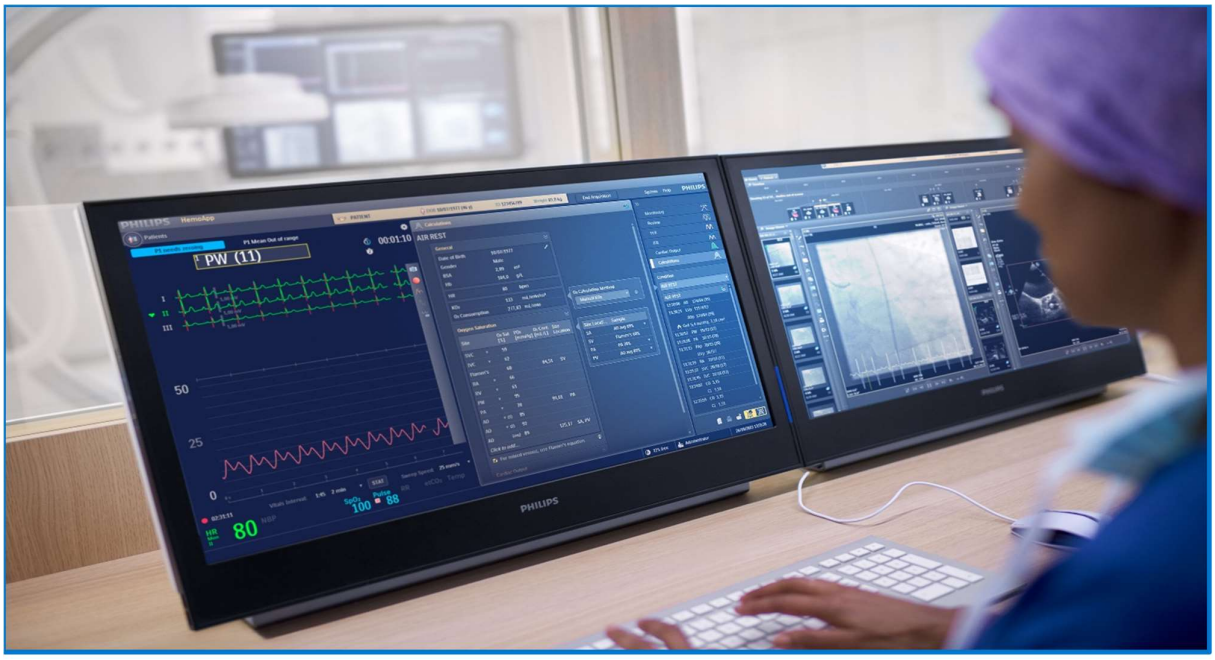
DICOM Conformance Statement

Philips Hemodynamic Application R1.5



- This page is left intentionally empty -

1. DICOM Conformance Statement Overview

The Philips Hemodynamic application is a software medical device that enables invasive investigation of cardiac and vascular diseases. When combined with a compatible patient monitoring device, the combination provides full patient monitoring and hemodynamic analysis functionality.
It provides the following DICOM data exchange features:

- Query a Radiology information system for a modality worklist.
- Send a Modality Performed Procedure Step 'In Progress' or 'Completed' message.
- Store a Secondary Capture jpeg image of a sample on DICOM storage.
- Store a Dicom-encapsulated pdf file on DICOM storage.
- Store case data as Raw Data object on DICOM storage.
- Request Storage Commitment from DICOM storage.
- Query DICOM storage.
- Retrieve Raw Data object from DICOM storage.

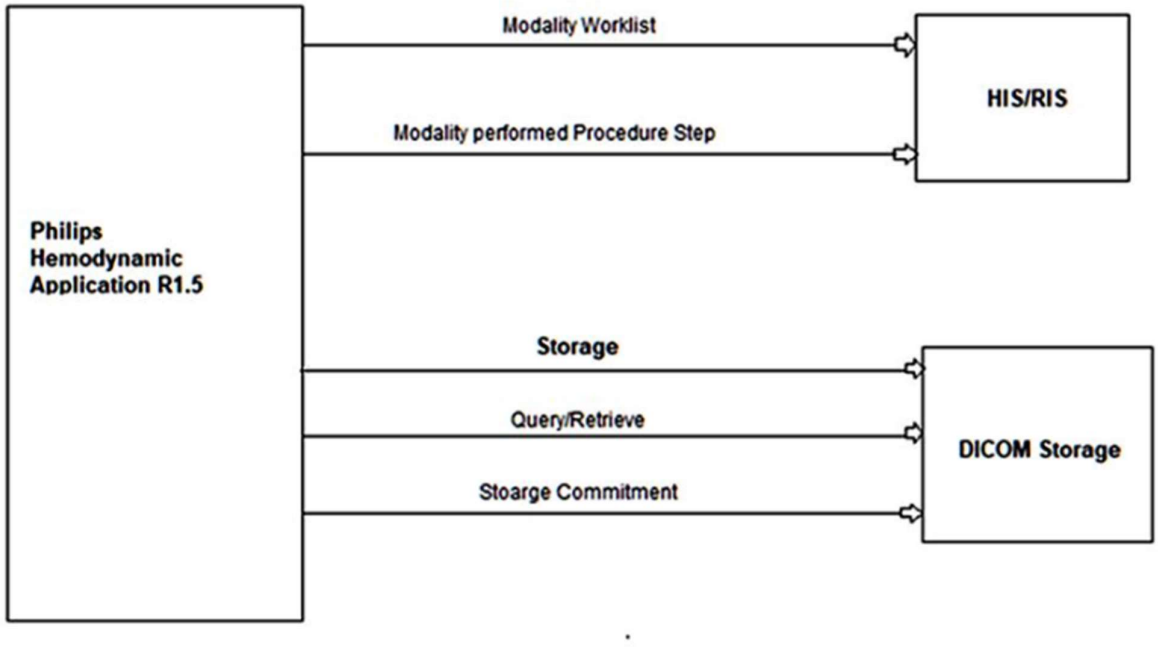


Figure 1: Philips Hemodynamic Application in a DICOM network overview

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	UID			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes	N/A
Query/Retrieve				
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	N/A
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No	N/A

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	**UID**			
Transfer				
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	No	N/A
Encapsulated PDF Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Yes	No	N/A
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No	N/A
Workflow Management				
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	N/A
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No	N/A
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No	N/A

2. Contents

3. Introduction

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

3.1. Revision History

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

Table 2: Revision History

Document Version	Date of Issue	Description of change
01	07-Aug-2025	First release of Philips Hemodynamic Application R1.5

3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

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

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to ensure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to

make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

Table 3: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
HD	Hemodynamics
HIS	Hospital Information System
HL7	Health Level Seven
IANA	Internet Assigned Numbers Authority
IHE	Integrating the Healthcare Enterprise
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISO	International Organization for Standardization
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
PHI	Protected Health Information
PPS	Performed Procedure Step
PHA	Philips Hemodynamic Application
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SDP	Service Description Protocol
SOP	Service Object Pair
SPS	Scheduled Procedure Step
TCP/IP	Transmission Control Protocol/Internet Protocol

Abbreviation/Term	Explanation
UID	Unique Identifier
UL	Upper Layer
VR	Value Representation
WLM	Worklist Management

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
National Electrical Manufacturers Association
1300 North 17th Street
Suite 900
Arlington, Virginia 22209
Internet: https://www.dicomstandard.org/current

4. Networking

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

4.1. Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1. Application Data Flow

Philips Hemodynamic Application system has a single Application Entity in its implementation, namely Philips Hemodynamic Application R1.5 Application Entity. Figure 2 shows the relationship between the Local and Remote Real World Activities (RWA).

- After RWA Verify Application Level Communication, the Philips Hemodynamic Application as SCU uses the remote Request Verification SCP functionality to verify communication.
- After RWA Modality Worklist, the Philips Hemodynamic Application as SCU uses the remote Modality Worklist Information Model SCP functionality to query for Modality Worklist.
- After RWA Create and Set Modality Performed Procedure Step, the Philips Hemodynamic Application as SCU uses the remote Modality Performed Procedure Step SOP Class functionality to Report Modality Performed Procedure Step for HD Modality and for Raw data storage SOP Class.
- After RWA Store Data, the Philips Hemodynamic Application as SCU uses the remote SCP Storage Service Class functionality to store local Raw Data, Secondary Capture images, Encapsulated PDFs in a remote database.
- After RWA Storage Commitment, the Philips Hemodynamic Application as SCU uses the remote SCP Storage Commitment Service Class functionality to commit remote storage for Raw data storage SOP Class.
- After RWA Query Retrieve, the Philips Hemodynamic Application as SCU uses the remote SCP Query Retrieve images Service Class functionality to Query Retrieve.
- The Philips Hemodynamic Application as SCP Request accepts remote request Verification SCU functionality to verify communication.

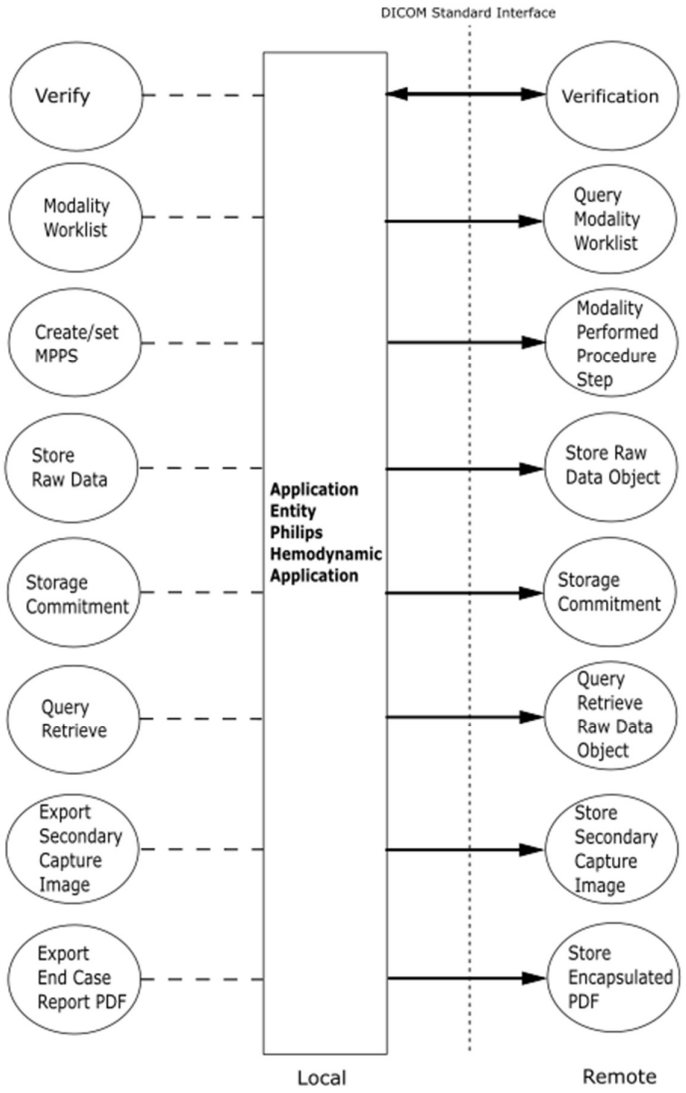


Figure 2: Philips Hemodynamic Application Data Flow Diagram

This section describes the organization of the supported Services into Application Entities based on the default configuration of the system. This may change based on the actual setup at the customer site. See Section 6 for details about the configurability of Services into AEs.

4.1.2. Functional Definition of Philips Hemodynamic Application AE's

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

Verification Service Class

Philips Hemodynamic Application AE provides Verification service as SCU. Philips Hemodynamic Application AE can request an association to a remote node for Verification SOP class. After receiving the response for the Verification request from the remote SCP system, it releases the association.
The Philips Hemodynamic Application AE can also perform the verification service as SCP, it shall accept association when the association is requested by the remote system and the remote AE title has been registered in Philips Hemodynamic Application.

