
DICOM

Conformance Statement

DSI R6.1.7



Issued by:

Philips Medical Systems Nederland B.V.
CTO/ C&S - Interoperability Competence Center

P.O. Box 10.000
5680 DA Best
The Netherlands

email: <mailto:dicom@philips.com>
Internet: <http://www.medical.philips.com/connectivity/>

Document Number: XBS 231-070219.06
Date: 12 July 2007

OVERVIEW

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

The DSI (Analog) System is an Analog 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

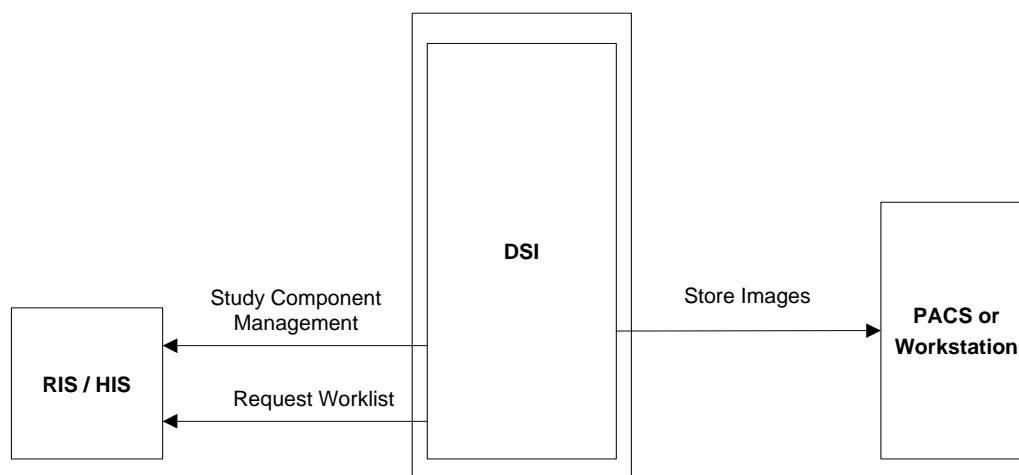


Figure 1: DSI (Analog) System in a DICOM Network environment

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.

Table 1 presents an overview of all network services and the applicable SOP classes as provided by DSI.

Table 1: Network Services for the DSI (Analog)

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 (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 (Processed) Mode (RF & SC and SC only)			
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

TABLE OF CONTENTS

OVERVIEW.....	3
TABLE OF CONTENTS.....	5
1. INTRODUCTION.....	8
1.1. Revision History.....	8
1.2. Scope and Field of Application.....	8
1.3. Intended Audience.....	8
1.4. Contents and Structure.....	8
1.5. Used Definitions, Terms and Abbreviations.....	8
1.6. References.....	9
1.7. Important Note to the Reader.....	9
1.8. General Acronyms and Abbreviations.....	10
1.9. References.....	11
2. NETWORKING.....	12
2.1. IMPLEMENTATION MODEL.....	12
2.1.1. Application Data Flow Diagram.....	12
2.2. Functional definition of Application Entities.....	14
2.2.1. DSI DICOM AE.....	14
2.2.1.1. Functional Definition of the DSI.....	14
2.3. Sequencing of Real World Activities.....	14
3. AE SPECIFICATIONS.....	16
3.1. DSI DICOM AE.....	16
3.1.1. Association Establishment Policies.....	17
3.1.1.1. General.....	17
3.1.1.2. Number of Associations.....	17
3.1.1.3. Asynchronous Nature.....	17
3.1.1.4. Implementation Identifying Information.....	17
3.1.2. Association Acceptance Policy.....	17
3.1.2.1. Export from DSI system.....	18
3.1.2.2. Request for a Modality Worklist.....	22
3.1.2.3. Create a Study Component.....	25
3.1.3. Association Acceptance Policy.....	27
4. COMMUNICATION PROFILES.....	28
4.1. Physical Network Interface.....	28
5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS.....	29
6. CONFIGURATION.....	30
6.1. AE Title/Presentation Address mapping.....	30
6.1.1. Local AE Titles and Presentation Addresses.....	30
6.1.1.1. Local AE Title.....	30
6.1.2. Remote AE Titles and Presentation Addresses.....	30
6.2. Configurable parameters.....	30
7. SUPPORT OF EXTENDED CHARACTER SETS.....	32
8. ANNEX.....	33
8.1. IOD CONTENTS.....	33
8.1.1. Created Secondary Capture Image Storage SOP Class (Processed / Non AutoPush).....	34
8.1.2. Created RF Image Storage SOP Class (Processed / No AutoPush).....	37
8.1.3. Created RAW data images for the Processed / No AutoPush Mode.....	40
8.1.3.1. Created Softcopy Presentation SOP class for Processed / No AutoPush Mode.	40
8.1.3.2. Specialized PMS X-Ray Object for Processed / No AutoPush Mode.	44
8.1.4. Created RAW data images for the UnProcessed / AutoPush Mode.....	48

8.1.4.1.	Created Softcopy Presentation State Storage SOP Class for UnProcessed / AutoPush Mode.....	48
8.1.4.2.	Specialized PMS X-Ray Object for UnProcessed / AutoPush Mode.	52
8.1.5.	Coerced / Modified fields.....	55
8.2.	Data Dictionary of Private Attributes.....	56
8.3.	Coded Terminology and Templates	56
8.4.	Grayscale Image consistency.....	56
8.5.	Standard Extended/Specialized/Private SOPs.....	56

