DICOM Conformance Statement

YSIO X.pree

VA20

siemens-healthineers.com

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SIEMENS Healthineers

1 Conformance Statement Overview

YSIO X.pree is a high-end digital radiography system and a new kind of X-ray solution. Equipped with next-generation intelligence, it redefines the way you manage clinical workload. YSIO X.pree offers myExam Companion functionalities – turning data into expertise and leveraging the full potential of both the technology and its operators. YSIO X.pree comes with a streamlined and easy-to-use interface, a 3D camera for patient positioning and advanced collimation, and a smart image processing engine.

For acquired images it utilizes the DICOM "Digital X-Ray Image Storage" classes and "X-Ray Radiation Dose SR Storage" for automatically generated Dose Reports. YSIO X.pree can also handle other DICOM image objects like "CT Image" or "MR Image" utilizing the DICOM "Query/Retrieve Service Class". Workflow Management is supported by querying worklists and returning information about the procedure performed. Furthermore, the import from and export to DICOM USB media and printing to a DICOM printer is supported.

YSIO X.pree conforms to the DICOM Standard and supports the network services as described in Table 1: Network Services and the media services as described in Table 2 - Media Services.

Table 1 - Network Services

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Verification			
Verification	1.2.840.10008.1.1	Yes	Yes

SOP Classes created by YSIO X.pree		Create	Send	Store	Display
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes	Yes
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	Yes	Yes
Additional SOP Classes managed by YSIO X.pree					
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes	Yes	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes	Yes	Yes

SOP Classes	SOP Class UID	User of Service(SCU)		Provider of Service (SCP)	
		Create	Send	Store	Display
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes	Yes	Yes
Storage Commitment					
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1		Yes		No
Worklist Management					
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31		Yes		No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3		Yes		No
Query/Retrieve					
Patient Root Q/R Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1		No		Yes
Patient Root Q/R - Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2		No		Yes
Study Root Q/R - Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1		Yes		Yes
Study Root Q/R - Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2		Yes		Yes
Patient/Study Only Q/R - Information Model FIND	1.2.840.10008.5.1.4.1.2.2.3		No		Yes
Patient/Study Only Q/R - Information Model MOVE	1.2.840.10008.5.1.4.1.2.3.2		No		Yes
Print Management					
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9		Yes		No
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18		Yes		No
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1		Yes		No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2		Yes		No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4		Yes		No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1		Yes		No
Printer SOP Class	1.2.840.10008.5.1.1.16		Yes		No
Print Job SOP Class	1.2.840.10008.5.1.1.14		Yes		No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23		Yes		No

Table 2 - Media Services

Media Storage Application Profile	Write Files (FSC / FSU)	Read Files (FSR)
USB		
STD-GEN-USB-J2K	Yes/No	Yes

Table 3 - Implementation Identifying Information

Name	Value
Application Context Name	1.2.840.100008.3.1.1.1
Implementation Class UID	1.3.12.2.1107.5.11.1
Implementation Version Name	UIS_VA10

3 Introduction

3.1 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.2 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between YSIO X.pree and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. DICOM by itself does not guarantee interoperability.

The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of conformance statements is the first step towards assessing interconnectivity and interoperability between YSIO X.pree and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

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3.3 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Additional Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
GSDF	Grayscale Standard Display Function
IOD	DICOM Information Object Definition
ISO	International Standard Organization
n. a.	not applicable
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM Server)
SOP	DICOM Service-Object Pair
SR	Structured Report

TFT	Thin Film Transistor (Display)
TID	Template ID
U	Unique Key Attribute
UID	Unique Identifier
UTF-8	Unicode Transformation Format-8
VR	Value Representation

3.4 References

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

[2] Integrating the Healthcare Enterprise – IHE Radiology Technical Framework – http://www.ihe.net

4 Networking

4.1 Implementation Model

YSIO X.pree supports storing DICOM images to remote nodes like workstations or Archiving Systems. Using the Storage Commitment Service, it can request safe keeping of previously stored instances from an Archiving system. Additionally the YSIO X.pree can query remote notes, retrieve and store selected instances from that node. Using the Modality Worklist service the YSIO X.pree can query a HIS/RIS for scheduled procedures. Performed procedure status and other procedure data can be returned to the HIS/RIS using the Modality Performed Procedure Step (MPPS) Service.

Furthermore, printing of color and grayscale images is supported.

4.1.1 Application Data Flow

The following figures provide a functional overview of the YSIO X.pree Application Entities (AE). Relationships are shown between user-invoked activities (in the circles at the left of the AEs) and the associated real-world activities provided by DICOM service providers (in the circles at the right of the AEs).

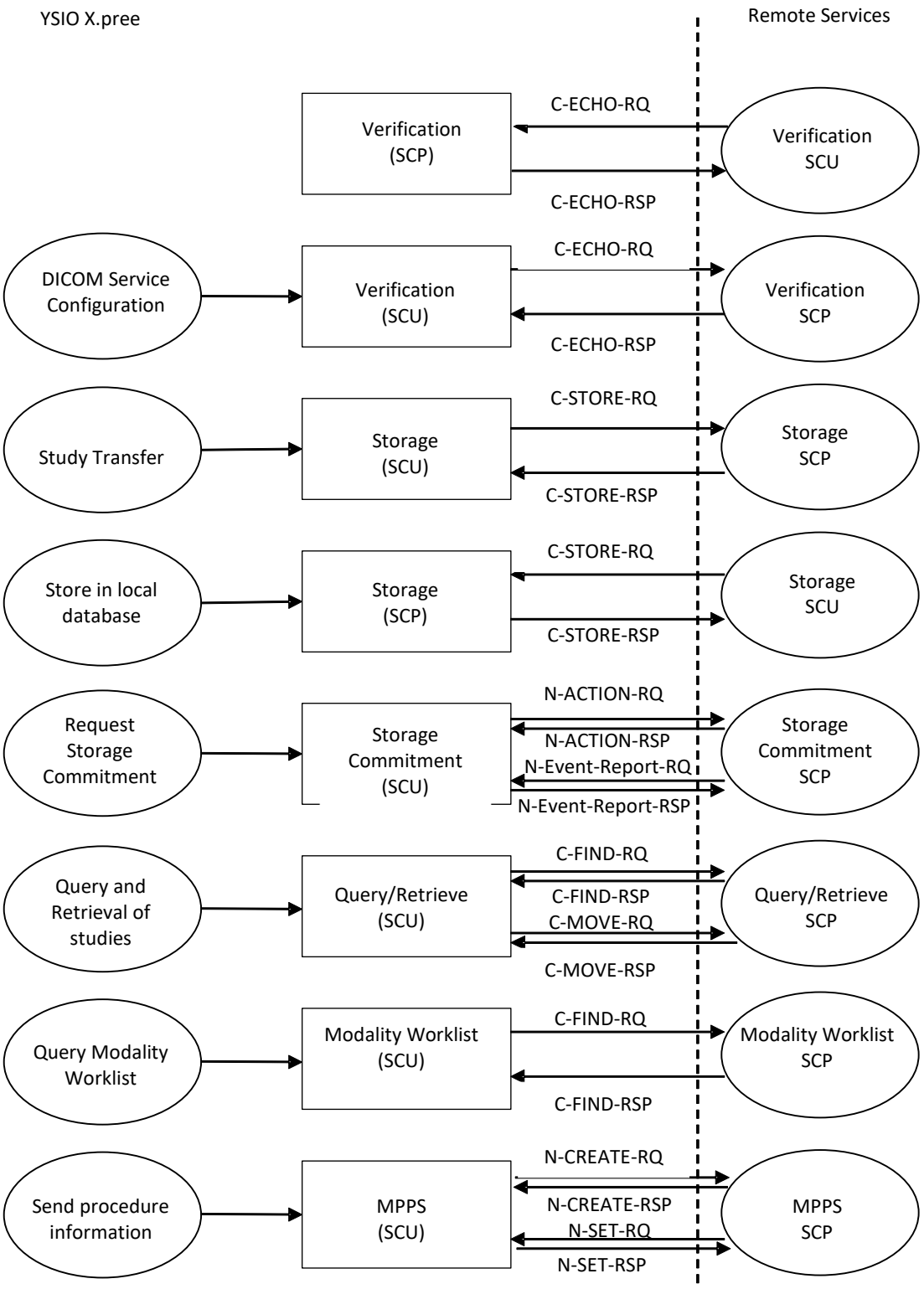


Figure 1: YSIO X.pree DICOM Data Flow diagram – Acquisition Workflow

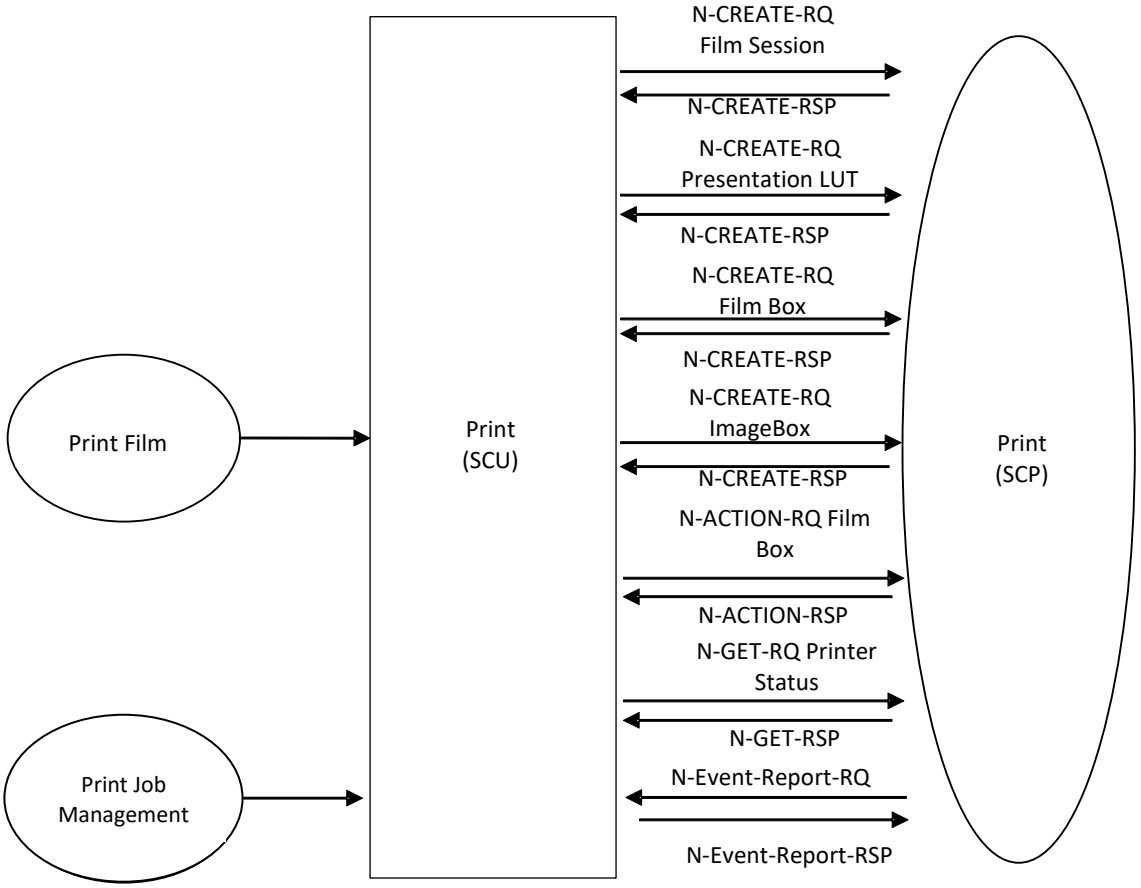


Figure 2: YSIO X.pree DICOM Data Flow diagram - Printing

4.1.2 Functional Definitions of Application Entities

The SCP components of the Application Entities of the YSIO X.pree operate as background server processes. They exist as soon as the system is powered up and wait for association requests. Upon accepting an association with a negotiated Presentation Context they start to receive and process the requests described in the following sections.

The SCU components of the Application Entity are invoked upon requests from the user interface or indirect by trigger from internal processes.

4.1.2.1 Functional Definition of Verification AE

YSIO X.pree supports the Verification service as a SCP and SCU. As a SCU, Verification can be activated from the Admin Portal during system configuration by sending a C-ECHO-Request.

As a SCP of the Verification Service the YSIO X.pree processes and responds to incoming verification requests using the C-ECHO-Response.

4.1.2.2 Functional Definition of Storage AE

YSIO X.pree Storage SCU is invoked either directly by the user, by an auto-archive trigger or internally by the Query/Retrieve Application Entity that is responsible for processing retrieve requests. The job consists of data describing the composite objects selected for storage and the destination Application Entity Title. An association is negotiated with the destination Application Entity and the image data is transferred using the C-STORE-Request. The transfer status is reported to the initiator of the Storage request.

The Storage SCP component of the YSIO X.pree starts to receive the Composite Objects and import them into the database after accepting an association with a negotiated Presentation Context.

4.1.2.3 Functional Definition of the Storage Commitment AE

If configured, the YSIO X.pree can serve as a SCU for the DICOM Storage Commitment service. Upon successful completion of a storage job, the system uses the N-ACTION-Request to request storage commitment from a remote DICOM storage commitment SCP. This can either be the same as the storage destination or a different system depending on the system configuration. Storage Commitment Requests are sent after a configurable delay after storing the objects. The YSIO X.pree can receive the N-EVENT-REPORT-Request on the same or a different association.

4.1.2.4 Functional Definition of Query/Retrieve AE

The YSIO X.pree supports DICOM Query/Retrieve as a SCU: The user can initiate a query to a remote node using the C-FIND-Request. After matching the specified keys, the remote Query /Retrieve SCP uses the C-FIND-Response to return the results of its search, which will be displayed to the user.
Depending on user action the YSIO X.pree Query/Retrieve DICOM SCU sends a C-MOVE-Request to initiate a C-STORE sub-operation on the SCP to start an image transfer from remote Storage SCU (running on Query/Retrieve SCP) to the system's Storage SCP.

The YSIO X.pree supports the following query models:

- Study Root Query Model (SCU and SCP)
- Patient Root Query Model (SCP only)
- Patient/Study Only Query Model (SCP only)

Furthermore, the SCU services may issue relational queries, if supported by the remote Query/ Retrieve SCP node and required by the querying Application.

The YSIO X.pree DICOM Query/Retrieve SCP accepts C-FIND Request, queries the local database based on the provided matching keys and returns the matches using the C-FIND-Response.
Depending on further request from the remote Query/Retrieve SCU, the YSIO X.pree responds to C-MOVE-Requests by initiating a C-STORE sub-operation to send image objects to the Storage SCP of the querying system.

4.1.2.5 Functional Definition of Modality Worklist AE

The YSIO X.pree Modality Worklist SCU issues DICOM Modality Worklist requests using C-FIND- Requests. The results in the C-FIND-Response are stored in internal database. The provided Patient and Procedure information is used for patient registration prior to starting an exam.

4.1.2.6 Functional Definition of Modality Performed Procedure Step SCU AE

The YSIO X.pree MPPS SCU uses the N-CREATE-Request to inform an Information System that a procedure step is IN PROGRESS.

The YSIO X.pree MPPS SCU uses the N-SET-Request to inform the Information System about the finalization of the Procedure Step, using either a status of COMPLETED or DISCONTINUED.

4.1.2.7 Functional Definition of Print AE

The Print SCU of the YSIO X.pree is invoked by the user interface to setup film-sheet layout and whenever an image is ready to be printed on film. The Print SCU will hold and maintain all data needed to compile a complete film-sheet from the data (images, layout, configuration) received. Whenever a film-sheet is ready to print, the related data is used to supply the Information to the SOP Classes of the Print Management Service Class. A queue is maintained, in order to intermediately store several film-sheets in case of resource problems on printer. The SCU will only supply and require the mandatory SOP Classes of the Print Management Service Class.

4.1.3 Sequencing of Activities

This section describes the sequencing of Real-World Activities performed by the YSIO X.pree entities using a UML sequence diagram. Real-World Activities are depicted as vertical bars and arrows show the events exchanged between them.

4.1.3.1 System Configuration

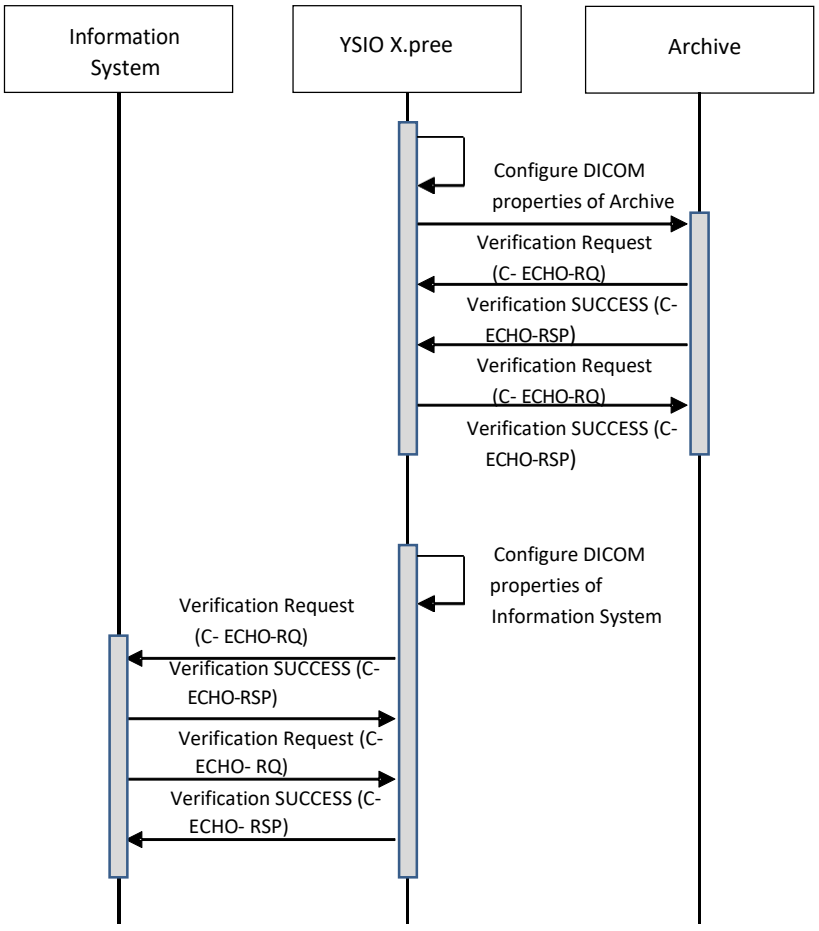


Figure 3: Sequence Diagram for Real World Activities - System Configuration

4.1.3.2 Acquisition Workflow

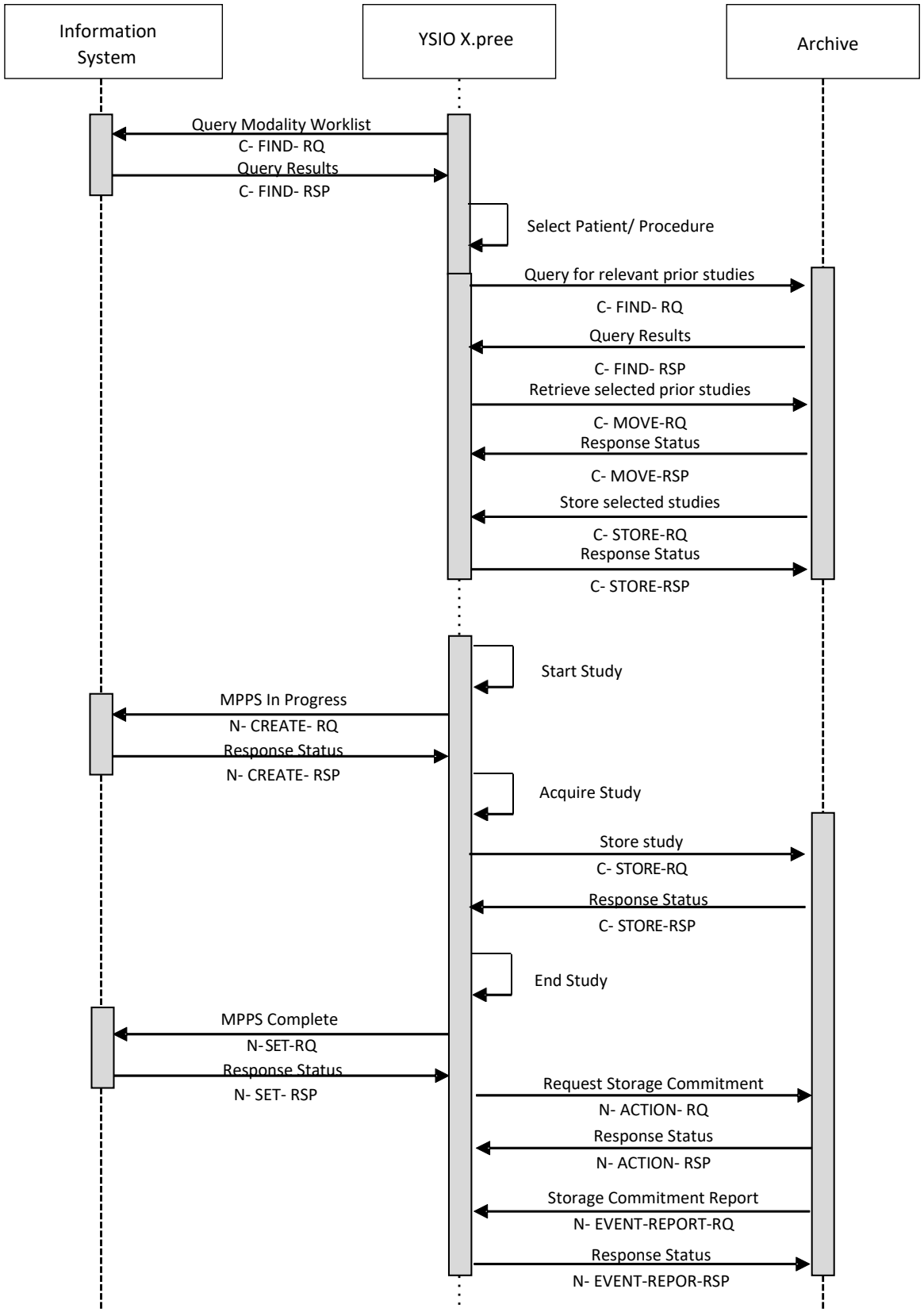


Figure 4: Sequence Diagram for Real World Activities - Acquisition workflow

4.1.3.3 Printing Workflow

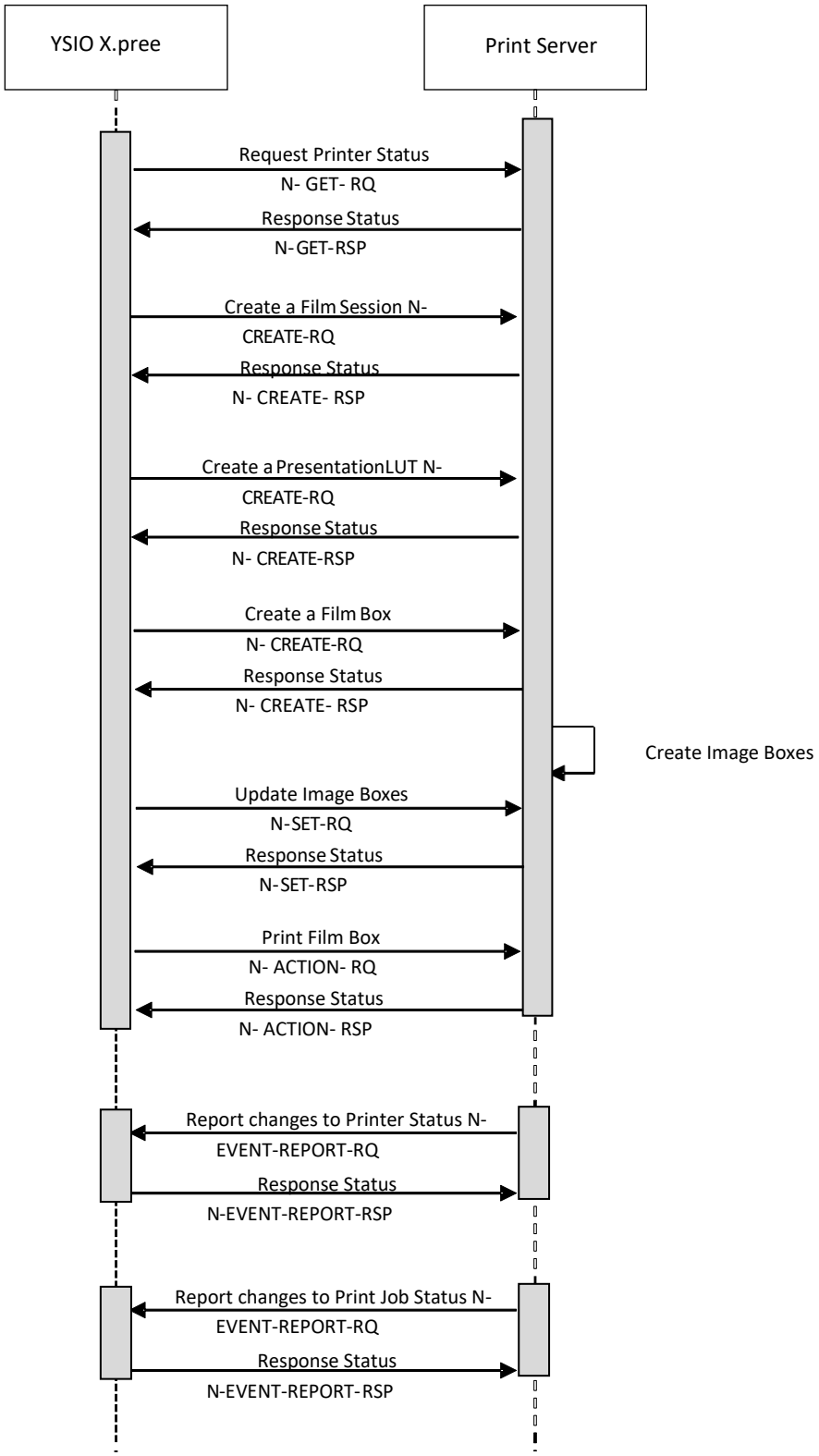


Figure 5: Sequence Diagram for Real World Activities - Printing

4.2 Application Entity Specification

This section outlines the specifications for each of the Application Entities that are part of the YSIO X.pree.

