

DICOM Conformance Statement
for
Diagnostic Ultrasound Equipments
Hitachi Prosound 6 version 3. 1. 3
and
Prosound 4 version 1. 2. 0
and
Prosound 2 version 2. 3. 0

Company Name : Hitachi, Ltd.
Product Name : Diagnostic Ultrasound System
Hitachi Prosound 6, Prosound 4 and Prosound 2
Version : Version 3. 1. 3, Version 1. 2. 0 and Version 2. 3. 0
Internal document number : ASE-20765
Date : 2016. 04. 01

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1. CONFORMANCE STATEMENT OVERVIEW

Hitachi Prosound-6, Prosound-4 and Prosound-2 (referenced as the Equipments to reduce redundancy) implement the necessary DICOM services to download worklists from an information system, save Ultrasound single frame images to a network storage device and to storage media, inform the information system about the work actually done, and print Ultrasound images to a networked hardcopy device.

Table1-1 provides an overview of the network services supported by Hitachi Prosound-6, -4 and -2.

Table 1-1 NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Ultrasound Image Storage	Yes	No
Storage Commitment Push Model	Yes	No
Verification	Yes	Yes
Workflow Management		
Modality Worklist	Yes	No
Modality Performed Procedure Step	Yes	No
Verification	Yes	No
Print Management		
Basic Grayscale Print Management Meta	Yes	No
Basic Color Print Management Meta	Yes	No

Table 1-2 provides an overview of the Media Storage Application Profiles supported by Hitachi Prosound-6, -4 and -2.

Table 1-2 Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
USB Memory & Compact Disk – Recordable		
Ultrasound Image Display	Yes	Yes
Ultrasound Image Spatial Calibration	Yes	Yes

2 TABLE OF CONTENTS

1.	CONFORMANCE STATEMENT OVERVIEW.....	2
2	TABLE OF CONTENTS	3
3	INTRODUCTION	5
3.1	REVISION HISTORY	5
3.2	AUDIENCE	5
3.3	REMARKS.....	5
3.4	DEFINITIONS, TERMS AND ABBREVIATIONS	6
3.5	REFERENCES	6
4	NETWORKING.....	7
4.1	IMPLEMENTATION MODEL.....	7
4.1.1	<i>Application Data Flow.....</i>	7
4.1.2	<i>Functional Definition of AEs</i>	8
4.1.2.1	Functional Definition of Workflow Application Entity	8
4.1.2.2	Functional Definition of Storage Application Entity	8
4.1.2.3	Functional Definition of Hardcopy Application Entity	8
4.1.3	<i>Sequencing of Real-World Activities.....</i>	9
4.2	AE SPECIFICATIONS	10
4.2.1	<i>Workflow Application Entity Specification</i>	10
4.2.1.1	SOP Classes.....	10
4.2.1.2	Association Policies.....	10
4.2.1.2.1	General	10
4.2.1.2.2	Number of Associations	10
4.2.1.2.3	Asynchronous Nature.....	10
4.2.1.2.4	Implementation Identifying Information.....	10
4.2.1.3	Association Initiation Policy	11
4.2.1.3.1	Activity – Find Worklist	11
4.2.1.3.2	Activity – Create & Update MPPS	15
4.2.1.4	Association Acceptance Policy	20
4.2.2	<i>Storage Application Entity Specification.....</i>	20
4.2.2.1	SOP Classes.....	20
4.2.2.2	Association Policies.....	20
4.2.2.2.1	General	20
4.2.2.2.2	Number of Associations	21
4.2.2.2.3	Asynchronous Nature.....	21
4.2.2.2.4	Implementation Identifying Information.....	21
4.2.2.3	Association Initiation Policy	21
4.2.2.3.1	Activity – Store Images.....	21
4.2.2.3.2	Activity – Verification	26
4.2.2.4	Association Acceptance Policy	27
4.2.2.4.1	Activity – Receive Storage Commitment Response	27
4.2.3	<i>Hardcopy Application Entity Specification.....</i>	29
4.2.3.1	SOP Classes.....	29
4.2.3.2	Association Policies.....	29
4.2.3.2.1	General	29
4.2.3.2.2	Number of Associations	30
4.2.3.2.3	Asynchronous Nature.....	30
4.2.3.2.4	Implementation Identifying Information.....	30
4.2.3.3	Association Initiation Policy	30
4.2.3.3.1	Activity – Print Images.....	30

4. 2. 3. 4	Association Acceptance Policy	40
4. 3	NETWORK INTERFACES.....	40
4. 3. 1	<i>Physical Network Interface</i>	40
4. 3. 2	<i>Additional Protocols</i>	40
4. 3. 3	<i>IPv4 and IPv6 Support</i>	40
4. 4	CONFIGURATION	40
4. 4. 1	<i>AE Title/Presentation Address Mapping</i>	40
4. 4. 1. 1	Local AE Titles	40
4. 4. 1. 2	Remote AE Title/Presentation Address Mapping	41
4. 4. 1. 2. 1	Workflow	41
4. 4. 1. 2. 2	Storage and Storage Commitment	41
4. 4. 1. 2. 3	Hardcopy.....	41
4. 4. 2	<i>Parameters</i>	41
5	MEDIA INTERCHANGE.....	44
5. 1	IMPLEMENTATION MODEL.....	44
5. 1. 1	<i>Application Data Flow</i>	44
5. 1. 2	<i>Functional Definition of AEs</i>	44
5. 1. 2. 1	Functional Definition of Offline-Media Application Entity	44
5. 1. 3	<i>Sequencing of Real-World Activities</i>	44
5. 1. 4	<i>File Meta Information Options</i>	44
5. 2	AE SPECIFICATIONS	45
5. 2. 1	<i>Offline-Media Application Entity Specification</i>	45
5. 2. 1. 1	File Meta Information for the Application Entity	45
5. 2. 1. 2	Real-World Activities	45
5. 2. 1. 2. 1	Activity – Store on Media or Store on CD-R.....	45
5. 3	AUGMENTED AND PRIVATE APPLICATION PROFILES	46
5. 4	MEDIA CONFIGURATION	46
6	SUPPORT OF CHARACTER SETS	47
7	SECURITY	48
8	ANNEXES.....	49
8. 1	IOD CONTENTS.....	49
8. 1. 1	<i>Created SOP Instances</i>	49
8. 1. 1. 1	Ultrasound Image IOD.....	49
8. 1. 1. 2	Common Modules	50
8. 1. 1. 3	Ultrasound Modules.....	54
8. 1. 2	<i>Used Fields in received IOD by application</i>	56
8. 1. 3	<i>Attribute mapping</i>	56
8. 1. 4	<i>Coerced/Modified Fields</i>	57
8. 2	DATA DICTIONARY OF PRIVATE ATTRIBUTES.....	58
8. 3	STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES	58
8. 3. 1	<i>Ultrasound Image Storage SOP Class</i>	58
8. 4	PRIVATE TRANSFER SYNTAXES	58

3 INTRODUCTION

3.1 REVISION HISTORY

Document Version	Date of Issue
1.0	October 23, 2008
2.0	March 10, 2009
2.1	July 25, 2011
2.2	Jun 11, 2012
2.2.1	Apr 01, 2016

3.2 AUDIENCE

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

3.3 REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Hitachi Prosound-6, -4 or -2 and other Medical equipments. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues :

- The comparison of different conformance statements is the first step towards assessing interconnectivity between the equipments produced by different manufacturers.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. Hitachi, Ltd. reserves the right to make changes to its products or to discontinue its delivery.

3. 4 DEFINITIONS, TERMS AND ABBREVIATIONS

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

Abbreviations and terms are as follows :

AE	DICOM Application Entity
AET	Application Entity Title
ACSE	Association Control Service Element
CD-R	Compact Disk Recordable
CF	Compact Flash memory
CSE	Customer Service Engineer
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization
LCD	Liquid Crystal Display
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MWL	Modality Worklist
R	Required Key Attribute
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
PHI	Protected Health Information
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
U	Unique Key Attribute
USB	Universal Serial Bus

3. 5 REFERENCES

[DICOM] Digital Imaging and Communications in Medicine, NEMA PS 3. 1 - 3. 18, 2009

4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

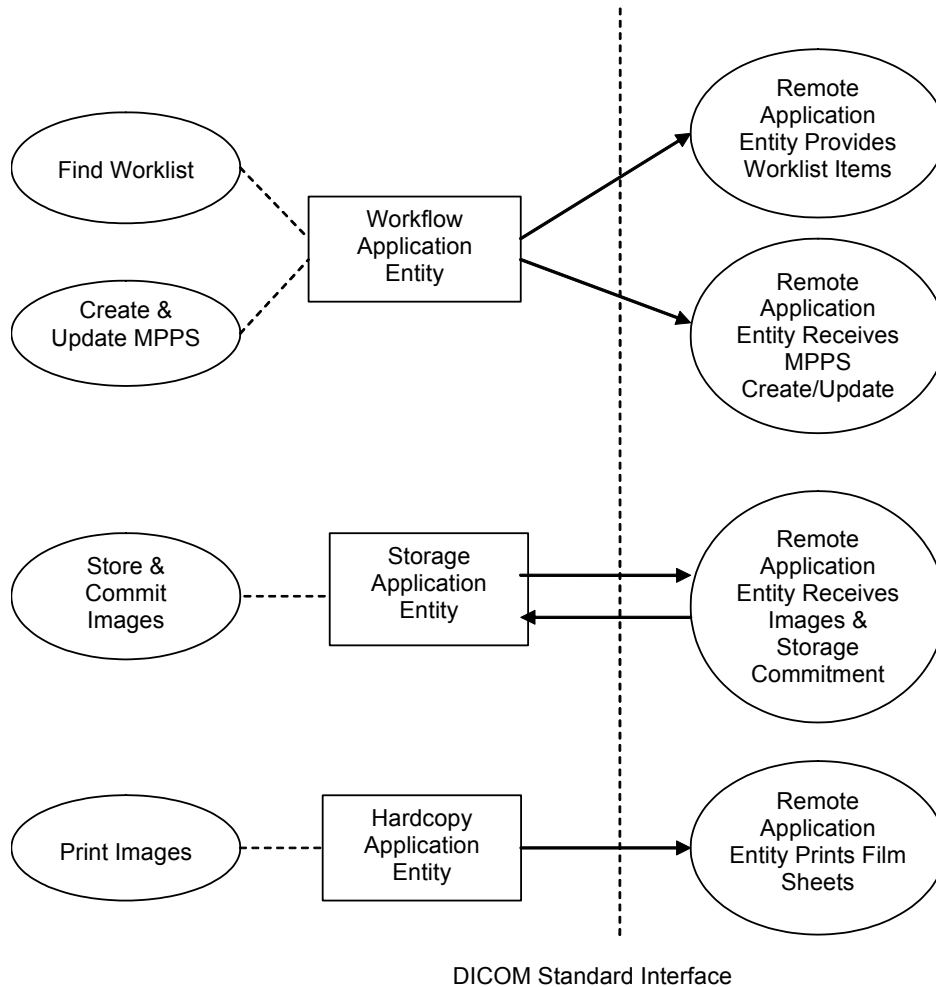


Figure 4. 1-1 APPLICATION DATA FLOW DIAGRAM

- The Workflow Application Entity receives Worklist information from a remote Worklist Provider AE and creates/updates Modality Performed Procedure Step (MPPS) information to a remote MPPS Provider AE. They are associated with the local real-world activities “Find Worklist” and “MPPS In Progress”, “MPPS Completed”, and “MPPS Discontinued” transactions. When the “Find Worklist” local real-world activity is requested by an operator the Workflow AE queries the remote Worklist Provider AE for worklist items and provides a set of worklist items matching the query request. When “Start Exam” local real-world activity is performed on the selected patient, an MPPS instance is automatically created if it has not already been created manually in the View Worklist interface. An existing MPPS instance is manually updated by initiating either the “MPPS Completed” or “MPPS Discontinued” local real-world activity. The Workflow AE can create concurrent MPPS instances managed by the remote MPPS Provider AE, if the equipment is to be intermittently disconnected from the network.
- The Storage Application Entity stores Ultrasound single frame image instances to a remote Storage Provider AE. It is associated with the local real-world activity “Send NET”. An ultrasound modality

displays image in real-time, and the operator captures it by pressing the freeze button. A "Frozen" image may be stored to a remote Storage AE or on the local CF, USB memory or CD-R for review and batch transfer. The "Send Server" button on the review screen initiates a batch transfer on each completed procedure or a group of images selected by the operator. If the remote Storage AE is configured as an archive device, the local storage AE will request the Storage Commitment Service and when it is replied successful, the Storage AE will record the committed status in the local database.

- The Hardcopy Application Entity prints images on a remote Print Provider AE. It is associated with the local real-world activity "Send to Printer". "Send to Printer" creates a print-session within the print queue containing one or more virtual film sheets composed of the images selected by the user.

4. 1. 2 Functional Definition of AEs

4. 1. 2. 1 Functional Definition of Workflow Application Entity

The "Find Worklist" local activity is initiated by pressing the "**Find Worklist**" function switch on the console while the "New Patient" demographic information is registered. The Patient ID, Patient Name, Accession Number, Requested Procedure ID, and/or Scheduled Procedure Step Start Date query keys may optionally be supplied before pressing the "Find Worklist" switch. Other query keys are the local Station AE Title and the Modality (US) , each of which may be nullified in the configuration. When the "Find Worklist" switch is pressed, the Workflow AE tries to open an association to a remote AE. If the Workflow AE establishes an association to the remote AE, it will transfer all worklist items via the open Association. During receiving the worklist response, the Workflow AE counts items and cancels the query processing, if the built-in limit of items (128) is reached. The results will be displayed in a separate list, which will be updated with the next "Find Worklist" activity.