1. INTRODUCTION

1.1. Revision History

Table 2: Revision History

Document Version	Date of Issue	Author	Description
06	12-07-2007	CTO, C&S-IC2	Approved version DICOM Conformance Statement DICOM ConformanceStatement DSI R6.1.7

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

1.2. Scope and Field of Application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices. This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

1.3. Intended Audience

This Conformance Statement is intended for:

- (potential) customers
- system integrators of medical equipment
- software designers implementing DICOM interfaces

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

1.4. Contents and Structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

1.5. Used 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.

1.6. References

- [DICOM] The Digital Imaging and Communications in Medicine (DICOM) standard Part 1 – 16 (NEMA PS 3.1 – PS 3.16), National Electrical Manufacturers Association (NEMA) Publication Sales 1300 N. 17th Street, Suite 1847 Rosslyn, Va. 22209, United States of America

1.7. Important Note to the Reader

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).

1.8. General Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

- AE Application Entity
- ACP Archiving / Connectivity and Print
- ACR American College of Radiology
- ANSI American National Standard Institute
- CD-R CD Recordable
- SCM Study Component Management SOP Class
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- DSI Digital Spot Imaging
- DVD Digital Versatile Disc
- ELE Explicit VR Little Endian
- EBE Explicit VR Big Endian
- EV EasyVision
- GUI Graphic User Interface
- HIS Hospital Information System
- HL7 Health Level Seven
- ILE Implicit VR Little Endian
- IOD Information Object Definition
- ISIS Information System - Imaging System
- MWL Modality Worklist
- NEMA National Electrical Manufacturers Association
- PACS Picture Archiving Communication System
- PDU Protocol Data Unit
- RIS Radiology Information System
- RF X-Ray Radiofluoroscopic Image
- RWA Real World Activity
- SC Secondary Capture Image
- SCM Study Component Management SOP Class
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet protocol
- UID Unique Identifier
- WLM Worklist Management

The following terms are used in this document:**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].

1.9. References

- [DICOM] Digital Imaging and Communications in Medicine (DICOM), Part 1 – 16 (NEMA PS 3.1 – PS 3.16),
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.

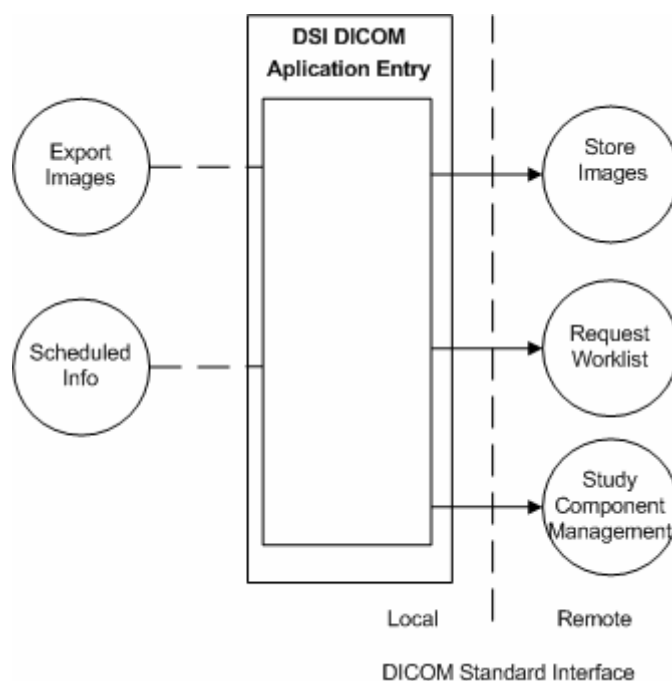


Figure 2. Networking Application Data Flow Diagram of the DSI R 6.1.7

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.

