> Graphic Filled	0070,0024	CS		ANAP	USER	Present if the first data point is the same as the last data point.

Table 59: Graphic Annotation Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Layer Sequence	0070,0060	SQ		ALWAYS	USER	-
> Graphic Layer	0070,0002	CS		ALWAYS	USER	GLn, with n=0…m
> Graphic Layer Order	0070,0062	IS		ALWAYS	USER	-

8.1.3.2.   Specialized PMS X-Ray Image Storage SOP Class (Processed / NO AutoPush) .

The following tables give a detailed overview of all supported attributes of the Specialized PMS X-Ray Storage SOP Class. Each Specialized PMS X-Ray image has his own Grayscale Softcopy Presentation State image.

The list of possible values are given. The situation that an attribute is present Conditionally / Optionally or that an attribute may contain a zero length value, is indicated to. Conditions and Defined / Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.
Private attributes are not applied in the tables below.

Table 60: Modules of the Created Specialized PMS X-Ray SOP Class by the DSI

Information Entity	Module Name	Reference	Presence of Module
Patient	Patient Module	Table 43	ALWAYS
Study	General Study Module	Table 44	ALWAYS
Series	General Series Module	Table 45	ALWAYS
Equipment	General Equipment Module	Table 46	ALWAYS
Image	General Image Module	Table 47	ALWAYS
	Image Pixel Module	Table 48	ALWAYS
	X-Ray Acquisition	Table 50	ALWAYS
	VOI LUT Module	Table 51	ALWAYS
	SOP Common Module	Table 52	ALWAYS
	XRF POSITIONER Module	Table 53	ALWAYS
	Display Shutter Module	Table 54	ALWAYS

Table 61: Specialized PMS X-Ray Image Store - Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO /USER	Received From RIS or Entered by Operator.
Patient ID	0010,0020	LO		VNAP	AUTO /USER	Received From RIS or Entered by Operator.
Patient's Birth Date	0010,0030	DA		VNAP	AUTO /USER	Received From RIS or Entered by Operator.
Patient's Sex	0010,0040	CS	F,M,O	ALWAYS	AUTO /USER	Received From RIS or Entered by Operator. If not present default O.

Table 62: Specialized PMS X-Ray Image Store - General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	-
Study Time	0008,0030	TM		ALWAYS	AUTO	-
Accession Number	0008,0050	SH		ALWAYS	AUTO	From RIS or empty if unknown

Referring Physician's Name	0008,0090	PN		ALWAYS	AUTO	From RIS or Empty if unknown
Study Description	0008,1030	LO		ALWAYS	AUTO	From RIS or Empty if unknown
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 63: Specialized PMS X-Ray Image Store - General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	System Date
Series Time	0008,0031	TM		ALWAYS	AUTO	System Time
Modality	0008,0060	CS	RF	ALWAYS	AUTO	-
Performing Physician's Name	0008,1050	PN		ALWAYS	AUTO/ USER	Received from RIS, entered by user or is empty if unknown. Only first 3 chars exported.
Protocol Name	0018,1030	LO		ALWAYS	AUTO	Examination Type (for DI/VF), Only first 6 chars. Zero length if not known
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		EMPTY.	AUTO	Always EMPTY.
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date
Performed Procedure Step Start Time	0040,0245	TM		EMPTY.	AUTO	Always EMPTY
Performed Procedure Step Description	0040,0254	LO		EMPTY.	AUTO	Always EMPTY

Table 64: Specialized PMS X-Ray Image Store - General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Institution Name	0008,0080	LO		ALWAYS	AUTO	Hospital Name
Station Name	0008,1010	SH		ALWAYS	AUTO	Local system ID
Manufacturer's Model Name	0008,1090	LO	Digital Imaging	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	-