The Workflow AE will create an MPPS Instance when the New Patient registration is completed by pressing the "Start Exam" switch provided an MPPS SCP is configured. If the equipment is to be disconnected for mobile examination, concurrent MPPS instances may be created by the operator. Further updates on the MPPS status can be performed from the "View Worklist" user interface. The MPPS "Completed" or "Discontinued" states should be updated for each procedure by the operator interaction.

4. 1. 2. 2 Functional Definition of Storage Application Entity

The Storage Application Entity can be requested in two modes. After a proper Worklist Item is selected or the patient identification is supplied by the operator and the image is frozen, pressing the "**Send NET**" function switch will directly store the image to the remote storage AE. Or pressing the "**STORE**" switch on the console will store the image in the Master Disk. In the Review screen, patient (s) and/or image (s) may be selected or deselected by clicking the line for a patient or another line for a image belonging to the patient. A storage association will be initiated by clicking the "**Send Server**" button on the screen. If the remote Storage AE returns successful status, the storage queue will be deleted, otherwise the recovery associations are automatically requested until the storage becomes successful or the retry count is expired.

4. 1. 2. 3 Functional Definition of Hardcopy Application Entity

The Hardcopy Application Entity is also initiated in the Review screen. The patient (s) and/or image (s) may be selected or deselected by clicking the line for a patient or another line for image belonging to the patient. A print association will be initiated by clicking the "**Send Printer**" button on the screen. After an association is established with the printer, its status is determined. And if the remote printer AE is operating normal, the film sheets composed of selected images will be printed. When the remote printer AE returns successful status, the printer queue will be deleted, otherwise the recovery associations are automatically requested until the hardcopy becomes successful or the retry count is expired.

4. 1. 3 Sequencing of Real-World Activities

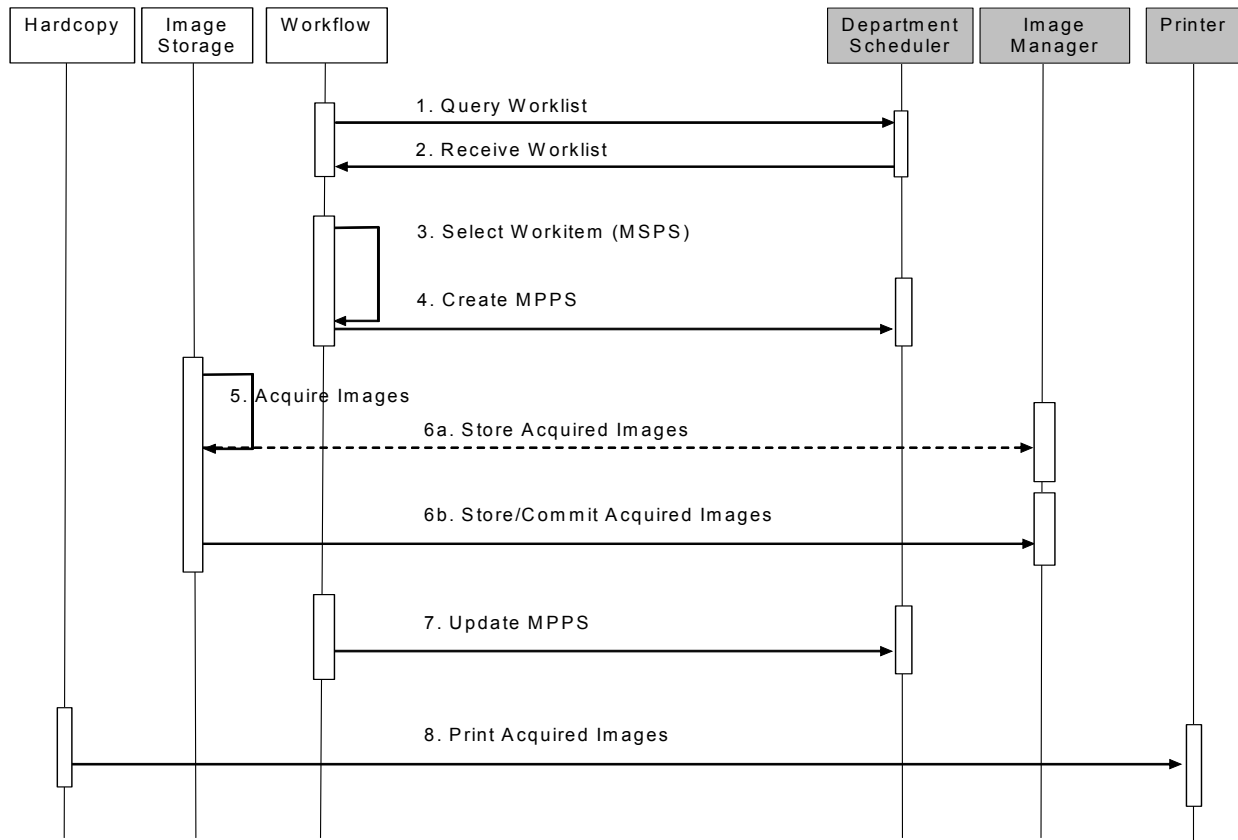


Figure 4. 1-2 SEQUENCING CONSTRAINTS

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 4. 1-2 apply :

1. Query Worklist
2. Receive Worklist of Modality Scheduled Procedure Steps (MSPS)
3. Select Workitem (MSPS) from Worklist
4. Create an MPPS just before an examination is to be performed
5. Acquire Images
- 6a. Store image for each acquisition (exclusive step to 6b)
- 6b. Batch Store and/or Commit image instances (exclusive step to 6a)
7. Update the MPPS to "Completed" or "Discontinued" state
8. Print acquired images (optional step)

Other workflow situations (e. g. unscheduled procedure steps) will have other sequencing constraints. Printing could equally take place after the acquired images have been stored. Printing could be omitted completely if no printer is connected or hardcopies are not required.

4. 2 AE SPECIFICATIONS

4. 2. 1 Workflow Application Entity Specification

4. 2. 1. 1 SOP Classes

The Equipments provide Standard Conformance to the following SOP Classes :

Table 4. 2-1 SOP CLASSES FOR AE WORKFLOW

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1. 2. 840. 10008. 5. 1. 4. 31	Yes	No
Modality Performed Procedure Step	1. 2. 840. 10008. 3. 1. 2. 3. 3	Yes	No
Verification	1. 2. 840. 10008. 1. 1	Yes	No

4. 2. 1. 2 Association Policies

4. 2. 1. 2. 1 General

The DICOM standard application context name for DICOM 3. 0 is always proposed :

Table 4. 2-2 DICOM APPLICATION CONTEXT FOR AE WORKFLOW

Application Context Name	1. 2. 840. 10008. 3. 1. 1. 1
--------------------------	------------------------------

4. 2. 1. 2. 2 Number of Associations

The Equipment initiates one Association at a time for a Workflow requests.

Table 4. 2-3 NUMBER OF ASSOCIATIONS INITIATED FOR AE WORKFLOW

Maximum number of simultaneous Associations	1
---	---

4. 2. 1. 2. 3 Asynchronous Nature

The Equipments do not support asynchronous communication (multiple outstanding transactions over a single Association) .

Table 4. 2-4 ASYNCHRONOUS NATURE AS A SCU FOR AE WORKFLOW

Maximum number of outstanding asynchronous transactions	1
---	---

4. 2. 1. 2. 4 Implementation Identifying Information

The implementation information for Workflow Application Entity is :

Table 4. 2-5 DICOM IMPLEMENTATION CLASS AND VERSION FOR AE WORKFLOW

Implementation Class UID	1. 2. 392. 200039. 107
Implementation Version Name	ADLib 20090209 (subject to change without notice)

4. 2. 1. 3 Association Initiation Policy

4. 2. 1. 3. 1 Activity – Find Worklist

4. 2. 1. 3. 1. 1 Description and Sequencing of Activities

An interactive query for Worklist is initiated by pressing the "**Find Worklist**" function switch in the "New Patient" demographic information registration interface. The "patient-based" query keys, Patient Name, Patient's ID, Accession Number, and/or Requested Procedure ID, may be supplied by the operator in the interface as well as the Scheduled Procedure Step Start Date (If it is not specified, the actual date is assumed) . Other "broad-query" keys are the Modality (US) and the local Station AE Title, each of which may be nullified in the configuration.

Upon an initiation of a worklist query, the Equipment will build an Identifier for the C-FIND request, will initiate an Association to send the request, and will wait for worklist responses. After retrieval of responses, the equipment will access the local database to update the patient's demographic information. To protect the system from overflow, it will limit the number of processed worklist responses to 128. During receiving the worklist responses, items are counted and the query processing is canceled by issuing a C-FIND-CANCEL when the limit of items is reached. The results will be displayed in a separate list.

The retrieved worklist items are stored locally and utilized for MPPS transactions during the day, which will be updated by the next worklist query. If the list is the latest and additional examination is to be performed on a patient, or the equipment is to be disconnected from the network for mobile examination, the stored worklist items may be referenced by pressing the "**View Worklist**" function switch in the "New Patient" registration. The additional examination using the same MSPS generates a second series of images coping with the Append Case among the IHE use cases.

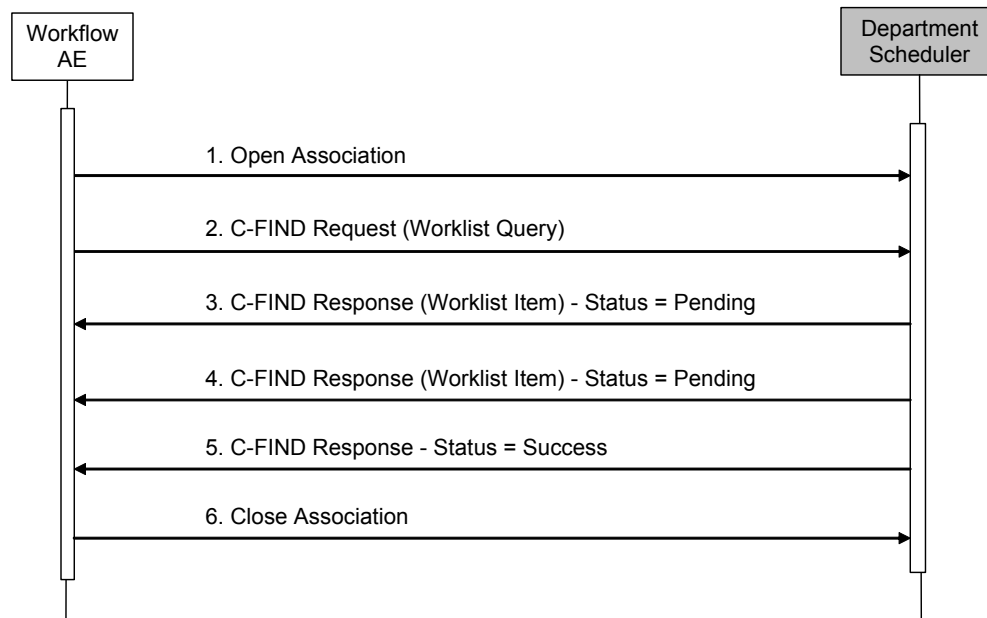


Figure 4. 2-1 SEQUENCING OF ACTIVITY – WORKLIST QUERY

A possible sequence of interactions between the Workflow AE and a Departmental Scheduler (e. g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the Figure above :

1. The Workflow AE opens an association with the Department Scheduler.
2. The Workflow AE sends a C-FIND request containing the Worklist Query attributes to the Department Scheduler.
3. The Department Scheduler returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Department Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Department Scheduler returns another C-FIND response with status Success indicating that no further matching Worklist Items exists. This example assumes that only 2 Worklist items match the Worklist Query.
6. The Workflow AE closes the association with the Department Scheduler.
7. The user selects a Worklist Item from the Worklist database and prepares to acquire images.

4. 2. 1. 3. 1. 2 Proposed Presentation Contexts

The Equipments will propose the Presentation Context as shown in the following table :

Table 4. 2-6 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY WORKLIST QUERY

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1. 2. 840. 10008. 5. 1. 4. 31	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

4. 2. 1. 3. 1. 3 SOP Specific Conformance for Modality Worklist

The behavior of the Equipments when encountering status codes in a Modality Worklist C-FIND response is summarized in the Table below. If any other SCP response status than "Success" or "Pending" is received by the Workflow AE, a Worklist Error Message will appear on the user interface.

Table 4. 2-7 MODALITY WORKLIST C-FIND RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display or further processing.
Refused	Out of Resources	A700	The Association is aborted using A-ABORT and the worklist query is failed.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the worklist query is failed.
Failed	Unable to Process	C000 – CFFF	The Association is aborted using A-ABORT and the worklist query is failed.
Cancel	Matching terminated due to	FE00	If the query was cancelled due to too may worklist items then the SCP has completed the matches. Worklist items are available for

	Cancel request		display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is failed.
Pending	Matches are continuing	FF00	The worklist item contained in the Identifier is collected for later display or further processing.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The worklist item contained in the Identifier is collected for later display or further processing.
*	*	Any other status code.	The Association is aborted using A-ABORT and the worklist is failed.

The behavior of the Equipments during communication failure is summarized in the Table below.

Table 4. 2-8 MODALITY WORKLIST COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the worklist query is failed. A Worklist Error is reported to the user.
Association aborted by the SCP or network layers	The worklist query is failed. A Worklist Error is reported to the user.

Whenever available, the acquired images will use the Study Instance UID specified for the Scheduled Procedure Step. If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The table below provides a description of the Worklist Request Identifier built by the Equipments and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored. No attempt is made to filter out possible duplicate entries.