Storage Service Class

The Philips Hemodynamic Application AE can perform (only to pre-configured systems) the Storage service as SCU (Raw Data object, Secondary Capture, and Dicom-encapsulated pdf), triggered by an event in the system, e.g. closing of a case. The Philips Hemodynamic Application AE shall request an association with the selected remote SCP for all applicable Storage SOP classes. When the association is accepted, the Philips Hemodynamic Application AE shall send the Storage requests (including data from local database), receive the Storage responses and act accordingly, and finally request for releasing the association.

Storage Commitment Service Class

The Philips Hemodynamic Application provides the Storage Commitment service as SCU. Philips Hemodynamic Application AE will request Storage Commit from the DICOM storage SCP only for Raw Data SOP class.

The Philips Hemodynamic Application AE requests an association with the selected remote SCP for the Storage Commitment Push Model SOP class. When the association is accepted, the Philips Hemodynamic Application will send the Storage Commitment requests, receive the Storage Commitment responses and act accordingly and release the association. When the remote commitment actions have been finished, the remote SCP will request an association with the Philips Hemodynamic Application AE (still SCU). After accepting the association, the Philips Hemodynamic Application AE receives the Storage Commitment reports and releases the association when requested. The Storage Commitment Service can be done asynchronously.

Basic Worklist Management Service Class

Philips Hemodynamic Application AE uses the Basic Worklist Management service as SCU. After initiating a worklist query, Philips Hemodynamic Application AE requests an association with the configured remote Basic Worklist Management SCP. After accepting the association Philips Hemodynamic Application be updated with the query results. Philips Hemodynamic Application AE can filter on modalities HD, XA, or all modalities.

The following sequence of Real-World activities are supported by Philips Hemodynamic Application:

- The clinical user queries the MWL SCP for a (specific) Worklist representing the list of Scheduled Procedure Steps (with demographic information). Based on that query entered at Philips Hemodynamic Application, it sends the C-FIND-RQ message with the query criteria.
- If auto-update of the local scheduled patient list is configured, Philips Hemodynamic Application AE will regularly query the MWL SCP and update the local scheduled patient list.

Study Management Service Class

The Philips Hemodynamic Application AE can perform (only to the pre-configured MPPS SCP) the Study Management service as SCU (RWA Create and Set Modality Performed Procedure Step), triggered by the start of an examination (triggered by opening the examination) for acquisition or closing. The Philips Hemodynamic Application AE shall request an association. When the association is accepted, the Philips Hemodynamic Application AE shall send Create and Set requests, receive the responses, and request for releasing the association. This is only done when one of the following conditions is true:

- The current case was admitted from DMWL and the modality was HD
- The current case was not admitted from DMWL (unscheduled case)

Query Retrieve Service Class

The Philips Hemodynamic Application AE can perform the Query Retrieve service as SCU. The Philips Hemodynamic Application AE shall request an association. When the association is accepted, the Philips Hemodynamic Application AE shall send a Query/Retrieve request, receive the responses, and request for releasing the association.

4.1.3. Sequencing of Real World Activities

The following sequence of Real World activities are supported by Philips Hemodynamic Application:

- The clinical user queries the MWL SCP for a (specific) Worklist representing the list of Scheduled Procedure Steps (with demographic information). Based on that query entered at Philips Hemodynamic Application, it sends the C-FIND-RQ message with the query criteria. The automatic broad query with configured query criteria shall be triggered whenever user selects scheduled patients page or all patients pages.
- The clinical user starts the examination. As a result, Philips Hemodynamic Application notifies the MWL SCP of the start of a new Procedure Step, i.e. it sends the MPPS N-CREATE-RQ message with the “IN PROGRESS” status of the examination.
- The clinical user closes the case. As a result, Philips Hemodynamic Application sends images as Secondary Captures, End-case reports as embedded pdf, and the case data as Raw Data Object to the DICOM storage node, i.e. it sends the C-STORE_RQ messages containing the data.
- When all images (and presentation states), which were to be automatically transferred to the PACS, have been transferred and storage-commit configured, the Philips Hemodynamic Application asks the PACS to take responsibility for the Raw Data Object that it has stored that originate from the examination, i.e., it sends the N-ACTION-RQ message containing the request for storage commit.
- Philips Hemodynamic Application notifies the MWL SCP of the completion of a Procedure Step, i.e., it sends the N-SET-RQ message with the “COMPLETED” status of the examination. Additionally, to the basic flow of activities, the clinical user may also perform the following steps:
    - The clinical user manually transfers images to the PACS and/or Workstation. As a result, Philips Hemodynamic Application sends the C-STORE-RQ messages containing the image information.

The figure below shows sequencing of RWA for Philips Hemodynamic Application:

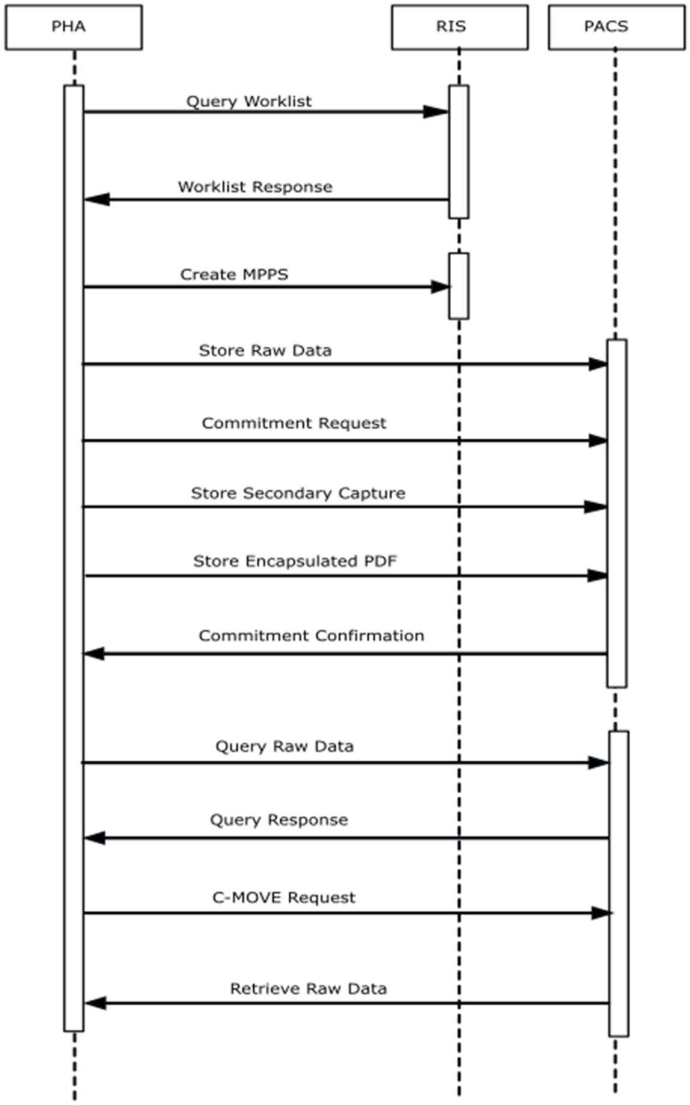


Figure 3: Sequencing of Real-World Activities for Philips Hemodynamic Application

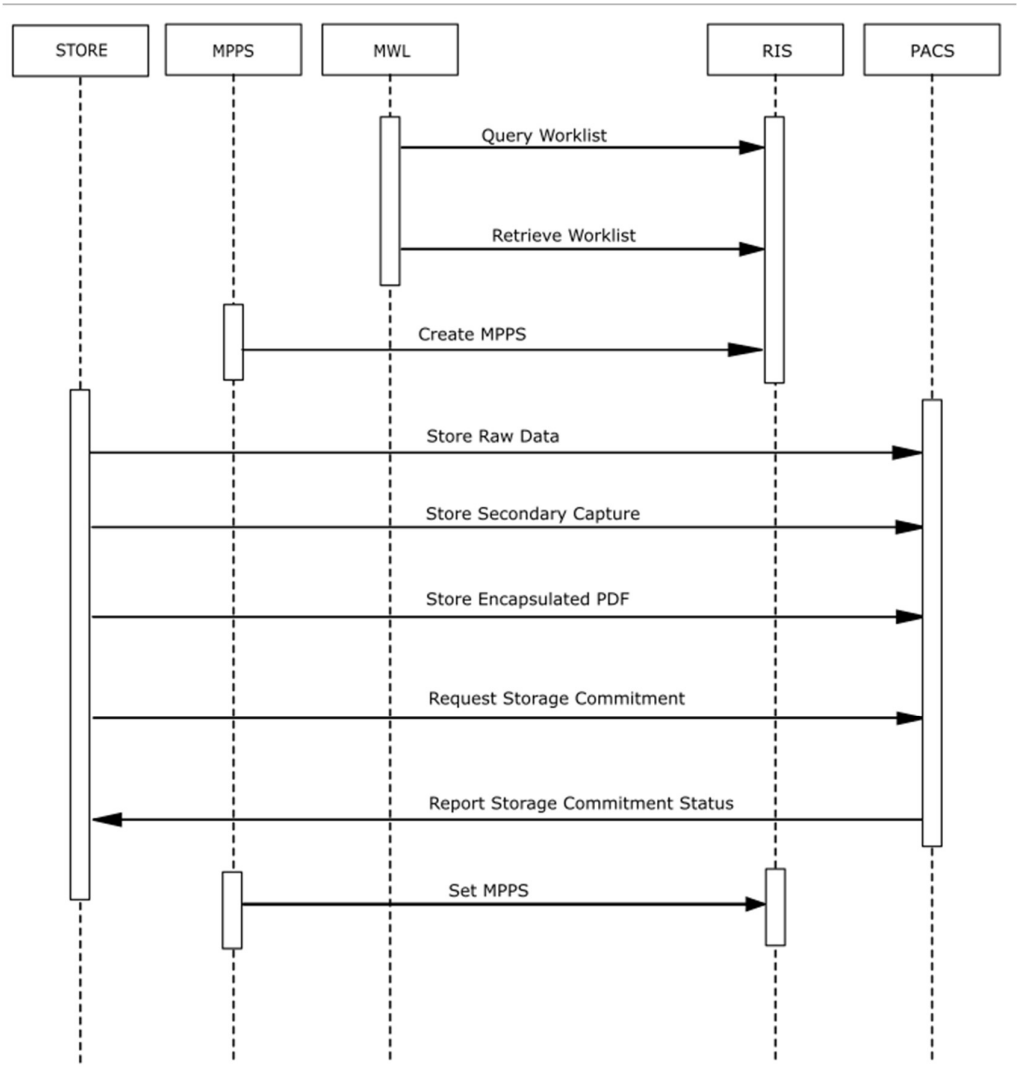


Figure 4: Real-World Activity and Cross Philips Hemodynamic Application AE interaction

4.2. AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1. Philips Hemodynamic Application AE

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

4.2.1.1. SOP Classes

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

Table 4: SOP Classes for Philips Hemodynamic Application AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Raw Data Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	No
Encapsulated PDF Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

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

4.2.1.2. Association Policies

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

4.2.1.2.1 General

The DICOM standard application context is specified below.

Table 5: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified here.

Table 6: Number of associations as an Association Initiator for Philips Hemodynamic Application AE

Description	Value
Maximum number of simultaneous associations	1

Table 7: Number of associations as an Association Acceptor for Philips Hemodynamic Application AE

Description	Value
Maximum number of simultaneous associations	1

4.2.1.2.3 Asynchronous Nature

The Philips Hemodynamic Application does not support asynchronous operations except for storage commitment. After the storage commitment N-ACTION request is transmitted, storage commitment notification may be handled on another association.

4.2.1.2.4 Implementation Identifying Information

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

Table 8: DICOM Implementation Class and Version for Philips Hemodynamic Application AE

Implementation Class UID	1.3.46.670589.64.150
Implementation Version Name	PHA R1.5

4.2.1.2.5 Communication Failure Handling

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

Table 9: Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Association aborted	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
Network Disconnect	The command is marked as failed. The reason is logged and reported to the user. Automatic retry of this service connection is started

4.2.1.3. Association Initiation Policy

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

Table 10: Association Rejection response

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

Result	Source	Reason/Diagnosis	Behavior
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	The Association is rejected. The reason is logged and reported to the user.
		2 - local-limit-exceeded	The Association is rejected. The reason is logged and reported to the user.