Table 65: Specialized PMS X-Ray Image Store - Display Shutter Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	CIRCULAR, RECTANGULAR	ALWAYS	AUTO /USER	-
Shutter Left Vertical Edge	0018,1602	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR.
Shutter Right Vertical Edge	0018,1604	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR.
Shutter Upper Horizontal Edge	0018,1606	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR.
Shutter Lower Horizontal Edge	0018,1608	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR.
Center of Circular Shutter	0018,1610	IS		ANAPC	AUTO	Required if Shutter Shape is CIRCULAR.
Radius of Circular Shutter	0018,1612	IS		ANAPC	AUTO	Required if Shutter Shape is CIRCULAR. 256/256
Shutter Presentation Value	0018,1622	US	Default 0x0000=0	ANAPC	AUTO	-

Table 66: Specialized PMS X-Ray Image Store – General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	-
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	Applied Value(s): 1-m
Instance Number	0020,0013	IS		ALWAYS	AUTO	Applied Value(s): 1-n
Patient Orientation	0020,0020	CS		ALWAYS	AUTO	Always EMPTY.
Image Comments	0020,4000	LT		ANAP	USER	Contains also the DI image annotations on normal (i.e. non zoomed) images in the format --(x,y) text --. This attribute is not present if not entered by user and if no annotations are present.

Table 67: Specialized PMS X-Ray Image Store - Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US	512, 1024	ALWAYS	AUTO	-
Columns	0028,0011	US	512, 1024	ALWAYS	AUTO	-
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	-

Table 68: Specialized PMS X-Ray Image Store - X-Ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	US	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	FIXED	-
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	FIXED	-
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	FIXED	-
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	-
Bits Stored	0028,0101	US	8	ALWAYS	FIXED	-
High Bit	0028,0102	US	7	ALWAYS	FIXED	-
Pixel Representation	0028,0103	US	0x0000=0	ALWAYS	FIXED	-
Pixel Intensity Relationship	0028,1040	US	DISP	ALWAYS	FIXED	-

Table 69: Specialized PMS X-Ray Image Store - XRF Positioner Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ALWAYS	AUTO	Zero length if unknow

Table 70: Specialized PMS X-Ray Image Store - X-Ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		EMPTY	AUTO	Always EMPTY.
Exposure Time	0018,1150	IS		EMPTY	AUTO	Always EMPTY.
X-Ray Tube Current	0018,1151	IS		EMPTY	AUTO	Always EMPTY.
Radiation Setting	0018,1155	CS	Applied Value(s): GR, SC	ALWAYS	AUTO	SC = low dose exposure generally corresponding to fluoroscopic settings (e.g. preparation for diagnostic quality image acquisition); GR = high dose for diagnostic quality image acquisition (also called digital spot or cine);

Table 71: Specialized PMS X-Ray Image Store - SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.3.46.670589.2.3.1.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |

Table 72: Specialized PMS X-Ray Image Store - VOI LUT Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	AUTO	This attribute is related to the DI Contrast / Brightness.
Window Width	0028,1051	DS		ALWAYS	AUTO	This Attribute is related to the DI Contrast / Brightness. Required if (0028,1050) is sent

8.1.4. Created RAW Image Storage SOP Class (UnProcessed / AutoPush)

The following tables give a detailed overview of all supported attributes of the create Grayscale Softcopy Presentation State Storage SOP Class and the Specialized PMS X-Ray images SOP class for the AutoPush (UnProcessed) Mode.
Each series of Specialized PMS X-Ray images has only one Grayscale Softcopy Presentation State image.

8.1.4.1. Created Softcopy Presentation SOP class (UnProcessed / AutoPush)

The following tables give a detailed overview of all supported attributes of the Grayscale Softcopy Presentation State image.

The list of possible values are given. The situation that an attribute is present Conditionally / Optionally or that an attribute may contain a zero length value, is indicated to. Conditions and Defined / Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.
Private attributes are not applied in the tables below.