Table 4. 2-9 WORKLIST REQUEST IDENTIFIERS

Module Name Attribute Name	Tag	VR	M	Q	R	D	IOD
SOP Common Specific Character Set	(0008, 0005)	CS					x
Scheduled Procedure Step Scheduled Procedure Step Sequence	(0040, 0100)	SQ			x		
> Modality	(0008, 0060)	CS	(S)			x	x
> Requested Contrast Agent	(0032, 1070)	LO			x	x	x
> Scheduled Station AET	(0040, 0001)	AE	(S)			x	
> Scheduled Procedure Step Start Date	(0040, 0002)	DA	R			x	

Module Name Attribute Name	Tag	VR	M	Q	R	D	IOD
> Scheduled Procedure Step Start Time	(0040, 0003)	TM			x	x	
> Scheduled Performing Physician's Name	(0040, 0006)	PN					
> Scheduled Procedure Step Description	(0040, 0007)	LO			x	x	x
> Scheduled Protocol Code Sequence	(0040, 0008)	SQ			x	x	x
> Scheduled Procedure Step ID	(0040, 0009)	SH			x	x	x
Requested Procedure							
Referenced Study Sequence	(0008, 1110)	SQ			x		x
Study Instance UID	(0020, 000D)	UI			x		x
Requested Procedure Description	(0032, 1060)	LO			x	x	x
Requested Procedure Code Sequence	(0032, 1064)	SQ			x	x	x
Requested Procedure ID	(0040, 1001)	SH		x	x	x	x
Imaging Service Request							
Accession Number	(0008, 0050)	SH		x	x	x	x
Referring Physician's Name	(0008, 0090)	PN			x	x	x
Requesting Physician	(0032, 1032)	PN			x		
Patient Identification							
Patient Name	(0010, 0010)	PN	*	x	x	x	x
Patient ID	(0010, 0020)	LO		x	x	x	x
Patient Demographic							
Patient's Birth Date	(0010, 0030)	DA			x	x	x
Patient's Sex	(0010, 0040)	CS			x	x	x
Patient's Size	(0010, 1020)	DS			x	x	x
Patient's Weight	(0010, 1030)	DS			x	x	x
Patient Medical							
Medical Alerts	(0010, 2000)	LO			x	x	
Allergies	(0010, 2110)	LO			x	x	
Pregnancy Status	(0010, 21C0)	US			x	x	
Last Menstrual Date	(0010, 21D0)	DA			x	x	x
Special Needs	(0038, 0050)	LO			x	x	
Patient State	(0038, 0500)	LO					

The above table should be read as follows :

Module Name : The name of the associated module for supported worklist attributes.

Attribute Name : Attributes supported to build a Worklist Request Identifier.

Tag : DICOM tag for this attribute.

VR : DICOM VR for this attribute.

M : Matching keys for Worklist Query. An "S" will indicate that the Equipment will supply an attribute value for Single Value Matching, an "R" will indicate Range Matching and an "*" will denote wildcard matching. It can be configured whether "Modality" or "Scheduled Station AE Title" is additionally supplied " (S) " or not.

- Q : Interactive Query Key. An "x" will indicate that the Equipment will supply this attribute as matching key, if entered in the New Patient dialog. For example, the Patient Name can be entered thereby restricting Worklist responses to Procedure Steps scheduled for the patient.
- R : Return keys. An "x" will indicate that the Equipment will supply this attribute as Return Key with zero length for Universal Matching.
- D : Displayed keys. An "x" indicates that this worklist attribute is displayed to the user during the View Worklist and/or Patient Registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination.
- IOD : An "x" indicates that this Worklist attribute is included into Image Object Instances created during performance of the related Procedure Step.

The configurable Query Keys are the "Modality (US) " and "Scheduled Station AE Title (local AET) ", each of which may be nullified in the preset user interface.

4. 2. 1. 3. 2 Activity – Create & Update MPPS

4. 2. 1. 3. 2. 1 Description and Sequencing of Activities

Pressing the "Start Exam" function switch in "New Patient" initiates creating an MPPS SOP Instance. An Association to the MPPS SCP is established and the related MPPS SOP Instance will be created.

A selective MPPS creation or update may be initiated by pressing the "MPPS In Progress", "MPPS Completed", or "MPPS Discontinued" function switches in the "View Worklist" interface. The "MPPS Completed" or "MPPS Discontinued" transaction can only be initiated manually by the operator. For a "Discontinued" case the user should also select the discontinuation reason from a pick list corresponding to Context Group 9300. An MPPS Instance that has been sent with a state of "COMPLETED" or "DISCONTINUED" can no longer be updated.

The Equipment will support creation of "unscheduled cases" by allowing MPPS Instances to be communicated for locally registered Patients. The Equipment only supports a 0-to-1 relationship between Scheduled and Performed Procedure Steps.

The Equipment will initiate an Association to issue an :

- N-CREATE request to create the Modality Performed Procedure Step SOP Instance according to the CREATE Modality Performed Procedure Step operation or a
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

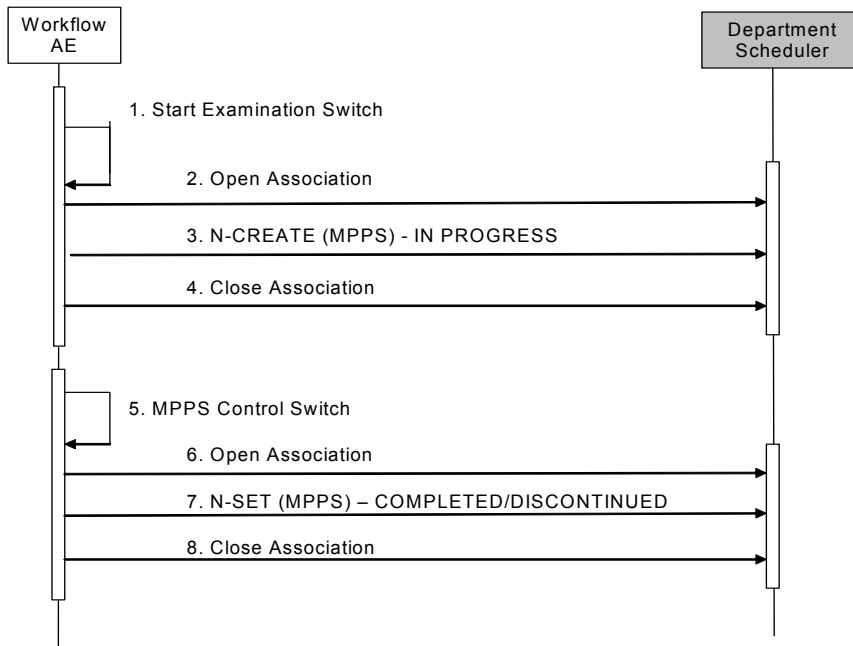


Figure 4. 2-2 SEQUENCING OF ACTIVITY – CREATE & UPDATE MPPS

A possible sequence of interactions between the Workflow AE and a Department Scheduler (e. g. a device such as a RIS or HIS which supports the MPPS SOP Class as an SCP) is illustrated in Figure 4. 2-2 :

1. “Start Exam” completes “New Patient” registration and is ready for acquisition.
2. The Workflow AE opens an association with the Department Scheduler.
3. The Workflow AE sends an N-CREATE request to the Department Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Department Scheduler acknowledges the MPPS creation with an N-CREATE response (status success) .
4. The Workflow AE closes the association with the Department Scheduler.
5. After all images are stored in the local database and/or sent to Image Archive, the operator reopens the “Patient Registration” to access to the “MPPS Control” switch. In the “View Worklist” interface, either “MPPS Complete” or “MPPS Discontinued” interaction is available.
6. The Workflow AE opens a second association with the Department Scheduler.
7. The Workflow AE sends an N-SET request to the Department Scheduler to update the MPPS instance with status of “COMPLETED” or “DISCONTINUED” and set all necessary attributes. The Department Scheduler acknowledges the MPPS update with an N-SET response (status success) .
8. The Workflow AE closes the association with the Department Scheduler.

4. 2. 1. 3. 2. 2 Proposed Presentation Contexts

The Equipments will propose Presentation Contexts as shown in the following table :

Table 4. 2-10 PROPOSED PRESENTATION CONTEXTS FOR CREATE & UPDATE MPPS

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1. 2. 840. 10008. 3. 1. 2. 3. 3	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

4. 2. 1. 3. 2. 3 SOP Specific Conformance for MPPS

The behavior of the Equipments when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in Table 4. 2-11. If any other SCP response status than "Success" is received by the Equipment, a message "MPPS Network communication error" will appear on the user interface.

Table 4. 2-11 MPPS N-CREATE / N-SET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Failure	Processing Failure – Performed Procedure Step Object may no longer be updated	0110	The Association is closed using A-RELEASE. The error status is reported to the user.
Warning	Attribute Value Out of Range	0116	The Association is closed using A-RELEASE. The error status is reported to the user.
*	*	Any other status code.	The Association is closed using A-RELEASE. The error status is reported to the user.

The behavior of the Equipments during communication failure is summarized in the Table below :

Table 4. 2-12 MPPS COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the timeout status is reported to the user.
Association aborted by the SCP or network layers	The MPPS is failed and the status is reported to the user.

Table 4. 2-13 provides a description of the MPPS N-CREATE and N-SET request identifiers sent by the Equipment. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An "x" indicates that an appropriate value will be sent. A "Zero length" attribute will be sent with zero length.

Table 4. 2-13 MPPS N-CREATE / N-SET REQUEST IDENTIFIER

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character Set	(0008, 0005)	CS	From Modality Worklist. If it is absent in MWL, the Attribute is not sent.	-
Referenced Patient Sequence	(0008, 1120)	SQ	Zero length	-
Patient's Name	(0010, 0010)	PN	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	-
Patient ID	(0010, 0020)	LO	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	-
Patient's Birth Date	(0010, 0030)	DA	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	-
Patient's Sex	(0010, 0040)	CS	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	-
Scheduled Step Attributes Sequence	(0040, 0270)	SQ	If the procedure step creates an SOP Instance	-
> Accession Number	(0008, 0050)	SH	From Modality Worklist or user input. If it is absent in MWL, the attribute should be set to zero-length.	-
> Referenced Study Sequence	(0008, 1110)	SQ	From Modality Worklist	-
>> Referenced SOP Class UID	(0008, 1150)	UI	From Modality Worklist	-
>> Referenced SOP Instance UID	(0008, 1155)	UI	From Modality Worklist	-
> Study Instance UID	(0020, 000D)	UI	From Modality Worklist or internally generated	-
> Requested Procedure Description	(0032, 1060)	LO	From Modality Worklist	-
> Scheduled Procedure Step Description	(0040, 0007)	LO	From Modality Worklist	-
> Scheduled Protocol Code Sequence	(0040, 0008)	SQ	From Modality Worklist	-
> Scheduled Procedure Step ID	(0040, 0009)	SH	From Modality Worklist	-
> Requested Procedure ID	(0040, 1001)	SH	From Modality Worklist	-

Procedure Code Sequence	(0008, 1032)	SQ	From Modality Worklist, mapped from Requested Procedure Code Sequence (0032, 1064)	-
Performed Station AE Title	(0040, 0241)	AE	AE Title of this Equipment	-
Performed Location	(0040, 0243)	SH	Zero length	-
Performed Procedure Step Start Date	(0040, 0244)	DA	Actual start date	-
Performed Procedure Step Start Time	(0040, 0245)	TM	Actual start time	-
Performed Procedure Step End Date	(0040, 0250)	DA	Zero length	Actual end date
Performed Procedure Step End Time	(0040, 0251)	TM	Zero length	Actual end time
Performed Procedure Step Status	(0040, 0252)	CS	IN PROGRESS	COMPLETED or DISCONTINUED
Performed Procedure Step ID	(0040, 0253)	SH	Automatically created.	-
Performed Procedure Step Description	(0040, 0254)	LO	Input by the user at "Reason for Study" in New Patient Registration.	-
Performed Procedure Type Description	(0040, 0255)	LO	Zero length	-
Performed Procedure Step Discontinuation Reason Code Sequence	(0040, 0281)	SQ	Zero length	If Performed Procedure Step Status (0040, 0252) is "DISCONTINUED" and a discontinuation reason is selected by the user, then a single item will be present containing a user-selected entry drawn from Context Group 9300.
Modality	(0008, 0060)	CS	US	-
Study ID	(0020, 0010)	SH	Copied from Requested Procedure ID (0040, 1001) in MWL. The user can modify values provided via Modality Worklist.	-
Performed Protocol Code Sequence	(0040, 0260)	SQ	Zero length	Zero or more items
Performed Series Sequence	(0040, 0340)	SQ	Zero length	One or more items
> Retrieve AE Title	(0008, 0054)	AE		Zero length
> Series Description	(0008, 103E)	LO		x

> Performing Physician's Name	(0008, 1050)	PN		x
> Operator's Name	(0008, 1070)	PN		x
> Referenced Image Sequence	(0008, 1140)	SQ		Zero or more items
> > Referenced SOP Class UID	(0008, 1150)	UI		
> > Referenced SOP Instance UID	(0008, 1155)	UI		x
> Protocol Name	(0018, 1030)	LO	Application	-
> Series Instance UID	(0020, 000E)	UI		x
> Referenced Non-image Composite SOP Instance Sequence	(0040, 0220)	SQ	Not sent : This Equipment creates only the Composite Image Instances.	

4. 2. 1. 4 Association Acceptance Policy

The Workflow Application Entity does not accept Associations.