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

Table 11: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

4.2.1.3.1 (Real-World) Activity – Verification as SCU

4.2.1.3.1.1 Description and Sequencing of Activities

For each Verify Application Level Communication request, an association towards the remote system is established and a C-ECHO request is transmitted. Once the response is received, the association is closed.

The Philips Hemodynamic Application AE can send a verification request (C-ECHO) to verify application level communication to a remote system. This verification is initiated on a separate service system by using the “Test” button in the system setting (configuration) tool.

The figure below shows sequencing of Association as SCU.

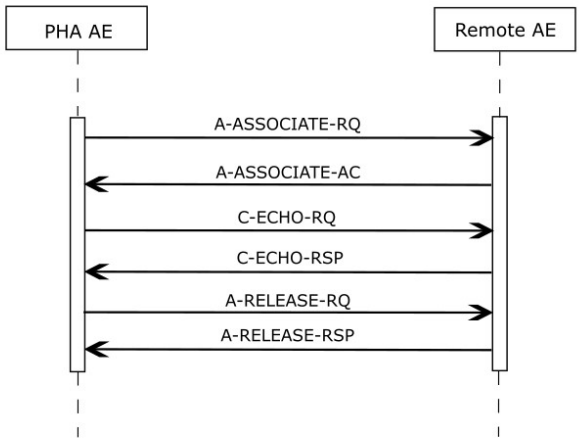


Figure 5: Real-World Activities for Verification as SCU

As a Service Class User of the Verification Service Class, the Philips Hemodynamic Application AE uses the C-ECHO-RQ message to verify end-to-end communications with a remote DICOM AE. Upon receipt of C-ECHO-RSP message, the SCU determines that verification is complete.

4.2.1.3.1.2 Proposed Presentation Contexts

Each time an association is initiated, the Philips Hemodynamic Application proposes one presentation contexts to be used on that association. The presentation context proposed by the Philips Hemodynamic Application for Verify Application Level Communication is defined in Table below.

Table 12: Proposed Presentation Contexts for (Real-World) Activity – Verification As SCU

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

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

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

4.2.1.3.1.3.1 Dataset Specific Conformance for Verification SOP Class C-ECHO-SCU

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

Table 13: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Association is established successfully	“Test Succeeded” appears on the UI

4.2.1.3.2 (Real-World) Activity – Modality Worklist as SCU

4.2.1.3.2.1 Description and Sequencing of Activities

For each Broad or Specific Worklist request, the Philips Hemodynamic Application opens an association towards the Basic Worklist Management SCP and sends a C-FIND request. After retrieval of all responses containing matching Worklist items, the association is closed. All returned Worklist items are displayed to the operator who can copy one or more items to the internal ‘Scheduled Patients list’ or select an item from the Worklist and perform an examination.

The clinical user may cancel the query to the MWL SCP. As a result, Philips Hemodynamic Application ends a C-FIND Cancel Request to the MWL SCP.

The figure below shows sequencing of MWL as SCU.

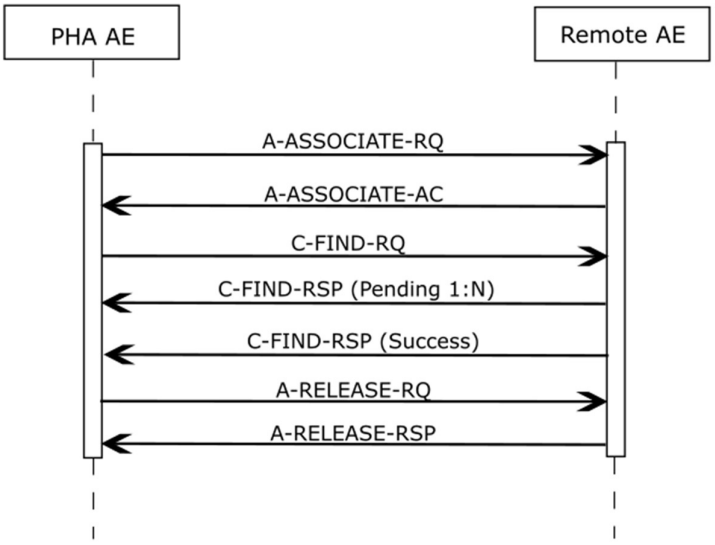


Figure 6: Real-World Activities for Modality Worklist as SCU

- When responses with missing mandatory attributes are received, Philips Hemodynamic Application displays study and continues querying for further studies without any error.
- When Mandatory return key violation is sent in response, Philips Hemodynamic Application continues querying for further studies without any error.
- When Mandatory value missing is sent in response, PHA R1.5 system continues querying for further studies without any error.
- When PHA 1.5 receives additional keys in the response than requested for, system continues querying for further studies without any error.
- When extra keys received in response SUT continues querying for further studies.
- When SUT receives response with missing values for Optional attributes, it continues to query for further studies without any error.
- While trying to perform the procedure for the patient which is not matching SUT's scheduled station AE Philips Hemodynamic Application will allow to perform procedure.
- When trying to perform the image acquisition with duplicate Study Instance UID, Philips Hemodynamic Application does not allow user to perform the acquisition and show as Not Admitted.

4.2.1.3.2.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 14: Proposed Presentation Contexts for (Real-World) Activity – MWL As SCU

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

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

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

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

This section specifies the Modality Worklist Request Attributes.
For each attribute in the following information is supplied:
Attribute Name: Attributes supported to build a Modality Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching Keys for (automatic) Worklist Update.
R: Return Keys. An "X" will indicate that this attribute as Return Key with zero length for Universal Matching.
Q: Interactive Query Key. An "X" will indicate that this attribute as matching key can be used.
D: Displayed Keys. An "X" indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD: An "X" indicates that this Worklist attribute is included into all object Instances created during performance of the related Procedure Step.
Types of matching supported:
Single Value Matching
List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

Table 15: C-FIND-RQ Dataset Specification

Modality Worklist Information Model – FIND SOP Class									
Attribute Name	**Tag**	**VR**	**M**	**R**	**Q**	**D**	**IOD**	**Type of Matching**	**Comment**
Scheduled Procedure Step									
Scheduled Procedure Step Sequence	0040,0100	SQ	X	X				N/A	
>Modality	0008,0060	CS	X	X	X	X	X	Single Value, Universal	
>Station Name	0008,1010	SH	X					Universal	
>Scheduled Station AE Title	0040,0001	AE	X	X	X	X		Single Value, Universal	
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X	X	X		Single Value, Universal, Wild Card	
>Scheduled Procedure Step Start Time	0040,0003	TM	X	X		X		Universal	
>Scheduled Procedure Step End Date	0040,0004	DA	X					Universal	
>Scheduled Procedure Step End Time	0040,0005	TM	X					Universal	
>Scheduled Performing Physician's Name	0040,0006	PN	X					Universal	

Modality Worklist Information Model – FIND SOP Class									
Attribute Name	**Tag**	**VR**	**M**	**R**	**Q**	**D**	**IOD**	**Type of Matching**	**Comment**
>Scheduled Procedure Step Description	0040,0007	LO	X			X		Universal	
>Scheduled Procedure Step ID	0040,0009	SH	X					Universal	
Requested Procedure									
Study Date	0008,0020	DA	X					Universal	
Study Time	0008,0030	TM	X					Universal	
Institution Name	0008,0080	LO	X					Universal	
Institution Address	0008,0081	ST	X					Universal	
Referenced Study Sequence	0008,1110	SQ	X					Universal	
Study Instance UID	0020,000D	UI	X					Universal	
Requesting Service	0032,1033	LO	X					Universal	
Requested Procedure Description	0032,1060	LO	X					Universal	
Requested Procedure Code Sequence	0032,1064	SQ	X					Universal	
Placer Order Number / Imaging Service Request	0040,2016	LO	X					Universal	
Filler Order Number / Imaging Service Request	0040,2017	LO	X					Universal	
Requested Procedure ID	0040,1001	SH	X		X			Single Value, Universal, Wild Card	
Imaging Service Request									
Accession Number	0008,0050	SH	X	X	X	X		Single Value, Universal, Wild Card	
Referring Physician's Name	0008,0090	PN	X			X		Universal	
Visit Relationship									
Referenced Patient Sequence	0008,1120	SQ	X					Universal	
Patient Identification									
Patient's Name	0010,0010	PN	X	X	X	X		Single Value, Universal, Wildcard	
Patient ID	0010,0020	LO	X	X	X	X		Single Value,	
Issuer of Patient ID	0010,0021	LO	X					Universal	
Additional Patient History	0010,21B0	LT	X					Universal	
Patient Demographic									
Patients Birth Date	0010,0030	DA	X			X		Universal	
Patient's Birth Time	0010,0032	TM	X					Universal	
Patient's Sex	0010,0040	CS	X			X		Universal	
Patient's Size	0010,1020	DS	X			X		Universal	
Patient's Weight	0010,1030	DS	X			X		Universal	

Modality Worklist Information Model – FIND SOP Class									
Attribute Name	**Tag**	**VR**	**M**	**R**	**Q**	**D**	**IOD**	**Type of Matching**	**Comment**
Pregnancy Status	0010,21C0	US	X					Universal	
Patient Comments	0010,4000	LT	X			X		Universal	
Patient Medical									
Medical Alerts	0010,2000	LO	X			X		Universal	
Allergies	0010,2110	LO	X			X		Universal	
Ethnic Group	0010,2160	SH	X					Universal	
Smoking Status	0010,21A0	CS	X					Universal	
SOP Common Module									
Specific Character Set	0008,0005	CS		X					

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

Table 16: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final identifier is supplied	The result is reported to the user and is logged.
Cancel	FE00	Matching terminated due to cancel	Stops with processing the C-FIND Response(s) from the SCP.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Continues with processing of the C-FIND Response(s) from the SCP.
Failure	A900	Error - Identifier does not match SOP Class	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged as Uxpected error.
	C001	Error - Unable to process	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged as Processing Failure.
	A700	Refused - Out of Resources	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged as NoResources.
	0122H	Refused - SOP Class Not Supported	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged as Uxpected error
*	Any other status code	*	Stops with processing the C-FIND Response(s) from the SCP. The reason is logged as Uxpected error

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

4.2.1.3.3.1 Description and Sequencing of Activities

The Philips Hemodynamic Application AE can perform (only to the pre-configured MPPS SCP) the Study Management service as SCU (RWA Create and Set Modality Performed Procedure Step), triggered by the start of an examination (triggered by the first x-ray exposure) for acquisition or closing. The Philips Hemodynamic Application AE shall request an association. When the association is accepted, the Philips Hemodynamic Application AE shall send Create and Set requests, receive the responses, and request for releasing the association. This is only done when one of the following conditions is true:

- The current case was admitted from DMWL and the modality was HD
- The current case was not admitted from DMWL (unscheduled case).

The figure below shows sequencing of MPPS as SCU.