Table 73: IOD of Created Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Curve	Displayed Area Module	ALWAYS
	Presentation Series Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
	Presentation State Relationship Module	ALWAYS
	Softcopy Presentation LUT Module	ALWAYS
	Softcopy VOI LUT Module	CONDITIONAL
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	Display Shutter Module	CONDITIONAL
	Presentation State Shutter Module	ALWAYS
	SOP Common Module	ALWAYS

Table 74: Displayed Area Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS	AUTO	-
>Displayed Area Top Left Hand Corner	0070,0052	SL	1, 1	ALWAYS	AUTO	-
>Displayed Area Bottom Right Hand Corner	0070,0053	SL	512, 512 1024, 1024	ALWAYS	AUTO	-
>Presentation Size Mode	0070,0100	CS	SCALE TO FIT	ALWAYS	AUTO	-
>Presentation Pixel Aspect Ratio	0070,0102	IS	1, 1	ANAPEV	AUTO	-

Table 75: Presentation Series Module (M)

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

Table 76: Presentation State Identification Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Content Label	0070,0080	CS	AS ACQUIRED	ALWAYS	AUTO	-
Content Description	0070,0081	LO		ALWAYS	USER	-
Presentation Creation Date	0070,0082	DA		ALWAYS	AUTO	-
Presentation Creation Time	0070,0083	TM		ALWAYS	AUTO	-
Content Creator's Name	0070,0084	PN		ALWAYS	AUTO	Zero length

Table 77: Presentation State Relationship Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		ALWAYS	AUTO	-
> Referenced Image Sequence	0008,1140	SQ		ALWAYS	AUTO	-
>> Referenced SOP Class UID	0008,1150	UI	1.3.46.670589.2.3.1.1	ALWAYS	AUTO	-
>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-

Table 78: Presentation State Shutter Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Presentation Value	0018,1622	US	0x0000=0	ANAP	AUTO	Required if the Display Shutter Module is present

Table 79: Softcopy Presentation LUT Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Sequence	2050,0010	SQ		ALWAYS	AUTO	-
>LUT Descriptor	0028,3002	US		ALWAYS	AUTO	-
>LUT Data	0028,3006	US		ALWAYS	AUTO	-

Table 80: Softcopy VOI LUT Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Softcopy VOI LUT Sequence	0028,3110	SQ		ALWAYS	AUTO	-
> Referenced Image Sequence	0008,1140	SQ		ALWAYS	AUTO	-
>> Referenced SOP Class UID	0008,1150	UI	1.3.46.670589.2.3.1.1	ALWAYS	AUTO	-
>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
> Window Center	0028,1050	DS		ALWAYS	AUTO	-
> Window Width	0028,1051	DS		ALWAYS	AUTO	-
> VOI LUT Sequence	0028,3010	SQ		ANAPEV	AUTO	-

Table 81: Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO/ WLM/ USER	Received from RIS or entered by operator
Patient ID	0010,0020	LO		VNAP	AUTO/ WLM/ USER	Received from RIS or entered by operator, zero length if not knwon.
Patient's Birth Date	0010,0030	DA		VNAP	AUTO/ WLM/ USER	Received from RIS or entered by operator, zero length if not known.
Patient's Sex	0010,0040	CS	F, M, O	ALWAYS	AUTO/ WLM/ USER	Received from RIS or entered by operator. If unknown default O

Table 82: General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	-
Study Time	0008,0030	TM		ALWAYS	AUTO	-
Accession Number	0008,0050	SH		ALWAYS	AUTO	Zero length if not received from RIS
Referring Physician's Name	0008,0090	PN		ALWAYS	AUTO	Zero length if not received from RIS
Study Description	0008,1030	LO		ALWAYS	AUTO	Zero length if not received from RIS
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Generated at the creation of the study or received from RIS
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 83: General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	Only the first 6 chars exported. Received from RIS or entered by operator, zero length if not known.
Performing Physician's Name	0008,1050	PN		ANAP	MWL/USER	Received from RIS or entered by operator, zero length if not known.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		EMPTY	AUTO	Always EMPTY
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date
Performed Procedure Step Start Time	0040,0245	TM		EMPTY	AUTO	Always EMPTY
Performed Procedure Step Description	0040,0254	LO		EMPTY	AUTO	Always EMPTY

Table 84: General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Institution Name	0008,0080	LO		ALWAYS	AUTO	Hospital Name
Station Name	0008,1010	SH		ALWAYS	AUTO	Local system ID
Manufacturer's Model Name	0008,1090	LO	Extended Digital Imaging	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	-