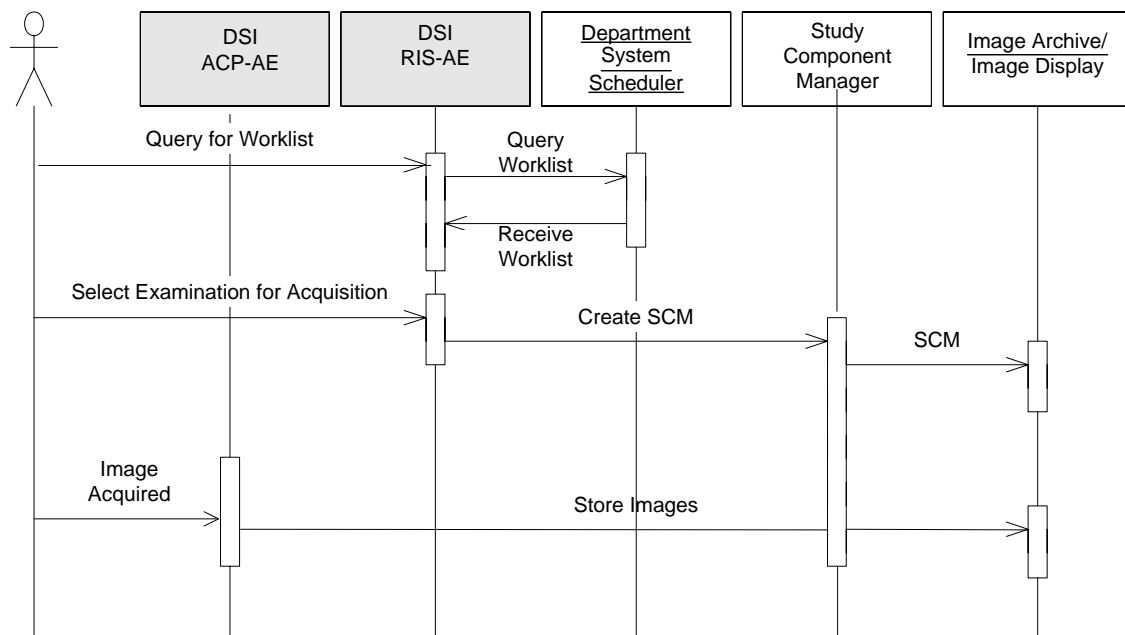


Figure 3. Sequencing of the Real Word Activities of the DSI System.

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 1. 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 NON_ 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)			
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:	R6.1.7.0010

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 2. 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	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None
X-Ray Specialization	1.3.46.670589.2.3.1.1	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	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 be 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.

Note that the SOP class UID will be generated each time export occurs. That means that when the same series is exported twice each export action will get a different SOP class UID allocated.

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

Table 3 gives an overview of the applied optional modules and attributes in the RF images.

Table 3. 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 4. 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.

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

Table 5 gives an overview of the applied optional modules and attributes in the SC images.

Table 5. Applied optional Modules and Attributes of the SC Image IO

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

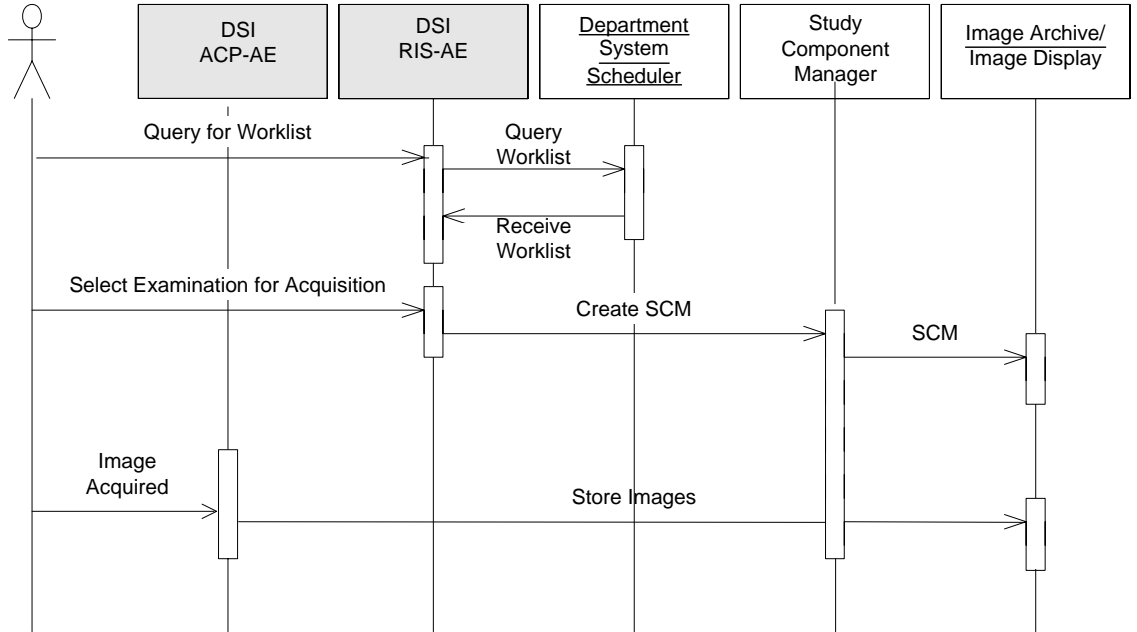
The modules selected from the IOD module table of DICOM 3.0 are given in the table below.

Table 6. 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 ANNEX.

3.1.2.2. Request for a Modality Worklist



Sequencing of the Real World 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 7. 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	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	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 8. Modality Worklist Information Model - Patient Identification Module

Attribute Name	Tag	Note
Patient's Name	0010,0010	
Patient ID	0010,0020	

Table 9. Modality Worklist Information Model - Patient Demographic Module

Attribute Name	Tag	Note
Patient's Birth Date	0010,0030	
Patient's Sex	0010,0040	

Table 10. Modality Worklist Information Model - Scheduled Procedure Step Module

Attribute Name	Tag	Note
Scheduled Procedure Step Sequence	0040,0100	
>Modality	0008,0060	Can be used as matching key. (RF)
>Scheduled Station AE Title	0040,0001	Can be used as matching key.
>Scheduled Procedure Step Start Time	0040,0003	
>Scheduled Performing Physician's Name	0040,0006	
>Scheduled Procedure Step Description	0040,0007	