4. 2. 2 Storage Application Entity Specification

4. 2. 2. 1 SOP Classes

The Equipments provide the following Conformance to the SOP Classes listed below :

Table 4. 2-15 SOP CLASSES FOR AE STORAGE

SOP Class Name	SOP Class UID	Conformance	SCU	SCP
Ultrasound Image Storage	1. 2. 840. 10008. 5. 1. 4. 1. 1. 6. 1	Standard Extended	Yes	No
Storage Commitment Push Model	1. 2. 840. 10008. 1. 20. 1	Standard	Yes	No
Verification	1. 2. 840. 10008. 1. 1	Standard	Yes	Yes

4. 2. 2. 2 Association Policies

4. 2. 2. 2. 1 General

The DICOM standard application context name for DICOM 3. 0 is always proposed :

Table 4. 2-16 DICOM APPLICATION CONTEXT FOR AE STORAGE

Application Context Name	1. 2. 840. 10008. 3. 1. 1. 1
--------------------------	------------------------------

4. 2. 2. 2 Number of Associations

The Equipment initiates one Association at a time for the destination to which a transfer request is being processed.

Table 4. 2-17 NUMBER OF ASSOCIATIONS INITIATED FOR AE STORAGE

Maximum number of simultaneous Associations initiated	1
---	---

4. 2. 2. 3 Asynchronous Nature

The Equipments do not support asynchronous communication (multiple outstanding transactions over a single Association) .

Table 4. 2-18 ASYNCHRONOUS NATURE AS A SCU FOR AE STORAGE

Maximum number of outstanding asynchronous transactions	1
---	---

4. 2. 2. 4 Implementation Identifying Information

The implementation information for this Application Entity is :

Table 4. 2-19 DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE

Implementation Class UID	1. 2. 392. 200039. 107
Implementation Version Name	ADLib 20090209 (subject to change without notice)

4. 2. 2. 3 Association Initiation Policy

4. 2. 2. 3. 1 Activity – Store Images

4. 2. 2. 3. 1. 1 Description and Sequencing of Activities

The Storage AE for storing images may be invoked in several ways. After the “New Patient” demographic registration is completed by selecting the worklist MSPS or by manual entry, ultrasound image is displayed in real-time. When the operator presses the “**Freeze**” switch on the console, the frozen image may be stored in the Master Disk (CF) by pressing the “**STORE**” switch or “**Store Master**” function switch. The “**Store Buf D**” or “**Store Media D**” function switch stores a DICOM image in CD-R buffer or in USB memory disk, respectively. The “**Send NET**” function switch initiates an immediate network storage association.

Pressing the “**Send NET**” function switch will open an association to the remote Storage SCP. If the association is accepted by the SCP, local Storage AE will send a single Image Instance to the SCP, and if the SCP responds with a success status the association is closed normally. If the association is rejected or it is not responded within the configured time interval, or the Storage AE receives failure status, the association is closed and the recovery associations are automatically requested until the storage becomes successful or the retry count is expired.

When the “**STORE**” switch or “**Store Master**” function switch is pressed, an Image Instance will be stored in the Master Disk (CF) each time it is pressed. The Image Instances are review by pressing the “**REVIEW**” switch on the console. After the user selects more than one image in the Review interface, pressing the “**Send Server**” button on the screen will open a storage association to the remote Archive. If the association is accepted, the Storage AE will send the all instances of the selected images to the remote Storage SCP within the single association. Each Instance successfully stored is indicated by an **S**-mark on the list, and the storage-committed Instance is indicated by a **C**-mark. If the Storage SCP does

not respond within the configured interval, the association is closed and the recovery associations are automatically requested until the storage becomes successful or the retry count is expired.

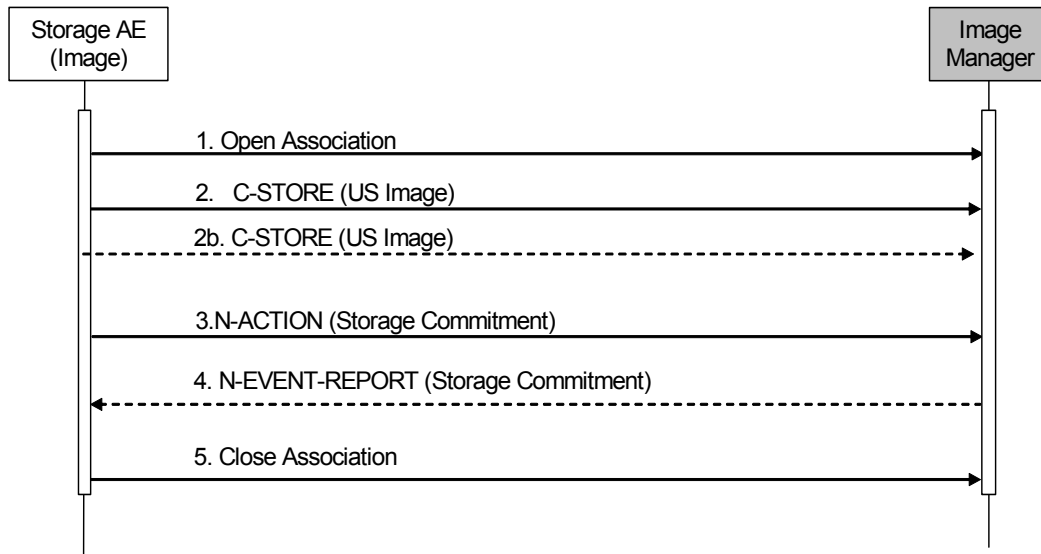


Figure 4. 2-4 SEQUENCING OF ACTIVITY – SEND IMAGES

A possible sequence of interactions between the Storage AE and Image Archive/Manager (e. g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in Figure 4. 2-4 :

1. The Storage AE opens an association with the Image Archive/Manager
2. An acquired US image is transmitted to the Image Archive using a C-STORE request and the Image Archive replies with a C-STORE response (status success) .
- 2b. Another acquired US image may optionally be transmitted to the Image Archive using a C-STORE request and the Image Archive replies with a C-STORE response (status success) .
3. The Storage AE sends a Storage Commitment N-ACTION request to the Image Manager to request the Images be committed.
4. The Image Manager may acknowledge the Storage Commitment Request with an N-EVENT-REPORT request in a same association.
5. The Storage AE closes the association with the Image Archive/Manager.

4. 2. 2. 3. 1. 2 Proposed Presentation Contexts

The Equipments are capable of proposing the Presentation Contexts shown in the following table :

Table 4. 2-20 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES

Send Image Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Ultrasound Image Storage	1. 2. 840. 10008. 5. 1. 4. 1. 1. 6. 1	Implicit VR Little Endian Explicit VR Little Endian JPEG Baseline Compression RLE Compression	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1 1. 2. 840. 10008. 1. 2. 4. 50 1. 2. 840. 10008. 1. 2. 5	SCU	None
Storage Commitment Push Model	1. 2. 840. 10008. 1. 20. 1	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

The Presentation Contexts for Ultrasound Image Storage will always be proposed. However the Presentation Context for Storage Commitment Push Model will be included when it is enabled for the specific Image Manager. An error message will be issued at sending the SOP Instance of the Presentation Context of which Abstract Syntax has been rejected by the Image Archive/Manager AE.

4. 2. 2. 3. 1. 3 SOP Specific Conformance for Image Storage SOP Class

The behavior of the Equipment when encountering status codes in a C-STORE response is summarized in Table 4. 2-21. If any other SCP response status than "Success" is received by the Equipment, a message "Storage Network communication error" will appear on the user interface.

Table 4. 2-21 STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance.
Warning	Attribute list error	0107	Object instance transmission is considered successful therefore the warning is not reported to the user.
Warning	Attribute Value Out of Range	0116	Object instance transmission is considered successful therefore the warning is not reported to the user.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful therefore the warning is not reported to the user.
Warning	Elements Discarded	B006	Image transmission is considered successful therefore the warning is not reported to the user.
Warning	Data Set does not match SOP Class	B007	Image transmission is considered successful therefore the warning is not reported to the user.
Refused	Out of Resources	A700-A7FF	The Association is aborted using A-ABORT and the failure is reported to the user. This is a transient failure.
Error	Data Set does not match SOP Class	A900-A9FF	The Association is aborted using A-ABORT and the failure is reported to the user.
Error	Cannot Understand	C000-CFFF	The Association is aborted using A-ABORT and the failure is reported to the user.

*	*	Any other status code.	The Association is aborted using A-ABORT and the failure is reported to the user.
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The behavior of Storage AE during communication failure is summarized in the Table below :

Table 4. 2-22 STORAGE COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the timeout error is reported to the user.
Association aborted by the SCP or network layers	The association failure is reported to the user.

A failed storage association may automatically be restarted if so configured.

4. 2. 2. 3. 1. 4 SOP Specific Conformance for Storage Commitment SOP Class

4. 2. 2. 3. 1. 4. 1 Storage Commitment Operations (N-ACTION)

The Storage AE will request storage commitment for instances of the Ultrasound Image Storage Class, if the remote Image Manager AE is configured as an Archive Device and a presentation context for the Storage Commitment Push Model has been accepted.

The Storage AE will consider Storage Commitment failed if no N-EVENT-REPORT for the Transaction UID is received within a configurable time period after receiving a successful N-ACTION response (duration of applicability for a Transaction UID) .

The behavior of Storage AE when encountering status codes in an N-ACTION response is summarized in the Table below :

Table 4. 2-23 STORAGE COMMITMENT N-ACTION RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request for storage commitment is considered successfully sent. A timer is started which will expire if no N-EVENT-REPORT for the Transaction UID is received within a configurable timeout period.
*	*	Any other status code.	The Association is closed using A-RELEASE and the failure is reported to the user.

The behavior of Storage AE during communication failure is summarized in the Table below :

Table 4. 2-24 STORAGE COMMITMENT COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the timeout error is reported to the user.
Association aborted by the SCP or network layers	The association failure is reported to the user.

4. 2. 2. 3. 1. 4. 2 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage AE is capable of receiving an N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push Model (i. e. only associations established with archive devices) .

Upon receipt of an N-EVENT-REPORT the timer associated with the Transaction UID will be canceled.

The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below.

Table 4. 2-25 STORAGE COMMITMENT N-EVENT-REPORT BEHAVIOUR

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Referenced SOP Instances under Referenced SOP Sequence (0008, 1199) are marked within the database as committed. Successfully committed SOP Instances are candidates for deletion from the local database. The least recently accessed SOP Instances are deleted first.
Storage Commitment Request Complete – Failures Exist	2	The Referenced SOP Instances under Referenced SOP Sequence (0008, 1199) are treated in the same way as in the success case (Event Type 1) . The Referenced SOP Instances under Failed SOP Sequence (0008, 1198) are not marked as committed within the database.

The reasons for returning specific status codes in an N-EVENT-REPORT response are summarized in the Table below.

Table 4. 2-26 STORAGE COMMITMENT N-EVENT-REPORT RESPONSE STATUS REASONS

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The storage commitment result has been successfully received.
Failure	Processing Failure	0110	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000, 0902) .
Failure	Invalid Argument Value	0115	One or more SOP Instance UIDs within the Referenced SOP Sequence (0008, 1199) or Failed SOP Sequence (0008, 1198) was not included in the Storage Commitment Request Associated with this Transaction UID. The unrecognized SOP Instance UIDs will be returned with the Event Information of the N-EVENT-REPORT response
Failure	No Such Event Type	0113	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Unrecognized Operation	0211	The Transaction UID in the N-EVENT-REPORT request is not recognized (was never issued with an N-ACTION request) .
Failure	Resource Limitation	0213	The Transaction UID in the N-EVENT-REPORT request has expired (no N-EVENT-REPORT was received within a configurable time limit) .

4. 2. 2. 3. 2 Activity – Verification

4. 2. 2. 3. 2. 1 Description and Sequencing of Activities

An interaction for Verification is initiated by selecting a remote Application Entity with the Rotary Encoder and pressing the "C-Echo" button in the Image Storage or IHE-SWF configuration.

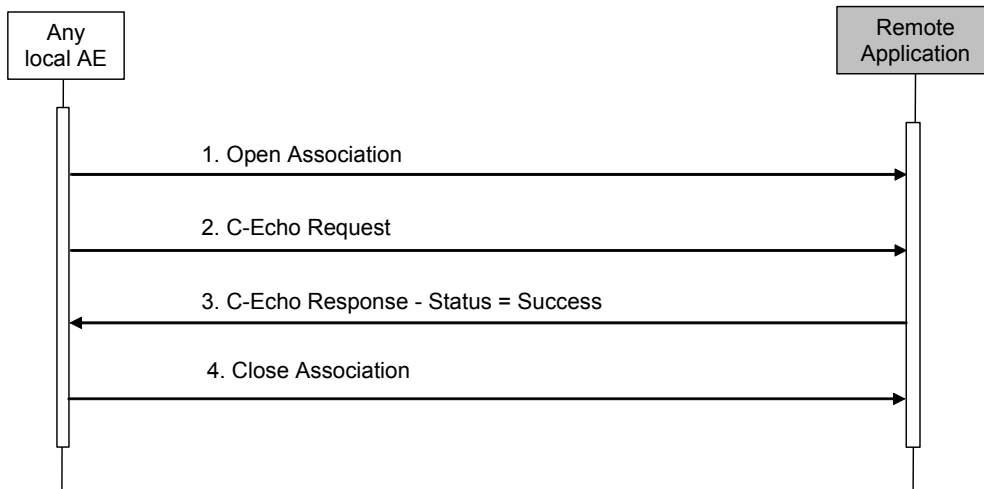


Figure 4. 2-5 SEQUENCING OF ACTIVITY – VERIFICATION

Even if the Verification SOP Class as an SCU is described as a part of the Storage AE, it may be requested to any remote Application supporting the service. A possible sequence of interactions between the local AE and a remote AE supporting the Verification SOP Class as an SCP is illustrated in the Figure above :

1. A local AE opens an association with the remote Verification SCP.
2. The local AE sends a C-ECHO request to the Verification SCP.
3. The Verification SCP returns a C-ECHO response of the successful Status.
4. The local AE closes the association with the Verification SCP.