Table 85: Display Shutter Module (C)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	CIRCULAR, RECTANGULAR,	ALWAYS	AUTO	-
Shutter Left Vertical Edge	0018,1602	IS		ANAPEV	AUTO	-
Shutter Right Vertical Edge	0018,1604	IS		ANAPEV	AUTO	-
Shutter Upper Horizontal Edge	0018,1606	IS		ANAPEV	AUTO	-
Shutter Lower Horizontal Edge	0018,1608	IS		ANAPEV	AUTO	-
Center of Circular Shutter	0018,1610	IS		ANAPEV	AUTO	-
Radius of Circular Shutter	0018,1612	IS		ANAPEV	AUTO	-
Shutter Presentation Value	0018,1622	US	Default 0x000=0	ALWAYS	AUTO	-

Table 86: SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.11.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-

8.1.4.2. Specialized PMS X-Ray Image Storage SOP Class (UnProcessed / AutoPush)

The following tables give a detailed overview of all supported attributes of the Specialized PMS X-Ray Storage SOP Class. Each image/series of Specialized PMS X-Ray images has only one Softcopy Presentation State image.

The list of possible values are given. The situation that an attribute is present Conditionally / Optionally or that an attribute may contain a zero length value, is indicated to. Conditions and Defined / Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.
Private attributes are not applied in the tables below.

Table 87: Modules of the Created Specialized PMS X-Ray SOP Class by the DSI

Information Entity	Module Name	Reference	Presence of Module
Patient	Patient Module	Table 71	ALWAYS
Study	General Study Module	Table 72	ALWAYS
Series	General Series Module	Table 73	ALWAYS
Equipment	General Equipment Module	Table 74	ALWAYS
	Display Shutter Module	Table 75	ALWAYS
	General Image Module	Table 76	ALWAYS
	Image Pixel Module	Table 77	ALWAYS
	X-Ray Image Module	Table 78	ALWAYS
	XRF Positioner Module	Table 79	ALWAYS
	X-Ray Acquisition	Table 80	ALWAYS
	SOP Common Module	Table 81	ALWAYS
	VOI LUT Module	Table 82	ALWAYS

Table 88: Specialized PMS X-Ray Image Store - Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN	ISO_IR 100	ALWAYS	AUTO	Received From RIS or Entered by Operator.
Patient ID	0010,0020	LO		ALWAYS	AUTO	Received From RIS or Entered by Operator.
Patient's Birth Date	0010,0030	DA		VNAP	AUTO	Received From RIS or Entered by Operator.
Patient's Sex	0010,0040	CS	F,M,O	VNAP	AUTO	Received From RIS or Entered by Operator.

Table 89: Specialized PMS X-Ray Image Store – General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	PN		ALWAYS	AUTO	-
Study Time	0008,0030	LO		ALWAYS	AUTO	-
Accession Number	0008,0050	DA		ALWAYS	AUTO	Zero length if not received from RIS.

Referring Physician's Name	0008,0090	CS		ALWAYS	AUTO	Zero length if not received from RIS.
Study Description	0008,1030	LO		VNAP	AUTO	Examination Type (for DI/VF)
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Generated at the creation of the study or received from RIS.
Study ID	0020,0010	SH		EMPTY	AUTO	Always EMPTY

Table 90: Specialized PMS X-Ray Image Store – General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Modality	0008,0060	CS	RF	ALWAYS	AUTO	-
Performing Physician's Name	0008,1050	PN		ALWAYS	AUTO	Received from RIS, entered by user or is empty if not known. Only frist 3 chars.
Protocol Name	0018,1030	LO		ALWAYS	AUTO	Received from RIS, entered by user or is empty if not known. Only frist 6 chars.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		EMPTY	AUTO	Always EMPTY.
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	System Date
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ALWAYS	AUTO	-