4.2.1 Verification AE Specification

4.2.1.1 SOP Classes

The Verification AE of the YSIO X.pree provides standard conformance to the Verification SOP Class listed in “Table 1: Network Services” section “Verification” in the “Conformance Statement Overview”.

4.2.1.2 Association Policy

The YSIO X.pree Admin Portal attempts to open an association for verification request whenever the Verification function is activated.

Table 4 - Association Policies

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

4.2.1.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any size is supported.

Table 5 - Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	10

4.2.1.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to “Table 3 - Implementation Identifying Information” in the “Conformance Statement Overview”.

[1] *Default, the value is configurable*

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – "Send Verification" Request

4.2.1.3.1.1 Description and Sequencing of Activity

YSIO X.pree serves as a SCU of the Verification Service Class. A C-ECHO-Request is initiated by the Admin Portal whenever "Verification" is requested. If an association to a remote Application Entity is successfully established, Verification with the configured AET is requested via the open association. If the C-ECHO response from the remote Application contains a status other than "Success" this will be indicated to the user and the association is closed.

4.2.1.3.1.2 Proposed Presentation Contexts

Table 6 - Presentation Context Table "Verification SCU"

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.1.3.1.3 SOP Specific Conformance – Verification SCU

The ECHO-SCU provides standard conformance to the Verification Service Class.

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity – "Receive Verification Request"

4.2.1.4.1.1 Description and Sequencing of Activity

YSIO X.pree serves as a SCP of the Verification Service Class. If the Verification SCP accepts an association, it will respond to C-ECHO-Requests. If the Called AE Title does not match any pre-configured AE Title shared by SCP, the association will be rejected.

4.2.1.4.1.2 Accepted Presentation Contexts

The YSIO X.pree DICOM application will accept Presentation Contexts as shown in the following table:

Table 7 - Presentation Context Table "Verification SCP"

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

4.2.1.4.1.3 SOP Specific Conformance – Verification SCP

The ECHO-SCP provides standard conformance to the Verification Service Class.

4.2.2 Storage AE Specification

4.2.2.1 SOP Classes

The Storage AE provides Standard Conformance to the SOP Classes listed in “Table 1: Network Services” section “SOP Classes Created by the YSIO X.pree” and “SOP Classes Managed by the YSIO X.pree” in the “Conformance Statement Overview”.

4.2.2.2 Association Policy

Table 8: Association Policies „Storage“

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.2.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 9: Asynchronous Nature as an Association Initiator for “Storage”

Maximum number of outstanding asynchronous transactions	10

4.2.2.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to “Table 3 - Implementation Identifying Information” in the “Conformance Statement Overview”.

4.2.2.3 Association Initiation Policy

4.2.2.3.1 Activity – “Send Storage Request”

[1] *Default, the value is configurable*

4.2.2.3.1.1 Description and Sequencing of Activities

YSIO X.pree serves as a SCU of the Storage Service Class. The Storage SCU is triggered by the transfer job queue or by an external retrieve request. An association request is sent to the destination AE. Upon successful negotiation of a Presentation Context, the transfer is started. Objects will be transferred sequentially on the same open association.

YSIO X.pree provides an automated retry mechanism, where the number of retries and the times between the retries can be configured.

4.2.2.3.1.2 Proposed Presentation Contexts

For all Image Objects listed in Table 1 in the Conformance Statement Overview the Transfer Syntaxes marked with “yes” in the Image Objects Column of the table below are supported.

For all Non-Image Objects listed in Table 1 in the Conformance Statement Overview the Transfer Syntaxes marked with “yes” in the Non-Image Objects Column of the table below are supported.

For a distinction between Image and Non-Image Objects please refer to the DICOM Standard PS3.3 Section A.1.4 “Overview of the Composite IOD Module Content” [1].

Table 10: Proposed Presentation Contexts for Storage

UID value	Transfer Syntax	Image Objects	Non-Image Objects
1.2.840.10008.1.2	Implicit Value Representation Little Endian native	yes	yes
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native	yes	yes
1.2.840.10008.1.2.2	Explicit Value Representation Big En-dian	yes	yes
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy com-pressed	yes	no
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed	yes	no
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed	yes	no
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Loss-less Only) compressed	yes	no
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed	yes	no
1.2.840.10008.1.2.5	RLE Lossless compressed	yes	no

Depending on the configuration, the Storage SCU will choose a compressed or uncompressed Transfer Syntax among those accepted by the SCP. The Transfer Syntax chosen is the preferred one among the compressed and uncompressed ones. The preference order is the order of occurrence in the configuration. For each node it is possible to select Transfer Syntaxes, that can be used, and Transfer Syntaxes, that are excluded. The configuration can even be extended, based on the combination of SOP Classes and supported Transfer Syntaxes.

An instance will be JPEG lossless (Process 1 and Process 2+4) compressed only if it fulfills the following criteria:

- Is an image and not already compressed
- Photometric Interpretation (0028,0004) is either “MONOCHROME1”, “MONOCHROME2”, “RGB”, “YBR_FULL” or “YBR_FULL_422”
- Bits Allocated (0028,0100) equal to “16” or “8”
- Bits Stored (0028,0101) is >= ”8”
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to “0”

An instance will be JPEG lossy compressed only if it fulfills the following criteria:

- Is an image and not already compressed
- Photometric Interpretation (0028,0004) is either MONOCHROME1, MONOCHROME2 or RGB
- Bits Allocated (0028,0100) equal to “16” or “8”
- Bits Stored (0028,0101) equal to “12” or “8”
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to “0”

An instance will be JPEG 2000 lossless compressed only if it fulfills the following criteria:

- Is an image and not already compressed
- Photometric Interpretation (0028,0004) is neither MONOCHROME , RGB, YBR_FULL nor YBR_FULL_422
- Bits Allocated (0028,0100) neither “16” nor “8”

An instance will be JPEG 2000 lossy compressed only if it fulfills the following criteria:

- Is an image and not already compressed
- Photometric Interpretation (0028,0004) is MONOCHROME or RGB
- Bits Stored (0028,0101) equal to “12” or “8”

There is no extended negotiation as an SCU.

4.2.2.3.1.3 SOP specific Conformance for SOP classes

The behavior of YSIO X.pree when encountering status codes in a C-STORE response is summarized in Table 11:

Table 11: DICOM Command Response Status Handling Behavior for “Storage”

Service Status	Further Meaning	Error Code	Behavior
Error	Any other DIMSE Error Status	Any none null Code	Send is continued till the end. Log message is created.
Success	Image is successfully stored	0000	If configured, Storage Commitment is requested for successfully stored instances

Table 12 below indicates the behavior if exceptions occur:

Table 12: DICOM Command Communication Failure Behavior for “Storage”

Exception	Behavior
Timeout	Log message is created (Timeout configurable; default 30s)
Association Aborted	Send is failed. Log message is created.

4.2.2.3.1.4 Correction and Rearrangement

When a Study is moved to a different:

- Procedure, the Study Instance UID is overwritten with the Study Instance UID and Accession- Number of the Procedure.
- Patient, the system generates a new Study Instance UID.

The system will not update references to the changed Study Instance UIDs, therefore it is possible that there will be broken links between Studies after such move operations.

In case of Patient Merge and Correction no UIDs are changed, therefore it is advised to delete any corrected or rearranged objects from the PACS before attempting to archive them again, to ensure that the PACS system can store them successfully.

When the Patient Birth Date or the Study Date is corrected, the system recalculates the Patient Age. A new item containing attributes that were removed or replaced by other values is added to the Original Attribute Sequence (0400,0561).

4.2.2.4 Association Acceptance Policy

4.2.2.4.1 Activity – “Receive Storage Request”

4.2.2.4.1.1 Description and Sequencing of Activities

YSIO X.pree serves as a SCP of the Storage Service Class. The storage SCP accepts incoming C-Store Request from any configured AE Title, receives supported objects transmitted on that association and stores them in the local database.

4.2.2.4.1.2 Accepted Presentation Contexts

For all supported Transfer Objects (see “Table 1: Network Services” section “SOP Classes Created by the YSIO X.pree” and “SOP Classes Managed by the YSIO X.pree” in the “Conformance Statement Overview”.) the Transfer Syntaxes described in Table 10: Proposed Presentation Contexts for Storage are supported.

Generally, all Presentation Contexts are accepted as long as they contain at least one suitable Transfer Syntax. All other Presentation Contexts are rejected.

There is no Extended Negotiation as an SCP

4.2.2.4.1.3 SOP-specific Conformance Statement for Storage SOP classes

YSIO X.pree conforms to the Full Storage Class at Level 2.

In case of a successful C-STORE operation, the image has successfully been written to disk either using the Explicit Little Endian format or in the compression format received.

The Storage AE of the YSIO X.pree returns the status “success” when the data is stored to disk and a minimal image header validation has been performed.

The following header attributes must be available and filled:

- SOP Class UID,
- Study Instance UID,
- Series Instance UID and
- SOP Instance UID.

Table 13 below list the status codes that the YSIO X.pree can return:

Table 13: Storage C-STORE Response Status

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	Image received correctly (success notification is done after receiving, before indexing and storing)
Failure	Out-of-resource	A700	No resource left in the Short Term Storage
Failure	Unable to Process	Cxxx	Error during instance reception
Failure	Data set does not match SOP Class	A9xx	The data set is not conform to the SOP Class contained in the resource.

Restriction: successful operation does not guarantee storage of header data in the database.

4.2.2.4.1.4 Other SOP specific behavior

If an image is received that is already stored in the database - identified by the SOP Instance UID - the new image will be ignored. The existent instance is not superseded.

4.2.3 Storage Commitment AE Specification

4.2.3.1 SOP Classes

The Storage Commitment AE of the YSIO X.pree provides standard conformance to the SOP Class listed in "Table 1: Network Services" section "Storage Commitment" in the "Conformance Statement Overview".

4.2.3.2 Association Policy

Table 14: Association Policies for Storage Commitment

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.3.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 15: Asynchronous Nature as an Association Initiator for Storage Commitment

Maximum number of outstanding asynchronous transactions	10

4.2.3.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity "Send Initial Storage Commitment"

4.2.3.3.1.1 Description and Sequencing of Activities

YSIO X.pree serves as a SCU of the Storage Commitment Service Class. After successful transfer of Imaging Objects to a configured Archive, the Storage Commitment SCU initiates an N-Action Request, if Storage Commitment is configured. This request will be sent on a different association than the storage request.

[1] *Default, the value is configurable*

The Storage Commitment Request will be sent out with a delay, to ensure that the remote node properly indexes received instances. The delay time is configurable with a default delay of 10 minutes.

The system may issue one N-ACTION Request for a complete set (bundle) of instances or issue one N-ACTION-Request per instance. This behavior is configurable; the default value is “bundled”.

YSIO X.pree will accept the N-Event-Report-Request on the same association if sent immediately after the N-ACTION-Response. However, it will not wait for it. The association is closed after three seconds.

4.2.3.3.1.2 Proposed Presentation Contexts

The YSIO X.pree DICOM application supports the presentation contexts listed in the following table for the Storage Commitment Service Class.

Table 16: Proposed Presentation Contexts for Storage Commitment

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

4.2.3.3.1.3 SOP specific Conformance for SOP classes

The behavior of YSIO X.pree when encountering status codes in an N-ACTION response is summarized in Table 17:

Table 17: DICOM Command Response Status Handling Behavior for Storage Commitment

Service Status	Further Meaning	Error Code	Behavior
Error	Any failure that occurs	Any none null Code	Failure reported to user; corresponding object(s) will be marked as “Archived failed”
Success	All Instances are available on the remote node	0000	Success reported to user; in case failures exist, the corresponding instances will be marked as “Archived failed”

Table 18 below indicates the behavior if exceptions occur:

Table 18: DICOM Command Communication Failure Behavior for Storage Commitment

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s); the request will be retried
Association Aborted	Failure reported to user the request will be retried

4.2.3.4 Association Acceptance Policy

4.2.3.4.1 Activity “Receive Reply to Initial Storage Commitment”

4.2.3.4.1.1 Description and Sequencing of Activities

YSIO X.pree supports the reverse role negotiation of the Storage Commitment Service Class as the SCU. It accepts incoming N-EVENT-REPORT-Request, if they do not arrive on the same association as the N-ACTION-Request.

4.2.3.4.1.2 Accepted Presentation Contexts

The YSIO X.pree DICOM application supports the presentation contexts listed in the following table for the Storage Commitment Service Class.

Table 19: Presentation Context Table “Update Flag Information”

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

4.2.3.4.1.3 SOP-specific Conformance Statement for Storage Commitment SOP class

The Storage Commitment SCU provides standard conformance to the Storage Commitment SOP Class.

4.2.4 Query/Retrieve AE Specification

4.2.4.1 SOP Classes

The Query/Retrieve AE provides Standard Conformance to the SOP Classes listed in “Table 1: Network Services” section “Query/Retrieve” in the “Conformance Statement Overview”.

4.2.4.2 Association Policy

Table 20: Association Policies for Query/Retrieve

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.4.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 21: Asynchronous Nature as an Association Initiator for Query/Retrieve

Maximum number of outstanding asynchronous transactions	10

4.2.4.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to “Table 3 - Implementation Identifying Information” in the “Conformance Statement Overview”.

[1] *Default, the value is configurable*

4.2.4.3 Association Initiation Policy

4.2.4.3.1 Activity "Querying a Remote Node" for Instances

4.2.4.3.1.1 Description and Sequencing of Activities

YSIO X.pree serves as a SCU for the following SOP Classes

- Patient Root Q/R Information Model - FIND SOP Class
- Study Root Q/R Information Model – FIND SOP Class
- Patient/Study only Q/R Information Model – FIND SOP Class.

Using the attributes specified by the user as Query Keys (in accordance with the query model) the Query SCU initiates a C-FIND Request and displays the responses to the user.

4.2.4.3.1.2 SOP Specific Conformance Statement to Query SOP classes

YSIO X.pree checks for the following status codes in the Query SCP's C-FIND-Response:

Table 22: DICOM Command Response Status Handling Behavior for Query/Retrieve

Service Status	Further Meaning	Error Code	Behavior
Failure	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FF00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FF01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table below indicates the behavior if exceptions occur:

Table 23: DICOM Command Communication Failure Behavior for Query/Retrieve

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

YSIO X.pree supports the following query levels:

- Study
- Series

Matching Keys on Instance Level is not supported by the YSIO X.pree as SCU.

The following table lists the various attributes at Study and Series level, which can be used for hierarchical queries as well as return values for display. The display capabilities are highly configurable and "yes" indicates that it is possible to configure display of the data:

Table 24: Attributes supported for instance Query - SCU

Attribute Name	Tag	Type	User input	UI
Study Level				
Patient's Name	(0010,0010)	O	enter value	yes
Patient ID	(0010,0020)	O	enter value	yes
Issuer of Patient ID	(0010,0021)	O	enter value	yes
Patient's Birth Date	(0010,0030)	O	enter value	yes
Patient's Sex	(0010,0040)	O	-	yes
Other Patient IDs	(0010,1000)	O	-	yes
Other Patient Names	(0010,1001)	O	-	yes
Patient Size	(0010,1020)	O	-	yes
Patient Weight	(0010,1030)	O	-	yes
Military Rank	(0010,1080)	O	-	yes
Medical Alerts	(0010,2000)	O	-	yes
Allergies	(0010,2110)	O	-	yes
Ethnic Group	(0010,2160)	O	-	yes
Pregnancy Status	(0010,21C0)	O	-	yes
Patient Comments	(0010,4000)	O	-	yes
Accession Number	(0008,0050)	O	enter value	yes
Study ID	(0020,0010)	O	enter value	yes
Study Instance UID	(0020,000D)	U	-	yes
Study Date	(0008,0020)	O	enter value	yes
Study Time	(0008,0030)	O	enter value	yes
Referring Physician' s Name	(0008,0090)	O	enter value	yes
Study Description	(0008,1030)	O	-	yes
Number of Study related Instances	(0020,1208)	O	-	yes
Modalities in Study	(0008,0061)	O	enter value	yes
Number of Study Related Series	(0020,1206)	O	-	yes
Series Level				
Modality	(0008,0060)	O	enter value	yes
Series Date	(0008,0021)	O	-	yes
Series Time	(0008,0031)	O	-	yes
Institution Name	(0008,0080)	O	-	yes
Institution Address	(0008,0081)	O	-	yes
Station Name	(0008,1010)	O	-	yes
Performing Physician Name	(0008,1050)	O	-	yes
Operators Name	(0008,1070)	O	-	yes
Manufacturer Model Name	(0008,1090)	O	-	yes
Body Part Examined	(0018,0015)	O	-	yes
Protocol Name	(0018,1030)	O	-	yes
Patient Position	(0018,5100)	O	-	yes
Laterality	(0020,0060)	O	-	yes
Number of Series related Instances	(0020,1209)	O	-	yes
Series Number	(0020,0011)	O	enter value	yes

Attribute Name	Tag	Type	User input	UI
Series Level				
Series Description	(0008,103E)	O	-	yes
Laterality	(0020,0060)	O	-	yes
Requesting Physician	(0032,1032)	O	-	yes
Request Attributes Sequence\ Requested Procedure ID	(0040,0275) \ (0040,1001)	O	enter value	yes
Request Attributes Sequence \ Scheduled Procedure Step ID	(0040,0275) \ (0040,0009)	O	enter value	yes
Performed Procedure Step Start Date	(0040,0244)	O	enter value	yes
Performed Procedure Step Start Time	(0040,0245)	O	enter value	yes
Performed Procedure Step Start DateTime	(0040,4050)	O	-	yes
Series Instance UID	(0020,000E)	U	-	yes

4.2.4.3.1.3 Proposed Presentation Contexts

The YSIO X.pree will propose Presentation Contexts as shown in the following table:

Table 25: Proposed Presentation Contexts for Query

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Ext. Neg.
Patient Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	Yes Yes Yes
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	Yes Yes Yes
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU SCU SCU	No No No

Table 26: Extended Negotiation as Query SCU

Name	UID	Extended Negotiation
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Relational Query will be negotiated if necessary, as defined in DICOM PS3.4 [1].
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated if necessary, as defined in DICOM PS3.4 [1].

4.2.4.3.1 Activity "Retrieve Instances from a remote node"

4.2.4.3.1.1 Description and Sequencing of Activities

The YSIO X.pree serves as a SCU for the following SOP Classes

- Patient Root Q/R Information Model - MOVE SOP Class
- Study Root Q/R Information Model – MOVE SOP Class
- Patient/Study only Q/R Information Model – MOVE SOP Class.

The C-MOVE-Request is used to retrieve the selected imaging objects. The Retrieve AE supports the query model Study Root.

4.2.4.3.1.2 Proposed Presentation Contexts

The YSIO X.pree proposes Presentation Contexts shown in the following table:

Table 27: Proposed Presentation Contexts for Retrieve and Activity "MOVE SCU"

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Ext. Neg.
Patient Root Query/Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	No
Study Root Query/Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	No
Patient/Study Root Query/Retrieve Model-MOVE	1.2.840.10008.5.1.4.1.2.2.3	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	No

4.2.4.3.1.3 SOP Specific Conformance Statement for Move SCU Classes

The presentation context is negotiated at association establishment time. When the C-MOVE- Request is processed, the Move Destination attribute (receiver of images) is ignored. However, the Move Destination AE must conform to the DICOM conventions (value representation AE).

The behavior of YSIO X.pree when encountering status codes in a C-MOVE response is summarized in Table 28.

Table 28: DICOM Command Response Status Handling Behavior for C-MOVE

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process; Move destination unknown	Any none null Code	Failure reported to user
Pending	Move Operation continues	FF00	Operation continues in background
Success	Move has been performed successfully.	0000	Success reported to user

Table 29 below indicates the behavior if exceptions occur:

Table 29: DICOM Command Communication Failure Behavior for C-MOVE

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.4.4 Association Acceptance Policy

The YSIO X.pree does not provide SCP functionality.

4.2.5 Modality Worklist AE Specification

4.2.5.1 SOP Classes

The Modality Worklist AE provides Standard Conformance to the SOP Classes listed in “Table 1: Network Services” section “Worklist Management” in the “Conformance Statement Overview”.

4.2.5.2 Association Policy

Table 30: Association Policies for Modality Worklist

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

The YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.5.2.1 Asynchronous Nature

The YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 31: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	10

4.2.5.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to “Table 3 - Implementation Identifying Information” in the “Conformance Statement Overview”.

4.2.5.3 Association Initiation Policy

4.2.5.3.1 Activity “Querying a Remote Node” for Modality Worklist

4.2.5.3.1.1 Description and Sequencing of Activities

The YSIO X.pree serves as a SCU of the Modality Worklist service. It performs worklist queries by issuing a C-FIND request at regular intervals. In addition, a worklist request can be triggered manually.

[1] *Default, the value is configurable*

4.2.5.3.1.2 Proposed Presentation Contexts

The YSIO X.pree will propose Presentation Contexts as shown in the following table:

Table 32: Proposed Presentation Contexts for Worklist

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Modality Worklist-FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2. 1.2.840.10008.1.2.2	SCU	None

4.2.5.3.1.3 SOP Specific Conformance for SOP Classes

Search Key Attributes of the Worklist C-FIND

The YSIO X.pree Modality Worklist SCU supports “broad worklist queries” with all required search keys. The following tables describe the “broad query” search keys that the SCU supports. The list is configurable in ‘DICOM Modality Worklist Query’.

Table 33: Broad Query search keys

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Modality	(0008,0060)	R	“*” or <configured Modality>
>Scheduled Station AE Title	(0040,0001)	R	<own AET> or “*” [a]
>Scheduled Procedure Step Start Date	(0040,0002)	R	Range from UI [b]
>Scheduled Procedure Step Description	(0040,0007)	O	
>Scheduled Station Name	(0040,0010)	O	
>Scheduled Procedure Step Location	(0040,0011)	O	
>Scheduled Procedure Step Status	(0040,0020)	O	
>Scheduled Performing Physician’s Name	(0040,0006)	O	
>Scheduled Protocol Code Sequence	(0040,0008)	O	
>>Code Value	(0008,0100)	O	
Requested Procedure Description	(0032,1060)	O	
Requested Procedure Priority	(0040,1003)	O	
Patient Transport Arrangements	(0040,1004)	O	
Requested Procedure Comments	(0040,1400)	O	
Requested Procedure Code Sequence	(0032,1064)	O	
>Code Value	(0008,0100)	O	
Requesting Physician	(0032,1032)	O	
Referring Physicians Name	(0008,0090)	O	
Current Patient Location	(0038,0300)	O	
Pregnancy Status	(0010, 21C0)	O	
Medical Alerts	(0010,2000)	O	
Allergies	(0010,2110)	O	

[a] *This depends on user configuration (Administration Portal->Technical Configuration->DICOM Nodes->Local DICOM Node->Worklist) if the “own AET” is provided or not.*

[b] *A time window can be configured by defining how many days to look into the past and into the future (Ad-ministration Portal-> Technical Configuration->DICOM Nodes->Local DICOM Node->Worklist)*

Return Key Attributes of the Modality Worklist C-FIND

The YSIO X.pree Modality Worklist SCU supports worklist queries with return key attributes of all types. The following tables describe the return keys that the SCU supports.

An “x” in the UI column indicates that the attribute may be visualized when browsing the Worklist results with the Browser. The Browser display is additionally influenced by the related Browser configuration.