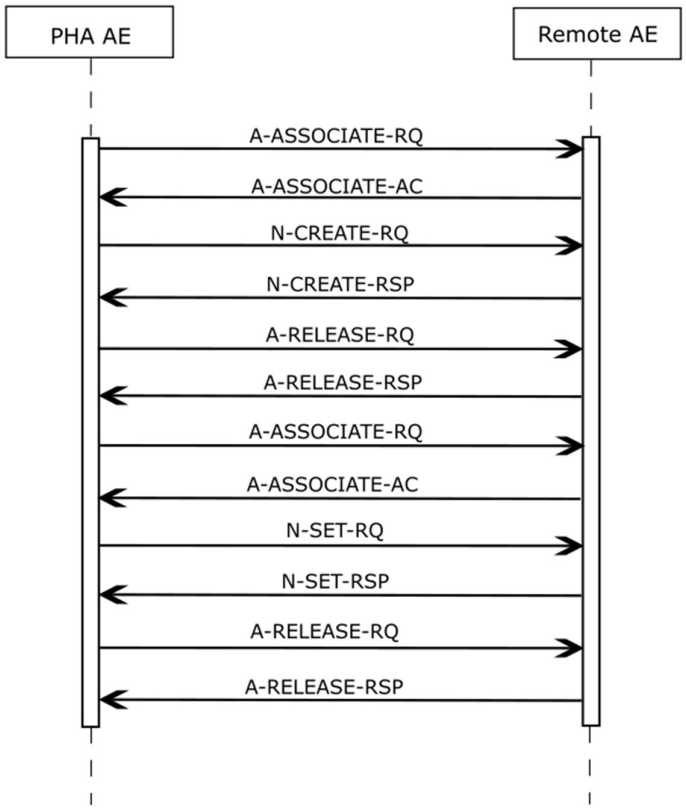


Figure 7: Real-World Activities for Modality Performed Procedure Step as SCU

4.2.1.3.3.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 17: Proposed Presentation Contexts for (Real-World) Activity – MPPS As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed	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		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Procedure Step SOP Class		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.3.3 SOP Specific Conformance for Modality Performed Procedure Step SOP Class

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

4.2.1.3.3.3.1 Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

Table 18: MPPS Request Identifiers for N-CREATE-RQ

Modality Performed Procedure Step SOP Class				
Attribute Name	Tag	VR	Value	Comment
SOP Common Module				
Specific Character Set	0008,0005	CS	ISO_IR 100 ISO_IR 192 ISO_IR 6	
Performed Procedure Step Relationship Module				
Referenced Patient Sequence	0008,1120	SQ		
Patient's Name	0010,0010	PN		
Patient ID	0010,0020	LO		
Patient's Birth Date	0010,0030	DA		
Patient's Sex	0010,0040	CS		
Study Date	0008,0020	DA		
Study Time	0008,0030	TM		
Accession Number	0008,0050	SH		
Study Instance UID	0020,000D	UI		
Referring Physician's Name	0008,0090	PN		
Study Description	0008,1030	LO		
Requested Procedure ID	0040,1001	SH		
Scheduled Step Attributes Sequence	0040,0270	SQ		
>Accession Number	0008,0050	SH		Empty in case of an unscheduled exam
>Referenced Study Sequence	0008,1110	SQ		Empty
>Study Instance UID	0020,000D	UI		
>Requested Procedure description	0032,1060	LO		Empty
>Scheduled Procedure Step description	0040,0007	LO		Empty
>Scheduled Protocol Code Sequence	0040,0008	SQ		Empty
>Scheduled Procedure Step ID	0040,0009	SH		Empty
>Requested Procedure ID	0040,1001	SH		Empty
Performed Procedure Step Information Module				
Procedure Code Sequence	0008,1032	SQ		

Modality Performed Procedure Step SOP Class				
Attribute Name	**Tag**	**VR**	**Value**	**Comment**
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Code Meaning	0008,0104	LO		
Performed Station AE Title	0040,0241	AE		
Performed Station Name	0040,0242	SH		
Performed Location	0040,0243	SH		
Performed Procedure Step Start Date	0040,0244	DA		
Performed Procedure Step Start Time	0040,0245	TM		
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step Status	0040,0252	CS	IN PROGRESS	
Performed Procedure Step ID	0040,0253	SH		
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Type Description	0040,0255	LO		
Image Acquisition Results Module				
Modality	0008,0060	CS		Applied Value(s): HD
Study ID	0020,0010	SH		
Performed Protocol Code Sequence	0040,0260	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Coding Scheme Version	0008,0103	LO		
>Code Meaning	0008,0104	LO		
Performed Series Sequence	0040,0340	SQ		Sequence will be empty when there are no images to report

The possible status responses for N-CREATE-RQ actions are shown in below table.

Table 19: Status Codes for N-CREATE of the Modality Performed Procedure Step SOP Class - SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	Association will be released. The notify status of the related examination is Updated (set to in progress). The examination status is not changed (e.g., still in progress).
Failure	0106	Invalid Attribute Value	The examination status is updated as failed. The reason for error is logged.
	0107	Attribute List Error	
	0111	Duplicate SOP Instance	
	0116	Attribute Value Out of Range	
	0121	Missing Attribute Value	
	0124	Refused: Not Authorized	

Service Status	Error Code	Further Meaning	Behavior
*	Any other status code	*	The examination status is updated as failed. The reason for error is logged in logs as “unexpected error”

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

Table 20: MPPS Request Identifiers for N-SET-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Type Description	0040,0255	LO		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step Status	0040,0252	CS	COMPLETED	
Performed Protocol Code Sequence	0040,0260	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Coding Scheme Version	0008,0103	SH		
>Code Meaning	0008,0104	LO		
Image Acquisition Results Module				
Performed Series Sequence	0040,0340	SQ		
SOP Common Module				
Specific Character Set	0008,0005	CS	ISO_IR 100 ISO_IR 192 ISO_IR 6	

Possible status responses from N-SET-RQ actions are shown in table below

Table 21: Status Codes for N-SET of the Modality Performed Procedure Step SOP Class - SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	Association will be released. The notify status of the related examination is Updated (set to notified). The examination status is Set to COMPLETED and it is logged.
Failure	0107	Attribute List Error	The examination status is updated as failed. The reason for error is logged.
	0110	Processing Failure	
	0117	Invalid Object Instance	
	0210	Duplicate Invocation	
	0212	Mistyped Argument	
*	Any other status code	*	The examination status is updated as failed. The reason for error is logged in logs as “unexpected error”

4.2.1.3.4 (Real-World) Activity – Storage as SCU

4.2.1.3.4.1 Description and Sequencing of Activities

After generating Raw data, Encapsulated PDF and Secondary capture, PHA will initiate the transmission. This causes the PHA to store the generated data into the configured Storage SCP.

The figure below shows sequencing of RWA for Storage as SCU.

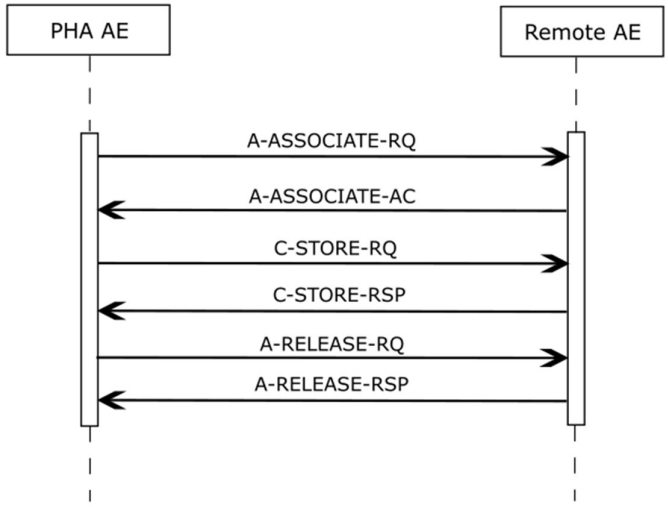


Figure 8: Real-World Activities for Storage as SCU

As a Service Class User of the Storage Service Class, the Philips Hemodynamic Application uses the C-STORE-RQ message to request storage of DICOM objects by a remote SCP.

4.2.1.3.4.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 22: Proposed Presentation Contexts for (Real-World) Activity – Image Export

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Raw Data Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Encapsulated PDF Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Lossless, Non Hierarchical (Process 14)	1.2.840.10008.1.2.4.57		

4.2.1.3.4.3 SOP Specific Conformance for Storage SOP Class

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

4.2.1.3.4.3.1 Dataset Specific Conformance for Storage SOP Class C-STORE-SCU

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

Table 23: Status Codes C-STORE for the Storage SOP Classes - SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The SCP has successfully stored the SOP Instances. If all SOP Instances in a send job have status success, then the job is marked as completed. Success is logged.
Refused	A700	Out of Resources	The association is released, and the send job is marked as failed. An error message is logged as Out of Resources.
Error	A900	Data Set does not match SOP Class	The association is released, and the send job is marked as failed. An error message is logged as Data Set does not match SOP Class.
	C000-CFFF	Cannot Understand	The association is released, and the send job is marked as failed. An error message is logged as Cannot Understand.
	0210	Duplicate Invocation	The association is released, and the send job is marked as failed. An error message is logged as Duplicate Invocation.
Warning	B000	Coercion of Data Elements	The association is released, and the send job is marked as failed. An error message is logged as unexpected error.
	B006	Elements discarded	
	B007	Data set does not match SOP class	
*	Any other status code	*	The association is released, and the send job is marked as failed. An error message is logged as unexpected error.

4.2.1.3.5 (Real-World) Activity – Storage Commitment as SCU

4.2.1.3.5.1 Description and Sequencing of Activities

Philips Hemodynamic Application AE will request Storage Commit from the DICOM storage SCP only for Raw Data SOP class.
The Philips Hemodynamic Application AE requests an association with the selected remote SCP for the Storage Commitment Push Model SOP class. When the association is accepted, the PHA will send the Storage Commitment requests, receive the Storage Commitment responses and act accordingly and release the association. When the remote commitment actions have been finished, the remote SCP will request an association with the Philips Hemodynamic Application AE (still SCU). After accepting the association, the PHA AE receives the Storage Commitment reports, and releases the association when requested. The Storage Commitment Service is done asynchronously.

The figure below shows sequencing of RWA for Storage Commitment as SCU.

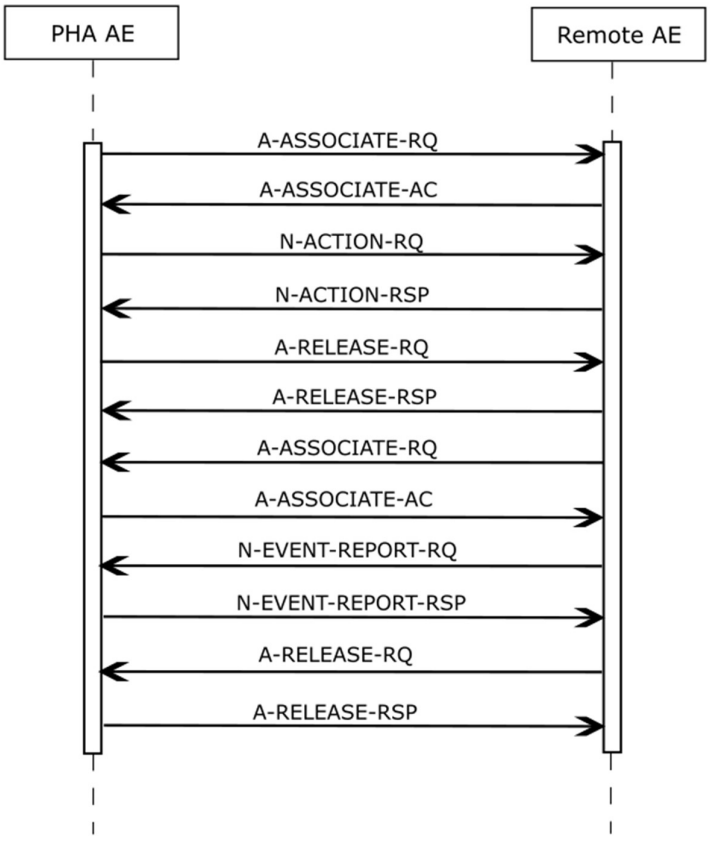


Figure 9: Real World Activity for Storage Commitment as SCU (Asynchronous)

As a Service Class User of the Storage Commitment SOP Class, the Philips Hemodynamic Application R1.5 uses the N-ACTION-RQ message to request storage commitment from a remote SCP. In turn, it receives N-EVENT-REPORT-RQ messages from the SCP indicating success or failure of the request.