Table 91: Specialized PMS X-Ray Image Store – General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Institution Name	0008,0080	LO		ALWAYS	AUTO	Hospital Name
Station Name	0008,1010	SH		ALWAYS	AUTO	Local system ID
Manufacturer's Model Name	0008,1090	LO	Extended Digital Imaging	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	-

Table 92: Specialized PMS X-Ray Image Store – Display Shutter Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	CIRCULAR, RECTANGULAR	ALWAYS	AUTO	-
Shutter Left Vertical Edge	0018,1602	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR
Shutter Right Vertical Edge	0018,1604	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR

Shutter Upper Horizontal Edge	0018,1606	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR
Shutter Lower Horizontal Edge	0018,1608	IS		ANAPC	AUTO	Required if Shutter Shape is RECTANGULAR
Center of Circular Shutter	0018,1610	IS		ANAPC	AUTO	Required if Shutter Shape is CIRCULAR.
Radius of Circular Shutter	0018,1612	IS		ANAPC	AUTO	Required if Shutter Shape is CIRCULAR. 256/256
Shutter Presentation Value	0018,1622	US	0x0000=0	ANAP	AUTO	-

Table 93: Specialized PMS X-Ray Image Store – General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	-
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	Applied Value(s): 1-n
Patient Orientation	0020,0020	CS		EMPTY	AUTO	Always EMPTY.

Table 94: Specialized PMS X-Ray Image Store – Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US	512 and 1024	ALWAYS	AUTO	-
Columns	0028,0011	US	512 and 1024	ALWAYS	AUTO	-
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO	-

Table 95: Specialized PMS X-Ray Image Store – X-Ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	US	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	FIXED	-
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	FIXED	-
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	FIXED	-
Bits Allocated	0028,0100	US	8	ALWAYS	FIXED	-
Bits Stored	0028,0101	US	8	ALWAYS	FIXED	-
High Bit	0028,0102	US	7	ALWAYS	FIXED	-
Pixel Representation	0028,0103	US	0x0000=0	ALWAYS	FIXED	-
Pixel Intensity Relationship	0028,1040	US	DISP	ALWAYS	FIXED	-

Table 96: Specialized PMS X-Ray Image Store – XRF Positioner Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		EMPTY	AUTO	Always EMPTY.

Table 97: Specialized PMS X-Ray Image Store – X-Ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		EMPTY	AUTO	Always EMPTY.
Exposure Time	0018,1150	IS		EMPTY	AUTO	Always EMPTY.
X-Ray Tube Current	0018,1151	IS		EMPTY	AUTO	Always EMPTY.
Exposure	0018,1152	IS		ANAPC	AUTO	-
Radiation Setting	0018,1155	CS	Applied Value(s): GR,SC	ALWAYS	AUTO	SC = low dose exposure generally corresponding to fluoroscopic settings (e.g. preparation for diagnostic quality image acquisition); GR = high dose for diagnostic quality image acquisition (also called digital spot or cine);

Table 98: Specialized PMS X-Ray Image Store – SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.3.46.670589.2.3.1.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-

Table 99: Specialized PMS X-Ray Image Store – VOI LUT Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	AUTO	This attribute is related to the DI Contrast / Brightness.
Window Width	0028,1051	DS		ALWAYS	AUTO	This Attribute is related to the DI Contrast / Brightness. Required if (0028,1050) is sent

8.1.5.   Attribute Mapping

The following mapping Table applies for attributes of the DSI in the Non Autopush Mode.

Table 100: Attribute Mapping of the DSI for the Non AutoPush Mode.