Table 34: Modality Worklist C-Find Return keys

Attribute Name	Tag	Return Key Type	UI	Notes
SOP Common				
Specific Character Set	(0008,0005)	1C	-	
Scheduled Procedure Step				
Scheduled Procedure Step Sequence	(0040,0100)	1		
>Modality	(0008,0060)	1	x	
>Scheduled Station AE Title	(0040,0001)	1		“Scheduled Station AE Title” is taken as default for “Performed Station AE Title”
>Scheduled Procedure Step Start Date	(0040,0002)	1	x	
>Scheduled Procedure Step Start Time	(0040,0003)	1	x	
>Scheduled Procedure Step End Date	(0040,0004)	3	-	
>Scheduled Procedure Step End Time	(0040,0005)	3	-	
>Scheduled Performing Physician’s Name	(0040,0006)	1	x	“Scheduled Performing Physician’s Name” is taken as default for “Performing Physician’s Name”
>Scheduled Procedure Step Description	(0040,0007)	1C	x	“Scheduled Procedure Step Description” is taken as default for “Performed Procedure Step Description”
>Scheduled Protocol Code Sequence	(0040,0008)	1C	-	Uses universal sequence match “Scheduled Protocol Code Sequence” is taken as default for “Performed Protocol Code Sequence”
>>Code Value	(0008,0100)	1C	-	
>>Coding Scheme Designator	(0008,0102)	1C	-	
>>Coding Scheme Version	(0008,0103)	3	-	
>>Code Meaning	(0008,0104)	3	-	
>>Context Identifier	(0008,010F)	3	-	
>>Mapping Resource	(0008,0105)	1C	-	
>>Context Group Version	(0008,0106)	1C	-	
>>Context Group Extension Flag	(0008,010B)	3	-	

Attribute Name	Tag	Return Key Type	UI	Notes
>>Context Group Local Version	(0008,0107)	1C	-	
>>Context Group Extension Creator UID	(0008,010D)	1C		
>Scheduled Procedure Step ID	(0040,0009)	1	-	"Scheduled Procedure Step ID" is taken as default for "Performed Procedure Step ID"
>Scheduled Station Name	(0040,0010)	2	-	
>Scheduled Procedure Step Location	(0040,0011)	2	-	"Scheduled Procedure Step Location" is taken as default for "Performed Location"
>Scheduled Procedure Step Status	(0040,0020)	3	-	
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-	
Requested Procedure				
Study Date	(0008,0020)	3	-	
Study Time	(0008,0030)	3	-	
Referenced Study Sequence match	(0008,1110)	2	-	Uses universal sequence
>Referenced SOP Class UID	(0008,1150)	1C	-	
>Referenced SOP Instance UID	(0008,1155)	1C	-	
Study Instance UID	(0020,000D)	1	-	
Requested Procedure Description	(0032,1060)	1C	x	
Requested Procedure Code Sequence	(0032,1064)	1C	-	Uses universal sequence match "Requested Procedure Code Sequence" is taken as default for "Procedure Code Sequence"
>Code Value	(0008,0100)	1C	-	
>Coding Scheme Designator	(0008,0102)	1C	-	
>Coding Scheme Version	(0008,0103)	3	-	
>Code Meaning	(0008,0104)	3	-	
>Context Identifier	(0008,010F)	3	-	
>Mapping Resource	(0008,0105)	1C	-	
>Context Group Version	(0008,0106)	1C	-	
>Context Group Extension Flag	(0008,010B)	3	-	
>Context Group Local Version	(0008,0107)	1C	-	
>Context Group Extension Creator UID	(0008,010D)	1C		
Requested Procedure ID	(0040,1001)	1	x	"Requested Procedure ID" is taken as default for "Study ID"
Reason for the Requested Procedure	(0040,1002)	3	-	
Requested Procedure Priority	(0040,1003)	2	-	
Patient Transport Arrangements	(0040,1004)	2	-	
Confidentiality Code	(0040,1008)	3	-	
Reporting Priority	(0040,1009)	3	-	

Attribute Name	Tag	Return Key Type	UI	Notes
Names of intended Recipients of Results	(0040,1010)	3	-	
Requested Procedure Comments	(0040,1400)	3	x	
Imaging Service Request				
Accession Number	(0008,0050)	2	x	
Referring Physician's Name	(0008,0090)	2	x	
Requesting Physician	(0032,1032)	2	x	
Requesting Service	(0032,1033)	3	-	
Issuing Date of Imaging Service Request	(0040,2004)	3	-	
Issuing Time of Imaging Service Request	(0040,2005)	3	-	
Placer Order Number / Imaging Service Request	(0040,2016)	3	-	Old tag (0040,2006) is retired and not used.
Filler Order Number / Imaging Service Request	(0040,2017)	3	-	Old tag (0040,2007) is retired and not used.
Order entered by …	(0040,2008)	3	-	
Order Enterer's location	(0040,2009)	3	-	
Order Callback Phone Number	(0040,2010)	3	-	
Imaging Service Request Comments	(0040,2400)	3	-	
Visit Identification				
Admission ID	(0038,0010)	2	x	
Issuer of Admission ID	(0038,0011)	3	-	
Visit Status				
Current Patient Location	(0038,0300)	2	x	
Visit Admission				
Admitting Diagnosis Description	(0008,1080)	3	x	
Admitting Date	(0038,0020)	3	-	
Patient Identification				
Patient's Name	(0010,0010)	1	x	
Patient ID	(0010,0020)	1	x	
Issuer of Patient ID	(0010,0021)	3	-	
Other Patient IDs	(0010,1000)	3	x	
Other Patient Names	(0010,1001)	3	x	
Patient's Birth Name	(0010,1005)	3	-	
Patient Demographic				
Patient's Birth Date	(0010,0030)	2	x	
Patient's Birth Time	(0010,0032)	3	-	
Patient's Sex	(0010,0040)	2	x	
Patient's Insurance Plan Code Sequence	(0010,0050)	3	-	Uses universal sequencematch
>Code Value	(0008,0100)	1C	-	
>Coding Scheme Designator	(0008,0102)	1C	-	
>Coding Scheme Version	(0008,0103)	3	-	
>Code Meaning	(0008,0104)	3	-	
Patient's Age	(0010,1010)	3	x	

Attribute Name	Tag	Return Key Type	UI	Notes
Patient's Size	(0010,1020)	3	x	
Patient's Weight	(0010,1030)	2	x	
Patient's Address	(0010,1040)	3	-	
Military Rank	(0010,1080)	3	x	
Branch of Service	(0010,1081)	3	-	
Ethnic Group	(0010,2160)	3	x	
Patient Comments	(0010,4000)	3	x	
Patient Medical				
Medical Alerts	(0010,2000)	2	x	
Allergies	(0010,2110)	2	x	
Pregnancy Status	(0010,21C0)	2	x	
Smoking Status	(0010,21A0)	3	-	
Last Menstrual Date	(0010,21D0)	3	-	
Additional Patient History	(0010,21B0)	3	-	
Special Needs	(0038,0050)	2	-	

The behavior of the YSIO X.pree when encountering status codes in a C-FIND response is summarized in Table 35:

Table 35: DICOM Command Response Status Handling Behavior for V-FIND

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FF00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FF01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 36 below indicates the behavior if exceptions occur:

Table 36: DICOM Command Communication Failure Behavior for C-FIND

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.5.4 Association Acceptance Policy

YSIO X.pree does not provide the functionality of a SCP of the Modality Worklist – Find SOP Class.

4.2.6 Modality Performed Procedure Step AE Specification

4.2.6.1 SOP Classes

The Modality Performed Procedure Step AE provides Standard Conformance to the SOP Classes listed in "Table 1: Network Services" section "Worklist Management" in the "Conformance Statement Overview".

4.2.6.2 Association Policy

Table 37: Association Policies for MPPS

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB[1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.6.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 38: Asynchronous Nature as an Association Initiator for MPPS

Maximum number of outstanding asynchronous transactions	10

4.2.6.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.6.3 Association Initiation Policy

4.2.6.3.1 Activity "Create Modality Performed Procedure Step"

4.2.6.3.1.1 Description and Sequencing of Activities

YSIO X.pree serves as a SCU of the Modality Performed Procedure Step SOP Class. It sends N-CREATE request to inform the Information System that a Procedure Step has been started. This either happens after the first image of a Procedure Step was acquired or when the operator discontinues the Procedure Step.

[1] *Default, the value is configurable*

4.2.6.3.1.2 Accepted Presentation Contexts

The YSIO X.pree proposes Presentation Contexts as shown in the following table:

Table 39: Acceptable Presentation Contexts Activity “Create MPPS”

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

4.2.6.3.1.3 SOP specific Conformance for MPPS SOP class

The behavior of YSIO X.pree when encountering status codes in an N-CREATE-RSP response is summarized in Table 40:

Table 40: MPPS N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	MPPS creation request could not be processed.	Any none null Code	MPPS is not created.
Success	MPPS creation request processed successfully.	0000	MPPS is created.

The attributes sent in the N-CREATE message are listed in chapter 9.5.

4.2.6.3.2 Activity “Update Modality Performed Procedure Step”

4.2.6.3.2.1 Description and Sequencing of Activities

When the procedure step has been finished, the YSIO X.pree sends N-SET request to inform the Information System about the finalization of the procedure step (completed or discontinued). This happens when the examination workflow is explicitly closed or the operator explicitly discontinues the procedure step.

4.2.6.3.2.2 Proposed Presentation Contexts

YSIO X.pree proposes Presentation Contexts as shown in the following table:

Table 41: Acceptable Presentation Contexts Activity “Update MPPS”

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

4.2.6.3.2.3 SOP specific Conformance for MPPS SOP class

The behavior of YSIO X.pree when encountering status codes in an N-SET-RSP response is summarized in Table 42:

Table 42: MPPS N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	MPPS update request could not be processed.	Any none null Code	MPPS is not updated.
Success	MPPS update request processed successfully.	0000	MPPS is updated.

The attributes sent in the N-SET message are listed in chapter 9.5.

4.2.6.4 Association Acceptance Policy

YSIO X.pree does not provide the functionality of a SCP of the Modality Performed Procedure Step SOP Class.

4.2.7 Print AE Specification

4.2.7.1 SOP Classes

The Print AE provides Standard Conformance to the SOP Classes listed in “Table 1: Network Services” section “Print Management” in the “Conformance Statement Overview”.

4.2.7.2 Association Policy

Table 43: Association Policies for Print Management

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB [1]
Maximum number of simultaneous associations as an association acceptor	12 [1]
Maximum number of simultaneous associations as an association initiator	unlimited

YSIO X.pree contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

4.2.7.2.1 Asynchronous Nature

YSIO X.pree supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 44: Asynchronous Nature as an Association Initiator for Print Management

Maximum number of outstanding asynchronous transactions	10

4.2.7.3 Association Initiation Policy

4.2.7.3.1 Activity Print Film

4.2.7.3.1.1 Description and Sequencing of Activities

Whenever a film sheet is prepared by the user, it is forwarded to the Printer Job queue. As soon as the associated Printer device is available the job is activated, and an association is established.

After the film sheet is internally processed, it is converted to a Standard/1,1 layout. After the rendered page is sent as a single image to the printer, the status is controlled by awaiting any N-EVENT-REPORT message throughout the transfer until the last image or film-sheet is sent.

[1] *Default, the value is configurable*

4.2.7.3.1.2 Proposed Presentation Context

YSIO X.pree proposes Presentation Contexts as shown in the following table:

Table 45: Presentation Contexts for the Activity “Print Film”

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Ext. Neg.
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.7.3.1.3 SOP Specific Conformance

YSIO X.pree Print SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class and the Basic Color Print Management Meta SOP Class.

The application uses a configuration platform to define the properties of the connected DICOM SCP, e.g.:

- supported film sizes of the connected DICOM SCP
- supported film formats of the DICOM SCP

The printing is only suspended in the case of a failure return status of the SCP.

Basic Film Session SOP Class

The Basic Film Session information object definition describes all the user-defined parameters, which are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes that are printed on one hardcopy printer.

The YSIO X.pree Print Management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE
- N-DELETE

The Basic Film Session SOP Class N-CREATE-RQ (SCU) uses the attributes listed in the table below:

Table 46: Attributes for the N-CREATE-RQ of the Basic Film Session

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	1
Medium Type	(2000,0030)	U	BLUE FILM CLEAR FILM PAPER MAMMO BLUE FILM MAMMO CLEAR FILM

The Affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Session.

The Basic Film Session SOP class interprets the status codes (from N-CREATE-RSP messages) listed in the table below:

Table 47: N-CREATE-RSP Status Handling Behavior for the Basic Film Session

Service Status	Further Meaning	Error Codes	Behavior
Warning	Memory Allocation not supported	B600	Print job continues, warning is logged
Success	Film session successfully created	0000	Print job continues

The N-DELETE-RQ on the Basic Film Session SOP Class is used to remove the complete Basic Film Session SOP Instance hierarchy.

Basic Film Box SOP Class

The Basic Film Box information object definition describes all user-defined parameters of one film of the film session including presentation parameters, which are common for all images on a given film sheet.

The Basic Film Box refers to one or more Image Boxes.

The YSIO X.pree Print Management SCU supports the following DIMSE Service elements for the Basic Film Box SOP Class as SCU:

- N-CREATE
- N-ACTION
- N-DELETE

The Basic Film Box SOP Class N-CREATE-RQ message uses the attributes listed below. The actual values for each attribute depend on DICOM printer configuration within the YSIO X.pree DICOM Print Management SCU:

Table 48: Attributes for the N-CREATE-RQ of the Basic Film Session

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	STANDARD\C,R
Referenced Film Session Sequence	(2010,0500)	M	
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT, LANDSCAPE
Film Size ID	(2010,0050)	M	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN,, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR, CUBIC, NONE, REPLICATE
Border Density	(2010,0100)	U	BLACK, WHITE
Max Density	(2010,0130)	U	0 < Value
Min Density	(2010,0120)	U	0 < Value < 50
Required if Presentation LUT is present			
Reflective Ambient Light	(2010,0160)	U	0 < Value
Illumination	(2010,015E)	U	0 < Value
Referenced Presentation LUT Sequence	(2050,0500)	U	

For Page Mode printing, the Image Display format used is Standard\1,1.

The N-CREATE-RSP message from the Print SCP includes the Referenced Image Box Sequence with SOP Class/Instance UID pairs which will be kept internally to be further used for the subsequent Basic Image Box SOP Class N-SET-RQ messages.

When all Image Boxes (including parameters) for the film-sheet have been set, the YSIO X.pree print manager will issue an N-ACTION-RQ message with the SOP Instance UID of the Basic Film Box and the Action Type ID of 1.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Box.

The Basic Film Box SOP class interprets the status codes listed in the tables below:

Table 49: N-CREATE-RSP Status Handling Behavior for Basic Film Box

Service Status	Meaning	Error Codes	Behavior
Failure	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	C616	Print job is marked as failed and the reason is logged.
Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605	Print job continues and warning is logged.
Success	Film Box successfully created	0000	Print job continues

Table 50: N-ACTION-RSP Status Handling Behavior for Basic Film Box

Service Status	Meaning	Error Codes	Behavior
Failure	Unable to create print job, print queue is full	C602	Print job is marked as failed and the reason is logged
	Image size is larger than images box size	C603	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Film box does not contain image box (empty page)	B603	Print job continues and warning is logged
	Image size is larger than image box size, the image has been demagnified	B604	Print job continues and warning is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	Print job continues and warning is logged
Success	Film accepted for printing	0000	Print job continues

Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Grayscale Image Box SOP Class uses only the N-SET-RQ with the attributes listed in the table below:

Table 51: Attributes for N-SET-RQ of Basic Grayscale Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
Basic Grayscale Image Sequence	(2020,0110)	M	
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME2
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8,16
> Bits Stored	(0028,0101)	M	8,12
> High Bit	(0028,0102)	M	7,11
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Basic Grayscale Image Box SOP class interprets the status codes as listed below:

Table 52: N-SET-RSP Status Handling Behavior for the Basic Grayscale Image Box SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Image size is larger than image box size, the image has been demagnified.	B604	Print job continues and the reason is logged
	Requested MinDensity or MaxDensity outside of Printer's operating range	B605	Print job continues and the reason is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	Print job continues and warning is logged
Success	Image successfully stored in Image Box	0000	Print job continues

Basic Color Image Box SOP Class

The Basic Color Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Color Image Box SOP Class uses only the N-SET-RQ with the attributes listed below:

Table 53: Attributes for N-SET-RQ of Basic Color Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Color Image Sequence	(2020,0111)	M	
> Samples per Pixel	(0028,0002)	M	3
> Photometric Interpretation	(0028,0004)	M	RGB
> Planar Configuration	(0028,0006)	M	0
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8
> Bits Stored	(0028,0101)	M	8
> High Bit	(0028,0102)	M	7
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Color Image Box SOP class interprets the status codes listed below:

Table 54: N-SET-RSP Status Handling Behavior for the Color Grayscale Image Box

Service Status	Meaning	Error Codes	Behavior
Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Image size larger than image box size	B604	Print job continues and the reason is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or		Print job continues and warning is logged
	Combined Print Image has been decimated to fit.	B60A	
Success	Image successfully stored in Image Box	0000	Print job continues

Presentation LUT SOP Class

The objective of the Presentation LUT is to realize image hardcopy printing tailored for specific modalities, applications and user preferences.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for hardcopy. P-Values are intended to be independent of the specific class or characteristics of the hardcopy device.

The YSIO X.pree Print Management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE
- N-DELETE

The Presentation LUT SOP Class uses only the N-CREATE-RQ with the attributes listed below:

Table 55: Attributes for N-CREATE-RQ of Presentation LUT SOP Class

Attribute Name	Tag	Usage SCU	Supported Values
Presentation LUT Shape	(2050,0020)	U	IDENTITY

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and is used for later requests on the Basic Film Box (N-CREATE-RQ) and on the Presentation LUT (N-DELETE-RQ).

The Presentation LUT SOP class interprets the status codes listed below:

Table 56: N-CREATE-RSP Status Handling Behavior for the Presentation LUT SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Warning	Requested MinDensity or MaxDensity outside of HCD's operating range. HCD will use its respective minimum or maximum density value instead.	B605	Print job continues and the rea-son is logged
Success	Presentation LUT successfully created	0000	Print job continues

Printer SOP Class

The Printer SOP Class provides the possibility to monitor the status of the hardcopy printer in a synchronous and in an asynchronous way.

When used synchronously the YSIO X.pree Print SCU uses the N-GET-RQ to request information about the printer status. It uses the attributes listed in the table below.

Table 57: Attributes for N-GET-RQ of the Printer SOP Class

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See table in chapter 9.7 for possible values.

The command communication failure behavior listed below applies to all SOP classes used for the “Print Film” activity:

Table 58: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure not reported to user (Timeout configurable; default 30s)
Association Aborted	Failure not reported to user

4.2.7.4 Association Acceptance Policy

4.2.7.4.1 Actvitiy Print Film

4.2.7.4.1.1 Description and Sequencing of Activities

YSIO X.pree supports the reverse role negotiation of the Printer SOP Class. Receiving the N-EVENT-REPORT-RQ from a printer the YSIO X.pree is asynchronously informed about changes of the printer status.

4.2.7.4.1.2 Accepted Presentation Context

The YSIO X.pree accepts Presentation Contexts as shown in the following table:

Table 59: Presentation Contexts for the Activity “Print Film”

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.7.4.1.3 SOP Specific Conformance

The arguments of the N-EVENT-REPORT-RQ are defined in the table below:

Table 60: Attributes for the N-EVENT-REPORT-RQ of the Printer SOP Class

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1	-	-	-
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

4.2.7.4.2 Activity Print Management

4.2.7.4.2.1 Description and Sequencing of Activities

YSIO X.pree supports the reverse role negotiation of the Print Job SOP Class. Receiving the N-EVENT- REPORT-RQ from a printer the YSIO X.pree is asynchronously informed about the status of a print job for monitoring its progress.

4.2.7.4.2.2 Accepted Presentation Context

YSIO X.pree accepts Presentation Contexts as shown in the following table:

Table 61: Presentation Contexts for the Activity “Print Management”

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.7.4.2.3 SOP Specific Conformance

Attributes that can be handled by the Print AE of the product are listed in the table below.

Table 62: Attributes for the N-EVENT-REPORT-RQ of the Print Job SOP Class

Event-type Name	Event	Attributes	Tag	Usage SCU
Pending	1	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Printing	2	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Done	3	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Failure	4	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U

4.3 Network Interfaces

4.3.1 Physical Network Interface

YSIO X.pree provides DICOM 3.0 TCP/IP network communication support as defined in Part 8 of the DICOM Standard. The network communication is independent from the physical medium over which TCP/IP executes; it inherits this from the Windows OS system upon which it executes.

4.3.2 Additional Protocols

none

4.3.3 IPv4 and IPv6 Support

IPv4 and IPv6 are supported. Regarding IPv6 please note, that the complete networking infrastructure in the hospital (firewalls, DNS-Servers, …) must support IPv6 in order to get a functioning communication.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

AE Titles shall be unique within the hospital. A common way to achieve that is to use the hostname as part of the AE Titles. The string can be up to 16 characters and must not contain any extended characters. Only 7-bit ASCII characters (excluding Control Characters) are allowed according to the DICOM Standard.

4.4.1.1 Local AE Titles

YSIO X.pree allows to configure AETitles, Ports and Services in any wished way. Default delivery is that all services are using the same AE title and only one port number. In case the connected systems cannot handle this default, the customer service engineer is able to configure for each service its own AE title and Port number.

Parameter	Configurable	Default Value
Default AE title	Yes	hostname in uppercase characters; limited to 16 characters
Default Port	Yes	104

4.4.1.2 Remote AE Title/Presentation Address Mapping

4.4.1.2.1 Remote Association Initiators

All relevant remote applications that may setup DICOM associations towards YSIO X.pree need to be configured in YSIO X.pree, before the association can be established. This behavior is configurable but it is recommended, not to change this behavior.

The mapping of external AE Titles to TCP/IP addresses and ports is configurable and initially set at the time of installation by Installation Personnel. Changes can later on also be performed by the local system administrator. The Application Entity Titles and supported transfer syntaxes need to be known for configuration.

To enable a fast and efficient configuration possibility Siemens Healthineers will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

Remote Application Entities can be configured without restarting the process.

4.4.1.2.2Remote Association Acceptors

For remote applications that shall be able to accept DICOM associations from YSIO X.pree, the following information needs to be available:

- Application Entity Title
- Host Name / IP address on which the remote application service runs
- Port number on which the remote application accepts association requests.

The remote system will be indicated in the UI of YSIO X.pree with a logical name, that is also entered when configuring the node in the administration UI.

To enable a fast and efficient configuration possibility Siemens Healthineers will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

Remote Application Entities can be configured without restarting the process.

4.4.2 Parameters

The next table lists configuration parameters, which are true for all Application Entities.

Table 63: Parameter List

Parameter	Configurable	Default Value
max PDU size	Yes	32768 Bytes
time-out for accepting/rejecting an association request	Yes	30 s
time-out for responding to an association open/close request	Yes	30 s
time-out for accepting a message over network	Yes	30 s
time-out for waiting for data between TCP/IP-packets	Yes	5 s
time-outs for waiting for a Service Request/Response message from the remote node (Storage SCP/SCU)	Yes	30 s
time-outs for waiting for a Service Request/Response message from the remote node (Query/Retrieve SCP/SCU)	Yes	30 s
time-out for waiting for a C-MOVE-RSP	No	1200 s
number of image collection before saving to database	Yes	20
max matches query limit	Yes	100
max number of parallel receiving associations	Yes	12

5 Media Interchange

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

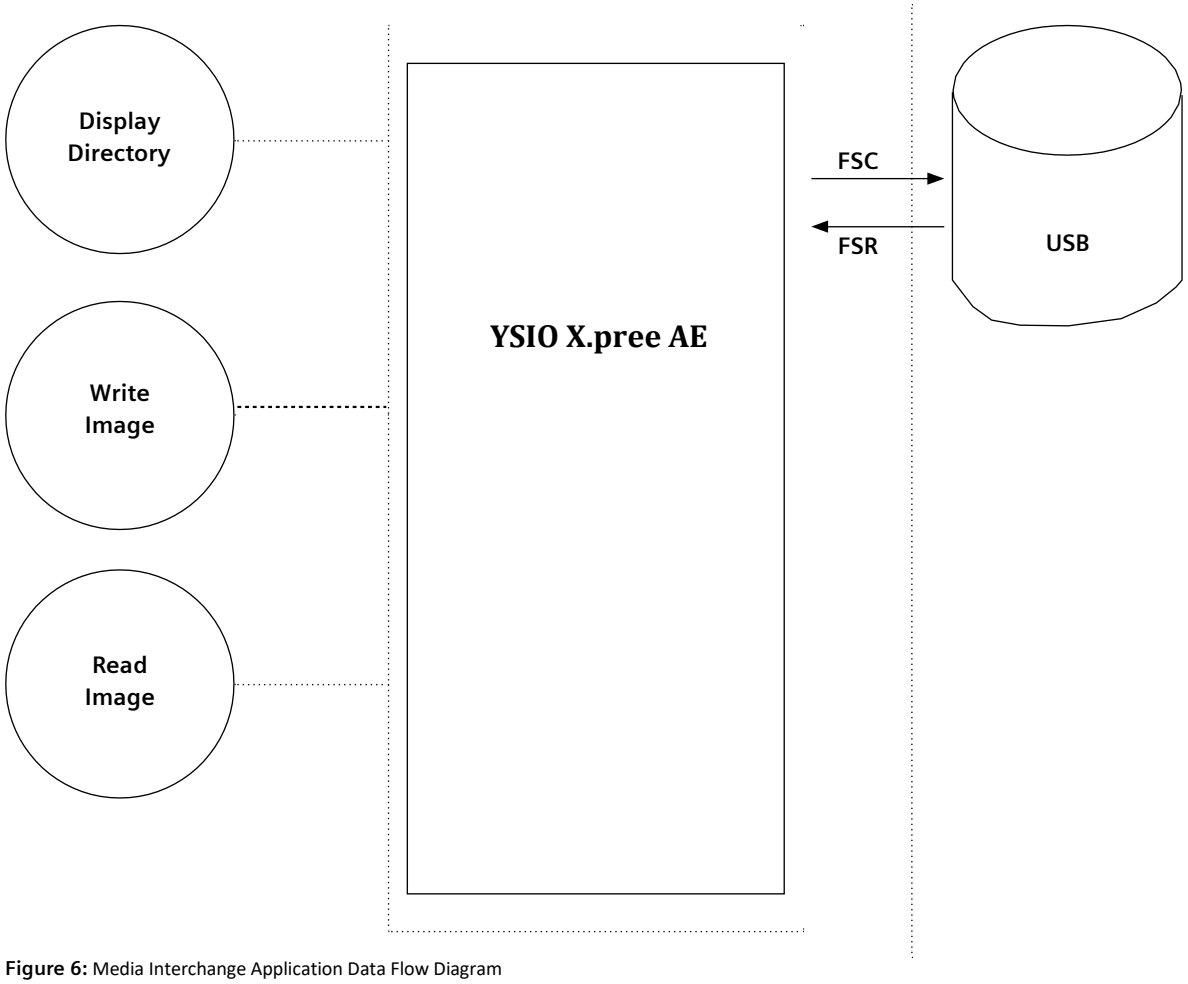


Figure 6: Media Interchange Application Data Flow Diagram

YSIO X.pree provides the functionality to Import or Export DICOM Instances from and to the File System. During export, a DICOMDIR is generated (user selection). All SOP Classes defined in Table 1 are supported for the Import/Export functionality.