4. 2. 1. 3. 2. 2 Proposed Presentation Contexts

The Equipments will propose Presentation Contexts as shown in the following table :

Table 4. 2-27 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY VERIFICATION

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1. 2. 840. 10008. 1. 1	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

4. 2. 1. 3. 2. 3 SOP Specific Conformance for Verification SOP Class

The Storage AE provides standard conformance to the Verification SOP Class as an SCU. If the C-ECHO Success status (0000) is received, a “Success” message is displayed in a pop-up window, otherwise a C-Echo “Failure” message will be displayed.

4. 2. 2. 4 Association Acceptance Policy

The Equipment will accept Associations to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class and Verification SOP Class.

Table 4. 2-28 NUMBER OF ASSOCIATIONS ACCEPTED FOR WORKFLOW AE

Maximum number of simultaneous Associations accepted	1
--	---

4. 2. 2. 4. 1 Activity – Receive Storage Commitment Response

4. 2. 2. 4. 1. 1 Description and Sequencing of Activities

The Storage AE will accept associations in order to receive responses to a Storage Commitment N-EVENT-REPORT Request.

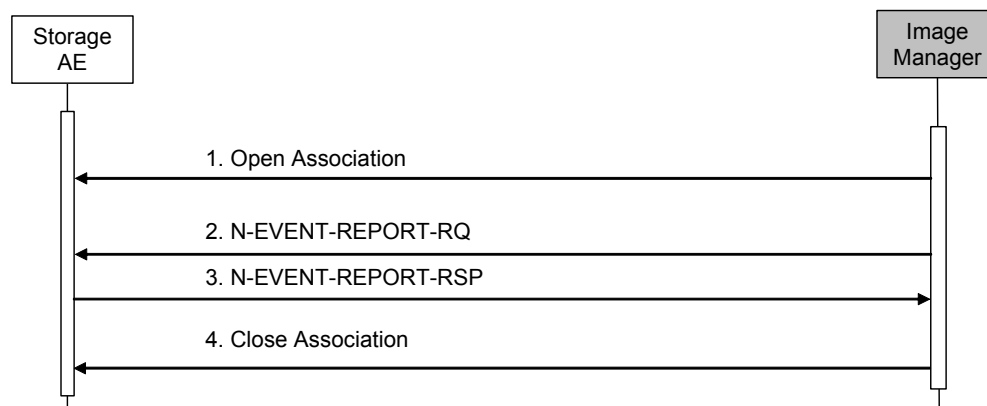


Figure 4. 2-6 SEQUENCING OF ACTIVITY -RECEIVE STORAGE COMMITMENT N-EVENT-REPORT

A possible sequence of interactions between the Storage AE and an Image Manager (e. g. a storage or archive device supporting Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above :

1. The Image Manager opens a new association with the Storage AE.
2. The Image Manager sends an N-EVENT-REPORT request notifying the Storage AE of the status of a previous Storage Commitment Request.
3. The Storage AE replies with an N-EVENT-REPORT response confirming receipt.
4. The Image Manager closes the association with the Storage AE.

The Storage AE may reject association attempts as shown in the Table below. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU (see PS 3. 8, Section 9. 3. 4) . The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are :

- a) 1 – DICOM UL service-user
- b) 2 – DICOM UL service-provider (ASCE related function)
- c) 3 – DICOM UL service-provider (Presentation related function)

Table 4. 2-29 ASSOCIATION REJECTION REASONS

Result	Source	Reason/Diag	Explanation
2 – rejected-transient	c	2 – local-limit-exceeded	The maximum number of simultaneous associations has been reached. An association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	1 – temporary-congestion	No associations can be accepted at this time because insufficient resources are available (e. g. memory, processes, or threads) . An association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The association request contained an unrecognized Called AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the association initiator is incorrectly configured and attempts to address the association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The association request contained an unrecognized Calling AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the association acceptor has not been configured to recognize the AE Title of the association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The association request could not be parsed. An association request with the same format will not succeed at a later time.

4. 2. 2. 4. 1. 2 Accepted Presentation Contexts

The Storage AE will accept Presentation Contexts as shown in the Table below.

Table 4. 2-30 ACCEPTABLE PRESENTATION CONTEXTS FOR ACTIVITY RECEIVE STORAGE COMMITMENT RESPONSE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1. 2. 840. 10008. 1. 20. 1	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

Verification	1. 2. 840. 10008. 1. 1	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCP	None
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The Storage AE will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within the Presentation Context for the Storage Commitment Push Model SOP Class. It will also prefer to select the Explicit VR Little Endian Transfer Syntax if multiple transfer syntaxes are offered.

4. 2. 2. 4. 1. 3 SOP Specific Conformance for Storage Commitment SOP Class

Upon receipt of an N-EVENT-REPORT the timer associated with the Transaction UID will be canceled.

The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 4. 2-25.

The reasons for returning specific status codes in an N-EVENT-REPORT response are summarized in Table 4. 2-26.

4. 2. 2. 4. 1. 4 SOP Specific Conformance for Verification SOP Class

The Storage AE provides standard conformance to the Verification SOP Class as an SCP. If the C-ECHO request was successfully received, a 0000 (Success) status code will be returned in the C-ECHO response. Consequently the Association should be closed by the Verification SCU.

4. 2. 3 Hardcopy Application Entity Specification

4. 2. 3. 1 SOP Classes

The Equipments provide Standard Conformance to the following SOP Classes :

Table 4. 2-31 SOP CLASSES FOR AE HARDCOPY

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1. 2. 840. 10008. 5. 1. 1. 9	Yes	No
Basic Color Print Management Meta	1. 2. 840. 10008. 5. 1. 1. 18	Yes	No

4. 2. 3. 2 Association Policies

4. 2. 3. 2. 1 General

The DICOM standard application context name for DICOM 3. 0 is always proposed :

Table 4. 2-32 DICOM APPLICATION CONTEXT FOR AE HARDCOPY

Application Context Name	1. 2. 840. 10008. 3. 1. 1. 1
--------------------------	------------------------------

4. 2. 3. 2. 2 Number of Associations

The Equipment initiates one Association at a time for an activated hardcopy device.

Table 4. 2-33 NUMBER OF ASSOCIATIONS INITIATED FOR AE HARDCOPY

Maximum number of simultaneous Associations	1
---	---

4. 2. 3. 2. 3 Asynchronous Nature

The Equipments do not support asynchronous communication (multiple outstanding transactions over a single Association) .

Table 4. 2-34 ASYNCHRONOUS NATURE AS A SCU FOR AE HARDCOPY

Maximum number of outstanding asynchronous transactions	1
---	---

4. 2. 3. 2. 4 Implementation Identifying Information

The implementation information for this Application Entity is :

Table 4. 2-35 DICOM IMPLEMENTATION CLASS AND VERSION FOR AE HARDCOPY

Implementation Class UID	1. 2. 392. 200039. 107
Implementation Version Name	ADLib 20090209 (subject to change without notice)

4. 2. 3. 3 Association Initiation Policy

4. 2. 3. 3. 1 Activity – Print Images

4. 2. 3. 3. 1. 1 Description and Sequencing of Activities

When a user selects images and requests to print them in the "REVIEW" interface, the images are sent to the printer queue folder. The virtual film sheets are composed according to the pre-defined film format. The film sheets are requests to be sent to a specific hardcopy device. The user can select the desired film format, number of copies, and other printing conditions in the Print Property Interface.

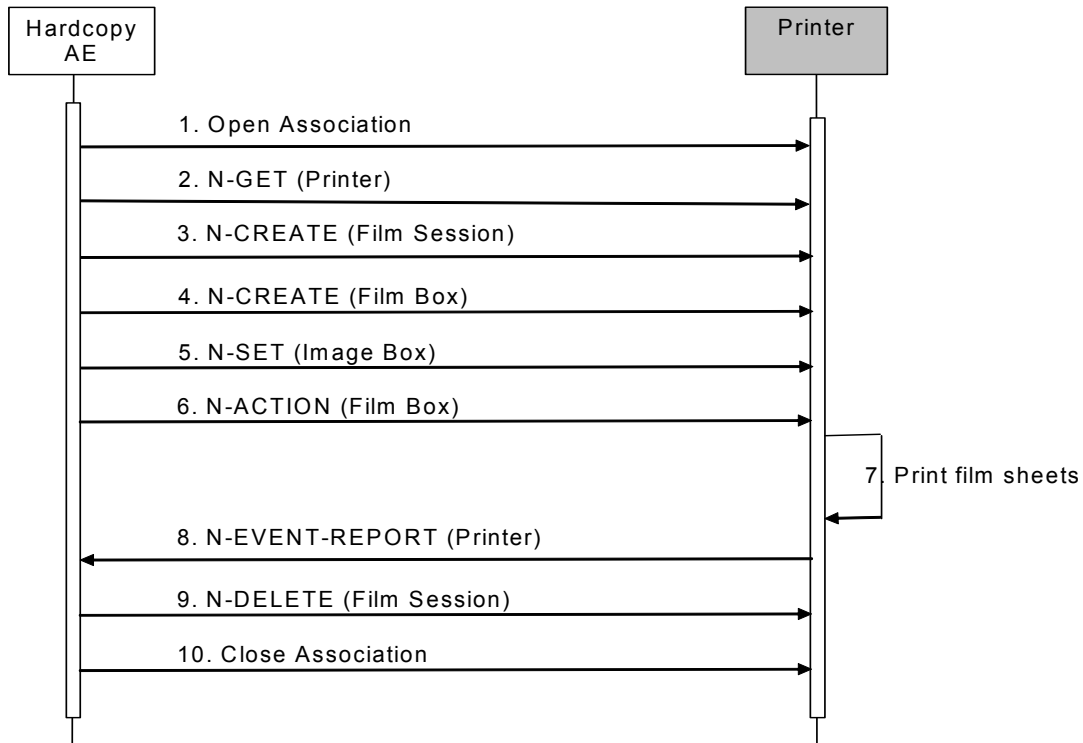


Figure 4. 2-7 SEQUENCING OF ACTIVITY – FILM IMAGES

A typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer is illustrated in Figure 4. 2-7 :

1. Hardcopy AE opens an association with the Printer
2. N-GET on the Printer SOP Class is used to obtain current printer status information. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.
3. N-CREATE on the Film Session SOP Class creates a Film Session.
4. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session. Pre-configured number of Image Boxes will be created as the result of this operation.
5. Each N-SET on Image Box SOP Class transfers the requested image to the printer at the successive position on the film sheet. The Hardcopy does not support the Presentation LUT SOP Class.
6. N-ACTION on the Film Box SOP Class instructs the printer to print the Film Box.
7. The printer prints the requested number of film sheets. The sequence 4 through 6 may be repeated when the single film sheet is not enough to contain the requested images.
8. The Printer asynchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class) . The printer can send this message at any time. Hardcopy AE does not require the N-EVENT-REPORT to be sent. Hardcopy AE is capable of receiving an N-EVENT-REPORT notification at any time during an association. If the Printer reports a status of FAILURE, the Print Session is terminated and the user informed.

9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. Hardcopy AE closes the association with the Printer.

If any Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Film Session is terminated and the status is user informed.

4. 2. 3. 3. 1. 2 Proposed Presentation Contexts

The Equipments are capable of exclusively proposing the Presentation Contexts shown in the Table below. The proposed Presentation Context is determined at the DICOM Printer META-SOP Class configuration :

Table 4. 2-36 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY PRINT IMAGES

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta	1. 2. 840. 10008. 5. 1. 1. 9	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None
Basic Color Print Management Meta	1. 2. 840. 10008. 5. 1. 1. 18	Implicit VR Little Endian Explicit VR Little Endian	1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 1	SCU	None

4. 2. 3. 3. 1. 3 Common SOP Specific Conformance for all Print SOP Classes

The general behavior of Hardcopy AE during communication failure is summarized in the Table below. This behavior is common for all SOP Classes supported by Hardcopy AE.

Table 4. 2-37 HARDCOPY COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the print-job is terminated. The reason is reported to the user.
Association aborted by the SCP or network layers	The print-job is terminated and the print-job is terminated. The reason is reported to the user.

4. 2. 3. 3. 1. 4 SOP Specific Conformance for the Printer SOP Class

Hardcopy AE supports the following DIMSE operations and notifications for the Printer SOP Class :

- N-GET
 - N-EVENT-REPORT
- Details of the supported attributes and status handling behavior are described in the following subsections.

4. 2. 3. 3. 1. 4. 1 Printer SOP Class Operations (N-GET)

Hardcopy AE uses the Printer SOP Class N-GET operation to obtain information about the current printer status. The attributes obtained via N-GET are listed in the Table below :

Table 4. 2-38 PRINTER SOP CLASS N-GET REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008, 0070)	LO	Provided by Printer	ANAP	Printer
Manufacturer's Model Name	(0008, 1090)	LO	Provided by Printer	ANAP	Printer
Device Serial Number	(0018, 1000)	LO	Provided by Printer	ANAP	Printer
Software Versions	(0018, 1020)	LO	Provided by Printer	ANAP	Printer
Printer Status	(2110, 0010)	CS	Provided by Printer	ALWAYS	Printer
Printer Status Info	(2110, 0020)	CS	Provided by Printer	ALWAYS	Printer
Printer Name	(2110, 0030)	LO	Provided by Printer	ANAP	Printer

The Printer Status information is evaluated as follows :

1. If Printer status (2110, 0010) is FAILURE, the Hardcopy AE is terminated and status is user informed.
2. If Printer status (2110, 0010) is NORMAL or WARNING, the Hardcopy AE continues to print.