Philips Hemodynamic Application R1.5 only requests storage commit for the Raw Data SOP class (1.2.840.10008.5.1.4.1.1.66)

As long as Philips Hemodynamic Application R1.5 has not received an N-EVENT-REPORT the study will be indicated in the UI as 'commitment pending'.

4.2.1.3.5.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 24: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model as SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.5.3 SOP Specific Conformance for Storage Commitment Push Model SOP Class

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

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

Table 25: N-ACTION-RQ Dataset Specification

Storage Commitment Push Model SOP Class			
Attribute Name	**Tag**	**VR**	**Comment**
Storage Commitment Module			
Transaction UID	0008,1195	UI	
Referenced SOP Sequence	0008,1199	SQ	
>Referenced SOP Class UID	0008,1150	UI	
>Referenced SOP Instance UID	0008,1155	UI	

The details regarding the response behavior to status codes are provided in Table below.

Table 26: Storage Commitment N-ACTION Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The storage commitment request has been successfully sent. The storage commitment request job is marked as completed. Success is logged.
*	Any other status code	*	The association is released, and the send job is marked as failed. An error message is logged as unexpected error.

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

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

Table 27: Storage Commitment N-EVENT-REPORT Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The storage commitment result has been successfully received. The SCP has successfully stored the SOP Instances. The examination is marked as completed.
*	Any other status code	*	The association is released, and the send job is marked as failed. An error message is logged as unexpected error.

Table 28: Storage Commitment N-EVENT-REPORT Response Status

Event Type	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Examination is marked as completed and it becomes a candidate for an automatic deletion from the local database if local resources become scarce.
Storage Commitment Request Complete – Failures Exist	2	The failure is reported to the operator by not marking the examination as completed. The operator may re-transfer the image data (which was previously transferred to the PACS).

4.2.1.3.6 (Real-World) Activity – FIND as SCU

4.2.1.3.6.1 Description and Sequencing of Activities

The operator is able to query a (pre-configured) remote database. The Philips Hemodynamic Application AE initiates an association to the selected Remote AE and uses it to send C-FIND requests (and receive the associated find replies). For each query a number of C-FIND requests is established in one association to the peer entity, which is released when all query results are received.

Note that Query service is supported only for Raw Data Object.

The figure below shows sequencing of RWA for FIND as SCU.

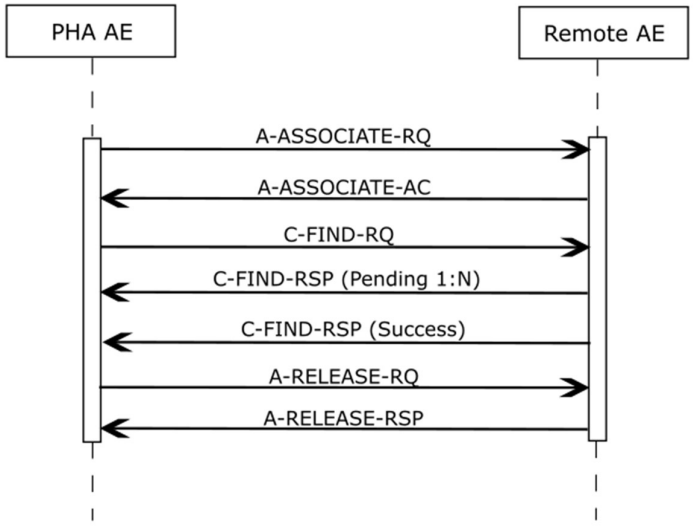


Figure 10: Real-World Activities for Query as SCU

As a Service Class User of the Storage Service Class, the Philips Hemodynamic Application uses the C-STORE-RQ message to request storage of DICOM objects by a remote SCP.

4.2.1.3.6.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 29: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.6.3 SOP Specific Conformance for Study Root QR Information Model – FIND SOP Class

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

4.2.1.3.6.3.1 Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

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

Table 30: Supported Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Value**	**Comment**
SOP Common Module				
Query/Retrieve Level	0008,0052	CS	Single Value	STUDY, SERIES, IMAGE
Specific Character Set	0008,0005	CS		
Q/R Study level				
Study Date	0008,0020	DA	Single Value, Range matching	
Study Time	0008,0030	TM	Universal matching only	
Accession Number	0008,0050	SH	Universal matching only	
Query/Retrieve Level	0008,0052	CS	Single Value Matching	STUDY
Referring Physician's Name	0008,0090	PN	Universal matching only	
Timezone Offset From UTC	0008,0201	SH	Universal matching only	
Study Description	0008,1030	LO	Universal matching	
Procedure Code Sequence	0008,1032	SQ	Universal matching only	
>Code Value	0008,0100	SH	Universal matching only	
>Coding Scheme Designator	0008,0102	SH	Universal matching only	
>Coding Scheme Version	0008,0103	SH	Universal matching only	
>Code Meaning	0008,0104	LO	Universal matching only	
Name of Physician(s) Reading Study	0008,1060	PN	Universal matching only	
Admitting Diagnoses Description	0008,1080	LO	Universal matching only	
Referenced Study Sequence	0008,1110	SQ	Universal matching only	
>Referenced SOP Class UID	0008,1150	UI	Universal matching only	
>Referenced SOP Instance UID	0008,1155	UI	Universal matching only	
Referenced Patient Sequence	0008,1120	SQ	Universal matching only	
>Referenced SOP Class UID	0008,1150	UI	Universal matching only	
>Referenced SOP Instance UID	0008,1155	UI	Universal matching only	
Patient's Name	0010,0010	PN	Single value matching or wild card matching or universal matching	
Patient ID	0010,0020	LO	Single Value, Wild Card or Universal matching	
Patient's Birth Date	0010,0030	DA	Single value matching or universal matching	
Patient's Birth Time	0010,0032	TM	Universal matching only	
Patient's Sex	0010,0040	CS	Universal matching only	
Other Patient IDs	0010,1000	LO	Universal matching only	
Other Patient Names	0010,1001	PN	Universal matching only	
Patient's Age	0010,1010	AS	Universal matching only	
Patient Size	0010,1020	DS	Universal matching only	
Patient Weight	0010,1030	DS	Universal matching only	
Ethnic Group	0010,2160	SH	Universal matching only	

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Value**	**Comment**
Occupation	0010,2180	SH	Universal matching only	
Additional Patient History	0010,21B0	LT	Universal matching only	
Patient Comment	0010,4000	LT	Universal matching only	
Study ID	0020,0010	SH	Universal matching only	
Study Instance UID	0020,000D	UI	Universal matching only	
Other Study Number	0020,1070	IS	Universal matching only	
Number of Patient Related Studies	0020,1200	IS	Universal matching only	
Number of Patient Related Series	0020,1202	IS	Universal matching only	
Number of Patient Related Instances	0020,1204	IS	Universal matching only	
Number Of Study Related Series	0020,1206	IS	Universal matching only	
Number of Study Related Instances	0020,1208	IS	Universal matching only	
Q/R Series level				
Series Date	0008,0021	DA	Universal matching only	
Acquisition Date	0008,0022	DA	Universal matching only	
Series Time	0008,0031	TM	Universal matching only	
Query/Retrieve Level	0008,0052	CS	Single Value Matching	SERIES
Modality	0008,0060	CS	Universal matching only	HD
Series Description	0008,103E	LO	Universal matching only	
Referenced Performed Procedure Step Sequence	0008,1111	SQ	Universal matching only	
>Referenced SOP Class UID	0008,1150	UI	Universal matching only	
>Referenced SOP Instance UID	0008,1155	UI	Universal matching only	
Body Part Examined	0018,0015	CS	Universal matching only	
Study Instance UID	0020,000D	UI	Single value matching only	
Series Instance UID	0020,000E	UI	Universal matching only	
Series Number	0020,0011	IS	Universal matching only	
Number of Series Related Instances	0020,1209	IS	Universal matching only	
Performed Procedure Step Start Date	0040,0244	DA	Universal matching only	
Performed Procedure Step Start Time	0040,0245	TM	Universal matching only	
Performed Procedure Step ID	0040,0253	SH	Universal matching only	
Request Attributes Sequence	0040,0275	SQ	Universal matching only	
>Scheduled Procedure Step ID	0040,0009	SH	Universal matching only	
>Requested Procedure ID	0040,1001	SH	Universal matching only	
Q/R Image level				
SOP Instance UID	0008,0018	UI	Universal matching only	
Content Date	0008,0023	DS	Universal matching only	
Content Time	0008,0033	TM	Universal matching only	
Query/Retrieve Level	0008,0052	CS	Single Value Matching	IMAGE
Study Instance UID	0020,000D	UI	Single Value Matching	

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Value**	**Comment**
Series Instance UID	0020,000E	UI	Single Value Matching	
Instance Number	0020,0013	IS	Universal matching only	

Table 31: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final Identifier is supplied.	Stops with processing the C-Find Response(s) from the SCP. All results are displayed to the operator.
Refused	A700	Out of Resources	The association is released, and the send job is marked as failed. An error message is logged.
Failed	A900	Identifier Does Not Match SOP Class	The association is released, and the send job is marked as failed. An error message is logged.
	CXXX	Unable to process	The association is released, and the send job is marked as failed. An error message is logged.
Cancel	FE00	Matching terminated due to Cancel Match request	Stops with processing the C-Find Response(s) from the SCP. Results already received up to that point are displayed to the operator.
Pending	FF00	Matches are continuing – Current Match is supported in the same manner as supplied and any Optional Keys were Required Keys.	Continues with processing of the C-Find Response(s) from the SCP
*	Any other status code	*	The association is aborted using A-ABORT. The reason is logged, and the failure is reported to the user.

4.2.1.3.7 (Real-World) Activity – MOVE as SCU

4.2.1.3.7.1 Description and Sequencing of Activities

The request to move remote images is forwarded to the job queue. For each move job, one association towards the remote system is established, and C-MOVE requests are transmitted. Once the responses are received, the association is closed. Query Retrieve service is supported only for Raw Data Object.

The figure below shows sequencing of RWA for MOVE as SCU.

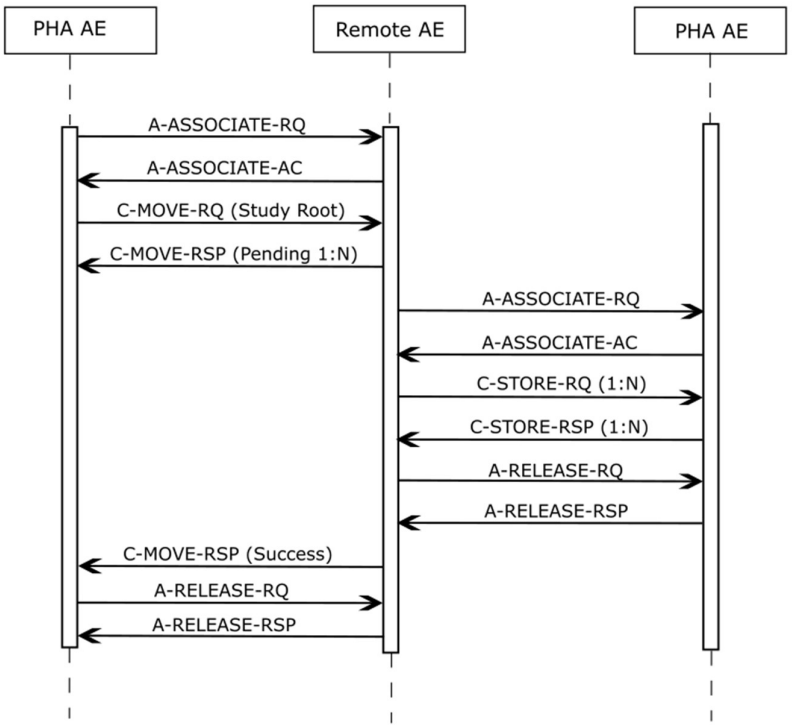


Figure 11: Real-World Activities for MOVE as SCU

4.2.1.3.7.2 Proposed Presentation Contexts

The proposed presentation contexts are defined in the next table.