5.1.2 Functional definitions of AEs

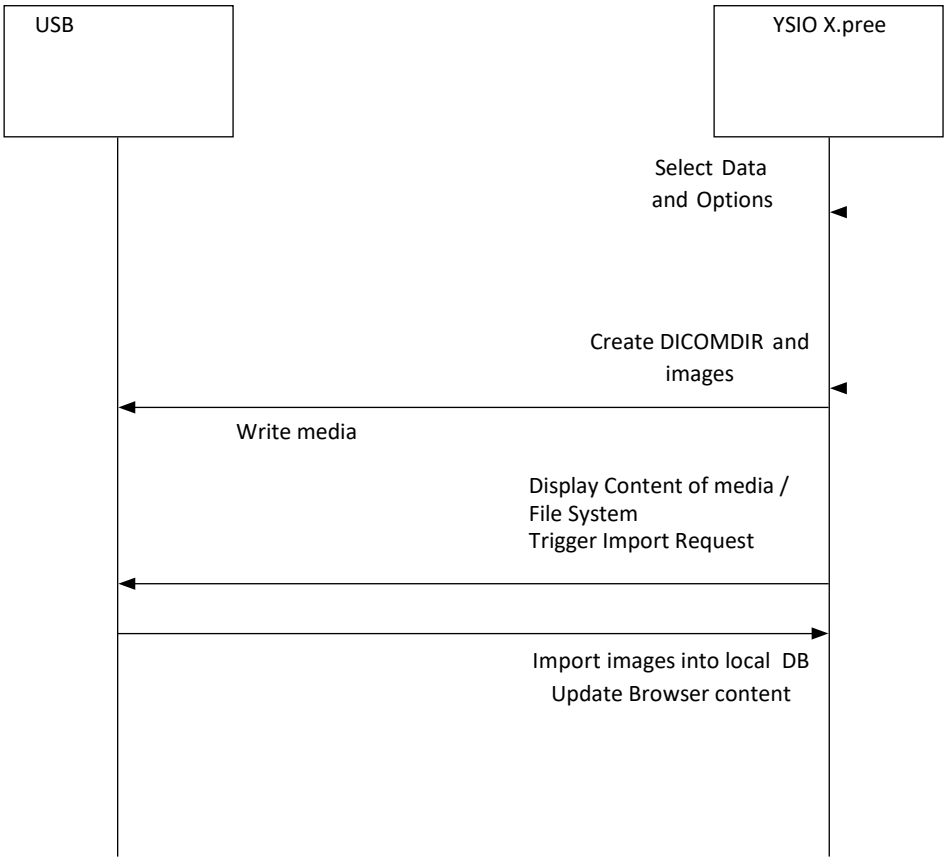
The YSIO X.pree application is capable of

- creating a new File-set in the File System (Export to ...)
- importing SOP Instances from the medium onto local storage
- writing the File-sets DICOMDIR information into the file system.

5.1.3 Sequencing of Real-World Activities

Whenever data is written to an external media, YSIO X.pree first creates a DICOMDIR from the selected data on the local hard disk. After that the data Is copied to the target device.

Figure 7: Sequence diagram – Media creation, Access and Import



5.1.4 File Meta Information for Implementation Class and Version

This section describes the values assigned to the File Meta Information attributes (see part PS 3.10) that pertain to the Implementation Class and Version.

Table 64: Implementation Class/Version Name - Media Interchange

File Meta Information Version	0001
Implementation Class UID (images)	1.3.12.2.1107.5.11.1
Implementation Version Name (images)	UIS_VA10
Implementation Class UID (DICOMDIR)	1.3.12.2.1107.5.11.1
Implementation Version Name (DICOMDIR)	UIS_VA10

5.2 AE SPECIFICATIONS

5.2.1 Media Storage AE – Specification

YSIO X.pree provides conformance to the following Application Profiles as an FSC as well as an FSR. The FSU role is only supported on a non-optical storage device (e.g. USB device).

In addition, augmented conformance is provided to store extra data attributes important for the full feature support of the *syngo*®-based products. Details are listed below:

Table 65: Media - Application Profiles and Real-World Activities

Application Profiles Supported	Real-World Activity	Role	Service Class Option
AUG- GEN-USB-J2K	Browse Directory Information Import into Application Export to local Archive Media	FSR, FSC, FSU	Interchange
STD-GEN-USB-J2K	Browse Directory Information Import into Application Export to local Archive Media	FSR, FSC, FSU	Interchange

5.2.1.1 Real-World Activities

5.2.1.1.1 Activity "Browse Directory Information"

YSIO X.pree acts as FSR using the interchange option when requested to read the media directory.

YSIO X.pree will read the DICOMDIR and insert those directory entries that are valid for the application profiles supported, into a local database. The database then is used for browsing media contents.

5.2.1.1.2 Real World Activity "Import into Application"

YSIO X.pree acts as FSR using the interchange option when requested to read SOP Instances from the medium into the application.

The SOP Instance selected from the media directory will be copied into the running Application. Only SOP Instances, that are valid for the application profile supported and supported by
YSIO X.pree, can be retrieved from media.

5.2.1.1.3 Real-World Activity "Export to local Archive Media"

YSIO X.pree acts as FSU (for media with existing DICOM file-set) or FSC (media not initialized) using the interchange option when requested to copy SOP Instances from the local storage to local Archive Medium. The activity as FSU is only possible for non-optical storage devices.

5.2.1.2 SOP Classes and Transfer Syntaxes

These Application Profiles are based on the Media Storage Service Class with the Interchange Option.

YSIO X.pree provides Standard Conformance to the SOP Classes listed in "Table 1: Network Services" section "SOP Classes Created by the YSIO X.pree" and "SOP Classes Managed by the YSIO X.pree" in the "Conformance Statement Overview".

Using the Application Profiles supporting compression (AUG- GEN-USB-J2K, STD-GEN-USB-J2K) the following Transfer Syntaxes are supported:

Table 66: Transfer Syntaxes for STD-GEN-USB-J2K

UID value	Transfer Syntax	Image Objects	Non-Image Objects
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native	yes	yes
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy com-pressed	yes	no
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed	yes	no
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed	yes	no
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Loss-less Only) compressed	yes	no
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed	yes	no
1.2.840.10008.1.2.5	RLE Lossless compressed	yes	no

Using the Application Profiles that do not support compression (AUG- GEN-USB, STD-GEN-USB) only Explicit Value Representation Little Endian (1.2.840.10008.1.2.1) is supported.

5.3 AUGMENTED AND PRIVATE APPLICATION PROFILES

5.3.1 Augmented Application Profiles

The standard application profiles are augmented with private object Siemens CSA Non-Image.

Table 67: Private SOP Classes and Transfer Syntaxes for Augmented Media Profiles

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	O	M

The Siemens non-image is typically used for raw data and 3D private data.

5.4 MEDIA CONFIGURATION

none

6 Support of Extended Character Sets

The YSIO X.pree DICOM application supports the following character sets as defined in the four tables below:

Table 68: Single-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO registration number	Character Set
Default Repertoire	None	ISO_IR 6	ISO 646
Latin alphabet No. 1	ISO_IR 100	ISO_IR 100 ISO_IR 6	Supplementary set ISO 646
Latin alphabet No. 2	ISO_IR 101	ISO_IR 101 ISO_IR 6	Supplementary set ISO 646
Latin alphabet No. 3	ISO_IR 109	ISO_IR 109 ISO_IR 6	Supplementary set ISO 646
Latin alphabet No. 4	ISO_IR 110	ISO_IR 110 ISO_IR 6	Supplementary set ISO 646

Table 69: Multi-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO registration number	Character Set
Unicode	ISO_IR 192	ISO 10646	Unicode in UTF-8
Chinese	GB18030	GB18030	GB 18030-2000 (China Association for Standardization)

All Special Character Sets (SCS) listed above are supported for incoming Data. When creating new Instances, the system will use the default SCS (or SCS List) configured on the machine.

When there is a mismatch between the given character set in attribute (0008,0005) and the characters in an IOD received by the system, then the following measures are taken to make the characters DICOM conform:

- Convert each illegal character to a '?'.

It is not possible to recognize the following mismatches automatically on receiving or importing:

- An attribute value is encoded in ISO_IR 192 ←→ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in GB18030 ←→ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in ISO 2022 ←→ (0008,0005) contains ISO_IR 192
- An attribute value is encoded in ISO 2022 ←→ (0008,0005) contains GB18030

An IOD that contains one of the above-mentioned inconsistencies is not DICOM conform. As these kinds of inconsistencies cannot be recognized by the system, the IOD will not be rejected but the character data might be corrupted.

7 Attribute confidentiality profiles

7.1 De-identification

YSIO X.pree can de-identify attributes, when exporting to Media. Three different levels of de-identifcation are supported:

- Full de-identification
- Reduced de-identification
- Service de-identificaiton

The user needs to select the appropriate de-identification level during export.

For full and reduced de-identification private attributes are not included in minimized studies. For service de-identification all private attributes are included in minimized studies.

In the following table for attributes marked with:

- 'Yes' - data are minimized
- 'No' - data are kept

Table 70: Application Level Confidentiality Profile attributes (standard tags)

DICOM Tag	Attribute Name	Full	Reduced	Service
(0002,0003)	Media Storage SOP Instance UID	Yes	No	No
(0004,1511)	Referenced SOP Instance UID in File	Yes	No	No
(0008,0014)	Instance Creator UID	Yes	No	No
(0008,0015)	Instance Coercion DateTime	Yes	No	No
(0008,0018)	SOP Instance UID	Yes	No	Yes
(0008,0020)	Study Date	Yes	No	No
(0008,0021)	Series Date	Yes	No	No
(0008,0022)	Acquisition Date	Yes	No	No
(0008,0023)	Content Date	Yes	No	No
(0008,0024)	Overlay Date	Yes	No	No
(0008,0025)	Curve Date	Yes	No	No
(0008,002A)	Acquisition DateTime	Yes	No	No
(0008,0030)	Study Time	Yes	No	No
(0008,0031)	Series Time	Yes	No	No
(0008,0032)	Acquisition Time	Yes	No	No
(0008,0033)	Content Time	Yes	No	No
(0008,0034)	Overlay Time	Yes	No	No
(0008,0035)	Curve Time	Yes	No	No
(0008,0050)	Accession Number	Yes	Yes	No
(0008,0058)	Failed SOP Instance UID List	Yes	No	No
(0008,0080)	Institution Name	Yes	Yes	No
(0008,0081)	Institution Address	Yes	Yes	No
(0008,0082)	Institution Code Sequence	Yes	Yes	No
(0008,0090)	Referring Physician's Name	Yes	Yes	Yes
(0008,0092)	Referring Physician's Address	Yes	Yes	Yes
(0008,0094)	Referring Physician's Telephone Numbers	Yes	Yes	Yes

DICOM Tag	Attribute Name	Full	Reduced	Service
(0008,0096)	Referring Physician's Identification Sequence	Yes	Yes	No
(0008,010D)	Context Group Extension Creator UID	Yes	No	No
(0008,0201)	Timezone Offset From UTC	Yes	No	No
(0008,1010)	Station Name	Yes	Yes	Yes
(0008,1030)	Study Description	Yes	Yes	No
(0008,103E)	Series Description	Yes	Yes	No
(0008,1040)	Institutional Department Name	Yes	Yes	No
(0008,1048)	Physician(s) of Record	Yes	Yes	Yes
(0008,1049)	Physician(s) of Record Identification Sequence	Yes	Yes	No
(0008,1050)	Performing Physicians' Name	Yes	Yes	Yes
(0008,1052)	Performing Physicians' Identification Sequence	Yes	Yes	No
(0008,1060)	Name of Physician(s) Reading Study	Yes	Yes	Yes
(0008,1062)	Physician Reading Study Identification Sequence	Yes	Yes	No
(0008,1070)	Operators' Name	Yes	Yes	Yes
(0008,1072)	Operators' Identification Sequence	Yes	Yes	No
(0008,1080)	Admitting Diagnoses Description	Yes	Yes	No
(0008,1084)	Admitting Diagnoses Code Sequence	Yes	Yes	No
(0008,1110)	Referenced Study Sequence	Yes	No	No
(0008,1111)	Referenced Performed Procedure Step Sequence	Yes	No	No
(0008,1120)	Referenced Patient Sequence	Yes	Yes	No
(0008,1140)	Referenced Image Sequence	Yes	No	No
(0008,1155)	Referenced SOP Instance UID	Yes	No	No
(0008,1195)	Transaction UID	Yes	No	No
(0008,2111)	Derivation Description	Yes	No	No
(0008,2112)	Source Image Sequence	Yes	No	No
(0008,3010)	Irradiation Event UID	Yes	No	No
(0008,4000)	Identifying Comments	Yes	Yes	No
(0008,9123)	Creator Version UID	Yes	No	No
(0010,0010)	Patient's Name	Yes	Yes	Yes
(0010,0020)	Patient ID	Yes	Yes	Yes
(0010,0021)	Issuer of Patient ID	Yes	Yes	No
(0010,0030)	Patient's Birth Date	Yes	Yes	Yes
(0010,0032)	Patient's Birth Time	Yes	Yes	No
(0010,0040)	Patient's Sex	Yes	No	No
(0010,0050)	Patient's Insurance Plan Code Sequence	Yes	Yes	Yes
(0010,0101)	Patient's Primary Language Code Sequence	Yes	Yes	Yes
(0010,0102)	Patient's Primary Language Modifier Code Sequence	Yes	Yes	Yes
(0010,1000)	Other Patient IDs	Yes	Yes	Yes
(0010,1001)	Other Patient Names	Yes	Yes	Yes
(0010,1002)	Other Patient IDs Sequence	Yes	Yes	Yes
(0010,1005)	Patient's Birth Name	Yes	Yes	Yes
(0010,1010)	Patient's Age	Yes	No	No
(0010,1020)	Patient's Size	Yes	No	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0010,1030)	Patient's Weight	Yes	No	No
(0010,1040)	Patient Address	Yes	Yes	Yes
(0010,1050)	Insurance Plan Identification	Yes	Yes	No
(0010,1060)	Patient's Mother's Birth Name	Yes	Yes	Yes
(0010,1080)	Military Rank	Yes	Yes	No
(0010,1081)	Branch of Service	Yes	Yes	No
(0010,1090)	Medical Record Locator	Yes	Yes	No
(0010,1100)	Referenced Patient Photo Sequence	Yes	Yes	No
(0010,2000)	Medical Alerts	Yes	Yes	No
(0010,2110)	Allergies	Yes	Yes	No
(0010,2150)	Country of Residence	Yes	Yes	No
(0010,2152)	Region of Residence	Yes	Yes	No
(0010,2154)	Patient's Telephone Number	Yes	Yes	Yes
(0010,2160)	Ethnic Group	Yes	No	No
(0010,2180)	Occupation	Yes	Yes	No
(0010,21A0)	Smoking Status	Yes	No	No
(0010,21B0)	Additional Patient's History	Yes	Yes	Yes
(0010,21C0)	Pregnancy Status	Yes	No	No
(0010,21D0)	Last Menstrual Date	Yes	No	No
(0010,21F0)	Patient's Religious Preference	Yes	Yes	No
(0010,2203)	Patient Sex Neutered	Yes	No	No
(0010,2297)	Responsible Person	Yes	Yes	No
(0010,2299)	Responsible Organization	Yes	Yes	No
(0010,4000)	Patient Comments	Yes	Yes	Yes
(0018,0010)	Contrast Bolus Agent	Yes	Yes	No
(0018,1000)	Device Serial Number	Yes	Yes	No
(0018,1002)	Device UID	Yes	No	No
(0018,1004)	Plate ID	Yes	Yes	No
(0018,1005)	Generator ID	Yes	Yes	No
(0018,1007)	Cassette ID	Yes	Yes	No
(0018,1008)	Gantry ID	Yes	Yes	No
(0018,1030)	Protocol Name	Yes	Yes	No
(0018,1400)	Acquisition Device Processing Description	Yes	Yes	No
(0018,2042)	Target UID	Yes	No	No
(0018,4000)	Acquisition Comments	Yes	Yes	No
(0018,700A)	Detector ID	Yes	Yes	No
(0018,9424)	Acquisition Protocol Description	Yes	Yes	No
(0018,9516)	Start Acquisition DateTime	Yes	No	No
(0018,9517)	End Acquisition DateTime	Yes	No	No
(0018,A003)	Contribution Description	Yes	Yes	No
(0020,000D)	Study Instance UID	Yes	No	Yes
(0020,000E)	Series Instance UID	Yes	No	Yes
(0020,0010)	Study ID	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0020,0052)	Frame of Reference UID	Yes	No	No
(0020,0200)	Synchronization Frame of Reference UID	Yes	No	No
(0020,3401)	Modifying Device ID	Yes	Yes	No
(0020,3404)	Modifying Device Manufacturer	Yes	Yes	No
(0020,3406)	Modified Image Description	Yes	Yes	No
(0020,4000)	Image Comments	Yes	Yes	No
(0020,9158)	Frame Comments	Yes	Yes	No
(0020,9161)	Concatenation UID	Yes	No	No
(0020,9164)	Dimension Organization UID	Yes	No	No
(0028,1199)	Palette Color Lookup Table UID	Yes	No	No
(0028,1214)	Large Palette Color Lookup Table UID	Yes	No	No
(0028,4000)	Image Presentation Comments	Yes	Yes	No
(0032,0012)	Study ID Issuer	Yes	Yes	No
(0032,1020)	Scheduled Study Location	Yes	Yes	No
(0032,1021)	Scheduled Study Location AE Title	Yes	Yes	No
(0032,1030)	Reason for Study	Yes	Yes	No
(0032,1032)	Requesting Physician	Yes	Yes	No
(0032,1033)	Requesting Service	Yes	Yes	No
(0032,1060)	Requested Procedure Description	Yes	Yes	No
(0032,1070)	Requested Contrast Agent	Yes	Yes	No
(0032,4000)	Study Comments	Yes	Yes	No
(0038,0004)	Referenced Patient Alias Sequence	Yes	Yes	No
(0038,0010)	Admission ID	Yes	Yes	No
(0038,0011)	Issuer of Admission ID	Yes	Yes	No
(0038,001E)	Scheduled Patient Institution Residence	Yes	Yes	No
(0038,0020)	Admitting Date	Yes	No	No
(0038,0021)	Admitting Time	Yes	No	No
(0038,0040)	Discharge Diagnosis Description	Yes	Yes	No
(0038,0050)	Special Needs	Yes	Yes	No
(0038,0060)	Service Episode ID	Yes	Yes	No
(0038,0061)	Issuer of Service Episode ID	Yes	Yes	No
(0038,0062)	Service Episode Description	Yes	Yes	No
(0038,0300)	Current Patient Location	Yes	Yes	No
(0038,0400)	Patient’s Institution Residence	Yes	Yes	No
(0038,0500)	Patient State	Yes	Yes	No
(0038,4000)	Visit Comments	Yes	Yes	No
(0040,0001)	Scheduled Station AE Title	Yes	Yes	No
(0040,0002)	Scheduled Procedure Step Start Date	Yes	No	No
(0040,0003)	Scheduled Procedure Step Start Time	Yes	No	No
(0040,0004)	Scheduled Procedure Step End Date	Yes	No	No
(0040,0005)	Scheduled Procedure Step End Time	Yes	No	No
(0040,0006)	Scheduled Performing Physician Name	Yes	Yes	No
(0040,0007)	Scheduled Procedure Step Description	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0040,000B)	Scheduled Performing Physician Identification Sequence	Yes	Yes	No
(0040,0010)	Scheduled Station Name	Yes	Yes	No
(0040,0011)	Scheduled Procedure Step Location	Yes	Yes	No
(0040,0012)	Pre-Medication	Yes	Yes	No
(0040,0241)	Performed Station AE Title	Yes	Yes	No
(0040,0242)	Performed Station Name	Yes	Yes	No
(0040,0243)	Performed Location	Yes	Yes	No
(0040,0244)	Performed Procedure Step Start Date	Yes	No	No
(0040,0245)	Performed Procedure Step Start Time	Yes	No	No
(0040,0250)	Performed Procedure Step End Date	Yes	No	No
(0040,0251)	Performed Procedure Step End Time	Yes	No	No
(0040,0253)	Performed Procedure Step ID	Yes	Yes	No
(0040,0254)	Performed Procedure Step Description	Yes	Yes	No
(0040,0275)	Request Attributes Sequence	Yes	Yes	No
(0040,0280)	Comments on Performed Procedure Step	Yes	Yes	No
(0040,0555)	Acquisition Context Sequence	Yes	Yes	No
(0040,1001)	Requested Procedure ID	Yes	Yes	No
(0040,1004)	Patient Transport Arrangements	Yes	Yes	No
(0040,1005)	Requested Procedure Location	Yes	Yes	No
(0040,1010)	Names of Intended Recipient of Results	Yes	Yes	No
(0040,1011)	Intended Recipients of Results Identification Sequence	Yes	Yes	No
(0040,1101)	Person Identification Code Sequence	Yes	Yes	No
(0040,1102)	Person Address	Yes	Yes	No
(0040,1103)	Person Telephone Numbers	Yes	Yes	No
(0040,1400)	Requested Procedure Comments	Yes	Yes	No
(0040,2001)	Reason for Imaging Service Request	Yes	Yes	No
(0040,2008)	Order Entered By	Yes	Yes	No
(0040,2009)	Order Enterer Location	Yes	Yes	No
(0040,2010)	Order Callback Phone Number	Yes	Yes	No
(0040,2016)	Placer Order Number of Imaging Service Request	Yes	Yes	No
(0040,2017)	Filler Order Number of Imaging Service Request	Yes	Yes	No
(0040,2400)	Imaging Service Request Comments	Yes	Yes	No
(0040,3001)	Confidentiality Constraint on Patient Data Description	Yes	Yes	No
(0040,4005)	Scheduled Procedure Step Start DateTime	Yes	No	No
(0040,4010)	Scheduled Procedure Step Modification DateTime	Yes	No	No
(0040,4011)	Expected Completion Date Time	Yes	No	No
(0040,4023)	Referenced General Purpose Scheduled Procedure Step Transaction UID	Yes	No	No
(0040,4025)	Scheduled Station Name Code Sequence	Yes	Yes	No
(0040,4027)	Scheduled Station Geographic Location Code Sequence	Yes	Yes	No
(0040,4028)	Performed Station Name Code Sequence	Yes	Yes	No
(0040,4030)	Performed Station Geographic Location Code Sequence	Yes	Yes	No
(0040,4034)	Scheduled Human Performers Sequence	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0040,4035)	Actual Human Performers Sequence	Yes	Yes	No
(0040,4036)	Human Performers Organization	Yes	Yes	No
(0040,4037)	Human Performers Name	Yes	Yes	No
(0040,4050)	Performed Procedure Step Start DateTime	Yes	No	No
(0040,4051)	Performed Procedure Step End DateTime	Yes	No	No
(0040,4052)	Procedure Step Cancellation DateTime	Yes	No	No
(0040,A027)	Verifying Organization	Yes	Yes	No
(0040,A073)	Verifying Observer Sequence	Yes	Yes	No
(0040,A075)	Verifying Observer Name	Yes	Yes	No
(0040,A078)	Author Observer Sequence	Yes	Yes	No
(0040,A07A)	Participant Sequence	Yes	Yes	No
(0040,A07C)	Custodial Organization Sequence	Yes	Yes	No
(0040,A088)	Verifying Observer Identification Code Sequence	Yes	Yes	No
(0040,A123)	Person Name	Yes	Yes	No
(0040,A124)	UID	Yes	Yes	No
(0040,A171)	Observation UID	Yes	No	No
(0040,A172)	Referenced Observation UID (Trial)	Yes	No	No
(0040,A192)	Observation Date (Trial)	Yes	No	No
(0040,A193)	Observation Time (Trial)	Yes	No	No
(0040,A307)	Current Observer (Trial)	Yes	Yes	No
(0040,A352)	Verbal Source (Trial)	Yes	Yes	No
(0040,A353)	Address (Trial)	Yes	Yes	No
(0040,A354)	Telephone Number (Trial)	Yes	Yes	No
(0040,A358)	Verbal Source Identifier Code Sequence (Trial)	Yes	Yes	No
(0040,A402)	Observation Subject UID (Trial)	Yes	No	No
(0040,A730)	Content Sequence	Yes	Yes	No
(0040,DB0C)	Template Extension Organization UID	Yes	No	No
(0040,DB0D)	Template Extension Creator UID	Yes	No	No
(0070,0001)	Graphic Annotation Sequence	Yes	Yes	No
(0070,0084)	Content Creator’s Name	Yes	Yes	No
(0070,0086)	Content Creator’s Identification Code Sequence	Yes	Yes	No
(0070,031A)	Fiducial UID	Yes	No	No
(0088,0140)	Storage Media Fileset UID	Yes	No	No
(0088,0200)	Icon Image Sequence	Yes	Yes	No
(0088,0904)	Topic Title	Yes	Yes	No
(0088,0906)	Topic Subject	Yes	Yes	No
(0088,0910)	Topic Author	Yes	Yes	No
(0088,0912)	Topic Keywords	Yes	Yes	No
(0400,0100)	Digital Signature UID	Yes	Yes	No
(0400,0402)	Referenced Digital Signature Sequence	Yes	Yes	No
(0400,0403)	Referenced SOP Instance MAC Sequence	Yes	Yes	No
(0400,0404)	MAC	Yes	Yes	No
(0400,0550)	Modified Attributes Sequence	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0400,0561)	Original Attributes Sequence	Yes	Yes	No
(2030,0020)	Text String	Yes	Yes	No
(3006,0024)	Referenced Frame of Reference UID	Yes	No	No
(3006,00C2)	Related Frame of Reference UID	Yes	No	No
(3008,0105)	Source Serial Number	No	No	No
(300A,0013)	Dose Reference UID	Yes	No	No
(300E,0008)	Reviewer Name	Yes	Yes	No
(4000,0010)	Arbitrary	Yes	Yes	No
(4000,4000)	Text Comments	Yes	Yes	No
(4008,0042)	Results ID Issuer	Yes	Yes	No
(4008,0102)	Interpretation Recorder	Yes	Yes	No
(4008,010A)	Interpretation Transcriber	Yes	Yes	No
(4008,010B)	Interpretation Text	Yes	Yes	No
(4008,010C)	Interpretation Author	Yes	Yes	No
(4008,0111)	Interpretation Approver Sequence	Yes	Yes	No
(4008,0114)	Physician Approving Interpretation	Yes	Yes	No
(4008,0115)	Interpretation Diagnosis Description	Yes	Yes	No
(4008,0118)	Results Distribution List Sequence	Yes	Yes	No
(4008,0119)	Distribution Name	Yes	Yes	No
(4008,011A)	Distribution Address	Yes	Yes	No
(4008,0202)	Interpretation ID Issuer	Yes	Yes	No
(4008,0300)	Impressions	Yes	Yes	No
(4008,4000)	Results Comments	Yes	Yes	No
(50xx,xxxx)	Curve Data	Yes	Yes	No
(60xx,0100)	Overlay Bits Allocated	Yes	Yes	No
(60xx,0102)	Overlay Bit Position	Yes	Yes	No
(60xx,3000)	Overlay Data	Yes	Yes	No
(60xx,4000)	Overlay Comments	Yes	Yes	No
(FFFA,FFFA)	Digital Signatures Sequence	Yes	Yes	Yes
(FFFC,FFFC)	Data Set Trailing Padding	Yes	Yes	Yes