The behavior of Hardcopy AE when encountering status codes in a N-GET response is summarized in the Table below :

Table 4. 2-39 PRINTER SOP CLASS N-GET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request to get printer status information was success.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is terminated. The status is reported to the user.

4. 2. 3. 3. 1. 4. 2 Printer SOP Class Notifications (N-EVENT-REPORT)

Hardcopy AE is capable of receiving an N-EVENT-REPORT request at any time during an association.

The behavior of Hardcopy AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below :

Table 4. 2-40 PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOUR

Event Type Name	Event Type ID	Behavior
Normal	1	The print session continues to be printed.

Warning	2	The print session continues to be printed. The Warning status is not reported to user.
Failure	3	The print session is terminated. The Failure is reported to user.
*	*	The print session is terminated. The Failure is reported to user.

The reasons for returning specific status codes in an N-EVENT-REPORT response are summarized in the Table below :

Table 4. 2-41 PRINTER SOP CLASS N-EVENT-REPORT RESPONSE STATUS REASONS

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The notification event has been successfully received.
Failure	No Such Event Type	0113H	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Processing Failure	0110H	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000, 0902) .

4. 2. 3. 3. 1. 5 SOP Specific Conformance for the Film Session SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Session SOP Class :

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behavior are described in the following subsections :

4. 2. 3. 3. 1. 5. 1 Film Session SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below. The values are typical and may be configured by the CSE :

Table 4. 2-42 FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Copies	(2000, 0010)	IS	1 . . 9	ALWAYS	CONFIG
Print Priority	(2000, 0020)	CS	HIGH, MED, or LOW	ALWAYS	CONFIG
Medium Type	(2000, 0030)	CS	BLUE FILM, CLEAR FILM, or PAPER	ALWAYS	CONFIG
Film Destination	(2000, 0040)	CS	MAGAZINE or PROCESSOR	ALWAYS	CONFIG
Memory Allocation	(2000, 0060)	IS		ANAP	CONFIG

The behavior of Hardcopy AE when encountering status codes in an N-CREATE response is summarized in the Table below :

Table 4. 2-43 FILM SESSION SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Attribute Value Out of Range	0116H	The N-CREATE operation is considered successful and the status is not reported to the user.
Warning	Attribute List Error	0107H	The N-CREATE operation is considered successful and the status is not reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print session is terminated. The status is reported to the user.

4. 2. 3. 3. 1. 5. 2 Film Session SOP Class Operations (N-DELETE)

The behavior of Hardcopy AE when encountering status codes in an N-DELETE response is summarized in the Table below :

Table 4. 2-44 FILM SESSION SOP CLASS N-DELETE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print session is terminated.

4. 2. 3. 3. 1. 6 SOP Specific Conformance for the Film Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Box SOP Class :

- N-CREATE
- N-ACTION

Details of the supported attributes and status handling behavior are described in the following subsections.

4. 2. 3. 3. 1. 6. 1 Film Box SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below. The values are typical and may be configured by the CSE :

Table 4. 2-45 FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Display Format	(2010, 0010)	ST	STANDARD\m, n	ALWAYS	CONFIG
Film Orientation	(2010, 0040)	CS	PORTRAIT or LANDSCAPE	ALWAYS	CONFIG

Film Size ID	(2010, 0050)	CS	14INX17IN, 14INX14IN, 11INX14IN, 11INX11IN, 85INX11IN, 8INX10IN	ALWAYS	CONFIG
Magnification Type	(2010, 0060)	CS	REPLICATE, BILINEAR, CUBIC or NONE	ALWAYS	CONFIG
Smoothing Type	(2010, 0080)	CS		ANAP	CONFIG
Border Density	(2010, 0100)	CS	BLACK or WHITE	ALWAYS	CONFIG
Empty Image Density	(2010, 0110)	CS	BLACK or WHITE	ALWAYS	CONFIG
Min Density	(2010, 0120)	US	0 . . 329	ALWAYS	CONFIG
Max Density	(2010, 0130)	US	1 . . 330	ALWAYS	CONFIG
Trim	(2010, 0140)	CS	YES or NO	ANAP	CONFIG
Configuration Information	(2010, 0150)	ST	Set if requested by Printer	ANAP	CONFIG
Referenced Film Session Sequence	(2010, 0500)	SQ		ALWAYS	AUTO
> Referenced SOP Class UID	(0008, 1150)	UI	1. 2. 840. 10008. 5. 1. 1. 1	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008, 1155)	UI	From created Film Session SOP Instance	ALWAYS	AUTO

The behavior of Hardcopy AE when encountering status codes in an N-CREATE response is summarized in the Table below :

Table 4. 46 FILM BOX SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Requested Min Density or Max Density outside of printer's operating range	B605H	The N-CREATE operation is considered successful and the status is not reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is terminated. The status is reported to the user.

4. 2. 3. 3. 1. 6. 2 Film Box SOP Class Operations (N-ACTION)

An N-ACTION Request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behavior of Hardcopy AE when encountering status codes in an N-ACTION response is summarized in the Table below :

Table 4. 2-47 FILM BOX SOP CLASS N-ACTION RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. The film has been accepted for printing.
Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	B603	The Association is aborted using A-ABORT and the print-job is terminated. The status is reported to the user.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604	The N-ACTION operation is considered successful and the status is not reported to the user.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609	The N-ACTION operation is considered successful and the status is not reported to the user.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60A	The N-ACTION operation is considered successful and the status is not reported to the user.
Failure	Unable to create Print Job SOP Instance ; print queue is full.	C602	The Association is aborted using A-ABORT and the status is reported to the user.
Failure	Image size is larger than Image Box size.	C603	The Association is aborted using A-ABORT and the status is reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613	The Association is aborted using A-ABORT and the status is reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the status is reported to the user.

4. 2. 3. 3. 1. 7 SOP Specific Conformance for the Image Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Basic Grayscale and Basic Color Image Box SOP Classes :

— N-SET

Details of the supported attributes and status handling behavior are described in the following subsections.

4. 2. 3. 3. 1. 7. 1 Basic Grayscale Image Box SOP Class Operations (N-SET)

The attributes supplied in an N-SET Grayscale Image Box Request are listed in the Table below :

Table 4. 2-48 BASIC GRAYSCALE IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	(2020, 0010)	US	1 to maximum image position allowed for the Image Display Format (2010, 0010)	ALWAYS	AUTO
Polarity	(2020, 0020)	CS	NORMAL or REVERSE	ALWAYS	CONFIG
Basic Grayscale Image Sequence	(2020, 0110)	SQ		ALWAYS	AUTO
> Samples Per Pixel	(0028, 0002)	US	1	ALWAYS	AUTO
> Photometric Interpretation	(0028, 0004)	CS	MONOCHROME2	ALWAYS	AUTO
> Rows	(0028, 0010)	US	Copied from source image	ALWAYS	AUTO
> Columns	(0028, 0011)	US	Copied from source image	ALWAYS	AUTO
> Pixel Aspect Ratio	(0028, 0034)	IS	Copied from source image	ANAP	AUTO
> Bits Allocated	(0028, 0100)	US	8	ALWAYS	AUTO
> Bits Stored	(0028, 0101)	US	8	ALWAYS	AUTO
> High Bit	(0028, 0102)	US	7	ALWAYS	AUTO
> Pixel Representation	(0028, 0103)	US	0	ALWAYS	AUTO
> Pixel Data	(7FE0, 0010)	OW	Pixels from source image	ALWAYS	AUTO

The behavior of Hardcopy AE when encountering status codes in an N-SET response is summarized in Table 4. 2-48.

4. 2. 3. 3. 1. 7. 2 Basic Color Image Box SOP Class Operations (N-SET)

The attributes supplied in an N-SET Color Image Box Request are listed in the Table below :

Table 4. 2-49 BASIC COLOR IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	(2020, 0010)	US	1 to maximum image position allowed for the Image Display Format (2010, 0010)	ALWAYS	AUTO

Polarity	(2020, 0020)	CS	Printer may ignore the value	ALWAYS	AUTO
Preformatted Color Image Sequence	(2020, 0111)	SQ		ALWAYS	AUTO
> Samples Per Pixel	(0028, 0002)	US	3	ALWAYS	AUTO
> Photometric Interpretation	(0028, 0004)	CS	RGB	ALWAYS	AUTO
> Planar Configuration	(0028, 0006)	US	1 (default) or 0	ALWAYS	CONFIG [*] ₁
> Rows	(0028, 0010)	US	Copied from source image	ALWAYS	AUTO
> Columns	(0028, 0011)	US	Copied from source image	ALWAYS	AUTO
> Pixel Aspect Ratio	(0028, 0034)	IS	Copied from source image	ANAP	AUTO
> Bits Allocated	(0028, 0100)	US	8	ALWAYS	AUTO
> Bits Stored	(0028, 0101)	US	8	ALWAYS	AUTO
> High Bit	(0028, 0102)	US	7	ALWAYS	AUTO
> Pixel Representation	(0028, 0103)	US	0	ALWAYS	AUTO
> Pixel Data	(7FE0, 0010)	OW	Pixels from source image	ALWAYS	AUTO

The behavior of Hardcopy AE when encountering status codes in an N-SET response is summarized in Table 4. 2-50.

Table 4. 2-50 IMAGE BOX SOP CLASSES N-SET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. Image successfully stored in Image Box.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604	The N-SET operation is considered successful and the status is not reported.
Warning	Requested Min Density or Max Density outside of printer's operating range.	B605	The N-SET operation is considered successful and the status is not reported.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609	The N-SET operation is considered successful and the status is not reported.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to	B60A	The N-SET operation is considered successful and the status is not reported.

	fit.		
Failure	Image size is larger than Image Box size.	C603	The Association is aborted using A-ABORT and the status is reported to the user.
Failure	Insufficient memory in printer to store the image.	C605	The Association is aborted using A-ABORT and the status is reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613	The Association is aborted using A-ABORT and the status is reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the status is reported to the user.

4. 2. 3. 4 Association Acceptance Policy

The Hardcopy Application Entity does not accept Associations.

4. 3 NETWORK INTERFACES

4. 3. 1 Physical Network Interface

The Equipments support a single network interface and the 100baseTX or 10base is automatically detected by the interface.

Table 4. 3-1 SUPPORTED PHYSICAL NETWORK INTERFACES

Ethernet 100baseTX or 10baseT is automatically detected

4. 3. 2 Additional Protocols

The Equipments do not conform to the System Management Profiles as DHCP, DNS, NTP nor LDAP.

4. 3. 3 IPv4 and IPv6 Support

The Equipments support IPv4 connections only.

4. 4 CONFIGURATION

4. 4. 1 AE Title/Presentation Address Mapping

4. 4. 1. 1 Local AE Titles

All local applications share the same AE Titles and TCP/IP Address configured at the Local AET registry in the DICOM Storage configuration. The AE Title, IP Address, and Port Number must be configured during installation, since the provided default values are only samples.

Table 4. 4-1 AE TITLE CONFIGURATION TABLE

Application Entity	Default AE Title	Default TCP/IP Port
Storage	PROSOUND6, PROSOUND4, or PROSOUND2	104
Workflow	same as above	Not Applicable
Hardcopy	same as above	Not Applicable

4. 4. 1. 2 Remote AE Title/Presentation Address Mapping

The AE Titles, IP Addresses, and Port numbers of remote applications are configured through the DICOM Storage and IHE-SWF/DICOM Printer interfaces.

4. 4. 1. 2. 1 Workflow

The Application Entity Titles, IP Addresses, and the Port Numbers of the remote Modality Worklist SCPs are registered at the Worklist rows of IHE-SWF interface. The Application Entity Titles, IP Addresses, and the Port numbers of remote MPPS servers may be registered at the MPPS rows of IHE-SWF interface. If none of WKLIST1 or WKLIST2 button is activated, Modality Worklist SOP service is disabled and if none of MPPS #1 or MPPS #2 button is activated, MPPS SOP service is similarly disabled.

4. 4. 1. 2. 2 Storage and Storage Commitment

The Application Entity Titles, IP Addresses, and the Port Numbers of the remote Image Archives / Image Managers receiving images and/or Storage Commitment are registered at the ARCHIV1 to ARCHIV4 rows of DICOM Storage interface. The Storage Commitment function is enabled for each SCP registration. Although the Multiple storage destinations may be registered, only one destination must be activated by pressing the "ARCHIV1" through "ARCHIV4" button in the interface.

4. 4. 1. 2. 3 Hardcopy

The Application Entity Titles, IP Addresses, and the Port Numbers of the remote Hardcopy SCPs are registered in the IHE-SWF/DICOM Printer interface. Although the Multiple Hardcopy destinations may be registered, only one destination must be activated by pressing the "PRN1" through "PRN4" button in the interface. The same Application Entity may be registered to configure different Hardcopy settings for selections by the user's preference.

4. 4. 2 Parameters

A large number of parameters related to acquisition and general operation can be configured using the DICOM configuration user interface. The Table below shows those configuration parameters relevant to DICOM communication.