Table 32: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

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

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

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

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

Table 33: Identifiers for MOVE Study Root Information Model as SCU

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Value**	**Comment**
SOP Common Module				
Query/Retrieve Level	0008,0052	CS	Single Value	IMAGE
Specific Character Set	0008,0005	CS		
Q/R Image level				
SOP Instance UID	0008,0018	UI	Universal matching only	
Query/Retrieve Level	0008,0052	CS	Single Value Matching	IMAGE
Study Instance UID	0020,000D	UI	Single Value Matching	
Series Instance UID	0020,000E	UI	Single Value Matching	

Table 34: Status response for Study Root Information Model C-MOVE-SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations Complete No Failures	The SCP has successfully stored the SOP Instances. If all SOP Instances in a send job have status success, then the job is marked as completed. Success is logged.
Refused	A701	Out of Resources – Unable to calculate number of matches	The association is released, and the send job is marked as failed. An error message is logged.
	A702	Out of Resources – Unable to perform sub operations	
	A801	Move Destination Unknown	
Failed	A900	Identifier Does Not Match SOP Class	The association is released, and the send job is marked as failed. An error message is logged
	CXXX	Unable to process	
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as cancelled. The association is released. The reason is logged and reported to the user.
Warning	B000	Sub-operations Complete – One or more Failures	The association is released, and the send job is marked as failed. An error message is logged.
*	Any other status code	*	The association is released, and the send job is marked as failed. An error message is logged.

4.2.1.4. Association Acceptance Policy

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

Table 35: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	The Association is rejected. The reason is logged and reported to the user.
		2 - application-context-name-not supported	The Association is rejected. The reason is logged and reported to the user.
		3 - calling-AE-title-not-recognized	The Association is rejected. The reason is logged and reported to the user.

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

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

Table 36: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	The Association is aborted using A-ABORT and command marked as failed. The reason is logged and reported to the user.
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

Table below describes how the AE responds when it receives an Association request that leads to a failure in communication.

Table 37: DICOM Communication Failure Handling as Association Acceptor

Exception	Behavior
Failure during processing of an Association request	ABORT message is sent out and the connection is closed
Unrecognized Called AE	AE responds with Association-RJ
Exceed limit for number of connections supported	AE responds with Association-RJ

4.2.1.4.1 (Real-World) Activity – Verification as SCP

4.2.1.4.1.1 Description and Sequencing of Activities

A remote SCU sends an association request to Philips Hemodynamic Application for Verification SOP class. After accepting the association, the Philips Hemodynamic Application receives and responds to the Verification request and releases the association when requested.

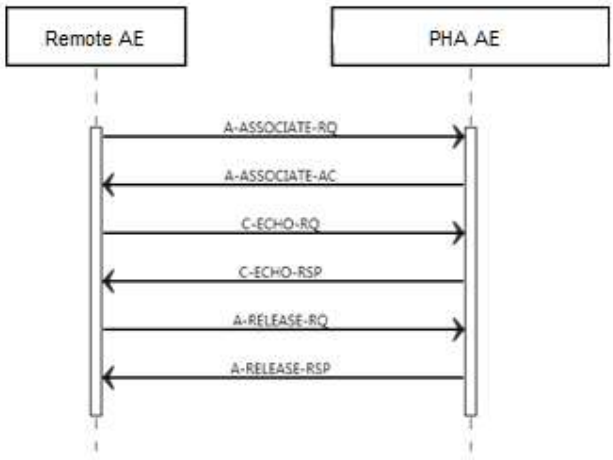


Figure 12: (Real World) Activity for Verification as SCP

4.2.1.4.1.2 Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 38: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

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

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class

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

4.2.1.4.1.3.1 Dataset Specific Conformance for Verification C-ECHO SCP

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

Table 39: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	C-ECHO command was successful received.

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.
TCP/IP is the only protocol stack supported.
Supported physical medium include:
IEEE 802.3-1995, 10BASE-T
IEEE 802.3-1995, 100BASE-TX (Fast Ethernet)
IEEE 802.3, 1000BASE-X (1 Gigabit over UTP).

The TCP/IP Stack as supported by the underlying Operating System.
The API is the WinSock 2 interface as supported by the underlying Operating System.

4.3.2. Additional Protocols

Not applicable. Philips Hemodynamic Application does not support additional protocols.

4.3.3. IPv4 and IPv6 Support

Philips Hemodynamic Application supports DICOM communication, as per DICOM standards/specifications, for IPv4.

4.4. Configuration

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

4.4.1. AE Title/Presentation Address Mapping

The DICOM operation of the Philips Hemodynamic Application is configured with the Service Application tool. This tool can be started after logging in to the operating system. It is password protected and intended to be used by Philips Customer Support Engineers only.

4.4.1.1. Local AE Titles

The local AE title mapping and configuration are specified as:

Table 40: AE Title configuration table

Application Entity	Default AE Title	Default TCP/IP Port
Network AE	NO NAME	Default: 8192 (Configurable)

4.4.1.2. Remote AE Title/Presentation Address Mapping

All relevant remote applications that should be able to set up a DICOM association with Philips Hemodynamic Application and that should be able to receive DICOM ping message and accept a DICOM association from Philips Hemodynamic Application must be configured during the configuration time of Philips Hemodynamic Application.

4.4.2. Parameters

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

Table 41: Configuration Parameters Table

Parameter	Configurable	Default Value
General Parameters		
Maximum PDU size the AE can receive	No	64234
Maximum PDU size the AE can send	No	64234
Maximum number of simultaneous associations	No	1
Timeout waiting for acceptance or rejection Response to an Association Open Request. (Application-Level timeout)	No	15 [seconds]
Timeout waiting for a response to an Association release request (Application Level Timeout)	No	0 [unlimited]
Transfer Syntax support: ILE, ELE, EBE	No	ILE, ELE, EBE
Storage Specific Parameters		
Automatic export to a configurable destination	Yes	-
Storage Commitment Specific Parameters		
Storage Commit Max Reply Waiting Time Specifies the time in seconds that is waited for a storage commitment event report message. After this time the association will be terminated Allowed values: -1: immediate timeout 0: unlimited waiting time 0 < n: real time in seconds	-	No default (value is configurable)
Basic Worklist Management Specific Parameters		
RIS query timeout Specifies the time after which the query is automatically aborted Allowed values: 1- 300 minutes	Yes	60 [seconds]
Default Modality type	-	HD

5. Media Interchange

Not Applicable. Philips Hemodynamic Application has not implemented Media Interchange DICOM Services.

6. Support of Character Sets

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

Table 42: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
Default repertoire	ISO_IR 6	-	ISO-IR 6	G0	ISO 646
Unicode in UTF-8	ISO_IR 192	-	-	-	-

7. Security

7.1. Security Profiles

The Philips Hemodynamic Application supports security measures that will be used for secure authentication of a node and for the generation of audit records.

7.1.1. Security use Profiles

Not applicable. Philips Hemodynamic Application has not implemented Security Use Profiles.

7.1.2. Security Transport Connection Profiles

The TLS Component is a “mode of operation” of Philips Hemodynamic Application and will be used for nodes that can authenticate each other before they communicate over sockets. Philips Hemodynamic Application conforms to the TLS protocol v1.2 of Secure Transport Connection Profile. Node authentication and encryption are only possible when the node has:

- a “private and public key”;
- a self-signed certificate or certificate signed by a Certificate Authority; and
- a list of certificates with which the system wants to communicate.

Furthermore, the TLS component may communicate using the following Cipher Suites:

- TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
- TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
- TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
- TLS_DHE_RSA_WITH_AES_256_GCM_SHA384
- TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
- TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA
- TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA
- TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
- TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
- TLS_RSA_WITH_AES_256_GCM_SHA384
- TLS_RSA_WITH_AES_128_GCM_SHA256
- TLS_RSA_WITH_AES_256_CBC_SHA256
- TLS_RSA_WITH_AES_128_CBC_SHA256
- TLS_RSA_WITH_AES_256_CBC_SHA
- TLS_RSA_WITH_AES_128_CBC_SHA
- TLS_RSA_WITH_3DES_EDE_CBC_SHA

In case no encryption is used the data is signed and hashed: integrity is present and confidentiality is not present.

Certificates

If two systems communicate with each other, one system will be listening on a port (server node) while the other system sets up a connection (client node). The certificate this server node will send to the other client node is the server certificate. The client node initiates the communication and the certificate that the client node is sending to the server is the client certificate. The following TLS Certification checks will be done (TLS

Handshake). The machine (either server or client) that will send its certificate will choose the certificate according to Common Name (CN) value in the Subject-field. This name is case-sensitive. All present certificates should have unique CN names.

The server verifies:

- that the client certificate is a valid X.509 certificate;
- that the client certificate is either signed by a CA or is self-signed;
- that the client certificate is in the list of trusted certificates;
- that the client certificate is valid (present time is between "Valid from" and "Valid to" fields of the X.509 certificate);
- that the client certificate has the correct purpose (at least the Client Authenticate purpose).

The client verifies:

- that the server certificate is a valid X.509 certificate;
- that the server certificate either is signed by a CA or is self-signed;
- that the server certificate is in the list of trusted certificates;
- that the server certificate is valid (present time is between "Valid from" and "Valid to" fields of the X.509 certificate);
- that the server certificate has the correct purpose (at least Server Authenticate purpose).

The System is responsible for:

- revocation of certificates;
- limiting the connection to a limited set of IP-addresses.

Additional information: The value in the Subject-field is determined in the certificate request. The CA will sign the request in case it accepts the values that are present in the request. The CN value can be: IP-address, hostname or hostname. Domain. The value in the CN-field must be equal to the value that is used in making a connection to the server. In case the name is specified as hostname. Domain that same value should be specified during connect. In the ideal situation the name-IP-number translation will be dealt with by the DNS in the hospital. This check is case-insensitive.

Figure below presents the message flow of TLS handshake supported by Lumify.

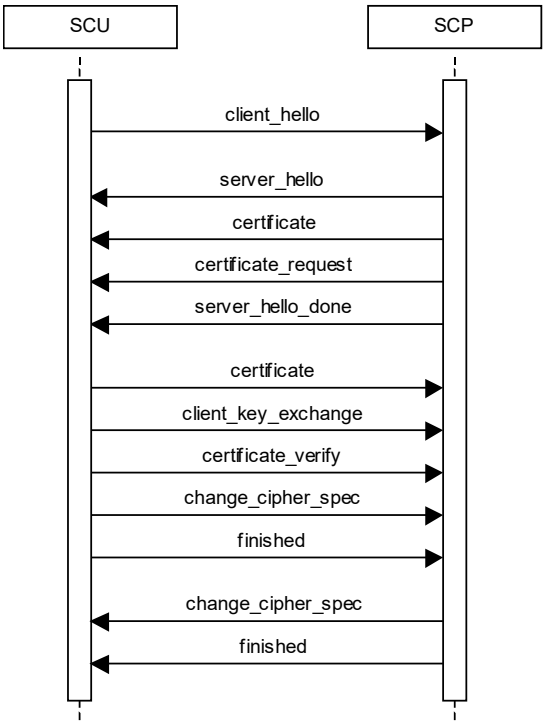


Figure 13: Message flow of TLS handshake

7.1.3. Digital Signature Profiles

Not applicable. Philips Hemodynamic Application has not implemented Digital Signature Profiles.

7.1.4. Media Storage Security Profiles

Not applicable. Philips Hemodynamic Application has not implemented Media Storage Security Profiles.

7.1.5. Attribute Confidentiality Profiles

Not applicable. Philips Hemodynamic Application has not implemented Attribute Confidentiality Profiles.

7.1.6. Network Address Management Profiles

Not applicable. Philips Hemodynamic Application has not implemented Network Address Management Profiles.

7.1.7. Time Synchronization Profiles

Philips Hemodynamic Application can synchronize time via NTP. If the NTP server cannot be found, the time will not be synchronized and local time will be used.

7.1.8. Application Configuration Management Profiles

Not applicable. Philips Hemodynamic Application has not implemented Application Configuration Management Profiles.