Attribute Name	MWL Tag	MPPS Tag N-CREATE	SC Tag	RF Tag	RAW Tag	PS Tag	Comment
Specific Character Set	-	-	(0008,0005)	(0008,0005)	(0008,0005)	(0008,0005)	(if present)
Accession Number	(0008,0050)	-	(0008,0050)	(0008,0050)	(0008,0050)	-	-
Referring Physician's Name	(0008,0090)	-	(0008,0090)	(0008,0090)	(0008,0090)	-	-
Patient's Name	(0010,0010)	-	(0010,0010)	(0010,0010)	(0010,0010)	(0010,0010)	-
Patient ID	(0010,0020)	-	(0010,0020)	(0010,0020)	(0010,0020)	(0010,0020)	-
Patient's Birth Date	(0010,0030)	-	(0010,0030)	(0010,0030)	(0010,0030)	(0010,0030)	-
Patient's Sex	(0010,0040)	-	(0010,0040)	(0010,0040)	(0010,0040)	(0010,0040)	-
Protocol Name	-	-	-	(0018,1030)	(0018,1030)	(0018,1030)	-
Study Instance UID	(0020,000D)	-	(0020,000D)	(0020,000D)	(0020,000D)	(0020,000D)	-
Study ID	-	(0020,0010)	-	(0020,0010)	(0020,0010)	(0020,0010)	-
Performed Procedure Step Start Date	-	-	-	(0040,0244)	(0040,0244)	(0040,0244)	Copied from (0008,0020) Study Date
Performed Procedure Step Start Time	-	-	-	(0040,0245)	(0040,0245)	(0040,0245)	Copied from (0008,0030) Study Time
Performed Procedure Step Description	-	-	-	(0040,0254)	(0040,0254)	(0040,0254)	Copied from (0008,1030) Study Description

The next mapping Table applies for attributes of the DSI in the Autopush Mode.

Table 101: Attribute Mapping of the DSI for the Autopush Mode.

Attribute Name	MWL Tag	MPPS Tag N-CREATE	RAW Tag	PS Tag	Comment
Specific Character Set	-	-	(0008,0005)	(0008,0005)	(if present)
Accession Number	(0008,0050)	-	(0008,0050)	-	-
Referring Physician's Name	(0008,0090)	-	(0008,0090)	-	-
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)	-
Protocol Name	-	-	(0018,1030)	(0018,1030)	-
Study Instance UID	(0020,000D)	-	(0020,000D)	-	-
Study ID	-	(0020,0010)	(0020,0010)	(0020,0010)	-
Performed Procedure Step Start Date	-	-	(0040,0244)	(0040,0244)	Copied from (0008,0020) Study Date
Performed Procedure Step Start Time	-	-	(0040,0245)	(0040,0245)	Copied from (0008,0030) Study Time
Performed Procedure Step Description	-	-	(0040,0254)	(0040,0254)	Copied from (0008,1030) Study Description

8.1.6. Coerced / Modified fields

In general, DSI will try and optimize the imported image data. This may involve the removal of redundant data, either or not due to the creation of a Grayscale Softcopy Presentation State object for the image data. This may also involve the creation of extra attributes. As it is not the intention of DSI to export this data as such, the SOP Instance UID shall not be changed.

If not available at import then DSI will create the additional attributes as listed in the Table below.

Table 102: Create Additional Attributes

Name	Tag	Generated Value
Performed Procedure Step Start Date	0040,0244	Copied from (0008,0020) Study Date.
Performed Procedure Step Start Time	0040,0245	Copied from (0008,0030) Study Time.
Performed Procedure Step Description	0040,0254	Copied from (0008,1030) Study Description.

If the SCU does not propose a Presentation Context for the Grayscale Softcopy Presentation State storage SOP class, then DSI will derive Grayscale Softcopy Presentation State data from the imported image data and store this data in a new series within the examination of the imported image.
However, if during import the image is accompanied by Grayscale Softcopy Presentation State data, the DSI database shall avoid data overlap by only storing the relevant data from the first object received; either the first image or its Presentation State!

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

Not applicable.

8.3.3. Private code definitions

Not applicable.

8.4. Grayscale Image consistency

The display monitor attached to the product can be calibrated by using the service tool together with a light probe. See the [VFRB; ViewForum Release Bulletin] for details on the calibration procedure.

8.5. Standard Extended/Specialized/Private SOPs

The Standard DICOM SOP Classes may be Extended with additional (private) attributes.

Standard attributes of other SOP Classes; the presence of these attributes in exported images can be configured.

8.6. Private Transfer syntaxes

Not applicable.