Table 71: Application Level Confidentiality Profile Attributes (private tags)

DICOM Tag	Attribute Name	Full	Reduced	Service
(0019, SIEMENS CT VA0 COAD, 90)	Osteo offset	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 92)	Osteo Regression Line Slope	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 93)	Osteo Regression Line Intercept	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 96)	Osteo Phantom Number	Yes	No	No
(0043, GEMS_PARM_01, 1E)	GE Delta Start Time	Yes	No	No
(0029, SIEMENS CSA ENVELOPE, 10)	Syngo Report Data	Yes	No	No
(0029, SIEMENS CSA ENVELOPE, 11)	Syngo Report Presentation	Yes	No	No
(0029, SIEMENS CSA HEADER, 08)	Modality Image Header Type	Yes	No	No
(0029, SIEMENS CSA HEADER, 09)	Modality Image Header Version	Yes	No	No
(0029, SIEMENS CSA HEADER, 10)	Modality Image Header Info	Yes	No	No
(0029, SIEMENS CSA HEADER, 18)	Modality Series Header Type	Yes	No	No
(0029, SIEMENS CSA HEADER, 19)	Modality Series Header Version	Yes	No	No
(0029, SIEMENS CSA HEADER, 20)	Modality Series Header Info	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 40)	Application Header Sequence	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 41)	Application Header Type	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 42)	Application Header ID	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 43)	Application Header Version	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 44)	Application Header Info	Yes	No	No
(0029, SIEMENS CT APPL DATASET, 00)	Dual Energy Algorithm Parameters	Yes	No	No
(0029, SIEMENS CT APPL ALG PARAMS, 20)	Perfusion Result Set Id	Yes	No	No

8 Security

8.1 Security Profiles

Time Synchronization Profiles: YSIO X.pree acts as an NTP Client in the Maintain Time Transaction.

8.2 Association Level Security

It is possible to configure whether the SCP will only answer to known AETs or to any AET.

8.3 Application Level Security

- User must login with own password.
- For configuration and Maintenance, Service Technician must login with a separate password.

9 Annexes

9.1 IOD Contents

9.1.1 Created SOP Instances

YSIO X.pree will create images during acquisition and with post processing applications. All acquired images are stored and can be exported in an unprocessed format (“Digital X-Ray Image Storage - For Processing”) and in format convenient for reading (“Digital X-Ray Image Storage - For Presentation”). The processed images can also be converted to CR format (Computed Radiography Image Storage) when sent out.

In addition to that, Dose Reports are created for each examination (X-Ray Radiation Dose SR Storage).

Images created during post processing will be marked as derived and can only be sent in a processed format (“DX” or “CR”).

9.1.1.1 Digital X-Ray Image Storage - For Presentation

A DX image acquired by YSIO X.pree consists of standard and private attributes listed in the modules from Table 72.

Table 72: Modules for Digital X-Ray Image Storage - For Presentation

IE	Module
Patient	Patient
Study	General Study Patient Study
Series	General Series DX Series
Equipment	General Equipment
Image	General Image General Reference Image Pixel Contrast/Bolus DX Anatomy Imaged DX Image DX Detector X-Ray Collimator DX Positioning X-Ray Acquisition Dose X-Ray Generation X-Ray Filtration X-Ray Grid Overlay Plane VOI LUT Acquisition Context SOP Common Common Instance Reference
Private	Private attributes

9.1.1.2 Digital X-Ray Image Storage - For Processing

A DX image acquired by YSIO X.pree consists of standard and private attributes listed in the modules from Table 73.

9.1.1.3 Computed Radiography Image Storage

A CR image acquired by YSIO X.pree consists of standard and private attributes listed in the modules from Table 73.

Table 73: Modules for Digital X-Ray Image Storage - For Processing

IE	Module
Patient	Patient
Study	General Study
	Patient Study
Series	General Series CR Series
Equipment	General Equipment
Image	General Image General Reference Image Pixel Contrast/Bolus CR Image Overlay Plane Modality LUT VOI LUT SOP Common Common Instance Reference
Private	Private attributes

9.1.1.4 X-Ray Radiation Dose SR Storage

An X-Ray Radiation Dose SR acquired by YSIO X.pree consists of standard and private attributes listed in the modules from Table 74.

Table 74: Modules for X-Ray Radiation Dose SR Storage

IE	Module
Patient	Patient
Study	General Study Patient Study
Series	SR Document Series
Equipment	General Equipment
Image	Enhanced General Equipment SR Document General SR Document Content SOP Common

9.1.1.5 Patient Module

Attribute Name	Tag	Type	VR	VM	Description
Patient's Name	(0010,0010)	2	PN	1	Name of patient.
Patient ID	(0010,0020)	2	LO	1	ID of patient.
Issuer of Patient ID	(0010,0021)	3	LO	1	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID.
Patient's Birth Date	(0010,0030)	2	DA	1	Birth date of patient.
Patient's Sex	(0010,0040)	2	CS	1	M: male F: female O: other
Quality Control Subject	(0010,0200)	3	CS	1	Indicates whether or not the subject is a quality control phantom ("YES" or "NO"). "YES" for images that were acquired - in a service workflow of category "IQAP" - in an Adjustment workflow Otherwise "NO"
Other Patient Ids	(0010,1000)	3	LO	1-n	Other identification numbers or codes used to identify the patient.
Other Patient Names	(0010,1001)	3	PN	1-n	Other names used to identify the Patient.
Ethnic Group	(0010,2160)	3	SH	1	Ethnic group of the Patient.
Patient Comments	(0010,4000)	3	LT	1	User-defined additional information about the Patient.
Patient Identity Removed	(0012,0062)	3	CS	1	"YES" in case of anonymized export, otherwise not present.
De-identification Method	(0012,0063)	1C	LO	1-n	Describes the De-identification method in case of minimized export, otherwise not present. 'Siemens Healthcare Service Use' in case of Service export. Otherwise identifies the profile from "De-identification Method Code Sequence" that was applied.
De-identification Method Code Sequence	(0012,0064)	1C	SQ	1	Describes the (coded) De-identification method in case of minimized export, otherwise not present. "Full" Anonymization: (DCM,113100,"Basic Application Confidentiality Profile") "Service" Anonymization: not present "Reduced" Anonymization: (DCM,113106,"Retain Longitudinal Temporal Information With Full Dates Op-tion") (DCM,113108,"Retain Patient Characteristics Option") (DCM,113110,"Retain UIDs Option")
>Code Value	(0008,0100)	1	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.

9.1.1.6 General Study Module

Attribute Name	Tag	Type	VR	VM	Description
Study Instance UID	(0020,000D)	1	UI	1	Study Instance UID from Modality Worklist in case of RIS registered studies, otherwise locally generated.
Study Date	(0008,0020)	2	DA	1	Taken from Modality Worklist. Date of first image acquisition in case of locally registered study.
Study Time	(0008,0030)	2	TM	1	Taken from Modality Worklist. Time of first image acquisition in case of locally registered study.
Referring Physician's Name	(0008,0090)	2	PN	1	Taken from Modality Worklist or entered by the user.
Study ID	(0020,0010)	2	SH	1	Requested Procedure ID from Modality Worklist. If not available (empty or locally generated procedure): Device generated identifier.
Accession Number	(0008,0050)	2	SH	1	Taken from Modality Worklist or entered by the user.
Study Description	(0008,1030)	3	LO	1	Contains the "Displayed Text" from the attribute that was used for RIS matching. Concatenated in case of several CPs. If not available (e.g. local registration): Concatenation of the CP names.
Referenced Study Sequence	(0008,1110)	3	SQ	1	Copy from Modality Worklist. Empty in case of locally registered study.
>Referenced SOP Class UID	(0008,1150)	1	UI	1	1.2.840.10008.3.1.2.3.2
>Referenced SOP Instance UID	(0008,1155)	1	UI	1	Study Instance UID from Modality Worklist.
Procedure Code Sequence	(0008,1032)	3	SQ	1	Empty in case of locally registered study. In scheduled case (procedure from Modality Worklist): - Copy from Requested Procedure Code SQ (0032,1064) in case the performed procedure was the planned procedure (no changes in RIS mapping) - Otherwise (change in RIS mapping: empty)
>Code Value	(0008,0100)	1	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>Coding Scheme Version	(0008,0103)	1C	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.

9.1.1.7 Patient Study Module

Attribute Name	Tag	Type	VR	VM	Description
Admitting Diagnoses Description	(0008,1080)	3	LO	1-n	Description of the admitting diagnosis (diagnoses).
Patient's Age	(0010,1010)	3	AS	1	Age of the patient when the examination is executed.
Patient's Size	(0010,1020)	3	DS	1	Size of the patient in meters when the examination is executed.
Patient's Weight	(0010,1030)	3	DS	1	Weight of the patient in kilograms when the examination is executed.
Medical Alerts	(0010,2000)	3	LO	1-n	Conditions to which medical staff should be alerted (e.g., contagious condition, drug allergies, etc.). Taken from Modality Worklist or entered by the user.
Allergies	(0010,2110)	3	LO	1-n	Description of prior reaction to contrast agents, or other patient allergies or adverse reactions. Taken from Modality Worklist or entered by the user.
Pregnancy Status	(0010,21C0)	3	US	1	0001: „not pregnant“, 0002: „possibly pregnant“ 0003: „definitely pregnant“, 0004: „unknown“
Admission ID	(0038,0010)	3	LO	1	Taken from Modality Worklist or entered by the user.

9.1.1.8 General Series Module

Attribute Name	Tag	Type	VR	VM	Description
Modality	(0008,0060)	1	CS	1	"DX" for DX images "CR" for CR images
Series Instance UID	(0020,000E)	1	UI	1	Every RAD image is stored in a separate series. All RAD images for an ORTHO series are stored in the same series. Each composed image is stored in a separate series. Unprocessed images and processed images are stored in different series. Reprocessed images are stored in the same series as the first processed image.
Series Number	(0020,0011)	2	IS	1	PROCESSED: For each series a running number is generated starting with 1. UNPROCESSED: For each series a running number is generated starting with 5001. For each new study the counter is reset to 1.
Laterality	(0020,0060)	2C	CS	1	Entered by user or taken over from CP Step
Series Date	(0008,0021)	3	DA	1	Date, when the first object in this series was created
Series Time	(0008,0031)	3	TM	1	Time, when the first object in this series was created
Performing Physician's Name	(0008,1050)	3	PN	1-n	Pre-filled with "Scheduled Performing Physician's Name" from Modality Worklist. Can be overwritten by the user.

Attribute Name	Tag	Type	VR	VM	Description
Protocol Name	(0018,1030)	3	LO	1	Name of CP Step.
Series Description	(0008,103E)	3	LO	1	Name of CP Step.
Operators' Name	(0008,1070)	3	PN	1-n	Value as entered during patient registration. Pre-filled with login name of current user.
Referenced Performed Procedure Step Sequence	(0008,1111)	3	SQ	1	Reference to the MPPS object
>Referenced SOP Class UID	(0008,1150)	1	UI	1	1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the MPPS object
Body Part Examined	(0018,0015)	3	CS	1	The Body Model / CP defines organs that are mapped to DICOM Body Parts as follows: Skull => SKULL, Jaw => JAW, C-Spine => CSPINE, T-Spine => TSPINE, L-Spine => LSPINE, S-Spine => SSPINE, Knee => KNEE, Ankle => ANKLE, Foot => FOOT, Leg => LEG, Chest => CHEST, Abdomen => AB-DOMEN, Shoulder => SHOULDER, Clavicle => CLAVICLE, Elbow => ELBOW, Hand => HAND, Pelvis => PELVIS, Hip => HIP, Fore-arm => FOREARM, Humerus => HUMER-US, Tibia => TIBIA, Femur => FEMUR, VertebralColumn => VERTEBRALCOLUMN
Patient Position	(0018,5100)	2C	CS	1	Entered by user.
Request Attributes Sequence	(0040,0275)	3	SQ	1	Collects information taken from Modality Worklist. In case of locally registered patient: not contained.
>Requested Procedure ID	(0040,1001)	1C	SH	1	The Requested Procedure ID from worklist request.
>Accession Number	(0008,0050)	3	SH	1	The Accession from worklist request.
>Study Instance UID	(0020,000D)	3	UI	1	The Study Instance UID from worklist request.
>Referenced Study Sequence	(0008,1110)	3	UI	1	The Referenced Study Sequence from worklist request.
>>Referenced SOP Class UID	(0008,1150)	1	UI	1	The Referenced SOP Class UID from (0008,1110).
>>Referenced SOP Instance UID	(0008,1155)	1	UI	1	The Referenced SOP Instance UID from (0008,1110).
>Requested Procedure Description	(0032,1060)	3	LO	1	The Requested Procedure Description from worklist request.
>Requested Procedure Code Sequence	(0032,1064)	3	SQ	1	The Requested Procedure Code Sequence from worklist request.
>>Code Value	(0008,0100)	1	SH	1	Code Value from (0032,1064).
>>Coding Scheme Designator	(0008,0102)	1	SH	1	Coding Scheme Designator from (0032,1064).
>>Coding Scheme Version	(0008,0103)	1C	SH	1	Coding Scheme Version from (0032,1064).

Attribute Name	Tag	Type	VR	VM	Description
>>Code Meaning	(0008,0104)	1	LO	1	Code Meaning from (0032,1064).
>Reason for the Requested Procedure	(0040,1002)	3	LO	1	The Reason for the Requested Procedure from worklist request.
>Scheduled Procedure Step ID	(0040,0009)	1C	SH	1	The Scheduled Procedure Step ID from worklist request (contained in Scheduled Procedure Step Sequence).
>Scheduled Procedure Step Description	(0040,0007)	3	LO	1	The Scheduled Procedure Description from worklist request (contained in Scheduled Procedure Step Sequence).
>Scheduled Protocol Code Sequence	(0040,0008)	3	SQ	1	The Scheduled Procedure Protocol Code Sequence from worklist request (con-tained in Scheduled Procedure Step Se-quence).
>>Code Value	(0008,0100)	1	SH	1	Code Value from (0040,0008).
>>Coding Scheme Designator	(0008,0102)	1	SH	1	Coding Scheme Designator from (0040,0008).
>>Coding Scheme Version	(0008,0103)	1C	SH	1	Coding Scheme Version from (0040,0008).
>>Code Meaning	(0008,0104)	1	LO	1	Code Meaning from (0040,0008).
Performed Procedure Step ID	(0040,0253)	3	SH	1	Internally generated. The PPSID of the MPPS instance to which this series is related.
Performed Procedure Step Start Date	(0040,0244)	3	DA	1	Date when the first acquisition for the CP took place.
Performed Procedure Step Start Time	(0040,0245)	3	TM	1	Time when the first acquisition for the CP took place.
Performed Procedure Step Description	(0040,0254)	3	LO	1	CP Name

9.1.1.9 DX Series Module

Attribute Name	Tag	Type	VR	VM	Description
Modality	(0008,0060)	1	CS	1	DX
Referenced Performed Procedure Step Sequence	(0008,1111)	1C	SQ	1	Reference to the MPPS object
>Referenced SOP Class UID	(0008,1150)	1	UI	1	1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the MPPS object
Presentation Intent Type	(0008,0068)	1	CS	1	“FOR PRESENTATION” for processed images. “FOR PROCESSING” for unprocessed images.

9.1.1.10 CR Series Module

Attribute Name	Tag	Type	VR	VM	Description
Body Part Examined	(0018,0015)	2	CS	1	See „Body Part Examined“ in „General Series“ module.
View Position	(0018,5101)	2	CS	1	See „View Position“ in „General Series“ module.
Filter Type	(0018,1160)	3	SH	1	See „Filter Type“ in „X-Ray Acquisition Dose“ module.
Focal Spot(s)	(0018,1190)	3	DS	1-n	See „Focal Spot(s)“ in „X-Ray Acquisition Dose“ module.

9.1.1.11 SR Document Series Module

Attribute Name	Tag	Type	VR	VM	Description
Modality	(0008,0060)	1	CS	1	SR
Series Instance UID	(0020,000E)	1	UI	1	The Dose Report is stored in a seperate series. There is one Dose Report per Procedure Step.
Series Number	(0020,0011)	1	IS	1	For each Dose Report there is an increasing number (starting with 10000)
Series Date	(0008,0021)	3	DA	1	Date, when the SR was created for the first time
Series Time	(0008,0031)	3	TM	1	Time, when the SR was created for the first time
Protocol Name	(0018,1030)	3	LO	1	Name of CP.
Series Description	(0008,103E)	3	LO	1	“Radiation Dose Information”.
Referenced Performed Procedure Step Sequence	(0008,1111)	3	SQ	1	Reference to the MPPS object.
>Referenced SOP Class UID	(0008,1150)	1	UI	1	1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the referenced MPPS object.

9.1.1.12 General Equipment Module

Attribute Name	Tag	Type	VR	VM	Description
Manufacturer	(0008,0070)	2	LO	1	Siemens Healthineers
Institution Name	(0008,0080)	3	LO	1	Institution Name from Modality Worklist request or if not available: Combination of Institution Name and Hospital Name from local configuration (AdminPortal: Site Information / Customer)
Institution Address	(0008,0081)	3	ST	1	Institution Address from Modality Worklist request, if the Institution Name was also provided via Modality Worklist. Otherwise: Institution Name Address from local config in this format: Street StreetNumber ZipCode City District Country
Station Name	(0008,1010)	3	SH	1	„Ward“ from AdminPortal („Site Information“ / „Customer“)
Institutional Department Name	(0008,1040)	3	LO	1	„Department“ from AdminPortal („Site Information“ / „Customer“)
Manufacturer‘s Model Name	(0008,1090)	3	LO	1	„Model“ from Local DICOM Node config
Device Serial Number	(0018,1000)	3	LO	1	The serial number of the device.
Software Versions	(0018,1020)	3	LO	1-n	1st entry: system marketing version with SYS prefix (e.g. „SYS_VA20B“) 2nd entry: UIS version with UIS prefix (e.g. „UIS_VA30B“) 3rd entry: Version for internal data (e.g. InstanceVersion_1.0)

9.1.1.13 Enhanced General Equipment

Attribute Name	Tag	Type	VR	VM	Description
Manufacturer	(0008,0070)	1	LO	1	See „Manufacturer“ in „General Equipment“ module.
Manufacturer‘s Model Name	(0008,1090)	1	LO	1	See „Manufacturer’s Model Name“ in „General Equipment“ module.
Device Serial Number	(0018,1000)	1	LO	1	See „Device Serial Number“ in „General Equipment“ module.
Software Versions	(0018,1020)	1	LO	1-n	See „Software Version“ in „General Equipment“ module.

9.1.1.14 General Image Module

Attribute Name	Tag	Type	VR	VM	Description
Instance Number	(0020,0013)	2	IS	1	Current number of the image in creation order within a series, e.g. 1,2,3… Next series again starts with 1.
Content Date	(0008,0023)	2C	DA	1	Date, when the pixel data or content was created.
Content Time	(0008,0033)	2C	TM	1	Time, when the pixel data or content was created.
Image Type	(0008,0008)	3	CS	2-n	See “Image Type” in DX Image Module.
Acquisition Number	(0020,0012)	3	IS	1	Running number of the acquisition event for the active patient starting with 1. Empty for Ortho composed images.
Acquisition Date	(0008,0022)	3	DA	1	Date, when the image was acquired In case of composed images the date of the last acquired projection image is taken.
Acquisition Time	(0008,0032)	3	TM	1	Time, when the image was acquired In case of composed images the time of the last acquired projection image is taken.
Acquisition DateTime	(0008,002A)	3	DT	1	Date/Time, when the image was acquired In case of composed images the time of the last acquired projection image is taken.
Quality Control Image	(0028,0300)	3	CS	1	See „Quality Control Subject“ in “Patient“ Module.
Burned In Annotation	(0028,0301)	3	CS	1	„YES“, if annotations were entered by the user and the configuration is accordingly (Admin Portal under Global DICOM Settings), otherwise „NO“.
Lossy Image Compression	(0028,2110)	3	CS	1	In case the image is transferred in lossy format: 01 Otherwise: 00
Lossy Image Compression Ratio	(0028,2112)	3	DS	1-n	The compression ratio in case the image is transferred in lossy format.
Lossy Image Compression Method	(0028,2114)	3	CS	1-n	The compression method in case the image is transferred in lossy format.
Presentation LUT Shape	(2050,0020)	3	CS	1	„IDENTITY“ as Photometric Interpretation is always „MONOCHROME2“
Irradiation Event UID	(0008,3010)	3	UI	1-n	For the acquisition of each RAD image an „Irradiation Event UID“ is generated and stored in the DICOM header of that image (both: unprocessed + processed). For ORTHO each original image gets an own „Irradiation Event UID“. The composed image contains all „Irradiation Event UIDs“ of the original images referenced (VM=1-n). In case of flavor change the reprocessed images all have the same Irradiation UID as they belong to the same Irradiation Event, but they all have a different SOPINUID.