7.1.9. Audit Trail Profiles

Philips Hemodynamic Application creates audit messages according to the IHE ATNA Integration Profile. The messages comply with the syslog RFC5425 standard and RFC3881 as specified the IHE ATNA profile.

These messages may contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository:

Table 43: List of supported events

Audit Event Trigger	Description	Message DICOM PS 3.15 A.5.3
Actor-start-stop	When application has started or is closed.	Application Activity
User Logon or Logoff	This message describes the event that a user has attempted to log on or log off. This report can be made regardless of whether the attempt was successful or not.	User Authentication
Node-Authentication-failure	A secure node authentication failure has occurred during TLS negotiation, e.g., invalid certificate.	Security Alert
Security Alert	When software, security or networking configuration of the system is changed via the field service functionality.	Security Alert
Instances-Stored	Storage of SOP instances to a remote repository has been completed.	DICOM Instances Transferred
Instances-deleted	SOP Instances are deleted from a specific study. One event covers all instances deleted for the particular study.	DICOM Study Deleted
Study-used	SOP Instances from a specific study are created or accessed. One event covers all instances used for the particular study.	DICOM Instances Accessed
PHI-export	Any export of PHI to media.	Export
Viewing Local Audit Log	This message describes the event of a person or process reading a log of audit trail information.	Audit Log Used

7.2. Association Level Security

Philips Hemodynamic Application accepts associations only from known applications or an application whose “calling AE Title” is defined in its configuration file. Philips Hemodynamic Application will reject association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application entity (AE) is known if – and only if – it is defined during configuration of Philips Hemodynamic Application, which is done via the configuration application.

7.3. Application Level Security

Philips Hemodynamic Application does not support any specific application level security measures.

- The Application which gives access to Patient records and DICOM communication requires Login with Username and Password.
- The system is used within a secured environment. It is assumed that a secured environment includes at a minimum.
  - The OS is solidified by white-listing applications and files. Not white-listed executable files, libraries, drivers, Java apps, ActiveX controls, scripts, and other code are blocked.
  - Firewall or router protections to ensure that only approved external hosts have network access to Lumify System.
  - Firewall or router protections to ensure that Lumify System only has network access to approved external hosts and services.
  - Any communication with external hosts outside the locally secured environment can be configured to use secure network channels.

Other network security procedures such as automated intrusion detection may be appropriate in some environments.

Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8. Annexes of application "Philips Hemodynamic Application"

8.1. IOD Contents

8.1.1. Created SOP Instance

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

In the "Source" column, the following Values can be used:

- FIXED: The Value is pre-defined and cannot be modified.
- GENERATED: The Value is generated by the system.
- CONFIGURATION: The Value is copied from the system configuration.
- MWL: The Value is copied from a Modality Worklist entry.
- QUERY: The Value is determined by performing a query of any of the supported Query/Retrieve Services.
- USER: The Value is entered by the user.
- SCANNED: The Value is read from a barcode scanner or similar device.
- EMPTY: The Attribute is sent with a zero-length Value.
- SRC_INSTANCE: The Value is copied from previously created/received SOP Instances.

The "Presence" columns reflect the usage of the Module, Functional Group Macro, Attributes, or Value in the MR System Implementation and is not necessarily the same as defined in the DICOM Standard. For the "Presence" column the following Values can be used:

- ALWAYS: the module, functional group macro, Attributes or Value is always present.
- CONDITIONAL: the presence of the module, functional group macro, Attributes or Value is dependent on a condition. The condition must be listed in the "Conditions" column.
- SRC_COPY: The presence of the Attributes and Values depends on the availability of these in the source instances, which are used for copying this information.
- EMPTY: The Attribute is present but without a Value (zero length).

8.1.1.1. List of created SOP Classes

Table 44: List of created SOP Classes

SOP Class Name	SOP Class UID
Raw Data Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.66
Encapsulated PDF Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

8.1.1.2. Information shared across multiple IODs

8.1.1.2.1 Common Modules

All SOP Instances generated by the Philips Hemodynamic Application uses the common modules listed below or a subset of them, as defined in the IOD specific subsections below.

Table 45: Patient Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Patient's Name	(0010,0010)	MWL, USER	ALWAYS	CONDITIONAL			-
Patient ID	(0010,0020)	MWL, USER	ALWAYS	ALWAYS			-
Patient's Birth Date	(0010,0030)	MWL, USER	ALWAYS	CONDITIONAL			-
Patient's Sex	(0010,0040)	MWL, USER	ALWAYS	CONDITIONAL			-

Table 46: General Study Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Study Date	(0008,0020)	GENERATED	ALWAYS	ALWAYS	Current Date		-
Study Time	(0008,0030)	GENERATED	ALWAYS	ALWAYS	Current Time		-
Accession Number	(0008,0050)	MWL, EMPTY	ALWAYS	CONDITIONAL			-
Referring Physician's Name	(0008,0090)	MWL	ALWAYS	CONDITIONAL			-
Study Description	(0008,1030)	MWL, USER	CONDITIONAL	ALWAYS			-
Study ID	(0020,0010)	MWL	ALWAYS	CONDITIONAL			-
Study Instance UID	(0018,000D)	MWL, GENERATED	ALWAYS	ALWAYS			-

Table 47: Patient Study Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Patient's Age	(0010,1010)	MWL, USER	CONDITIONAL	ALWAYS			When received from the RIS, the value can be modified

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Patient's Size	(0010,1020)	MWL, USER	CONDITIONAL	ALWAYS			When received from the RIS, the value can be modified
Patient's Weight	(0010,1030)	MWL, USER	CONDITIONAL	ALWAYS			When received from the RIS, the value can be modified
Medical Alerts	(0010,2000)	MWL, USER	CONDITIONAL	ALWAYS			-
Allergies	(0010,2110)	MWL, USER	CONDITIONAL	ALWAYS			-
Additional Patient History	(0010,21B0)	MWL	CONDITIONAL	ALWAYS			-

Table 48: General Equipment Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Manufacturer	(0008,0070)	FIXED	ALWAYS	ALWAYS	Philips		-
Station Name	(0008,1010)	CONFIGURATION	ALWAYS	ALWAYS			-
Manufacturer's Model Name	(0008,1090)	FIXED	ALWAYS	ALWAYS	Philips Hemodynamic Application		-
Software Versions	(0018,1020)	FIXED	ALWAYS	ALWAYS	1.5.0.0		-

Table 49: SOP Common Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Specific Character Set	(0008,0005)	GENERATED	ALWAYS	ALWAYS			-
Instance Creation Date	(0008,0012)	GENERATED	ALWAYS	ALWAYS			-
Instance Creation Time	(0008,0013)	GENERATED	ALWAYS	ALWAYS			-
SOP Class UID	(008,0016)	FIXED	ALWAYS	ALWAYS	1.2.840.10008.5.1.4.1.1.66 or 1.2.840.10008.5.1.4.1.1.7 or 1.2.840.10008.5.1.4.1.1.104.1		-
SOP Instance UID	(0008,0018	GENERATED	ALWAYS	ALWAYS			-
Timezone Offset From UTC	(0008,0201)	GENERATED	ALWAYS	ALWAYS			-

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Instance Number	(0020,0013)	GENERATED	ALWAYS	ALWAYS			-

8.1.1.2.2 Common Functional Group Macros

Not applicable. Philips Hemodynamic Application has not implemented functional group macros.

8.1.1.2.3 Common Private Modules

Not applicable. Philips Hemodynamic Application has not implemented private modules.

8.1.1.2.4 Common Coded Values

Not applicable. Philips Hemodynamic Application has not implemented coded values.

8.1.1.3. Raw Data Image IOD

8.1.1.3.1 Raw Data Image IOD Specific Modules

Table below defines the structure of the Raw Data Image IOD.

Table 50: Raw Data Image IOD Modules

IE	Module Name	Presence of Module	Condition	Reference
Patient	Patient	ALWAYS		Table 45: Patient Module
Study	General Study	ALWAYS		Table 46: General Study Module
	Patient Study	CONDITIONAL		Table 47: Patient Study Module
Series	General Series	ALWAYS		Table 51: General Series Module
Frame of Reference	Frame of Reference	CONDITIONAL		Table 52: General Series Module
Equipment	General Equipment	ALWAYS		Table 48: General Equipment Module
Raw Data	Acquisition Context	ALWAYS		Table 53: Acquisition Context Module
	Raw Data	ALWAYS		Table 54: Raw Data Module
	SOP Common	ALWAYS		Table 49: SOP Common Module

IE	Module Name	Presence of Module	Condition	Reference
Extended	Extended	ALWAYS		Table 55: Extended Module
Private	Philips Hemodynamic Application Fixed	CONDITIONAL		Table 56: Private Module Philips Hemodynamic Application Fixed for Raw Data Image IOD

Table 51: General Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Series Date	(0008,0021)	GENERATED	ALWAYS	ALWAYS			-
Series Time	(0008,0031)	GENERATED	ALWAYS	ALWAYS			-
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	HD		-
Series Description	(0008,103E)	GENERATED	ALWAYS	ALWAYS	“Hemo mutable" or “Hemo fixed”		-
Performing Physician's Name	(0008,1050)	GENERATED	ALWAYS	EMPTY			-
Operators' Name	(0008,1070)	GENERATED	ALWAYS	EMPTY			-
Series Instance UID	(0020,000E)	GENERATED	ALWAYS	ALWAYS			-
Series Number	(0020,0011)	GENERATED	ALWAYS	ALWAYS			-

Table 52: General Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Frame of Reference UID	(0020,0052)	GENERATED	ALWAYS	ALWAYS			-
Position Reference Indicator	(0020,1040)	GENERATED	ALWAYS	CONDITIONAL			-

Table 53: Acquisition Context Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Acquisition Context Sequence	(0040,0555)	GENERATED	ALWAYS	EMPTY			-

Table 54: Raw Data Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Content Date	(0008,0023)	GENERATED	ALWAYS	ALWAYS			-
Content Time	(0008,0033)	GENERATED	ALWAYS	ALWAYS			-
Creator-Version UID	(0008,9123)	FIXED	ALWAYS	ALWAYS	1.3.46.670589.64.150		-
Instance Number	(0020,0013)	GENERATED	ALWAYS	CONDITIONAL			-

Table 55: Extended Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Referenced Series Sequence	(0008,1115)	GENERATED	CONDITIONAL	ALWAYS			-
>Referenced Instance Sequence	(0008,114A)	GENERATED	CONDITIONAL	ALWAYS			-
>>Referenced SOP Class UID	(0008,1150)	GENERATED	CONDITIONAL	ALWAYS			-
>>Referenced SOP Instance UID	(0008,1155)	GENERATED	CONDITIONAL	ALWAYS			-
>Series Instance UID	(0020,000E)	GENERATED	CONDITIONAL	ALWAYS			-
Requested Procedure ID	(0040,1001)	GENERATED	CONDITIONAL	EMPTY			-

8.1.1.3.2 Raw Data Image IOD Functional Group Macros

Not applicable. Philips Hemodynamic Application has not implemented functional group macros.

8.1.1.3.3 Raw Data Image IOD Private Modules

Table 56: Private Module Philips Hemodynamic Application Fixed for Raw Data Image IOD

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Private Creator Group 2003	(2003,00XX)	SH	1	NO	GENERATED	CONDITIONAL	ALWAYS	Philips Hemodynamic Application Fixed		-
Private Attribute	(2003,XX00)	LO	1	NO	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX01)	OB	1	NO	GENERATED	CONDITIONAL	ALWAYS			-

Attribute Name	Tag	VR	VM	Identifiable Information	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Private Attribute	(2003,XX02)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX03)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX04)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX05)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX06)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX07)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX08)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX09)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX0A)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX0B)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-
Private Attribute	(2003,XX0C)	OB	1	OB	GENERATED	CONDITIONAL	ALWAYS			-

8.1.1.3.4 Raw Data Image IOD Coded Values

Not applicable. Philips Hemodynamic Application has not implemented coded values.