Table 4. 4-2 CONFIGURATION PARAMETERS TABLE

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
Max PDU Receive Size	No	32120 bytes
Max PDU Send Size (larger PDUs will never be sent, even if the receiver supports a larger Max PDU Receive Size. If the receiver supports a smaller Max PDU Receive Size then the Max PDU Send Size will be reduced accordingly for the duration of the Association. Max PDU Receive Size information is exchanged during DICOM Association Negotiation in the Maximum Length Sub-Item of the A-ASSOCIATION-RQ and A-ASSOCIATE-AC)	No	32120 Bytes
Time-out waiting for a acceptance or rejection response to an Association Request (Application Level Timeout)	Yes	15 s
Time-out waiting for a response to an Association release request (Application Level Timeout)	Yes	15 s
Time-out waiting for completion of a TCP/IP connect request (Low-level timeout)	No	20 s
Time-out awaiting a Response to a DIMSE Request (Low-Level Timeout)	Yes	15 s
Time-out for waiting for data between TCP/IP-packets (Low Level Timeout)	Yes	15 s
Modality Worklist Parameters		
Modality Worklist SCU time-out waiting for the final response to a C-FIND-RQ	Yes	15 s
Maximum number of Worklist Items	No	128
Supported Transfer Syntaxes for Modality Worklist	No	Implicit VR Little Endian Explicit VR Little Endian
Query Worklist for specific Scheduled Station AE Title	Yes	PROSOUND6, PROSOUND4, or PROSOUND2
Query Worklist for specific Modality Value	Yes	US
MPPS Parameters		
MPPS SCU time-out waiting for a response to a N-CREATE-RQ	Yes	15 s
MPPS SCU time-out waiting for a response to a N-SET-RQ	Yes	15 s
Supported Transfer Syntaxes for MPPS	No	Implicit VR Little Endian Explicit VR Little Endian
Maximum number of retries	Yes	2
Retry interval	Yes	1 min

Parameter	Configurable (Yes/No)	Default Value
Storage Parameters		
Storage SCU time-out waiting for a response to a C-STORE-RQ	Yes	15 s
Maximum number of simultaneously initiated Associations by the Storage AE	Yes	1
Supported Transfer Syntaxes (separately configurable for each Presentation Context)	Yes	Implicit VR Little Endian Explicit VR Little Endian RLE Lossless JPEG Baseline
Maximum number of retries	Yes	2
Retry interval	Yes	1 min
Storage Commitment Parameters		
Timeout waiting for a Storage Commitment Notification (maximum duration of applicability for a Storage Commitment Transaction UID) .	Yes	10 days
Maximum number of simultaneously accepted Associations by the Storage AE	No	1
Delay association release after sending a Storage Commitment Request (wait for a Storage Commitment Notification over the same association) .	Yes	5 s
Print Parameters		
Grayscale Image Print or Color Image Print Meta SOP Classes	Yes	Grayscale Image Print
Print SCU time-out waiting for a response to a N-CREATE-RQ	Yes	15 s
Print SCU time-out waiting for a response to a N-SET-RQ	Yes	15 s
Print SCU time-out waiting for a response to a N-ACTION-RQ	Yes	15 s
Supported Transfer Syntaxes	No	Implicit VR Little Endian Explicit VR Little Endian

5 MEDIA INTERCHANGE

5.1 IMPLEMENTATION MODEL

5.1.1 Application Data Flow

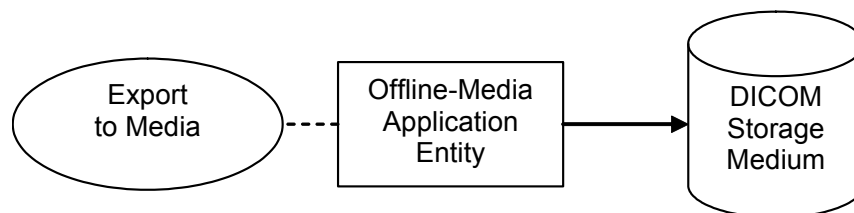


Figure 5. 1-1 APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE

- The Offline-Media Application Entity exports Ultrasound Images to USB memory or to CD-R Storage Buffer folder. It is associated with the local real-world activity "**Store Media Dicom**" or "**Store Buf Dicom**", respectively. The Image Instances stored in the CD-R Buffer will be written to CD-R media when the "Write CD-R" function switch is pressed in the "REVIEW" interface.

5.1.2 Functional Definition of AEs

5.1.2.1 Functional Definition of Offline-Media Application Entity

Activation of the "**Store Media Dicom**" or "**Store Buf Dicom**" will save the frozen image to designated storage media of the Offline-Media Application Entity. The contents of each export job will be written in a single media.

5.1.3 Sequencing of Real-World Activities

At least one object instance must exist and be selected before the Offline-Media Application Entity can be invoked. The operator can insert a new CD-R media at any time before invocation of the Offline-Media Application Entity. The Offline-Media Application Entity will wait indefinitely for a media to be inserted before starting to write to the CD-R device. If no CD-R media is available the export job can be canceled.

5.1.4 File Meta Information Options

The implementation information written to the File Meta Header in each file is :

Table 5. 1-1 DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE

Implementation Class UID	1. 2. 392. 200039. 107
Implementation Version Name	ADLib 20090209 (subject to change without notice)

5.2 AE SPECIFICATIONS

5.2.1 Offline-Media Application Entity Specification

The Offline-Media Application Entity provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed below :

Table 5. 2-1 APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA

Application Profiles Supported	Single Frame	Real World Activity	Role	SC Option
Image Display	STD-US-ID-SF-xxxx	Store Media (USB memory) Store on CD-R Buffer	FSC	Interchange
Spatial Calibration	STD-US-SC-SF-xxxx			

5.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is same that of local Storage AET.

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity – Store on Media or Store on CD-R

The Offline-Media Application Entity acts as an FSC using the interchange option when requested to export SOP Instances from the local database to USB memory CD-R media.

Object Instances can be added to USB memory device or CD-R buffer area. If USB medium reaches full, the user will be prompted to replace to an empty medium. The DicomDIR will be updated each time an object instance is successfully written to USB memory or CD-R buffer.

When the object instances are exported to CD-R, the user will be prompted to insert an empty CD-R for each export. The contents of the export job will be written together with a corresponding DicomDIR to a single-session CD-R. Writing in multi-session mode is not supported.

5.2.1.2.1.1 Media Storage Application Profiles

The supported Offline-Media Application Profiles are listed in Table 5. 2-1.

5.2.1.2.1.1.1 Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table below :

Table 5. 2-2 IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR OFFLINE MEDIA

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1. 2. 840. 10008. 1. 3. 10	Explicit VR Little Endian	1. 2. 840. 10008. 1. 2. 1

Ultrasound Image Storage	1. 2. 840. 10008. 5. 1. 4. 1. 1. 6. 1	Explicit VR Little Endian Implicit VR Little Endian JPEG Baseline Compression RLE Lossless Compression	1. 2. 840. 10008. 1. 2. 1 1. 2. 840. 10008. 1. 2 1. 2. 840. 10008. 1. 2. 4. 50 1. 2. 840. 10008. 1. 2. 5
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5. 3 AUGMENTED AND PRIVATE APPLICATION PROFILES

The Equipments do not support any augmented for private application profiles.

5. 4 MEDIA CONFIGURATION

The Application Entity Title for Media Services is same that is configured for Storage Service :

Table 5. 4-1 AE TITLE CONFIGURATION TABLE

Application Entity	Default AE Title
Offline-Media	PROSOUND6, PROSOUND4 or PROSOUND2

6 SUPPORT OF CHARACTER SETS

All DICOM applications of the Equipments can support the

ISO_IR 100 (ISO 8859-1 : 1987 Latin Alphabet No. 1 supplementary set)

Even if the Equipments have no means to input and display the Japanese Kanji (漢字) and Kana (かな) characters encoded in “ISO 2022 IR 87”, the Kanji and Kana characters received in MWL response will be set in the US image IOD instances.

7 SECURITY

The Equipments do not support any specific security measures.

It is assumed that the Equipments are used within a secured environment. It is assumed that a secured environment includes at a minimum :

a. Firewall or router protections to ensure that only approved external hosts have network access to the Equipment.

b. Firewall or router protections to ensure that the Equipment only have network access to approved external hosts and services.

c. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e. g. such as a Virtual Private Network (VPN))

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

8.1 IOD CONTENTS

8.1.1 Created SOP Instances

Table 8. 1-1 specifies the attributes of an Ultrasound Image transmitted by the storage application of the Equipments.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of ...” column are :

ALWAYS	Always Present
ANAP	Attribute Not Always Present
VNAP	Value Not Always Present (attribute sent zero length if no value is present)
EMPTY	Attribute is sent without a value

The abbreviations used in the “Source” column :

MWL	the attribute value source Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
MPPS	the attribute value is the same as that use for Modality Performed Procedure Step
CONFIG	the attribute value source is a configurable parameter

Attributes in *Italic* are additions to the Standard Information Entity Modules.

8.1.1.1 Ultrasound Image IOD

Table 8. 1-1 IOD OF ULTRASOUND AND ULTRASOUND MULTI-FRAME IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
			US
Patient	Patient	Table 8. 1-2	ALWAYS
	Clinical Trial Subject	-	Not used
Study	General Study	Table 8. 1-3	ALWAYS
	Patient Study	Table 8. 1-4	ALWAYS
	Clinical Trial Study	-	Not used
Series	General Series	Table 8. 1-5	ALWAYS
	Clinical Trial Series	-	Not used
Frame of Reference	Frame of Reference	-	Not used
	Synchronization	-	Not used

Equipment	General Equipment	Table 8. 1-6	ALWAYS
Image	General Image	Table 8. 1-7	ALWAYS
	Contrast/bolus	Table 8. 1-8	ANAP
	US Region Calibration	Table 8. 1-12	ANAP
	US Image	Table 8. 1-13	ALWAYS
	Image Pixel	Table 8. 1-9	ALWAYS
	VOI LUT	Table 8. 1-10	Not used
	SOP Common	Table 8. 1-11	ALWAYS

8. 1. 1. 2 Common Modules

Table 8. 1-2 PATIENT MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0010, 0010)	PN	Patient's Name	From Modality Worklist or input by user. Values supplied via Modality Worklist will be entered as received. Values supplied via user input may contain all 5 components (some possibly empty) . Maximum 64 characters.	VNAP	MWL/ USER
(0010, 0020)	LO	Patient ID	From Modality Worklist or input by user. Maximum 64 characters.	ALWAYS	MWL/ USER
(0010, 0030)	DA	Patient's Birth Date	From Modality Worklist or input by user	VNAP	MWL/ USER
(0010, 0040)	CS	Patient's Sex	From Modality Worklist or input by user	VNAP	MWL/ USER

Table 8. 1-3 GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0020)	DA	Study Date	"YYYYMMDD"	ALWAYS	AUTO
(0008, 0030)	TM	Study Time	"hhmmss"	ALWAYS	AUTO
(0008, 0050)	SH	Accession Number	From Modality Worklist or input by user	VNAP	MWL/ USER
(0008, 0090)	PN	Referring Physician's Name	From Modality Worklist or Input by user	VNAP	MWL/ USER
(0008, 1030)	LO	Study Description	0-length	NO	
(0008, 1032)	SQ	Procedure Code Sequence	From Modality Worklist, mapped from Requested Procedure Code Sequence (0032, 1064)	ANAP	MWL
> Include "Code Sequence Macro"					

(0008, 1060)	PN	Name of Physician (s) reading Study.	Entered as "Reporting Phys" in the New Patient Registration	ANAP	USER
(0008, 1110)	SQ	Referenced Study Sequence	From Modality Worklist	ANAP	MWL
> (0008, 1150)	UI	Referenced SOP Class UID	From Modality Worklist	VNAP	MWL
> (0008, 1155)	UI	Referenced SOP Instance UID	From Modality Worklist	VNAP	MWL
(0020, 000D)	UI	Study Instance UID	From Modality Worklist or generated by device	ALWAYS	MWL/AUTO
(0020, 0010)	SH	Study ID	Copied from Requested Procedure ID (0040, 1001) in Worklist or generated by device. User may modify the value.	ALWAYS	MWL/AUTO/USER
(0032, 1060)	LO	Requested Procedure Description	From Modality Worklist	VNAP	MWL

Table 8. 1-4 PATIENT STUDY MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0010, 1010)	AS	Patient's Age	Calculated from DoB input on base of actual Date	ANAP	AUTO
(0010, 1020)	DS	Patient's Size	From Modality Worklist or user input	ANAP	MWL/USER
(0010, 1030)	DS	Patient's Weight	From Modality Worklist or user input	ANAP	MWL/USER
(0010, 2000)	LO	<i>Medical Alerts</i>	<i>From Modality Worklist</i>	<i>VNAP</i>	<i>MWL</i>
(0010, 2110)	LO	<i>Contrast Allergies</i>	<i>From Modality Worklist</i>	<i>VNAP</i>	<i>MWL</i>
(0010, 2180)	SH	Occupation	From Modality Worklist or User input	ANAP	MWL/USER
(0010, 21D0)	DA	<i>Last Menstrual Date</i>	<i>From Modality Worklist or User input</i>	<i>ANAP</i>	<i>MWL/USER</i>
(0038, 0050)	LO	<i>Special Needs</i>	<i>From Modality Worklist</i>	<i>VNAP</i>	<i>MWL</i>

Table 8. 1-5 GENERAL SERIES MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0021)	DA	Series Date	"YYYYMMDD"	ALWAYS	AUTO
(0008, 0031)	TM	Series Time	"hhmmss"	ALWAYS	AUTO
(0008, 0060)	CS	Modality	"US"	ALWAYS	AUTO
(0008, 103E)	LO	Series Description	0-length	NO	
(0008, 1070)	PN	Operator's Name	Sonographer in Study list. Maximum 64 characters.	ANAP	USER