Table 11. Modality Worklist Information Model - Requested Procedure Module

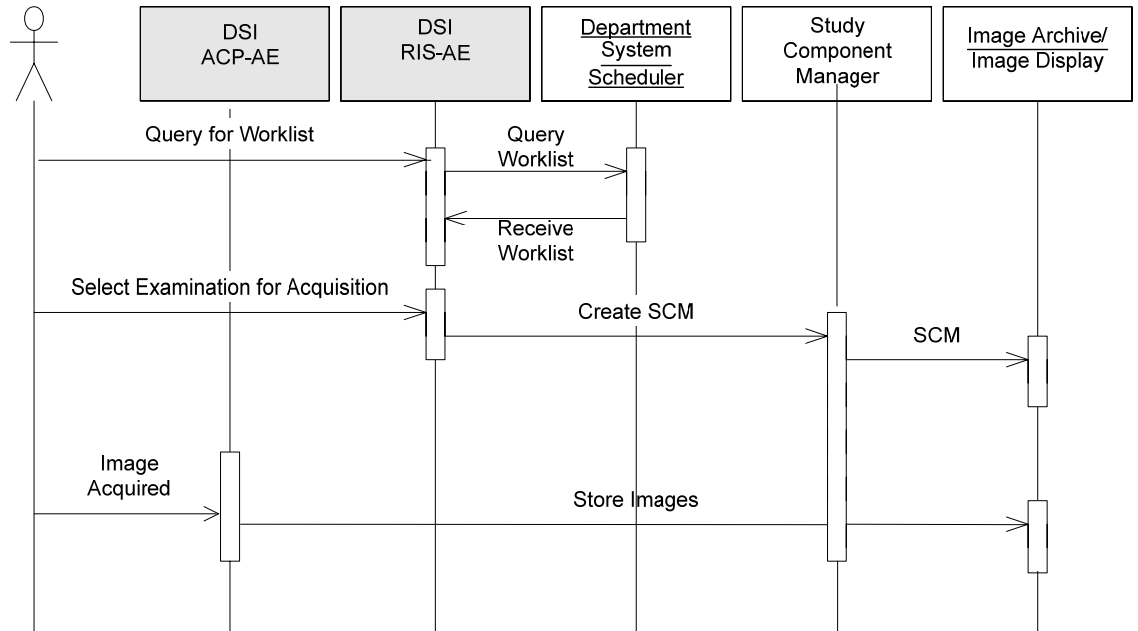
Attribute Name	Tag	Note
Study Instance UID	0020,000D	
Requested Procedure Code Sequence	0032,1064	Default : EMPTY

Table 12. Modality Worklist Information Model - Imaging Service Request Module

Attribute Name	Tag	Note
Accession Number	0008,0050	
Referring Physician's Name	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 13. 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	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

3.1.2.3.3. SOP Specific Conformance to Study Component Management

DSI provides standard conformance, with one exception: because the Procedure Code Sequence is not supported yet in the Study Component Management SOP Class.

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.

Table 14. Study Component Management SOP Class - Study Component Module

Attribute Name	Tag	Note
Referenced Series Sequence	0008,1115	Is always EMPTY
Study ID	0020,0010	Is always EMPTY

Table 15. Study Component Management SOP Class - Study Component Relationship Module

Attribute Name	Tag	Note
Referenced Study Sequence	0008,1110	
>Referenced SOP Class UID	0008,1150	Applied Value(s): 1.2.840.10008.3.1.2.3.1
>Referenced SOP Instance UID	0008,1155	Value from Study Instance UID in C-FIND Response of Modality Worklist.

Table 16. Study Component Management SOP Class -Study Component Acquisition Module

Attribute Name	Tag	Note
Modality	0008,0060	Applied Value: RF
Study Description	0008,1030	Description of the classification of the Study (Component) performed, entered by institution.
Procedure Code Sequence	0008,1032	Not supported yet
Study Component Status ID	0032,1055	Applied Value(s): COMPLETED

Table 17. Study Component Management SOP Class - Sop Common Module

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied Value(s): ISO_IR 100

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 18. 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).

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.

Used Presentation Values:

ALWAYS	the module or attribute shall always be present with value
ANAP	Attribute Not Always Present
ANAPC	Attribute Not Always Present, Present under Condition
VNAP	Value Not Always Present (attribute sent zero length if no value is present)
EMPTY	Attribute is sent without a value
MAYBE	the Attribute may be present under specified condition
OPTIONAL	the module may be available, depending on source object

Used Source Items:

AUTO	the attribute value is generated automatically
CONF	the attribute value source is a configurable parameter
IMPL	the attribute value source is a user-implicit configuration setting
MPPS	the attribute value source is a modality performed procedure step
MWL	the attribute value source is a modality Worklist
SPEC	the attribute value source is a specific DICOM object
USER	the attribute value source is explicit user input

8.1.1. Created Secondary Capture Image Storage SOP Class (Processed / Non 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.