8.1.1.4. Secondary Capture Image IOD

8.1.1.4.1 Secondary Capture Image IOD Specific Modules

Table 57: Secondary Capture Image IOD Modules

IE	Module Name	Presence of Module	Condition	Reference
Patient	Patient	ALWAYS		Table 45: Patient Module
Study	General Study	ALWAYS		Table 46: General Study Module
	Patient Study	CONDITIONAL		Table 47: Patient Study Module
Series	General Series	ALWAYS		Table 58: General Series Module
Equipment	General Equipment	ALWAYS		Table 48: General Equipment Module

IE	Module Name	Presence of Module	Condition	Reference
	SC Equipment	ALWAYS		Table 59: SC Equipment Module
Acquisition	General Acquisition	ALWAYS		Table 60: General Acquisition Module
Image	General Image	ALWAYS		Table 61: General Image Module
	General Reference	CONDITIONAL		Table 62: General Reference Module
	Image Pixel	ALWAYS		Table 63: Image Pixel Module
	SC Image	ALWAYS		Table 64: SC Image Module
	VOI LUT	CONDITIONAL		Table 65: VOI LUT Module
	SOP Common	ALWAYS		Table 49: SOP Common Module
Extended	Extended	ALWAYS		Table 66: Extended Module

Table 58: General Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Series Date	(0008,0021)	GENERATED	ALWAYS	ALWAYS			-
Series Time	(0008,0031)	GENERATED	ALWAYS	ALWAYS			-
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	HD		-
Series Description	(0008,103E)	GENERATED	ALWAYS	ALWAYS			-
Performing Physician's Name	(0008,1050)	GENERATED	ALWAYS	EMPTY			-
Operators' Name	(0008,1070)	GENERATED	ALWAYS	EMPTY			-
Series Instance UID	(0020,000E)	GENERATED	ALWAYS	ALWAYS			-
Series Number	(0020,0011)	GENERATED	ALWAYS	ALWAYS			-

Table 59: SC Equipment Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	CONDITIONAL	ALWAYS	HD		-

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Conversion Type	(0008,0064)	GENERATED	ALWAYS	ALWAYS			Applied Vale: WSD
Secondary Capture Device Manufacturer	(0008,0060)	FIXED	CONDITIONAL	ALWAYS	Philips		-
Secondary Capture Device Manufacturer's Model Name	(0008,103E)	FIXED	CONDITIONAL	ALWAYS	Philips Hemodynamic Application		-
Secondary Capture Device Software Versions	(0008,1050)	FIXED	CONDITIONAL	ALWAYS	1.5.0.0		-

Table 60: General Acquisition Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Acquisition Date	(0008,0022)	GENERATED	CONDITIONAL	ALWAYS			-
Acquisition Time	(0008,0032)	GENERATED	CONDITIONAL	ALWAYS			-

Table 61: General Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Image Type	(0008,0008)	GENERATED	ALWAYS	ALWAYS			-
Content Date	(0008,0023)	GENERATED	CONDITIONAL	ALWAYS			-
Content Time	(0008,0033)	GENERATED	CONDITIONAL	ALWAYS			-
Instance Number	(0020,0013)	GENERATED	CONDITIONAL	CONDITIONAL			-
Patient Orientation	(0020,0020)	GENERATED	CONDITIONAL	CONDITIONAL			-
Lossy Image Compression	(0028,2110)	GENERATED	CONDITIONAL	ALWAYS			-
Lossy Image Compression Ratio	(0028,2112)	GENERATED	CONDITIONAL	ALWAYS			-
Lossy Image Compression Method	(0028,2114)	GENERATED	CONDITIONAL	ALWAYS			-

Table 62: General Reference Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Derivation Description	(0008,2111)	GENERATED	CONDITIONAL	ALWAYS			-

Table 63: Image Pixel Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Samples per Pixel	(0028,0002)	GENERATED	ALWAYS	ALWAYS			-
Photometric Interpretation	(0028,0004)	GENERATED	ALWAYS	ALWAYS	RGB		-
Planar Configuration	(0028,0006)	GENERATED	CONDITIONAL	ALWAYS			-
Rows	(0028,0010)	GENERATED	ALWAYS	ALWAYS			-
Columns	(0028,0011)	GENERATED	ALWAYS	ALWAYS			-
Bits Allocated	(0028,0100)	GENERATED	ALWAYS	ALWAYS	8 or 16		Note: For Snapshot function, this number is 8
Bits Stored	(0028,0101)	GENERATED	ALWAYS	ALWAYS	8 or 12		Note: For Snapshot function, this number is 8
High Bit	(0028,0102)	GENERATED	ALWAYS	ALWAYS	7 or 11		-
Pixel Representation	(0028,0103)	GENERATED	ALWAYS	ALWAYS	0000H		
Smallest Image Pixel Value	(0028,0106)	GENERATED	CONDITIONAL	ANAP			
Largest Image Pixel Value	(0028,0107)	GENERATED	CONDITIONAL	ANAP			
Pixel Data	(7FE0,0010)	GENERATED	CONDITIONAL	ALWAYS			

Table 64: SC Image Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Date of Secondary Capture	(0018,1012)	GENERATED	CONDITIONAL	ALWAYS			-
Time of Secondary Capture	(0018,1014)	GENERATED	CONDITIONAL	ALWAYS			-
Nominal Scanned Pixel Spacing	(0018,2010)	GENERATED	CONDITIONAL	ALWAYS			-

Table 65: VOI LUT Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Window Center	(0028,1050)	GENERATED	CONDITIONAL	ALWAYS			-
Window Width	(0028,1051)	GENERATED	CONDITIONAL	ALWAYS			-

Table 66: Extended Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Number of Frames	(0028,0008)	GENERATED	CONDITIONAL	ALWAYS			-
Requested Procedure ID	(0040,1001)	GENERATED	CONDITIONAL	EMPTY			-

8.1.1.4.2 Secondary Capture Image IOD Functional Group Macros – NA

Not applicable. Philips Hemodynamic Application has not implemented functional group macros.

8.1.1.4.3 Secondary Capture Image IOD Private Modules

Not applicable. Philips Hemodynamic Application has not implemented Private modules.

8.1.1.4.4 Secondary Capture Image IOD Coded Values – N/A

Not applicable. Philips Hemodynamic Application has not implemented coded values.

8.1.1.5. Encapsulated PDF Image IOD

8.1.1.5.1 Encapsulated PDF Image IOD Specific Modules

Table 67: Encapsulated PDF Image IOD Modules

IE	Module Name	Presence of Module	Condition	Reference
Patient	Patient	ALWAYS		Table 45: Patient Module
Study	General Study	ALWAYS		Table 46: General Study Module
	Patient Study	CONDITIONAL		Table 47: Patient Study Module
Series	Encapsulated Document Series	ALWAYS		Table 68: Encapsulated Document Series Module

IE	Module Name	Presence of Module	Condition	Reference
Equipment	General Equipment	ALWAYS		Table 48: General Equipment Module
	SC Equipment	ALWAYS		Table 69: SC Equipment Module
Encapsulated Document	Encapsulated Document	ALWAYS		Table 70: Encapsulated Document Module
	SOP Common	ALWAYS		Table 49: SOP Common Module
Extended	Extended	ALWAYS		Table 71: Extended Module

Table 68: Encapsulated Document Series Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	ALWAYS	ALWAYS	HD		-
Series Description	(0008,103E)	GENERATED	ALWAYS	ALWAYS			-
Series Instance UID	(0020,000E)	GENERATED	ALWAYS	ALWAYS			-
Series Number	(0020,0011)	GENERATED	ALWAYS	ALWAYS			-

Table 69: SC Equipment Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Modality	(0008,0060)	FIXED	CONDITIONAL	ALWAYS	HD		-
Conversion Type	(0008,0064)	GENERATED	ALWAYS	ALWAYS			Applied Vale: WSD
Secondary Capture Device Manufacturer	(0008,0060)	FIXED	CONDITIONAL	ALWAYS	Philips		-
Secondary Capture Device Manufacturer's Model Name	(0008,103E)	FIXED	CONDITIONAL	ALWAYS	Philips Hemodynamic Application		-
Secondary Capture Device Software Versions	(0008,1050)	FIXED	CONDITIONAL	ALWAYS	1.5.0.0		-

Table 70: Encapsulated Document Module

Attribute Name	Tag	Source	Presence of Attribute	Presence of Value	Value	Conditions	Comments
Content Date	(0008,0023)	GENERATED	ALWAYS	CONDITIONAL			-
Acquisition DateTime	(0008,002A)	GENERATED	ALWAYS	CONDITIONAL			-
Content Time	(0008,0033)	GENERATED	ALWAYS	CONDITIONAL			-
Instance Number	(0020,0013)	GENERATED	ALWAYS	ALWAYS			-
Burned In Annotation	(0028,0301)	GENERATED	ALWAYS	ALWAYS			-
Concept Name Code Sequence	(0040,A043)	GENERATED	ALWAYS	CONDITIONAL			-
Verification Flag	(0040,A493)	GENERATED	CONDITIONAL	ALWAYS			-
Document Title	(0042,0010)	GENERATED	ALWAYS	CONDITIONAL			-
Encapsulated Document	(0042,0011)	GENERATED	ALWAYS	ALWAYS			-
MIME Type of Encapsulated Document	(0042,0012)	GENERATED	ALWAYS	ALWAYS			-

8.1.1.5.2 Encapsulated PDF Image IOD Functional Group Macros

Not applicable. Philips Hemodynamic Application has not implemented functional group macros.

8.1.1.5.3 Encapsulated PDF Image IOD Private Modules

Not applicable. Philips Hemodynamic Application has not implemented Private modules.

8.1.1.5.4 Encapsulated PDF Storage Coded Values

Not applicable. Philips Hemodynamic Application has not implemented coded values.

8.1.2. Attribute Mapping

Table 71: Attribute mapping during Modality Workflow

Name	BWLM Tag	MPPS CREATE Tag	MPPS SET Tag	Image IOD Tag
Accession Number	0008,0050	0008,0050	-	0008,0050
Modality	-	0008,0060	-	0008,0060
Referring Physician's Name	0008,0090	-	-	0008,0090
Referenced Study Sequence	0008,1110	0008,1110	-	-
SOP Class UID	-	-	0008,1150	0008,0016
SOP Instance UID	-	-	0008,1155	0008,0018
Patient's Name	0010,0010	0010,0010	-	0010,0010
Patient ID	0010,0020	0010,0020	-	0010,0020
Patient's Birth Date	0010,0030	0010,0030	-	0010,0030
Patient's Sex	0010,0040	0010,0040	-	0010,0040
Medical Alerts	0010,2000	-	-	0010,2000
Allergies	0010,2110	-	-	0010,2110
Additional Patient History	0010,21B0	-	-	0010,21B0
Study Instance UID	0020,000D	0020,000D	-	0020,000D
Series Instance UID	-	-	0020,000E	0020,000E
Study ID	-	0020,0010	-	0020,0010
Requested Procedure Description	0032,1060	0032,1060	-	-
Requested Procedure ID	0040,1001	0040,1001	-	0040,1001

8.1.3. Coerced/Modified fields

Not Applicable. Philips Hemodynamic Application has not implemented coercion/modification of image fields.

8.2. Data Dictionary of Private Attributes

Not Applicable. Philips Hemodynamic Application has not implemented Private attributes.

8.3. Coded Terminology and Templates

Not Applicable. Philips Hemodynamic Application has not implemented coded terminologies and templates.

8.4. Grayscale Image consistency

Not Applicable. Philips Hemodynamic Application has not implemented grayscale image creation.

8.5. Standard Extended/Specialized/Private SOPs

Not Applicable. Philips Hemodynamic Application has not implemented private SOPs.

8.6. Private Transfer Syntaxes

Not Applicable. Philips Hemodynamic Application has not implemented private transfer syntaxes.

- This part of the page is left intentionally empty -

Issued by:
Philips Medical Systems Nederland B.V.
Veenpluis 6
5684 PC Best
The Netherlands

Internet: https://www.philips.com/dicom
Doc Id: *1911978*
Date: *07-Aug-2025*