9.1.1.15 General Reference Module

Attribute Name	Tag	Type	VR	VM	Description
Derivation Description	(0008,2111)	3	ST	1	Only set in case the image is an ORTHO composed image or the image was recovered: “Ortho composed image” “Image Recovery Candidate” (for unprocessed image with black image pixel data before recovery) “Recovered Image” (for unprocessed image with rocevered pixel data and for processed image which is generated from the recovered unprocessed image)
Source Image Sequence	(0008,2112)	3	SQ	1	In case of Ortho-composed images the resulting image contains references to the original projections. In case of DX images the “FOR PRESENTATION” images contain references to the “FOR PROCESSING” images.
>Referenced SOP Class UID	(0008,1150)	1	UI	1	SOP Class UID of the original image (see above).
>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the original image (see above).

9.1.1.16 Image Pixel Module

Attribute Name	Tag	Type	VR	VM	Description
Samples per Pixel	(0028,0002)	1	US	1	1
Photometric Interpretation	(0028,0004)	1	CS	1	MONOCHROME2 In case of inversion, the pixel data is changed.
Rows	(0028,0010)	1	US	1	Number of Rows
Columns	(0028,0011)	1	US	1	Number of Columns
Bits Allocated	(0028,0100)	1	US	1	16
Bits Stored	(0028,0101)	1	US	1	Globally configurable ("Global DICOM Settings"), if 12 or 16.
High Bit	(0028,0102)	1	US	1	Globally configurable ("Global DICOM Settings"), if 11 or 15
Pixel Representation	(0028,0103)	1	US	1	0
Pixel Data	(7FE0,0010)	1C	OB or OW	1	A data stream of the pixel samples that comprise the Image.

9.1.1.17 Contrast/Bolus Module

Attribute Name	Tag	Type	VR	VM	Description
Contrast/Bolus Agent	(0018,0010)	2	LO	1	User entered value for Contrast/Bolus Agent.

9.1.1.18 DX Anatomy Imaged Module

Attribute Name	Tag	Type	VR	VM	Description
Image Laterality	(0020,0062)	1	CS	1	Predefined from CP-Step Can be changed by the user
Anatomic Region Sequence	(0008,2218)	2	SQ	1	Skull => (89546000,SCT,"Skull") Jaw => (661005,SCT,"Jaw Region") C-Spine => (122494005,SCT,"Cervical spine") T-Spine => (122495006,SCT,"Thoracic spine") L-Spine => (122496007,SCT,"Lumbar spine") S-Spine => (54735007,SCT,"Sacrum") Knee => (72696002,SCT,"Knee") Ankle => (70258002,SCT,"Ankle joint") Foot => (56459004,SCT,"Foot") Chest => (51185008,SCT,"Chest") Abdomen => (113345001,SCT,"Abdomen") Shoulder => 16982005,SCT,"Shoulder") Clavicle => (51299004,SCT,"Clavicle") Elbow => (16953009,SCT,"Elbow joint") Hand => (85562004,SCT,"Hand") Pelvis => (12921003,SCT,"Pelvis") Hip => HIP (29836001,SCT,"Hip joint") Forearm => (14975008,SCT,"Forearm") Humerus => (85050009,SCT,"Humerus") Tibia => (12611008,SCT,"Tibia") Femur => (71341001,SCT,"Femur") VertebralColumn => (110517009,SCT,"Vertebral column and cranium") Leg => (416631005,SCT,"Pelvis and lower extremities")
>Code Value	(0008,0100)	1	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.

9.1.1.19 DX Image Module

Attribute Name	Tag	Type	VR	VM	Description
Image Type	(0008,0008)	1	CS	2-n	“ORIGINAL\PRIMARY\\RAD” for RAD images. “DERIVED\SECONDARY\\algorithm” for Composed Ortho images (“SPINE”, “LLD_ORTHO”, “LLD_ORTHO_ONE_LEG” for algorithm) In case of reprocessing (another flavor used): the Image Type does not change.
Samples per Pixel	(0028,0002)	1	US	1	1

Attribute Name	Tag	Type	VR	VM	Description
Photometric Interpretation	(0028,0004)	1	CS	1	See Image Pixel Module.
Bits Allocated	(0028,0100)	1	US	1	16
Bits Stored	(0028,0101)	1	US	1	See "Image Pixel" module
High Bit	(0028,0102)	1	US	1	See "Image Pixel" module
Pixel Representation	(0028,0103)	1	US	1	0
Pixel Intensity Relationship	(0028,1040)	1	CS	1	LIN for unprocessed images DISP for processed images
Pixel Intensity Relationship Sign	(0028,1041)	1	SS	1	The sign of the relationship between the Pixel sample values stored in Pixel Data (7FE0,0010) and the X-Ray beam intensity. -1: Higher pixel values correspond to less X-Ray beam intensity "1" by default "-1" in case of inversion
Rescale Intercept	(0028,1052)	1	DS	1	0
Rescale Slope	(0028,1053)	1	DS	1	1
Rescale Type	(0028,1054)	1	LO	1	US
Presentation LUT Shape	(2050,0020)	1	CS	1	See „Presentation LUT Shape“ in „General Image” module.
Lossy Image Compression	(0028,2110)	1	CS	1	See „ Lossy Image Compression“ in „General Image” module.
Lossy Image Compression Ratio	(0028,2112)	1C	DS	1-n	See „ Lossy Image Compression Ratio“ in „General Image” module.
Derivation Description	(0008,2111)	3	ST	1	See „Derivation Description“ in „General Reference” module.
Calibration Image	(0050,0004)	3	CS	1	“YES” in case this image is used for detector CALIBRATION, otherwise “NO”.
Burned In Annotation	(0028,0301)	1	CS	1	See „ Burned In Annotation“ in „General Reference” module.
Window Center	(0028,1050)	1C	DS	1-n	First value is the Window Center after user adjustments, second is the original value from auto window. Not contained for unprocessed images. User value might be skipped, if the user did not change windowing.
Window Width	(0028,1051)	1C	DS	1-n	First value is the Window Width after user adjustments, second is the original value from auto window. Not contained for unprocessed images. User value might be skipped, if the user did not change windowing.
Window Center & Width Explanation	(0028,1055)	3	LO	1-n	1. USER 2. AUTO Not contained for unprocessed images.

9.1.1.20 CR Image Module

Attribute Name	Tag	Type	VR	VM	Description
Photometric Interpretation	(0028,0004)	1	CS	1	See „Photometric Interpretation“ in „Image Pixel“ module.
KVP	(0018,0060)	3	DS	1	See „KVP“ in „X-Ray Acquisition Dose“ module.
Distance Source to Detector	(0018,1110)	3	DS	1	See „Distance Source to Detector“ in „X-Ray Acquisition Dose“ module.
Distance Source to Patient	(0018,1111)	3	DS	1	See „Distance Source to Detector“ in „X-Ray Acquisition Dose“ module.
Exposure Time	(0018,1150)	3	IS	1	See „Exposure Time“ in „X-Ray Acquisition Dose“ module.
X-Ray Tube Current	(0018,1151)	3	IS	1	See „X-Ray Tube Current“ in „X-Ray Acquisition Dose“ module.
Exposure	(0018,1152)	3	IS	1	See „Exposure“ in „X-Ray Acquisition Dose“ module.
Exposure in µAs	(0018,1153)	3	IS	1	See „Exposure in µAs“ in „X-Ray Acquisition Dose“ module.
Imager Pixel Spacing	(0018,1164)	3	DS	2	See „Imager Pixel Spacing“ in „DX Detector“ module.
Pixel Spacing	(0028,0030)	1C	DS	2	See „Pixel Spacing“ in „DX Detector“ module.
Pixel Spacing Calibration Type	(0028,0A02)	3	CS	1	See „Pixel Spacing Calibration Type“ in „DX Detector“ module.
Pixel Spacing Calibration Description	(0028,0A04)	1C	LO	1	See „Pixel Spacing Calibration Description“ in „DX Detector“ module.
Acquisition Device Processing Description	(0018,1400)	3	LO	1	See „Acquisition Device Processing Description“ in „DX Image“ module.
Acquisition Device Processing Code	(0018,1401)	3	LO	1	See „Acquisition Device Processing Code“ in „DX Image“ module.
Relative X-Ray Exposure	(0018,1405)	3	IS	1	See „Relative X-Ray Exposure“ in „X-Ray Acquisition Dose“ module.
Anatomic Region Sequence	(0008,2218)	2	SQ	1	See „Anatomic Region Sequence“ in „DX Anatomy Imaged“ module.
>Code Value	(0008,0100)	1	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.
Exposure Index	(0018,1411)	3	DS	1	See „Exposure Index“ in „DX Detector“ module.
Target Exposure Index	(0018,1412)	3	DS	1	See „Target Exposure Index“ in „DX Detector“ module.
Deviation Index	(0018,1413)	3	DS	1	See „Deviation Index“ in „DX Detector“ module.

9.1.1.21 DX Detector Module

Attribute Name	Tag	Type	VR	VM	Description
Detector Type	(0018,7004)	2	CS	1	“SCINTILLATOR”
Detector Configuration	(0018,7005)	3	CS	1	“AREA”
Detector Description	(0018,7006)	3	LT	1	serial#-part#-firmware-detectorcode-FDtype
Detector ID	(0018,700A)	3	SH	1	Serial Number of detector
Date of Last Detector Calibration	(0018,700C)	3	DA	1	The date on which the detector used to acquire this image as identified in Detector ID (0018,700A) was last calibrated. Empty if not calibrated.
Time of Last Detector Calibration	(0018,700E)	3	TM	1	The time at which the detector used to acquire this image as identified in Detector ID (0018,700A) was last calibrated. Empty if not calibrated.
Detector Binning	(0018,701A)	3	DS	2	1\1
Detector Manufacturer Name	(0018,702A)	3	LO	1	TRIXELL
Detector Manufacturer’sModel Name	(0018,702B)	3	LO	1	Model name of the detector component of the acquisition system.
Detector Conditions Nominal Flag	(0018,7000)	3	CS	1	“NO”, if something is uncommon (not calibrated, expired, different detector, Temperature not within calibrated range), otherwise “YES”
Detector Temperature	(0018,7001)	3	DS	1	Detector temperature during exposure in degrees Celsius.
Exposure Index	(0018,1411)	3	DS	1	Measure of the detector response to radiation in the relevant image region of an image acquired with a digital x-ray imaging system as defined in IEC 62494-1. Empty for Ortho composed images.
Target Exposure Index	(0018,1412)	3	DS	1	Target Exposure Index as defined in IEC 62494-1. For 1-pt-technique: 100 * dose_level (from CP Step) For other techniques: value from corresponding 1-pt-technique variant. Empty for Ortho composed images.
Deviation Index	(0018,1413)	3	DS	1	DI = 10 * log10(EI/TEI) Exposure Index (EI) and Target Exposure Index (TEI) Only written for processed images. Empty for Ortho composed images.
Field of View Shape	(0018,1147)	3	CS	1	RECTANGLE (only set for unprocessed images otherwise absent)
Field of View Dimension(s)	(0018,1149)	3	IS	1-2	Dimensions in mm of the Field of View, that is the image pixels stored in Pixel Data (7FE0,0010). Row dimension followed by column. Only set for unprocessed images otherwise absent.

Attribute Name	Tag	Type	VR	VM	Description
Field of View Origin	(0018,7030)	1C	DS	2	Offset of the TLHC (top left-hand corner) of a rectangle circumscribing the Field of View, that is the image pixels stored in Pixel Data (7FE0,0010), before rotation or flipping, from the TLHC of the physical detector area measured in physical detector pixels as a row offset followed by a column offset. Only set for unprocessed images otherwise absent.
Field of View Rotation	(0018,7032)	1C	DS	1	Clockwise rotation in degrees of Field of View, that is the image pixels stored in Pixel Data (7FE0,0010), relative to the physical detector. Enumerated Values: 0,90,180,270 Only set for unprocessed images otherwise absent.
Field of View Horizontal Flip	(0018,7034)	1C	CS	1	Whether or not a horizontal flip has been applied to the Field of View, that is the image pixels stored in Pixel Data (7FE0,0010), after rotation relative to the physical detector as described in Field of View Rotation (0018,7032). Enumerated Values: YES,NO Only set for unprocessed images otherwise absent.
Imager Pixel Spacing	(0018,1164)	1	DS	2	Physical distance measured at the front plane of the detector housing between the center of each image pixel specified by a numeric pair - row spacing value(delimiter) column spacing value in mm.
Pixel Spacing	(0028,0030)	1C	DS	2	Physical distance in the patient between the center of each pixel, specified by a numeric pair - adjacent row spacing (delimiter) adjacent column spacing in mm. If a magnification factor is received during an acquisition then the pixel spacing attribute in the DICOM header will be filled: Pixel spacing (0028, 0030) = Image pixel spacing * (SOD / SID) Also in case of successful image calibration the Pixel Spacing is contained.

9.1.1.22 X-Ray Collimator Module

Attribute Name	Tag	Type	VR	VM	Description
Collimator Shape	(0018,1700)	1	CS	1-3	“RECTANGULAR”, if image was collimated, otherwise not contained.
Collimator Left Vertical Edge	(0018,1702)	1C	IS	1	Location of the left edge of the rectangular collimator with respect to pixels in the image given as column.
Collimator Right Vertical Edge	(0018,1704)	1C	IS	1	Location of the right edge of the rectangular collimator with respect to pixels in the image given as column.
Collimator Upper Horizontal Edge	(0018,1706)	1C	IS	1	Location of the upper edge of the rectangular collimator with respect to pixels in the image given as row.
Collimator Lower Horizontal Edge	(0018,1708)	1C	IS	1	Location of the lower edge of the rectangular collimator with respect to pixels in the image given as row.

9.1.1.23 DX Positioning Module

Attribute Name	Tag	Type	VR	VM	Description
Patient Position	(0018,5100)	3	CS	1	Patient position descriptor relative to the equipment. Can be entered by the user.
View Position	(0018,5101)	3	CS	1	Can be entered by the user. Empty if not defined. Possible values: "AP", "PA", "LATERAL", "OBLIQUE"
View Code Sequence	(0054,0220)	3	SQ	1	Can be entered by the user. Baseline CID 4010 “DX View”. Empty if not defined. Possible values: (399348003,SCT,"antero-posterior") (272479007,SCT,"postero-anterior") (399182000,SCT,"oblique") (399067008,SCT,"lateral")
>Code Value	(0008,0100)	1	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>Coding Scheme Version	(0008,0103)	1C	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.
Distance Source to Patient	(0018,1111)	3	DS	1	Distance in mm from source to center of field of view. Also known as SOD (Source Object Distance). Only set in case it is known, otherwise empty.
Distance Source to Detector	(0018,1110)	3	DS	1	Distance in mm from source to detector center. Also known as SID (Source Image Distance) Only set in case it is known, otherwise empty.
Estimated Radiographic Magnification Factor	(0018,1114)	3	DS	1	Ratio of Source Image Receptor Distance (SID) over Source Object Distance (SOD). Only set in case it is know, otherwise empty.
Positioner Type	(0018,1508)	2	CS	1	CARM
Detector Primary Angle	(0018,1530)	3	DS	1	Angle of the X-Ray beam in the row direction in degrees relative to the normal to the detector

					plane. Positive values indicate that the X-Ray beam is tilted toward higher numbered columns. Negative values indicate that the X-Ray beam is tilted toward lower numbered columns. Only contained, if this value is known.
Detector Secondary Angle	(0018,1531)	3	DS	1	Angle of the X-Ray beam in the column direction in degrees relative to the normal to the detector plane. Positive values indicate that the X-Ray beam is tilted toward lower numbered rows. Negative values indicate that the X-Ray beam is tilted toward higher numbered rows. Only contained, if this value is known.
Table Type	(0018,113A)	3	CS	1	For table acquisitions: "FIXED" otherwise NONE

9.1.1.24 X-Ray Acquisition Dose Module

Attribute Name	Tag	Type	VR	VM	Description
KVP	(0018,0060)	3	DS	1	Peak kilo voltage output of the X-Ray generator used. For ortho composed images: If all KV values in the projection images are equal: this value, otherwise empty.
X-Ray Tube Current	(0018,1151)	3	IS	1	X-Ray Tube Current in mA Empty for Ortho Composed image
X-Ray Tube Current in µA	(0018,8151)	3	DS	1	X-Ray Tube Current in µA. Empty for Ortho Composed image
Exposure Time	(0018,1150)	3	IS	1	Duration of X-Ray exposure in ms.
Exposure Time in µS	(0018,8150)	3	DS	1	Duration of X-Ray exposure in µs.
Exposure	(0018,1152)	3	IS	1	The exposure expressed in mAs.
Exposure in µAs	(0018,1153)	3	IS	1	The exposure expressed in µAs.
Distance Source to Detector	(0018,1110)	3	DS	1	See “Distance Source to Detector” in module “DX Positioning”.
Distance Source to Patient	(0018,1111)	3	DS	1	See “Distance Source to Patient” in module “DX Positioning”.
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	DS	1	DAP in dGy cm² in case a DAP chamber is present, otherwise empty In case of Ortho composed images the sum of all DAP values of the projection images.
Relative X-Ray Exposure	(0018,1405)	3	IS	1	Physical EXI. Empty for ORTHO composed images.
Entrance Dose	(0040,0302)	3	US	1	Same as skin dose/air kerma/Dose at Reference Point. Measured in dGy. Only available, if SID and SOD are known. Otherwise empty. For ortho composed image the sum of all Entrance Dose values of the projection images.
Entrance Dose in mGy	(0040,8302)	3	DS	1	Same as skin dose/air kerma/Dose at Reference Point. Measured in mGy. Only available, if SID and SOD are known. Otherwise empty. For ortho composed image the sum of all Entrance Dose values of the projection images.
Entrance Dose Derivation	(0040,8303)	3	CS	1	IAK
Anode Target Material	(0018,1191)	3	CS	1	TUNGSTEN
Filter Type	(0018,1160)	3	SH	1	FLAT in case COPPER filter is used, otherwise NONE
Filter Material	(0018,7050)	3	CS	1-n	COPPER (empty if no copper filter used)
Filter Thickness Minimum	(0018,7052)	3	DS	1-n	thickness of copper filter 0.0 if no filter used
Filter Thickness Maximum	(0018,7054)	3	DS	1-n	thickness of copper filter 0.0 if no filter used
Rectification Type	(0018,1156)	3	CS	1	CONST POTENTIAL
Exposure Index	(0018,1411)	3	DS	1	See “Exposure Index” in module “DX Detector”.
Target Exposure Index	(0018,1412)	3	DS	1	See “Target Exposure Index” in module “DX Detector”.
Deviation Index	(0018,1413)	3	DS	1	See “Deviation Index” in module “DX Detector”.

9.1.1.25 X-Ray Generation Module

Attribute Name	Tag	Type	VR	VM	Description
KVP	(0018,0060)	3	DS	1	See „KVP“ in module „X-Ray Acquisition Dose“.
X-Ray Tube Current	(0018,1151)	3	IS	1	See „X-Ray Tube Current“ in module „X-Ray Acquisition Dose“.
X-Ray Tube Current in µA	(0018,8151)	3	DS	1	See „X-Ray Tube Current in µA“ in module „X-Ray Acquisition Dose“.
Exposure Time	(0018,1150)	3	IS	1	See „Exposure Time“ in „X-Ray Acquisition Dose“ module.
Exposure Time in µS	(0018,8150)	3	DS	1	See „Exposure Time in µs“ in „X-Ray Acquisition Dose“ module.
Exposure	(0018,1152)	3	IS	1	See „Exposure“ in „X-Ray Acquisition Dose“ module.
Exposure in µAs	(0018,1153)	3	IS	1	See „Exposure in µAs“ in „X-Ray Acquisition Dose“ module.
Exposure Control Mode	(0018,7060)	3	CS	1	AUTOMATIC for 1-pt-technique MANUAL for 2-pt and 3-pt technique
Exposure Control Mode Description	(0018,7062)	3	LT	1	Used technique („1-pt“,“2-pt“,“3-pt“). For 1-pt-technique additional information about AEC chambers from AKTMESSF is contained.
Focal Spot(s)	(0018,1190)	3	DS	1-n	Focal spot size in mm.

9.1.1.26 X-Ray Filtration Module

Attribute Name	Tag	Type	VR	VM	Description
Filter Type	(0018,1160)	3	SH	1	See „Filter Type“ in module „X-Ray Acquisition Dose“.
Filter Material	(0018,7050)	3	CS	1-n	See „Filter Material“ in module „X-Ray Acquisition Dose“.
Filter Thickness Minimum	(0018,7052)	3	DS	1-n	See „Filter Thickness Minimum“ in module „X-Ray Acquisition Dose“.
Filter Thickness Maximum	(0018,7054)	3	DS	1-n	See „Filter Thickness Maximum“ in module „X-Ray Acquisition Dose“.

9.1.1.27 X-Ray Grid Module

Attribute Name	Tag	Type	VR	VM	Description
Grid	(0018,1166)	3	CS	1-n	FIXED in case of fixed grid, FOCUSED in case of focused grid, UNKNOWN in case this is not know (mobile detector) or NONE, if no grid was inserted/used.
Grid Absorbing Material	(0018,7040)	3	LT	1	“LEAD” Empty or non-existant in case of no grid.
Grid Spacing Material	(0018,7041)	3	LT	1	Empty
Grid Focal Distance	(0018,704C)	3	DS	1	Focal distance in mm of a FOCUSED grid. Otherwise not existent.

9.1.1.28 Overlay Plane Module

It is configurable, if graphic objects are written in the overlay plane or “Burned” into the pixel data.

Attribute Name	Tag	Type	VR	VM	Description
Overlay Rows	(60xx,0010)	1	US	1	Number of Rows in overlay.
Overlay Columns	(60xx,0011)	1	US	1	Number of Columns in overlay.
Overlay Type	(60xx,0040)	1	CS	1	G
Overlay Origin	(60xx,0050)	1	SS	2	Location of first overlay point with respect to pixels in the image, given as row\column.
Overlay Bits Allocated	(60xx,0100)	1	US	1	1
Overlay Bit Position	(60xx,0102)	1	US	1	0
Overlay Data	(60xx,3000)	1	OB or OW	1	Overlay pixel data.
Overlay Label	(60xx,1500)	3	LO	1	GRAPHICAL OBJECTS

9.1.1.29 Modality LUT Module

Attribute Name	Tag	Type	VR	VM	Description
Rescale Intercept	(0028,1052)	1	DS	1	0
Rescale Slope	(0028,1053)	1	DS	1	1
Rescale Type	(0028,1054)	1	LO	1	US

9.1.1.30 VOI LUT Module

Attribute Name	Tag	Type	VR	VM	Description
Window Center	(0028,1050)	1C	DS	1-n	See „Window Center“ in module „DX Image“.
Window Width	(0028,1051)	1C	DS	1-n	See „Window Width“ in module „DX Image“.
Window Center & Width Explanation	(0028,1055)	3	LO	1-n	See „Window Center & Width Explanation“ in module „DX Image“.

9.1.1.31 Acquisition Context Module

Attribute Name	Tag	Type	VR	VM	Description
Acquisition Context Sequence	(0040,0555)	2	SQ	1	Empty.

9.1.1.32 SOP Common Module

Attribute Name	Tag	Type	VR	VM	Description
SOP Class UID	(0008,0016)	1	UI	1	Computed Radiography Image Storage: 1.2.840.10008.5.1.4.1.1.1 Digital X-Ray Image Storage - For Presentation: 1.2.840.10008.5.1.4.1.1.1.1 Digital X-Ray Image Storage - For Processing: 1.2.840.10008.5.1.4.1.1.1.1.1 X-Ray Radiation Dose SR: 1.2.840.10008.5.1.4.1.1.88.67
SOP Instance UID	(0008,0018)	1	UI	1	Unique UID for the SOP Instance.
Specific Character Set	(0008,0005)	1C	CS	1-n	Contains the Character Set string for the local language. Only required, if characters outside ISO-IR 6 (english) are used. The Character Set used depends on the local configuration.
Instance Creation Date	(0008,0012)	3	DA	1	Date, when the instance was created.
Instance Creation Time	(0008,0013)	3	TM	1	Time, when the instance was created.
Instance Creator UID	(0008,0014)	3	UI	1	Device/Product UID
Instance Number	(0020,0013)	3	IS	1	See „Instance Number“ in module „General Image“.
Original Attributes Sequence	(0400,0561)	3	SQ	1	Contains attributes that were changed after the image was acquired. Only contained for images, not for Dose Reports.
>Source of Previous Values	(0400,0564)	2	LO	1	Empty
>Attribute Modification DateTime	(0400,0562)	1	DT	1	Date/Time of modification
>Modifying System	(0400,0563)	1	LO	1	"Siemens Healthcare syngo Transfer Framework"
>Reason for the Attribute Modification	(0400,0565)	1	CS	1	"COERCE"
>Modified Attributes Sequence	(0400,0550)	1	SQ	1	Contains the changed attributes.

9.1.1.33 Common Instance Reference Module

Attribute Name	Tag	Type	VR	VM	Description
Referenced Series Sequence	(0008,1115)	1C	SQ	1	For Ortho composed image the composed image refers to all original images. Not written for RAD images.
>Series Instance UID	(0020,000E)	1	UI	1	Series Instance UID of the referenced series.
>Referenced Instance Sequence	(0008,114A)	1	SQ	1	Referenced instances of the series.
>>Referenced SOP Class UID	(0008,1150)	1	UI	1	SOP Class UID of the referenced instance.
>>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the referenced instance.