Table 3: SC Image Storage SOP Class - Patient Module (M)

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

Table 4: SC Image Storage SOP Class - General Study Module (M)

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

Table 5: SC Image Storage SOP Class - General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Date	0008,0021	DA		ALWAYS	AUTO
Series Time	0008,0031	TM		ALWAYS	AUTO
Protocol Name	0018,1030	LO	Received from RIS, entered by user or is empty if not known. Exported only first 6 characters of name.	VNAP	AUTO
Performing Physicians' Name	0008,1050	PN	Received from RIS, entered by user or is empty if not known. Exported only first 3 characters of name.	VNAP	USER
Series Instance UID	0020,000E	UI	Generated at creation of the series	ALWAYS	AUTO

Series Number	0020,0011	IS		ALWAYS	AUTO
Laterality	0020,0060	CS	Always zero length value.	ALWAYS	AUTO
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO
Performed Procedure Step Start Time	0040,0245	TM	Always zero length value.	ALWAYS	AUTO
Performed Procedure Step Description	0040,0254	LO	Always zero length value.	ALWAYS	AUTO

Table 6: SC Image Storage SOP Class – General Equipment Module (O)

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

Table 7: SC Image Storage SOP Class – SC Image Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	0008,0060	CS	RF	ALWAYS	AUTO
Conversion Type	0008,0064	CS	DV (Digitized Video)	ALWAYS	AUTO
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	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122	ALWAYS	AUTO

Table 8: SC Image Storage SOP Class – SC Image Module (M)

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

Table 9: SC Image Storage SOP Class - General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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 zero length value.	ALWAYS	AUTO
Image Comments	0020,4000	LT	present if entered by user	ANAP	USER

Table 10: SC Image Storage SOP Class - Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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 11: SC Image Storage SOP Class – VOI LUT Module (O)

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

Table 12: SC Image Storage SOP Class – SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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

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.

Table 19. XRF Image Storage SOP Class -Patiënt Module (M)

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

Table 20. XRF Image Storage SOP Class -General Study Module (M)

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

Table 21. XRF Image Storage SOP Class -General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Date	0008,0021	DA		ALWAYS	AUTO
Series Time	0008,0031	TM		ALWAYS	AUTO
Modality	0008,0060	CS	Applied Value(s): RF	ALWAYS	AUTO
Performing Physician's Name	0008,1050	PN	Received from RIS, entered by user or is empty if not known. Only the first 3 chars exported.	ALWAYS	AUTO
Protocol Name	0018,1030	LO	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	ALWAYS	AUTO
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Laterality	0020,0060	CS	Always zero length.	ALWAYS	AUTO
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO
Performed Procedure Step Start Time	0040,0245	TM	Always zero length.	ALWAYS	AUTO
Performed Procedure Step Description	0040,0254	LO	Always zero length.	ALWAYS	AUTO

Table 22. XRF Image Storage SOP Class -General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO
Institution Name	0008,0080	LO	Service-configurable values	ALWAYS	AUTO
Station Name	0008,1010	SH	Service-configurable values	ALWAYS	AUTO
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	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122	ALWAYS	AUTO

Table 23. XRF Image Storage SOP Class -General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
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 zero length value.	ALWAYS	AUTO
Image Comments	0020,4000	LT	Present if entered by user	ANAP	USER

Table 24. XRF Image Storage SOP Class -Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rows	0028,0010	US	Equal to the value of Rows (512 or 1024). The actual image size in 60 Hz DSI system is smaller: 470 or 960. Applied Value(s): 1024, 512	ALWAYS	AUTO
Columns	0028,0011	US	Equal to the value of Rows (512 or 1024). The actual image size in 60 Hz DSI system is smaller: 470 or 960. Applied Value(s): 1024, 512	ALWAYS	AUTO
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO

Table 25. XRF Image Storage SOP Class - Display Shutter Module (O)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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 26. XRF Image Storage SOP Class -Image Pixel Module (M)

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

Table 27. XRF Image Storage SOP Class -X-ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	0008,0008	CS	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	AUTO
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	CS	MONOCHROME2	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	0000H	ALWAYS	AUTO
Pixel Intensity Relationship	0028,1040	CS	DISP	ALWAYS	AUTO

Table 28. XRF Image Storage SOP Class -X-ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	0018,0060	DS	Always zero length value.	ALWAYS	AUTO
Exposure Time	0018,1150	IS	Required if Exposure (0018,1152) is not present.	ANAP	AUTO
X-Ray Tube Current	0018,1151	IS	Required if Exposure (0018,1152) is not present.	ANAP	AUTO
Exposure	0018,1152	IS	Required if either Exposure Time (0018,1150) or X-RayTube Current (0018,1151) are not present. Default Always zero length value.	ALWAYS	AUTO
Radiation Setting	0018,1155	CS	Applied Value(s): GR, SC	ALWAYS	AUTO

Table 29. XRF Image Storage SOP Class -VOI LUT Module (O)

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

Table 30. XRF Image Storage SOP Class -SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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

8.1.3. Created RAW data images for the Processed / No AutoPush Mode

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 ACQUIRED".

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 for Processed / No AutoPush Mode.

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

Table 13: 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
	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
Image	SOP Common Module	ALWAYS

Table 14: 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	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 15: Presentation Series Module (M)

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

Table 16: Presentation State Identification 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		ALWAYS	AUTO	
>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Shutter Presentation Value	0018,1622	US	Default : 0x0000=0	ALWAYS	AUTO	Generated by device if shutter present
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Content Label	0070,0080	CS	AS ACQUIRED	ALWAYS	AUTO	
Content Description	0070,0081	LO	Zero length if unknow	ALWAYS	AUTO	
Presentation Creation Date	0070,0082	DA		ALWAYS	AUTO	
Presentation Creation Time	0070,0083	TM		ALWAYS	AUTO	
Content Creator's Name	0070,0084	PN	Zero length if unknow	ALWAYS	AUTO	

Table 17: Softcopy Presentation LUT Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Sequence	2050,0010	SQ		ANAPEV	AUTO	

>LUT Descriptor	0028,3002	US /SS		ALWAYS	AUTO	
>LUT Explanation	0028,3003	LO		ANAP	AUTO	
>LUT Data	0028,3006	US /SS		ALWAYS	AUTO	
Presentation LUT Shape	2050,0020	CS		ALWAYS	AUTO	

Table 18: 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	128	ALWAYS	AUTO	
>Window Width	0028,1051	DS	255	ALWAYS	AUTO	
>VOI LUT Sequence	0028,3010	SQ		ANAPEV	AUTO	
>>LUT Descriptor	0028,3002	US /SS		ALWAYS	AUTO	
>>LUT Data	0028,3006	US /SS		ALWAYS	AUTO	

Table 19: Patient Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	AUTO	
Patient ID	0010,0020	LO	Zero if unknown	VNAP	AUTO	
Patient's Birth Date	0010,0030	DA	Zero if unknown	VNAP	AUTO	
Patient's Sex	0010,0040	CS	If unknown default O	ALWAYS	AUTO	

Table 20: 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	From RIS or zero if unknown	ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN	From RIS or zero if unknown	ALWAYS	AUTO	
Study Description	0008,1030	LO	From RIS or zero if unknown	ALWAYS	AUTO	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH	Always EMPTY	ALWAYS	AUTO	

Table 21: 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	
Series Description	0008,103E	LO		ANAP	USER	
Performing Physician's Name	0008,1050	PN	From RIS or zero length if unknown	ANAP	MWL/ /USER	Only the first 3 chars. exported.
Operators' Name	0008,1070	PN		ANAP	MWL/ /USER	

Protocol Name	0018,1030	LO	From RIS or zero length if unknown	ALWAYS	AUTO	Only the first 6 chars. exported.
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Laterality	0020,0060	CS	Always EMPTY	ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM	Always EMPTY	ALWAYS	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO	zero length if unknown	ALWAYS	USER	

Table 22: General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	CONFIG	Philips Medical Systems
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Service-configurable values
Station Name	0008,1010	SH		ALWAYS	CONFIG	Service-configurable values
Manufacturer's Model Name	0008,1090	LO		ALWAYS	CONFIG	Digital Imaging
Device Serial Number	0018,1000	LO		ALWAYS	CONFIG	
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122
Date of Last Calibration	0018,1200	DA		ANAP	USER	

Table 23: 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	256 / 256	ANAPEV	AUTO	
Radius of Circular Shutter	0018,1612	IS	254	ANAPEV	AUTO	

Table 24: SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100, 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	

8.1.3.2. Specialized PMS X-Ray Object for Processed / No AutoPush Mode.

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 25: 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 26	ALWAYS
Study	General Study Module	Table 27	ALWAYS
Series	General Series Module	Table 28	ALWAYS
Equipment	General Equipment Module	Table 29	ALWAYS
Image	General Image Module	Table 31	ALWAYS
	Image Pixel Module	Table 32	ALWAYS
	Specialized PMS X-Ray Image Module	Table 33	ALWAYS
	X-Ray Acquisition	Table 35	ALWAYS
	VOI LUT Module	Table 37	ALWAYS
	SOP Common Module	Table 36	ALWAYS
	XRF POSITIONER Module	Table 34	ALWAYS
	Display Shutter Module	Table 30	ALWAYS

Table 26: Specialized PMS X-Ray Image Store - Patient Module (M)

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

Table 27: Specialized PMS X-Ray Image Store - General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Date	0008,0020	PN		ALWAYS	AUTO
Study Time	0008,0030	LO		ALWAYS	AUTO
Accession Number	0008,0050	DA	Zero length if not received from RIS.	ALWAYS	AUTO
Referring Physician's Name	0008,0090	CS	Zero length if not received from RIS.	ALWAYS	AUTO
Study Description	0008,1030	LO	Zero length if not received from RIS	ALWAYS	AUTO
Study Instance UID	0020,000D	UI	Generated at the creation of	ALWAYS	AUTO

			the study or received from RIS.		
Study ID	0020,0010	SH	Always EMPTY	ALWAYS	AUTO

Table 28: Specialized PMS X-Ray Image Store - General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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	Received from RIS, entered by user or is empty if unknown. Only first 3 chars exported.	ALWAYS	AUTO
Referenced Study Component Sequence	0008,1111	SQ		ANAP	AUTO
> Referenced SOP Class UID	0008,1150	UI		ALWAYS	SPEC
> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO
Protocol Name	0018,1030	LO	Examination Type (for DI/VF), Only first 6 chars. Zero length if not known	ALWAYS	AUTO
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		ALWAYS	AUTO
Laterality	0020,0060	CS	Always EMPTY.	ALWAYS	AUTO
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO
Performed Procedure Step Start Time	0040,0245	TM	Always EMPTY	ALWAYS	AUTO
Performed Procedure Step Description	0040,0254	LO	Always EMPTY	ALWAYS	AUTO
Request Attributes Sequence	0040,0275	SQ		ANAP	AUTO
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	AUTO
>Scheduled Procedure Step ID	0040,0009	SH		ANAPC	AUTO
>Requested Procedure ID	0040,1001	SH		ANAPC	AUTO