9.1.1.34 Private attributes

Attribute Name	Private Creator	Tag	VR	VM	Description
Comments on Image Generation	UIS_COMMON	(0015,xx01)	UT	1	Describes the Image generation (e.g. special error scenarios).
Clinical Protocol Step Instance ID	UIS_COMMON	(0015,xx09)	LO	1	Identifies the runtime instance of a Clinical Protocol Step.
Clinical Protocol Name	UIS_COMMON	(0015,xx10)	LO	1	The name of the Clinical Protocol.
Clinical Protocol Step Name	UIS_COMMON	(0015,xx11)	LO	1	The name of the Clinical Protocol Step.
Clinical Protocol Step GUID	UIS_COMMON	(0015,xx12)	LO	1	The global unique identifier for the Clinical Protocol Step.
Original Clinical Protocol Name	UIS_COMMON	(0015,xx13)	LO	1	The name of the Clinical Protocol in English.
Original Clinical Protocol Step Name	UIS_COMMON	(0015,xx14)	LO	1	The name of the Clinical Protocol Step in English.
Image Type	UIS_COMMON	(0015,xx15)	LO	1	Can be „2D“, „Ortho“, „Ortho Composed“.
Acquisition Type	UIS_COMMON	(0015,xx16)	LO	1	Can be „Table“, „Wall Stand“, „Free Exposure“.
Table Object Distance (TOD)	UIS_COMMON	(0015,xx17)	DS	1	Distance between patient and table in mm. Only set for Ortho acquisitions.
Table Detector Distance (TDD)	UIS_COMMON	(0015,xx18)	DS	1	Distance between detector and table in mm. Only set for Ortho acquisitions.
Detector Mode Number	UIS_COMMON	(0015,xx19)	US	1	Detector Mode Number RAD = 30 LTE = 31
Ortho Direction	UIS_COMMON	(0015,xx30)	LO	1	Ortho direction: „HEAD2FEET“/“FEET2HEAD“
Ortho Composing	UIS_COMMON	(0015,xx31)	CS	1	„A“: Auto „M“: Manual
Ortho Transition Mode	UIS_COMMON	(0015,xx32)	CS	1	BLEND CUT
Ortho Step Distance	UIS_COMMON	(0015,xx33)	US	1	Distance to previous ortho step in 0.1 mm (from upper edge to upper edge of previous image in series). Value equals to 0 in the first image of the Ortho series (Instance Number =1).
Ortho Algorithm	UIS_COMMON	(0015,xx34)	LO	1	(„SPINE“, „“LLD_ORTHO, „LLD_ORTHO_ONE_LEG“) in ortho projection and composed images.
Cropping Points	UIS_COMMON	(0015,xx50)	SS	2-n	Points in image plane used for cropping.

Attribute Name	Private Creator	Tag	VR	VM	Description
IsRejected	SIEMENS_FLCOMPACT_VA01A_PROC	(0017,xxCA)	US	1	0 (not rejected), 1 (rejected)
RejectReason	SIEMENS_FLCOMPACT_VA01A_PROC	(0017,xxCB)	LO	1	The reason for rejection entered by the user, if available, otherwise empty.
RejectUser	SIEMENS_FLCOMPACT_VA01A_PROC	(0017,xxCC)	LO	1	The operator who rejected the image, if available, otherwise empty.
RejectDateTime	SIEMENS_FLCOMPACT_VA01A_PROC	(0017,xxCD)	DT	1	The date and time, when the image was rejected.
TPS	UIS_IMAGE_PRESENTATION	(0019,xx10)	SQ	1	The Technical Presentation State object for this image is stored in a single item in this sequence in case it was exported in Backup Mode.
UIS Export Mode	UIS_IMAGE_PRESENTATION	(0019,xx20)	CS	1	Indicates the mode, how the image was exported: BACKUP CLINICAL
Pre-Horizontal Flip	UIS_IMAGE_PRESENTATION	(0019,xx41)	CS	1	Whether or not to flip the image horizontally after any Image Rotation has been applied such that the left side of the image becomes the right side. Enumerated Values: YES, NO Only stored in unprocessed images.
Pre-Rotation Angle	UIS_IMAGE_PRESENTATION	(0019,xx42)	DS	1	Rotation Angle in degrees. Only stored in unprocessed images.
CP Step Horizontal Flip	UIS_IMAGE_PRESENTATION	(0019,xx43)	CS	1	Horizontal Flip from CP Step Enumerated Values: YES, NO
CP Step Vertical Flip	UIS_IMAGE_PRESENTATION	(0019,xx44)	CS	1	Vertical Flip from CP Step Enumerated Values: YES, NO
CP Step Rotation Angle	UIS_IMAGE_PRESENTATION	(0019,xx45)	DS	1	Rotation Angle in degrees from CP Step.

Attribute Name	Private Creator	Tag	VR	VM	Description
Flavor Template	UIS_IQ_IP	(0021,xx10)	OB	1	BLOB that contains some meta information for the flavors and the flavor parameters.
Flavor Modifier	UIS_IQ_IP	(0021,xx11)	OB	1	Contains the flavor customizing parameters.
Flavor Name	UIS_IQ_IP	(0021,xx12)	LO	1	Contains the original name of the flavor that was used for the processing of the image. Only for processed images.
Flavor Processing Lane	UIS_IQ_IP	(0021,xx13)	LO	1	LANE1 for Default Flavor LANE2 for Secondary Flavor
Readable CIPT and Flavor Information	UIS_IQ_IP	(0021,xx14)	LT	1	Contains the following information about CIPT and Flavors: CIPT, Flavor, Version, UI Parameters with UI Parameter as B (Brightness), C (Contrast), Small Structures (S), Medium Structures (M), Dynamic (D), Noise Reduction (N)

9.1.1.35 SR Document General

Attribute Name	Tag	Type	VR	VM	Description
Instance Number	(0020,0013)	1	IS	1	1
Completion Flag	(0040,A491)	1	CS	1	COMPLETE
Verification Flag	(0040,A493)	1	CS	1	UNVERIFIED
Content Date	(0008,0023)	1	DA	1	Date, when the content was created.
Content Time	(0008,0033)	1	TM	1	Time, when the content was created.
Author Observer Sequence	(0040,A078)	3	SQ	1	N.a.
>Observer Type	(0040,A084)	1	CS	1	DEV
>Station Name	(0008,1010)	2C	SH	1	See „Station Name“ in module „General Equipment“.
>Device UID	(0018,1002)	1C	UI	1	Device/Product UID
>Manufacturer	(0008,0070)	1C	LO	1	See „Manufacturer“ in module „General Equipment“.
>Manufacturer‘s Model Name	(0008,1090)	1C	LO	1	See „Manufacturer‘s Model Name“ in module „General Equipment“.
>Station AE Title	(0008,0055)	3	AE	1	Storage SCU AET of the system.
>Device Serial Number	(0018,1000)	3	LO	1	See „Device Serial Number“ in module „General Equipment“.
>Software Versions	(0018,1020)	3	LO	1-n	See „Software Versions“ in module „General Equipment“.
>Institution Name	(0008,0080)	2	LO	1	See „Institution Name“ in module „General Equipment“.
>Institution Code Sequence	(0008,0082)	2	SQ	1	Empty.

>Institutional Department Name	(0008,1040)	3	LO	1	See "Institutional Department Name" in module "General Equipment".
Referenced Request Sequence	(0040,A370)	1C	SQ	1	Filled in case of RIS procedure. Absent for locally registered procedure.
>Study Instance UID	(0020,000D)	1	UI	1	The Study Instance UID of the RIS procedure.
>Referenced Study Sequence	(0008,1110)	2	SQ	1	Empty.
>>Referenced SOP Class UID	(0008,1150)	1	UI	1	N.a.
>>Referenced SOP Instance UID	(0008,1155)	1	UI	1	N.a.
>Accession Number	(0008,0050)	2	SH	1	The Accession Number of the RIS procedure.
>Placer Order Number/ Imaging Service Request	(0040,2016)	2	LO	1	The Placer Order Number of the RIS procedure if available, otherwise empty.

Attribute Name	Tag	Type	VR	VM	Description
>Filler Order Number / Imaging Service Request Attribute	(0040,2017)	2	LO	1	The Filler Order Number of the RIS procedure if available, otherwise empty.
>Requested Procedure ID	(0040,1001)	2	SH	1	The Requested Procedure ID of the RIS procedure.
>Requested Procedure Description	(0032,1060)	2	LO	1	The Requested Procedure Description of the RIS procedure.
>Requested Procedure Code Sequence	(0032,1064)	2	SQ	1	The Requested Procedure Code of the RIS procedure if available.
>>Code Value	(0008,0100)	1	SH	1	N.a.
>>Coding Scheme Designator	(0008,0102)	1	SH	1	N.a.
>>Coding Scheme Version	(0008,0103)	1C	SH	1	N.a.
>>Code Meaning	(0008,0104)	1	LO	1	N.a.
>Reason for the R equested Procedure	(0040,1002)	3	LO	1	The Reason for the Requested Procedure of the RIS procedure.
Performed Procedure Code Sequence	(0040,A372)	2	SQ	1	Empty.
>Code Value	(0008,0100)	1C	SH	1	N.a.
>Coding Scheme Designator	(0008,0102)	1C	SH	1	N.a.
>Coding Scheme Version	(0008,0103)	1C	SH	1	N.a.
>Code Meaning	(0008,0104)	1	LO	1	N.a.
Current Requested Procedure Evidence Sequence	(0040,A375)	1C	SQ	1	Contains all images that were created during this procedure step.
>Study Instance UID	(0020,000D)	1	UI	1	The Study Instance UID of the Dose Report and images.
>Referenced Series Sequence	(0008,1115)	1	SQ	1	All series of this study including the unproccessed images.
>>Series Instance UID	(0020,000E)	1	UI	1	The Series Instance UID of the corresponding series.
>>Referenced SOP Sequence	(0008,1199)	1	SQ	1	The Referenced SOP Sequence.
>>>Referenced SOP Class UID	(0008,1150)	1	UI	1	SOP Class UID of the referenced image.
>>>Referenced SOP Instance UID	(0008,1155)	1	UI	1	SOP Instance UID of the referenced image.
>>Referenced SOP Sequence	(0008,1199)	1	SQ	1	The Referenced SOP Sequence.

9.1.1.36 SR Document Content

TID Name	TID
Projection X-Ray Radiation Dose	10001
Accumulated X-Ray Dose	10002
Irradiation Event X-Ray Data	10003

9.1.1.37 TID 10001: Projection X-Ray Radiation Dose

NL	Relation with Parent	VT	Concept Name	Value
		CONTAINER	EV (113701,DCM,”X-Ray Radiation Dose Report”)	Root node.
>	HAS CONCEPT MOD	CODE	EV (121058,DCM, ”Procedure reported”)	DT (113704, DCM, “Projection X-Ray”)
>>	HAS CONCEPT MOD	CODE	EV (363703001, SCT, "Has Intent")	EV (261004008, SCT, "Diagnostic Intent")
>	CONTAINS	CODE	EV (122142,DCM, ”Acquisition Device Type”)	EV (113958,DCM, ”Integrated Projection Radiography System”)
DTID 1002 “Observer Context”				
>	HAS OBS CONTEXT	CODE	EV (121005,DCM,”Observer Type”)	EV (121007,DCM, “Device”)
>	HAS OBS CONTEXT	UIDREF	EV (121012,DCM,“Device Observer UID”)	Device product UID
>	HAS OBS CONTEXT	TEXT	EV (121013,DCM,“Device Observer Name”)	Value from Station Name (0008,1010)
>	HAS OBS CONTEXT	TEXT	EV (121014,DCM,“Device Observer Manufacturer”)	Value from Manufacturer (0008,0070)
>	HAS OBS CONTEXT	TEXT	EV (121015,DCM,“Device Observer Model Name”)	Value from Manufacturer’s Model Name (0008,1090)
>	HAS OBS CONTEXT	TEXT	EV (121016,DCM,“Device Observer Serial Number”)	Value from Device Serial Number (0018,1000)
>	HAS OBS CONTEXT	CODE	EV (121005,DCM,"Observer Type")	EV (121006,DCM, “Person”)
>	HAS OBS CONTEXT	PNAME	EV (121008,DCM,"Person Observer Name")	Same as Operator's Name
>	HAS OBS CONTEXT	TEXT	EV (121009,DCM,"Person Observer's Organization Name")	Value from Institution Name (0008,0080)
>	HAS OBS CONTEXT	CODE	EV (121011,DCM,"Person Observer's Role in this Procedure")	EV (113851,DCM, “Irradiation Administering”)
>	HAS OBS CONTEXT	CODE	EV (113705,DCM,"Scope of Accumulation")	EV (113970, DCM, ”Procedure Step To This Point")
>>	HAS PROPERTIES	UIDREF	EV (121126,DCM,"Performed Procedure Step SOP Instance UID")	*Performed Procedure Step SOP Instance UID*
>	CONTAINS	CODE	EV (113945,DCM,"X-Ray Detector Data Available")	EV("373066001",SCT,"Yes")
>	CONTAINS	CODE	EV (113945,DCM,"X-Ray Detector Data Available")	EV("373066001",SCT,"Yes")
>	CONTAINS	CODE	EV (113945,DCM,"X-Ray Detector Data Available")	EV("373066001",SCT,"Yes")
>	CONTAINS	INCLUDE	DTID 10002 “Accumulated X-Ray Dose”	See Accumulated X-Ray Dose.
>	CONTAINS	INCLUDE	DTID 10003 “Irradiation Event X-Ray Data”	For each Irradiation Event. See "Irradiation Event X-Ray Data".

NL	Relation with Parent	VT	Concept Name	Value
>	CONTAINS	TEXT	EV (121106, DCM, “Comment”)	Formatted dose information. See Comments on Radiation Dose (0040,0310) for MPPS.
>	CONTAINS	CODE	EV (113854, DCM, "Source of Dose Information")	EV("15869005",SCT,"Dosimeter ")

9.1.1.38 TID 10002: Accumulated X-Ray Dose

NL	Relation with Parent	VT	Concept Name	Value
		CONTAINER	EV (113702, DCM, „Accumulated X-Ray Dose Data“)	N.a.
>	HAS CONCEPT MOD	CODE	EV (113764, DCM, „Acquisition Plane“)	EV (113622, DCM, ”Single Plane”)
>	CONTAINS	NUM	EV (113722, DCM, “Dose Area Product Total”)	Accumulated dose area product from acquisitions.
>	CONTAINS	NUM	EV (113725, DCM, “Dose (RP) Total”)	Accumulated entrance dose from acquisitions.
>	CONTAINS	NUM	EV (113737, DCM, “Distance Source to Reference Point”)	Distance to the Reference Point (RP) defined according to IEC 60601-2-43 or equipment defined.
>	CONTAINS	NUM	EV (113731, DCM, “Total Number of Radiographic Frames”)	Accumulated count of exposure pulses (single or multi-frame encoded) created from irradiation events performed with high dose (acquisition).
>	CONTAINS	NUM	EV (113727, DCM, “Acquisition Dose Area Product Total”)	Accumulated dose area product from acquisition only.
>	CONTAINS	NUM	EV (113729, DCM, “Acquisition Dose (RP) Total”)	Accumulated entrance dose from acquisitions.
>	CONTAINS	CODE	EV (113780, DCM,“Reference Point Definition“)	EV (113984,DCM,“At Surface of patient”)
>	CONTAINS	NUM	EV (113855, DCM, “Total Acquisition Time”)	Total accumulated acquisition clock time in the scope of the including report (sum of the Irradiation Duration values for accumulated acquisition irradiation events).

9.1.1.39 TID 10003: Irradiation Event X-Ray Data

NL	Relation with Parent	VT	Concept Name	Value
>	CONTAINS	CONTAINER	EV (113706, DCM, ”Irradiation Event X-Ray Data”)	
>>	HAS CONCEPT MOD	CODE	EV (113764, DCM, “Acquisition Plane”)	EV (113662, DCM, “Single Plane”)
>>	CONTAINS	UIDREF	EV (113769, DCM, “Irradiation Event UID”)	Value from Irradiation Event UID (0008,3010)
>>	CONTAINS	TEXT	EV (113605, DCM, „Irradiation Event Label“)	The label for this Irradiation event. An increasing number starting with 1.
>>	CONTAINS	DATETIME	DT (111526,DC“, „DateTime Started“)	Date/Time the irradiation event started
>>	CONTAINS	CODE	EV (113721, DCM, “Irradiation Event Type”)	EV (113611, DCM, ”Stationary Acquisition”)
>>	CONTAINS	TEXT	EV (125203, DCM, “Acquisition Protocol”)	Name of used CP Step
>>	CONTAINS	CODE	EV (111031, DCM, „Image View“)	Can be entered by the user. Baseline CID 4010 “DX View”. Empty if not defined. Possible values: EV (399348003,SCT,"antero-posterior") EV (272479007,SCT,"postero-anterior") EV (399182000,SCT,"oblique") EV (399067008,SCT,"lateral")
>>	CONTAINS	CODE	EV (113745, DCM, „Patient Table Relationship“)	Can be entered by the user. Absent if not set. The following values are possible: EV(102540008,SCT,"headfirst") EV (102541007,SCT,"feet-first")
>>	CONTAINS	CODE	EV (113743, DCM,	Can be entered by the user. Absent if not set. The following values are possible: EV(102538003,SCT,"recumbent") for table acquisitions EV (C86043,NCIt,"erect") for wall acquisitions
>>>	HAS CONCEPT MOD	CODE	EV (113744, DCM, „Patient Orientation Modifier“)	Can be entered by the user. Absent if not set. The following values are possible: EV (10904000,SCT,"standing") for wall acquisitions EV (1240000,SCT,"prone") for Patient Position "HFP", "FFP" EV (40199007,SCT,"supine") for Patient Position "HFS","FFS" EV (102535000,SCT,"right lateral decubitus") for Patient Position "HFDR","FFDR" EV (102536004,SCT,"left lateral

				decubitus") for Patient Position "HFDL","FFDL"
>>	CONTAINS	CODE	EV (123014,DCM, "Target Region")	Skull => 89546000,SCT,"Skull") Jaw => (661005,SCT,"Jaw Region") C-Spine => 122494005,SCT,"Cervical spine") T-Spine => (122495006,SCT,"Thoracic spine") L-Spine => (122496007,SCT,"Lumbar spine") S-Spine => (54735007,SCT,"Sacrum") Knee => (72696002,SCT,"Knee") Ankle => (70258002,SCT,"Ankle joint") Foot => (56459004,SCT,"Foot") Chest => (51185008,SCT,"Chest") Abdomen => (113345001,SCT,"Abdomen") Shoulder => 16982005,SCT,"Shoulder") Clavicle => (51299004,SCT,"Clavicle") Elbow => (16953009,SCT,"Elbow joint") Hand => (85562004,SCT,"Hand") Pelvis => (12921003,SCT,"Pelvis") Hip => HIP (29836001,SCT,"Hip joint") Forearm => (14975008,SCT,"Forearm") Humerus => (85050009,SCT,"Humerus") Tibia => (12611008,SCT,"Tibia") Femur => (71341001,SCT,"Femur") VertebralColumn => (110517009,SCT,"Vertebral column and cranium") Leg => (416631005,SCT,"Pelvis and lower extremities")

NL	Relation with Parent	VT	Concept Name	Value
>>>	HAS CONCEPT MOD	CODE	EV (272741003, SCT, "Laterality")	Can be entered by the user. Absent if not defined. Possible values: R => EV(24028007,SCT,"Right") L=> EV(7771000,SCT,"Left") U=> EV not contained B=> EV(51440002,SCT,"Bilateral")
>>	CONTAINS	NUM	EV (122130, DCM, "Dose Area Product")	Dose Area Product (in Gy.m2) for this irradiation event.
>>	CONTAINS	CODE or TEXT	EV (113780, DCM," Reference Point Definition")	EV (113964,DCM,"At Surface of patient")
>>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	Formatted dose information. Same as "Comment" in "Projection X-Ray Radiation Dose" but only for a single irradiation.
>>	CONTAINS	NUM	EV (113845, DCM, "Exposure Index")	See „Exposure Index" in module "DX Detector".
>>	CONTAINS	NUM	EV (113846, DCM, "Target Exposure Index")	See „Target Exposure Index" in module "DX Detector".
>>	CONTAINS	NUM	EV (113847, DCM, "Deviation Index")	See „Deviation Index" in module "DX Detector".
>>	CONTAINS	CODE	EV (113876, DCM, "Device Role in Procedure")	EV (113859, DCM, "Irradiating Device")
>>>	HAS PROPERTIES	TEXT	EV (113878, DCM, "Device Manufacturer")	Value from Manufacturer (0008,0070).
>>>	HAS PROPERTIES	TEXT	EV (113879, DCM, "Device Model Name")	Value from Manufacturer's Model Name (0008,1090)
>>>	HAS PROPERTIES	TEXT	EV (113880, DCM, "Device Serial Number")	Value from Device Serial Number (0018,1000)
>>>	HAS PROPERTIES	UIDREF	EV (121012, DCM, "Device Observer UID")	Device/Product UID
>>	CONTAINS	IMAGE	EV (113795, DCM, "Acquired Image")	Reference to the image (but only in case an image was created for this event).
>>	CONTAINS	NUM	EV (113738, DCM, "Dose (RP)")	Entrance Dose in Gy for this irradiation event.
>>	CONTAINS	NUM	EV (113768, DCM, "Number of Pulses")	Number of Pulses.
>>	CONTAINS	NUM	EV (113793, DCM, "Pulse Width")	Average X-Ray pulse width in ms
>>	CONTAINS	NUM	EV (113742, DCM, "Irradiation Duration")	Irradiation Duration in sec
>>	CONTAINS	NUM	EV (113733, DCM, "KVP")	KV
>>	CONTAINS	NUM	EV (113734, DCM, "X-Ray Tube Current")	X-Ray tube current in mA
>>	CONTAINS	NUM	EV (113824, DCM, "Exposure Time")	Exposure Time in ms
>>	CONTAINS	NUM	EV (113736, DCM, "Exposure")	µAs
>>	CONTAINS	NUM	EV (113766, DCM, "Focal Spot Size")	Focal spot size in mm.
>>	CONTAINS	CONTAINER	EV (113771, DCM, "X-Ray Filters")	N.a.
>>>	CONTAINS	CODE	EV (113772, DCM, "X-Ray Filter Type")	EV (111609,DCM,"No Filter") in case no copper filter was inserted, otherwise EV (113650,DCM,"Strip filter")
>>>	CONTAINS	CODE	EV (113757, DCM, "X-Ray Filter Material")	EV (C-127F9,SRT,"Copper or Copper compound") EV (105837005,SCT,"Copper or Copper compound")
>>>	CONTAINS	NUM	EV (113758, DCM, "X-Ray Filter Thickness Minimum")	Thickness of copper filter. 0 in case no filter was used.

>>>	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	Thickness of copper filter. 0 in case no filter was used.
>>	CONTAINS	NUM	EV (113790, DCM, "Collimated Field Area")	Collimated field area at image receptor.
>>	CONTAINS	NUM	EV (113788, DCM, "Collimated Field Height")	Distance between the collimator blades in pixel column direction as projected at the detector plane.
>>	CONTAINS	NUM	EV (113789, DCM, "Collimated Field Width")	Distance between the collimator blades in pixel row direction as projected at the detector plane.
>>	CONTAINS	CODE	EV (111635, DCM, "X-Ray Grid")	EV (DCM,111642,"Focused grid") in case of focused grid EV (DCM,111646,"No grid") in case of no grid
>>	CONTAINS	CODE	EV (113956, DCM, "CR/DR Mechanical Configuration")	EV (DCM,113953,"Unmounted detector") in case of free exposures EV (DCM,113952,"Table Mount") in case of table acquisitions EV (DCM,113954,"Upright Stand Mount") in case of wall stand acquisitions
>>	CONTAINS	NUM	EV (113750,DCM“, "Distance Source to Detector")	Distance in mm from source to detector center. Also known as SID (Source Image Distance) Only set in case it is known, otherwise not contained.

9.2 Data Dictionary of Private Attributes

Table 75 and chapter 9.1.1.34 list private attributes created by YSIO X.pree which may be included in the generated instances.

Table 75: Private Data Element Dictionary

DICOM Tag	Name	VR	VM
(7FDF,SIEMENS SYNGO DATA PADDING,FC)	Pixel Data Leading Padding	OB	1

9.2.1 Usage of Attributes from received IODs

N/A

9.2.2 Attribute mapping

There is currently no mapping from attributes received in DICOM Modality Worklist to other attributes.

9.2.3 Coerced / Modified fields

N/A

9.3 Private Transfer Syntaxes

No private Transfer Syntaxes are defined for or requested by YSIO X.pree DICOM application.

9.4 DICOM Print SCU – detailed status displays

The following tables document the behavior of the YSIO X.pree DICOM Print AE in response to messages received for the printer SOP class and the print job SOP class.