Table 29: Specialized PMS X-Ray Image Store - General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO
Institution Name	0008,0080	LO	Service-configurable values	ALWAYS	AUTO
Station Name	0008,1010	SH	Service-configurable values	ALWAYS	AUTO
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	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122	ALWAYS	AUTO

Table 30: Specialized PMS X-Ray Image Store - Display Shutter Module (M)

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

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

Table 31: Specialized PMS X-Ray Image Store - General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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	Applied Value(s): 1-m	ALWAYS	AUTO
Instance Number	0020,0013	IS	Applied Value(s): 1-n	ALWAYS	AUTO
Patient Orientation	0020,0020	CS	Always EMPTY.	ALWAYS	AUTO
Image Comments	0020,4000	LT	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.	ANAP	USER

Table 32: Specialized PMS X-Ray Image Store - Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	AUTO
Rows	0028,0010	US	512, 1024	ALWAYS	AUTO
Columns	0028,0011	US	512, 1024	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	0	ALWAYS	AUTO
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO

Table 33: Specialized PMS X-Ray Image Store - X-Ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	0008,0008	US	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	AUTO
Rows	0028,0010	US	512, 1024	ALWAYS	AUTO
Columns	0028,0011	US	512, 1024	ALWAYS	AUTO
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO
Bits Stored	0028,0101	US	8	ALWAYS	AUTO
Pixel Intensity Relationship	0028,1040	US	DISP	ALWAYS	AUTO

Table 34: Specialized PMS X-Ray Image Store - XRF Positioner Module (M)

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

Table 35: Specialized PMS X-Ray Image Store – X-Ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	0018,0060	DS	Always EMPTY.	ALWAYS	AUTO
Exposure Time	0018,1150	IS	Always EMPTY.	ALWAYS	AUTO
X-Ray Tube Current	0018,1151	IS	Always EMPTY.	ALWAYS	AUTO
Radiation Setting	0018,1155	CS	GR, SC	ALWAYS	AUTO

Table 36: Specialized PMS X-Ray Image Store - SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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

Table 37: Specialized PMS X-Ray Image Store - VOI LUT Module (M)

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

8.1.4. Created RAW data images for the UnProcessed / AutoPush Mode

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 State Storage SOP Class for UnProcessed / AutoPush Mode.

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 38: IOD of Created Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Curve	Displayed Area Module	ALWAYS
Curve	Presentation Series Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
Presentation State	Softcopy Presentation LUT Module	ALWAYS
Presentation State	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
Image	SOP Common Module	ALWAYS

Table 39: 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	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 40: Presentation Series Module (M)

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

Table 41: Presentation State Identification 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		ALWAYS	AUTO	
>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Shutter Presentation Value	0018,1622	US		ANAP	AUTO	Generated by device if shutter present
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	Zero length	ALWAYS	AUTO	

Table 42: 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 /SS		ALWAYS	AUTO	
>LUT Data	0028,3006	US /SS		ALWAYS	AUTO	

Table 43: 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	255	ALWAYS	AUTO	
>VOI LUT Sequence	0028,3010	SQ		ANAPEV	AUTO	

Table 44: Patient Module (M)

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

Table 45: 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	Zero length if not received from RIS	ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN	Zero length if not received from RIS	ALWAYS	AUTO	
Study Description	0008,1030	LO	Zero length if not received from RIS	ALWAYS	AUTO	
Study Instance UID	0020,000D	UI	Generated at the creation of the study or received from RIS	ALWAYS	AUTO	
Study ID	0020,0010	SH	Always EMPTY	ALWAYS	AUTO	

Table 46: 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	
Series Description	0008,103E	LO		ANAP	USER	Only the first 3 chars exported.
Operators' Name	0008,1070	PN		ANAP	MWL/USER	
Protocol Name	0018,1030	LO	Received from RIS or entered by operator, zero length if not known.	ALWAYS	AUTO	Only the first 6 chars exported.
Performing Physician's Name	0008,1050	PN	Received from RIS or entered by operator, zero length if not known.	ANAP	MWL/USER	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Laterality	0020,0060	CS	Always EMPTY	ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM	Always EMPTY	ALWAYS	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO	
Performed Procedure Step Description	0040,0254	LO	Always EMPTY	ALWAYS	AUTO	

Table 47: 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	Service-configurable values	ALWAYS	AUTO	
Station Name	0008,1010	SH	Service-configurable values	ALWAYS	AUTO	
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	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122	ALWAYS	AUTO	
Date of Last Calibration	0018,1200	DA		ANAP	USER	

Table 48: 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		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	256 / 256	ANAPEV	AUTO	
Radius of Circular Shutter	0018,1612	IS	254	ANAPEV	AUTO	
Shutter Presentation Value	0018,1622	US	Default 0x000=0	ANAPC	AUTO	

Table 49: SOP Common Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100, 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	

8.1.4.2. Specialized PMS X-Ray Object for UnProcessed / AutoPush Mode.

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 50: 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 26	ALWAYS
Study	General Study Module	Table 27	ALWAYS
Series	General Series Module	Table 28	ALWAYS
Equipment	General Equipment Module	Table 29	OPTIONAL
	Specialized PMS X-Ray Equipment Module		OPTIONAL
Image	General Image Module	Table 31	ALWAYS
	Image Pixel Module	Table 32	ALWAYS
	Specialized PMS X-Ray Image Module	Table 33	ALWAYS
	X-Ray Acquisition	Table 35	ALWAYS
	Modality LUT Module (Only if Pixel Intensity Relationship is LOG)		OPTIONAL
	VOI LUT Module	Table 37	ALWAYS
	SOP Common Module	Table 36	ALWAYS
	XRF POSITIONER Module	Table 34	ALWAYS
	Display Shutter Module	Table 30	ALWAYS

Table 51: Specialized PMS X-Ray Image Store - Patient Module (M)

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

Table 52: Specialized PMS X-Ray Image Store - General Study Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Date	0008,0020	PN		ALWAYS	AUTO
Study Time	0008,0030	LO		ALWAYS	AUTO
Accession Number	0008,0050	DA	Zero length if not received from RIS.	ALWAYS	AUTO
Referring Physician's Name	0008,0090	CS	Zero length if not received from RIS.	ALWAYS	AUTO
Study Description	0008,1030	LO	Examination Type (for DI/VF)	VNAP	AUTO

Protocol Name	0018,1030				
Study Instance UID	0020,000D	UI	Generated at the creation of the study or received from RIS.	ALWAYS	AUTO
Study ID	0020,0010	SH	Always EMPTY	ALWAYS	AUTO

Table 53: Specialized PMS X-Ray Image Store - General Series Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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	Received from RIS, entered by user or is empty if not known. Only first 3 chars.	ALWAYS	AUTO
Protocol Name	0018,1030	LO	Received from RIS, entered by user or is empty if not known. Only first 6 chars.	ALWAYS	AUTO
Series Instance UID	0020,000E	UI		ALWAYS	CONF
Series Number	0020,0011	IS		ALWAYS	AUTO
Laterality	0020,0060	CS	Always EMPTY.	ALWAYS	AUTO
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO
Performed Procedure Step Start Time	0040,0245	TM		VNAP	AUTO
Performed Procedure Step Description	0040,0254	LO		VNAP	AUTO

Table 54: Specialized PMS X-Ray Image Store - General Equipment Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO
Institution Name	0008,0080	LO	Service-configurable values	ALWAYS	AUTO
Station Name	0008,1010	SH	Service-configurable values	ALWAYS	AUTO
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	DSI R6.1.7 LUT 05-11-15 R6.1.7.0122	ALWAYS	AUTO

Table 55: Specialized PMS X-Ray Image Store - Display Shutter Module (O)

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

Table 56: Specialized PMS X-Ray Image Store - General Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
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	Applied Value(s): 1-n	ALWAYS	AUTO
Patient Orientation	0020,0020	CS	Always EMPTY.	ALWAYS	AUTO

Table 57: Specialized PMS X-Ray Image Store - Image Pixel Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	AUTO
Rows	0028,0010	US	512, 1024	ALWAYS	AUTO
Columns	0028,0011	US	512, 1024	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	0	ALWAYS	AUTO
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO

Table 58: Specialized PMS X-Ray Image Store - X-Ray Image Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	0008,0008	US	ORIGINAL, PRIMARY, SINGLE PLANE	ALWAYS	AUTO
Rows	0028,0010	US	512, 1024	ALWAYS	AUTO
Columns	0028,0011	US	512, 1024	ALWAYS	AUTO
Samples per Pixel	0028,0002	CS	0x0001=1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	US	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO
Bits Stored	0028,0101	US	8	ALWAYS	AUTO
Pixel Intensity Relationship	0028,1040	US	DISP	ALWAYS	AUTO

Table 59: Specialized PMS X-Ray Image Store - XRF Positioner Module (O)

Attribute Name	Tag	VR	Value	Presence of Value	Source
Distance Source to Detector	0018,1110	DS	empty	ALWAYS	AUTO

Table 60: Specialized PMS X-Ray Image Store – X-Ray Acquisition Module (M)

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	0018,0060	DS	Always EMPTY.	ALWAYS	AUTO
Exposure Time	0018,1150	IS	Always EMPTY.	ALWAYS	AUTO
X-Ray Tube Current	0018,1151	IS	Always EMPTY.	ALWAYS	AUTO
Exposure	0018,1152	IS		ANAPC	AUTO
Radiation Setting	0018,1155	CS	GR, SC	ALWAYS	AUTO

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

Attribute Name	Tag	VR	Value	Presence of Value	Source
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

Table 62: Specialized PMS X-Ray Image Store - VOI LUT Module (O)

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

8.1.5. 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 63: 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 ID	0040,0253	Copied from (0020,0010) Study ID.
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.

8.4. 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] for details on the calibration procedure.

8.5. Standard Extended/Specialized/Private SOPs

The Standard DICOM SOP Classes may be Extended with additional attributes:

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