Table 76: Common Printer Status Information

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
NORMAL	Camera is ready	Camera is ready	<None>/idle
BAD RECEIVE MGZ	There is a problem with the film receive magazine. Films from the printer cannot be transported into the magazine.	Problem with receive magazine.	<None>/interact
BAD SUPPLY MGZ	There is a problem with the film supply magazine. Films from this magazine cannot be transported into the printer.	Problem with supply magazine.	<None>/interact
CALIBRATING	Printer is performing self calibration, it is expected to be available for normal operation shortly.	Self calibration. Please wait.	<None>/idle
CALIBRATION ERR	An error in the printer calibration has been detected, quality of processed films may not be optimal.	Problem in calibration. Film quality may not be optimal.	<None>/interact
CHECK CHEMISTRY	A problem with the processor chemicals has been detected, quality of processed films may not be optimal.	Problem with chemistry. Film quality may not be optimal.	<None>/interact
CHECK SORTER	There is an error in the film sorter	Error in film sorter.	<None>/interact
CHEMICALS EMPTY	There are no processing chemicals in the processor, films will not be printed and processed until the processor is back to normal.	Camera chemistry empty. Please check.	<None>/interact
CHEMICALS LOW	The chemical level in the processor is low, if not corrected, it will probably shut down soon.	Camera chemistry low. Please check.	<None>/interact
COVER OPEN	One or more printer or processor covers, drawers, doors are open.	Camera cover, drawer or door open.	<None>/interact
ELEC CONFIG ERR	Printer configured improperly for this job.	Camera configured improperly for this job. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
ELEC DOWN	Printer is not operating due to some unspecified elec- trical hardware problem.	Camera electrical hardware Problem.	<None>/interact
ELEC SW ERROR	Printer not operating for some unspecified software error.	Camera software problem. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped
EMPTY 8X10	The 8x10 inch film supply magazine is empty.	8x10 film supply empty.	<None>/interact
EMPTY 8X10 BLUE	The 8x10 inch blue film supply magazine is empty.	8x10 blue film supply empty.	<None>/interact
EMPTY 8X10 CLR	The 8x10 inch clear film supply magazine is empty.	8x10 clear film supply empty.	<None>/interact
EMPTY 8X10 PAPR	The 8x10 inch paper supply magazine is empty.	8x10 paper supply empty.	<None>/interact
EMPTY 10X12	The 10x12 inch film supply magazine is empty.	10x12 film supply empty.	<None>/interact
EMPTY 10X12 BLUE	The 10x12 inch blue film supply magazine is empty.	10x12 blue film supply empty.	<None>/interact
EMPTY 10X12 CLR	The 10x12 inch clear film supply magazine is empty.	10x12 clear film supply empty.	<None>/interact
EMPTY 10X12 PAPR	The 10x12 inch paper supply magazine is empty.	10x12 paper supply empty.	<None>/interact
EMPTY 10X14	The 10x14 inch film supply magazine is empty.	10x14 film supply empty.	<None>/interact
EMPTY 10X14 BLUE	The 10x14 inch blue film supply magazine is empty.	10x14 blue film supply empty.	<None>/interact
EMPTY 10X14 CLR	The 10x14 inch clear film supply magazine is empty.	10x14 clear film supply empty.	<None>/interact
EMPTY 10X14 PAPR	The 10x14 inch paper supply magazine is empty.	10x14 paper supply empty.	<None>/interact
EMPTY 11X14	The 11x14 inch film supply magazine is empty.	11x14 film supply empty.	<None>/interact
EMPTY 11X14 BLUE	The 11x14 inch blue film supply magazine is empty.	11x14 blue film supply empty.	<None>/interact
EMPTY 11X14 CLR	The 11x14 inch clear film supply magazine is empty.	11x14 clear film supply empty.	<None>/interact
EMPTY 11X14 PAPR	The 11x14 inch paper supply magazine is empty.	11x14 paper supply empty.	<None>/interact
EMPTY 14X14	The 14x14 inch film supply magazine is empty.	14x14 film supply empty.	<None>/interact
EMPTY 14X14 BLUE	The 14x14 inch blue film supply magazine is empty.	14x14 blue film supply empty.	<None>/interact
EMPTY 14X14 CLR	The 14x14 inch clear film supply magazine is empty.	14x14 clear film supply empty.	<None>/interact
EMPTY 14X14 PAPR	The 14x14 inch paper supply magazine is empty.	14x14 paper supply empty.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
EMPTY 14X17	The 14x17 inch film supply magazine is empty.	14x17 film supply empty.	<None>/interact
EMPTY 14X17 BLUE	The 14x17 inch blue film supply magazine is empty.	14x17 blue film supply empty.	<None>/interact
EMPTY 14X17 CLR	The 14x17 inch clear film supply magazine is empty.	14x17 clear film supply empty.	<None>/interact
EMPTY 14X17 PAPR	The 14x17 inch paper supply magazine is empty.	14x17 paper supply empty.	<None>/interact
EMPTY 24X24	The 24x24 inch film supply magazine is empty.	24x24 film supply empty.	<None>/interact
EMPTY 24X24 BLUE	The 24x24 inch blue film supply magazine is empty.	24x24 blue film supply empty.	<None>/interact
EMPTY 24X24 CLR	The 24x24 inch clear film supply magazine is empty.	24x24 clear film supply empty.	<None>/interact
EMPTY 24X24 PAPR	The 24x24 inch paper supply magazine is empty.	24x24 paper supply empty	<None>/interact
EMPTY 24X30	The 24x30 inch film supply magazine is empty.	24x30 film supply empty.	<None>/interact
EMPTY 24X30 BLUE	The 24x30 inch blue film supply magazine is empty.	24x30 blue film supply empty.	<None>/interact
EMPTY 24X30 CLR	The 24x30 inch clear film supply magazine is empty.	24x30 clear film supply empty.	<None>/interact
EMPTY 24X30 PAPR	The 24x30 inch paper supply magazine is empty.	24x30 paper supply empty.	<None>/interact
EMPTY A4 PAPR	The A4 paper supply magazine is empty.	A4 paper supply empty.	<None>/interact
EMPTY A4 TRANS	The A4 transparency supply magazine is empty.	A4 transparency supply empty.	<None>/interact
EXPOSURE FAILURE	The exposure device has failed due to some unspecified reason.	Exposure device has failed.	<None>/interact
FILM JAM	A film transport error has occurred and a film is jammed in the printer or processor.	Film jam.	<None>/interact
FILM TRANSP ERR	There is a malfunction with the film transport, there may or may not be a film jam.	Film transport problem.	<None>/interact
FINISHER EMPTY	The finisher is empty.	Finisher is empty.	<None>/interact
FINISHER ERROR	The finisher is not operating due to some unspecified reason	Finisher problem.	<None>/interact
FINISHER LOW	The finisher is low on supplies.	Finisher low.	<None>/interact
LOW 8X10	The 8x10 inch film supply magazine is low.	8x10 film supply low.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOW 8X10 BLUE	The 8x10 inch blue film supply magazine is low.	8x10 blue film supply low.	<None>/interact
LOW 8X10 CLR	The 8x10 inch clear film supply magazine is low.	8x10 clear film supply low.	<None>/interact
LOW 8X10 PAPR	The 8x10 inch paper supply magazine is low.	8x10 paper supply low.	<None>/interact
LOW 10X12	The 10x12 inch film supply magazine is low.	10x12 film supply low.	<None>/interact
LOW 10X12 BLUE	The 10x12 inch blue film supply magazine is low.	10x12 blue film supply low.	<None>/interact
LOW 10X12 CLR	The 10x12 inch clear film supply magazine is low.	10x12 clear film sup-ply low.	<None>/interact
LOW 10X12 PAPR	The 10x12 inch paper supply magazine is low.	10x12 paper supply low.	<None>/interact
LOW 10X14	The 10x14 inch film supply magazine is low.	10x14 film supply low.	<None>/interact
LOW 10X14 BLUE	The 10x14 inch blue film supply magazine is low.	10x14 blue film supply low.	<None>/interact
LOW 10X14 CLR	The 10x14 inch clear film supply magazine is low.	10x14 clear film supply low.	<None>/interact
LOW 10X14 PAPR	The 10x14 inch paper supply magazine is low.	10x14 paper supply low.	<None>/interact
LOW 11X14	The 11x14 inch film supply magazine is low.	11x14 film supply low.	<None>/interact
LOW 11X14 BLUE	The 11x14 inch blue film supply magazine is low.	11x14 blue film supply low.	<None>/interact
LOW 11X14 CLR	The 11x14 inch clear film supply magazine is low.	11x14 clear film supply low.	<None>/interact
LOW 11X14 PAPR	The 11x14 inch paper supply magazine is low.	11x14 paper supply low.	<None>/interact
LOW 14X14	The 14x14 inch film supply magazine is low.	14x14 film supply low.	<None>/interact
LOW 14X14 BLUE	The 14x14 inch blue film supply magazine is low.	14x14 blue film supply low.	<None>/interact
LOW 14X14 CLR	The 14x14 inch clear film supply magazine is low.	14x14 clear film supply low.	<None>/interact
LOW 14X14 PAPR	The 14x14 inch paper supply magazine is low.	14x14 paper supply low.	<None>/interact
LOW 14X17	The 14x17 inch film supply magazine is low.	14x17 film supply low.	<None>/interact
LOW 14X17 BLUE	The 14x17 inch blue film supply magazine is low.	14x17 blue film supply low.	<None>/interact
LOW 14X17 CLR	The 14x17 inch clear film supply magazine is low.	14x17 clear film supply low.	<None>/interact
LOW 14X17 PAPR	The 14x17 inch paper supply magazine is low.	14x17 paper supply low.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOW 24X24	The 24x24 inch film supply magazine is low.	24x24 film supply low.	<None>/interact
LOW 24X24 BLUE	The 24x24 inch blue film supply magazine is low.	24x24 blue film supply low.	<None>/interact
LOW 24X24 CLR	The 24x24 inch clear film supply magazine is low.	24x24 clear film supply low.	<None>/interact
LOW 24X24 PAPR	The 24x24 inch paper supply magazine is low.	24x24 paper supply low.	<None>/interact
LOW 24X30	The 24x30 inch film supply magazine is low.	24x30 film supply low.	<None>/interact
LOW 24X30 BLUE	The 24x30 inch blue film supply magazine is low.	24x30 blue film supply low.	<None>/interact
LOW 24X30 CLR	The 24x30 inch clear film supply magazine is low.	24x30 clear film supply low.	<None>/interact
LOW 24X30 PAPR	The 24x30 inch paper supply magazine is low.	24x30 paper supply low.	<None>/interact
LOW A4 PAPR	The A4 paper supply magazine is low.	A4 paper supply low.	<None>/interact
LOW A4 TRANS	The A4 transparency supply magazine is low.	A4 transparency supply low.	<None>/interact
NO RECEIVE MGZ	The film receive magazine is not available.	Film receiver not available.	<None>/interact
NO RIBBON	The ribbon cartridge needs to be replaced.	Replace ribbon cartridge.	<None>/interact
NO SUPPLY MGZ	The film supply magazine is not available.	Film supply not available.	<None>/interact
CHECK PRINTER	The printer is not ready at this time, operator intervention is required to make the printer available.	Check camera.	<None>/interact
CHECK PROC	The processor is not ready at this time, operator intervention is required to make the printer available.	Check processor.	<None>/interact
PRINTER DOWN	The printer is not operating due to some unspecified reason.	Camera down.	<None>/interact
PRINTER INIT	The printer is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Camera initializing.	<None>/Idle
PRINTER OFFLINE	The printer has been disabled by an operator or service person.	Camera off-line.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PROC DOWN	The processor is not operating due to some unspecified reason.	Processor down.	<None>/interact
PROC INIT	The processor is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Processor initializing.	<None>/Idle
PROC OVERFLOW FL	Processor chemicals are approaching the overflow full mark.	Processor chemicals near overflow.	<None>/interact
PROC OVERFLOW HI	Processor chemicals have reached the overflow full mark.	Processor chemicals overflow.	<None>/interact
QUEUED	Print job in Queue	--	<None>/Idle
RECEIVER FULL	The film receive magazine is full.	Receiver full.	<None>/interact
REQ MED NOT INST	The requested film, paper, or other media supply magazine is installed in the printer, but may be available with operator intervention.	Install media supply.	<None>/interact
REQ MED NOT AVAI	The requested film, paper, or other media requested is not available on this printer.	Media supply not available on this camera. Queue stopped. Change camera.	Queue for this camera will be STOPPED/ Queue stopped
RIBBON ERROR	There is an unspecified problem with the print ribbon.	Error with print ribbon.	<None>/interact
SUPPLY EMPTY	The printer is out of film.	Camera out of film.	<None>/interact
SUPPLY LOW	The film supply is low.	Film supply low.	<None>/interact
UNKNOWN	There is an unspecified problem.	Unspecified problem with camera.	<None>/interact

9.4.1 Additional DICOM Execution Status Information

Printer Status Info and Execution Status Info are defined terms and can therefore be extended or reduced by camera manufacturers. Therefore YSIO X.pree shall be flexible.

If any other printer status info or execution status info is received (as described in Table 9.7.1, YSIO X.pree will react as shown in the following table:

Table 77: Additional Printer Status Information

Printer Status / Execution	Printer / Execution Status Info	Description	Message string visible in the Job status bar	Other action for syngo / camera symbol
WARNING	<any other>	<not defined status info>	Camera info: <status info>	<None>/Interact
FAILURE	<any other>	<not defined status info>	Camera info: <status info>	Queue stopped. Queue for this camera will be STOPPED/ Queue stopped

9.5 MPPS attributes

The following table list the DICOM attributes that are sent to all configured remote MPPS nodes:

Attribute Name	Tag	VR	Type[1]	N-CREATE	N-SET
Specific Character Set	(0008,0005)	CS	1C/1C	Only set, if characters outside ISO-IR 6 are used.	Only set, if characters outside ISO-IR 6 are used.
Patient's Name	(0010,0010)	PN	2/-	Patient's Name	Not contained.
Patient ID	(0010,0020)	LO	2/-	Patient ID	Not contained.
Issuer of Patient ID	(0010,0021)	LO	3/-	Issuer of Patient ID	Not contained.
Patient's Birth Date	(0010,0030)	DA	2/-	Patient's Birth Date	Not contained.
Patient's Sex	(0010,0040)	CS	2/-	Patient's Sex	Not contained.
Scheduled Step Attributes Sequence	(0040,0270)	SQ	1/-	In case of RIS registered patient the information from Modality Worklist item is taken, otherwise (local registration) a single item is added that only contains the Study Instance UID. Other attributes are empty.	Not contained.
>Study Instance UID	(0020,000D)	UI	1/-	In case of RIS registered patient, the information from Modality Worklist item is taken, otherwise (locally registered): a new Study Instance UID is generated.	Not contained.
>Referenced Study Sequence	(0008,1110)	SQ	2/-	In case of RIS registered patient, the information from Modality Worklist item is taken, otherwise (locally registered): empty	Not contained.
>>Referenced SOP Class UID	(0008,1150)	UI	1	The referenced SOP Class UID from (0008,1110).	Not contained.
>>Referenced SOP Instance UID	(0008,1155)	UI	1	The referenced SOP Instance UID from (0008,1110).	Not contained.

>Accession Number	(0008,0050)	SH	2/-	Accession Number taken from RIS Modality Worklist or empty in case of locally registered patient.	Not contained.
>Requested Procedure ID	(0040,1001)	SH	2/-	Requested Procedure ID taken from RIS Modality Worklist or empty in case of locally registered patient.	Not contained.
>Requested Procedure Description	(0032,1060)	LO	2/-	Requested Procedure Description taken from RIS Modality Worklist or empty in case of locally registered patient.	Not contained.
>Scheduled Procedure Step ID	(0040,0009)	SH	2/-	In case of RIS registered patient, the information from Modality Worklist item is taken, otherwise (locally registered): empty	Not contained.
>Scheduled Procedure Step Description	(0040,0007)	LO	2/-	In case of RIS registered patient, the information from Modality Worklist item is taken, otherwise (locally registered): empty	Not contained.
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	2/-	In case of RIS registered patient, the information from Modality Worklist item is taken, otherwise (locally registered): empty	Not contained.
>>Code Value	(0008,0100)	SH	1	Code Value from (0040,0008)	Not contained.
>>Coding Scheme Designator	(0008,0102)	SH	1	Coding Scheme Designator from (0040,0008)	Not contained.
>>Code Meaning	(0008,0104)	LO	1	Code Meaning from (0040,0008)	Not contained.
Performed Station AE Title	(0040,0241)	AE	1/-	The configured AET of MPPS SCU.	Not contained.
Performed Station Name	(0040,0242)	SH	2/-	"Ward" from AdminPortal ("Site Information" / "Customer")	Not contained.
Performed Location	(0040,0243)	SH	2/-	"Department" from AdminPortal ("Site Information" / "Customer")	Not contained.
Performed Procedure Step Start Date	(0040,0244)	DA	1/-	Date when the first acquisition for the CP took place.	Not contained.
Performed Procedure Step Start Time	(0040,0245)	TM	1/-	Time when the first acquisition for the CP took place.	Not contained.
Performed Procedure Step ID	(0040,0253)	SH	1/-	Internally generated	Not contained.
Performed Procedure Step End Date	(0040,0250)	DA	2/3	Empty	The date the procedure step (exam for the CP) was closed. Only sent in final N-SET (COMPLETED or DISCONTINUED).
Performed Procedure Step End Time	(0040,0251)	TM	2/3	Empty	The time the procedure step (exam for the CP) was closed. Only sent in final N-SET (COMPLETED or DISCONTINUED).

Performed Procedure Step Status	(0040,0252)	CS	1/3	IN PROGRESS	IN PROGRESS: if the CP is not yet finished COMPLETED: if at least one CP Step of the SPS was done and the examination workflow closed. DISCONTINUED: if the CP was cancelled
Performed Procedure Step Description	(0040,0254)	LO	2/3	CP name.	CP name.
Procedure Code Sequence	(0008,1032)	SQ	2/3	In case the procedure was executed as scheduled in RIS, the Requested Procedure Code (0032,1064) from Modality Worklist is copied Otherwise (locally registered, different): empty	In case the procedure was executed as scheduled in RIS, the Requested Procedure Code (0032,1064) from Modality Worklist is copied Otherwise (locally registered, different): empty
>Code Value	(0008,0100)	SH	1	Code Value from (0008,1032)	Code Value from (0008,1032)
>Coding Scheme Designator	(0008,0102)	SH	1	Coding Scheme Designator from (0008,1032)	Coding Scheme Designator from (0008,1032)
>Code Meaning	(0008,0104)	LO	1	Code Meaning from (0008,1032)	Code Meaning from (0008,1032)
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	SQ	3/3	Empty.	Contains the reason the user selected in UI in case the PPS was cancelled. See CID 9300 “Procedure Discontinuation Reasons”.
>Code Value	(0008,0100)	SH	1	Code Value from (0040,0281)	Code Value from (0040,0281)
>Coding Scheme Designator	(0008,0102)	SH	1	Coding Scheme Designator from (0040,0281)	Coding Scheme Designator from (0040,0281)
>Coding Scheme Version	(0008,0103)	SH	1C	Coding Scheme Version from (0040,0281)	Coding Scheme Version from (0040,0281)
>Code Meaning	(0008,0104)	LO	1	Code Meaning from (0040,0281)	Code Meaning from (0040,0281)
Modality	(0008,0060)	CS	1/-	"DX"	Not contained.
Study ID	(0020,0010)	SH	2/-	Copy of the Requested Procedure ID from Worklist request	Not contained.
Performed Protocol Code Sequence	(0040,0260)	SQ	2/3	Always empty.	Always empty.
Performed Series Sequence	(0040,0340)	SQ	2/3	Always contains the images (processed and unprocessed) and Dose Report that were already created for this PPS, even in case of rejection/deletion.	Always contains the images (processed and unprocessed) and Dose Report that were already created for this PPS, even in case of rejection/deletion.
>Performing Physician's Name	(0008,1050)	PN	2/2	Performing Physician's Name either entered/changed by the user or taken from RIS Modality Worklist (Prefilled with "Scheduled Performing Physician's Name").	Performing Physician's Name either entered/changed by the user or taken from RIS Modality Worklist (Prefilled with "Scheduled Performing Physician's Name").
>Operators' Name	(0008,1070)	PN	2/2	Value as entered during patient registration. Prefilled with login name of current user.	Value as entered during patient registration. Prefilled with login name of current user.

>Protocol Name	(0018,1030)	LO	1/1	Name of CP Step in case of images. For Dose Report: "Radiation Dose Information"	Name of CP Step in case of images. For Dose Report: "Radiation Dose Information"
>Series Instance UID	(0020,000E)	UI	1/1	Internally generated.	Internally generated.
>Series Description	(0008,103E)	LO	2/2	Name of CP Step in case of images. For Dose Report: "Radiation Dose Information"	Name of CP Step in case of images. For Dose Report: "Radiation Dose Information"
>Retrieve AE Title	(0008,0054)	AE	2/2	Empty	Empty
>Referenced Image Sequence	(0008,1140)	SQ	2/2	Contains all images that were acquired until the current point in time. This includes also deleted/rejected images and unprocessed images.	Contains all images that were acquired until the current point in time. This includes also deleted/rejected images and unprocessed images.
>>Referenced SOP Class UID	(0008,1150)	UI	1	The Referenced SOP Class UID from (0008,1140)	The Referenced SOP Class UID from (0008,1140)
>>Referenced SOP Instance UID	(0008,1155)	UI	1	The Referenced Instance Class UID from (0008,1140)	The Referenced Instance Class UID from (0008,1140)
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	SQ	2/2	Not contained.	See "Referenced Image Sequence", but here only NON-image objects are contained (e.g. Dose Reports).
>>Referenced SOP Class UID	(0008,1150)	UI	1	The Referenced SOP Class UID from (0040,0220)	The Referenced SOP Class UID from (0040,0220)
>>Referenced SOP Instance UID	(0008,1155)	UI	1	The Referenced Instance Class UID from (0040,0220)	The Referenced Instance Class UID from (0040,0220)
Anatomic Structure, Space or Region Sequence	(0008,2229)	SQ	3/3	Empty.	Please refer to EV (123014,DCM, "Target Region") in Dose Report.
>Code Value	(0008,0100)	SH	1	Not contained.	Code Value from (0008,2229)
>Coding Scheme Designator	(0008,0102)	SH	1	Not contained.	Coding Scheme Designator from (0008,2229)
>Code Meaning	(0008,0104)	LO	1	Not contained.	Code Meaning from (0008,2229)
Total Time of Fluoroscopy	(0040,0300)	US	3/3	Empty	0
Total Number of Exposures	(0040,0301)	US	3/3	Empty.	The total number of exposures for all images referenced in this MPPS (also in case of DISCONTINUED).
Distance Source to Detector	(0018,1110)	DS	3/3	Empty	Set, if it is the same for all acquisitions, otherwise empty.
Entrance Dose	(0040,0302)	US	3/3	see N-SET	Sum of the entrance dose for all irradiation events for the procedure step already executed. Same as skin dose/air kerma/Dose at RP. Measured in dGy. Only available, if SID and SOD are known.
Entrance Dose in mGy	(0040,8302)	DS	3/3	see N-SET	See Entrance Dose
Image and Fluoroscopy Area Dose Product	(0018,115E)	DS	3/3	Empty	The total area-dose-product for all images referenced in this procedure step (also in case of DISCONTINUED). Also includes cassette images and rejected images.

Comments on Radiation Dose	(0040,0310)	ST	3/3	Empty	Formatted dose information. The following information is included: - Name of Clinical Protocol Step - DAP - kV - mAs - Filter Thickness in mm - EXI The information for all images referenced in this MPPS (also in case of DISCONTINUED). Also includes cassette images and rejected images.
Exposure Dose Sequence	(0040,030E)	SQ	3/3	Empty	One item for each acquisition / irradiation event.
>Radiation Mode	(0018,115A)	CS	3	Not contained.	"PULSED"
>KVP	(0018,0060)	DS	3	Not contained.	Peak kilo voltage output of the X-Ray generator used.
>X-Ray Tube Current in µA	(0018,8151)	DS	3	Not contained.	X-Ray Tube Current in µA.
>Exposure Time	(0018,1150)	IS	3	Not contained.	Duration of X-Ray exposure in msec
>Filter Type	(0018,1160)	SH	3	Not contained.	FLAT in case COPPER filter is used, otherwise NONE
>Filter Material	(0018,7050)	CS	3	Not contained.	COPPER (empty if no copper filter used)
>Comments on Radiation Dose	(0040,0310)	ST	3	Not contained.	See "Comments on Radiation Dose", but here only for a single irradiation event.
>Entrance Dose in mGy	(0040,8302)	DS	3	Not contained.	Entrance dose for this irradiation event. Same as skin dose/air kerma/Dose at RP.
>Distance Source to Detector	(0018,1110)	DS	3	Not contained.	Distance in mm from source to detector center. Also known as SID (Source Image Distance) Only set in case it is know, otherwise empty.
>Image and Fluoroscopy Area Dose Product	(0018,115E)	DS	3	Not contained.	DAP in dGy cm^2 in case a DAP chamber is present, otherwise empty
>Protocol Name	(0018,1030)	LO	3	Not contained.	Name of CP Step.
>Relative X-Ray Exposure	(0018,1405)	IS	3	Not contained.	Physical EXI

Annex A: Index of Tables

Annex B: Table of Figures

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