(0008, 1111)	SQ	Referenced Performed Procedure Step Sequence	Identifies the MPPS SOP Instance to which this image is related	ANAP	MPPS
> (0008, 1150)	UI	Referenced SOP Class UID	MPPS SOP Class UID	ALWAYS	MPPS
> (0008, 1155)	UI	Referenced SOP Instance UID	MPPS SOP Instance UID	ALWAYS	MPPS
(0018, 0015)	CS	Body Part Examined	Set by user from a pick list	ANAP	USER
(0018, 1030)	LO	Protocol Name	Application type selected by user.	ALWAYS	AUTO
(0020, 000E)	UI	Series Instance UID	Generated by device	ALWAYS	AUTO
(0020, 0011)	IS	Series Number	Generated by device	ALWAYS	AUTO
(0020, 0060)	CS	Laterality	Set by user from	ANAP	USER
(0040, 0244)	DA	Performed Procedure Step Start Date	Same as Series Date (0008, 0021)	ALWAYS	
(0040, 0245)	TM	Performed Procedure Step Start Time	Same as Series Time (0008, 0031)	ALWAYS	
(0040, 0253)	SH	Performed Procedure Step ID	YYYYMMDD.hhmmss	ALWAYS	AUTO
(0040, 0254)	LO	Performed Procedure Step Description	Mapped from Scheduled Procedure Step Description or input by user via Edit PPCS interface. Maximum 64 characters.	ANAP	MWL/ USER
(0040, 0260)	SQ	Performed Protocol Code Sequence	Mapped from Scheduled Protocol Code Sequence or updated by user via Edit PPCS interface.	ANAP	MWL/ USER
> Include "Code Sequence Macro"					
(0040, 0275)	SQ	Request Attributes Sequence	Zero or 1 item will be present	ANAP	AUTO
> (0032, 1060)	LO	Requested Procedure Description	From Modality Worklist	ANAP	MWL
> (0040, 0007)	LO	Scheduled Procedure Step Description	From Modality Worklist	ANAP	MWL
> (0040, 0008)	SQ	Scheduled Protocol Code Sequence	From Modality Worklist	ANAP	MWL
> > Include "Code Sequence Macro"					
> (0040, 0009)	SH	Scheduled Procedure Step ID	From Modality Worklist	VNAP	MWL
> (0040, 1001)	SH	Requested Procedure ID	From Modality Worklist	VNAP	MWL

Table 8. 1-6 GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0070)	LO	Manufacturer	Hitachi Aloka Medical, Ltd	ALWAYS	AUTO

(0008, 0080)	LO	Institution Name	From Configuration	VNAP	CONFIG
(0008, 0081)	ST	Institution Address	From Configuration	ANAP	CONFIG
(0008, 1010)	SH	Station Name	From Configuration	ALWAYS	CONFIG
(0008, 1040)	LO	Institutional Department Name	From Configuration	ANAP	CONFIG
(0008, 1090)	LO	Manufacturer's Model Name	PROSOUND6, PROSOUND4, or PROSOUND2	ALWAYS	AUTO
(0018, 1000)	LO	Device Serial Number	Built-in	ANAP	AUTO
(0018, 1020)	LO	Software Version (s)	Built-in	ALWAYS	AUTO

Table 8. 1-7 GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0008)	CS	Image Type	ORIGINAL or DERIVED for value 1, PRIMARY or SECONDARY for value 2. See Table 8. 1-13 for value 3 and 4.	ALWAYS	AUTO
(0008, 0023)	DA	Content Date	"YYYYMMDD"	ALWAYS	AUTO
(0008, 0033)	TM	Content Time	"hhmmss"	ALWAYS	AUTO
(0020, 0013)	IS	Instance Number	Generated by device	ALWAYS	AUTO
(0020, 0020)	CS	Patient Orientation	Input by user.	ANAP	USER
(0028, 2110)	CS	Lossy Image Compression	Generated by device	ANAP	AUTO

Table 8. 1-8 CONTRAST/BOLUS MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0018, 0010)	LO	Contrast/Bolus Agent	From MWL	ANAP	MWL

Table 8. 1-9 IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0028, 0002)	US	Samples per Pixel	1 (MONOCHROME2)	ALWAYS	AUTO
(0028, 0004)	CS	Photometric Interpretation	"MONOCHROME2"	ALWAYS	AUTO
(0028, 0010)	US	Rows	480	ALWAYS	AUTO
(0028, 0011)	US	Columns	640	ALWAYS	AUTO
(0028, 0034)	IS	Pixel Aspect Ratio	Only if pixel aspect ratio is not 1 : 1.	ANAP	AUTO
(0028, 0100)	US	Bits Allocated	8 (MONOCHROME2)	ALWAYS	AUTO
(0028, 0101)	US	Bits Stored	8 (MONOCHROME2)	ALWAYS	AUTO
(0028, 0102)	US	High Bits	7 (MONOCHROME2)	ALWAYS	AUTO

(0028, 0103)	US	Pixel Representation	0	ALWAYS	AUTO
(7FE0, 0010)	OW /OB	Pixel Data	The Pixel Data contains burned-in annotation (Patient ID, Patient's Name, Scale Mark etc.)	ALWAYS	AUTO

Table 8. 1-10 VOI LUT MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0028, 3010)	SQ	VOI LUT Sequence	One item	NO	
> (0028, 3002)	US	LUT Descriptor	<256, 0, 8>	NO	
> (0028, 3006)	US	LUT Data	LUT	NO	
(0028, 1050)	DS	Window Center	Not used	NO	-
(0028, 1051)	DS	Window Width	Not used	NO	-

Table 8. 1-11 SOP COMMON MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0005)	CS	Specific Character Set	From Modality Worklist or ISO_IR 100	ANAP	MWL/ CONFIG
(0008, 0012)	DA	Instance Creation Date	Instance Date	ANAP	AUTO
(0008, 0013)	TM	Instance Creation Time	Instance Time	ANAP	AUTO
(0008, 0014)	UI	Instance Creator UID	Built-in	ANAP	AUTO
(0008, 0016)	UI	SOP Class UID	1. 2. 840. 10008. 5. 1. 4. 1. 1. 6. 1	ALWAYS	AUTO
(0008, 0018)	UI	SOP Instance UID	Generated by device	ALWAYS	AUTO

8. 1. 1. 3 Ultrasound Modules**Table 8. 1-12 US REGION CALIBRATOIN MODULE OF CREATED SOP INSTANCES**

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0018, 6011)	SQ	Sequence of Ultrasound Regions	If Region Calibration is turned on	ANAP	CONFIG
> (0018, 6012)	US	Region Spatial Format	0=none, 1=cross section, 2=M-mode	ALWAYS	AUTO
> (0018, 6014)	US	Region Data Type	0=none, 1=tissue, D=Gray Scale	ALWAYS	AUTO
> (0018, 6016)	UL	Region Flag	1=transparent, 2=scale protected, 4=Doppler represented in frequency.	ALWAYS	AUTO
> (0018, 6018)	UL	Region Location Min. x0	X and Y coordinates of upper	ALWAYS	AUTO

> (0018, 601A)	UL	Region Location Min. y0	left corner of the region	ALWAYS	AUTO
> (0018, 601C)	UL	Region Location Max. x1	X and Y coordinates of lower right corner of the region	ALWAYS	AUTO
> (0018, 601E)	UL	Region Location Max. y1		ALWAYS	AUTO
> (0018, 6020)	SL	Referenced Pixel X0	B : Transducer surface center, M : Transducer surface left	ANAP	AUTO
> (0018, 6022)	SL	Referenced Pixel Y0		ANAP	AUTO
> (0018, 6024)	US	Physical Unit X Direction	Physical units for X and Y directions	ALWAYS	AUTO
> (0018, 6026)	US	Physical Unit Y Direction		ALWAYS	AUTO
> (0018, 6028)	FD	Referenced Pixel Physical Value X	Reference pixel physical values in X and Y direction physical units, respectively	ANAP	AUTO
> (0018, 602A)	FD	Referenced Pixel Physical Value Y		ANAP	AUTO
> (0018, 602C)	FD	Physical Delta X	Physical values in X and Y direction physical units, respectively	ALWAYS	AUTO
> (0018, 602E)	FD	Physical Delta Y		ALWAYS	AUTO
> (0018, 6030)	UL	Transducer Frequency	In [kHz]	ANAP	AUTO
> (0018, 6032)	UL	Pulse Repetition Frequency	PRF in [kHz]	ANAP	AUTO
> (0018, 603D)	SL	TM-Line Position X0	Used in B-mode image, if M-mode region accompanies	ANAP	AUTO
> (0018, 603F)	SL	TM-Line Position Y0		ANAP	AUTO
> (0018, 6041)	SL	TM-Line Position X1		ANAP	AUTO
> (0018, 6043)	SL	TM-Line Position Y1		ANAP	AUTO
> (0019, 0010)	LO	<i>Private Identification Code</i>	<i>ALOKA : 1. 2. 392. 200039. 105. 2</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1008)	FD		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 100C)	CS		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 100E)	DS		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1018)	SL		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 101A)	SL		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1040)	SS		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1052)	DS		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1054)	DS		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1060)	US		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1064)	US		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 1066)	US		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 106C)	FD		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>
> (0019, 106E)	FD		<i>Private attribute without PHI</i>	<i>ANAP</i>	<i>AUTO</i>

Table 8. 1-13 US IMAGE MODULE OF CREATED SOP INSTANCES

Tag	VR	Attribute Name	Value	Presence of Value	Source
(0008, 0008)	CS	Image Type	Value 3 is picked by the user from the Pull Down List, and Value 4 is set automatically.	VNAP	AUTO
(0009, 0010)	LO	Private Identification Code	ALOKA : 1. 2. 392. 200039. 107. 2	ANAP	AUTO
(0009, 1000)	SH		Private attribute without PHI	ANAP	AUTO
(0009, 100A)	SH		Private attribute without PHI	ANAP	AUTO
(0018, 5000)	SH	Output Power		ANAP	AUTO
(0018, 5010)	LO	Transducer Data		ALWAYS	AUTO
(0018, 5050)	IS	Depth of Scan Field		ANAP	AUTO
(0018, 6031)	CS	Transducer Type		ANAP	AUTO
(0028, 0002)	US	Samples per Pixel	1	ALWAYS	AUTO
(0028, 0004)	CS	Photometric Interpretation	MONOCHROME2	ALWAYS	AUTO
(0028, 0100)	US	Bits Allocated	8	ALWAYS	AUTO
(0028, 0101)	US	Bits Stored	8	ALWAYS	AUTO
(0028, 0102)	US	High Bit	7	ALWAYS	AUTO
(0028, 0103)	US	Pixel Representation	0000H	ALWAYS	AUTO
(0028, 2110)	CS	Lossy Image Compression	If lossy image compression applied	ANAP	AUTO

8. 1. 2 Used Fields in received IOD by application

The storage application of the Equipment does not receive SOP Instances. The usage of attributes received via Modality Worklist is described in section 4. 2. 1. 3. 1. 3.

8. 1. 3 Attribute mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in Table 8. 1-14.

Table 8. 1-14 ATTRIBUTE MAPPING BETWEEN MODALITY WORKLIST, IMAGE AND MPPS

Modality Worklist	Image IOD	MPPS IOD
Patient Name	Patient Name	Patient Name
Patient ID	Patient ID	Patient ID
Patient's Birth Date	Patient's Birth Date	Patient's Birth Date
Patient's Sex	Patient's Sex	Patient's Sex
Patient's Size	Patient's Size	
Patient's Weight	Patient's Weight	
Referring Physician's Name	Referring Physician's Name	
----	----	Scheduled Step Attributes Sequence

Modality Worklist	Image IOD	MPPS IOD
Study Instance UID	Study Instance UID	> Study Instance UID
Referenced Study Sequence	Referenced Study Sequence	> Referenced Study Sequence
Accession Number	Accession Number	> Accession Number
----	Request Attributes Sequence	----
Requested Procedure ID	> Requested Procedure ID	> Requested Procedure ID
Requested Procedure Description	> Requested Procedure Description	> Requested Procedure Description
Scheduled Procedure Step ID	> Scheduled Procedure Step ID	> Scheduled Procedure Step ID
Scheduled Procedure Step Description	> Scheduled Procedure Step Description	> Scheduled Procedure Step Description
Scheduled Protocol Code Sequence	> Scheduled Protocol Code Sequence	> Scheduled Protocol Code Sequence
----	Performed Protocol Code Sequence	Performed Protocol Code Sequence
----	Study ID	Study ID
----	Performed Procedure Step ID	Performed Procedure Step ID
----	Performed Procedure Step Start Date	Performed Procedure Step Start Date
----	Performed Procedure Step Start Time	Performed Procedure Step Start Time
----	Performed Procedure Step Description	Performed Procedure Step Description
----	----	Performed Series Sequence
----	Name of Physician's Reading Study	> Performing Physician's Name
Requested Procedure Code Sequence	Procedure Code Sequence	Procedure Code Sequence
----	Referenced Performed Procedure Step Sequence	----
----	> Referenced SOP Class UID	SOP Class UID
----	> Referenced SOP Instance UID	SOP Instance UID
----	Protocol Name	Protocol Name

8. 1. 4 Coerced/Modified Fields

The Modality Worklist AE will truncate attribute values received in the response to a Modality Worklist Query if the value length is longer than the maximum length permitted by the attribute's VR.

8. 2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

The Private Attributes added to create SOP Instances are listed in the Table below. The Equipments reserve blocks of private attributes in groups 0009 and 0019. Further details on usage of these private attributes are contained in Section 8. 1.

Table 8. 2-1 DATA DICTIONARY OF PRIVATE ATTRIBUTES

Tag	VR	VM	Attribute Name
(0009, 0010)	LO	1	
(0009, 1000)	SH	1	
(0009, 100A)	SH	1	
(0019, 0010)	LO	1	
(0019, 1008)	FD	1	
(0019, 100C)	CS	1	
(0019, 100E)	DS	1	
(0019, 1018)	SL	1	
(0019, 101A)	SL	1	
(0019, 1040)	SS	1	
(0019, 1060)	US	1	
(0019, 1064)	US	1	
(0019, 1066)	US	1	
(0019, 106C)	FD	1	
(0019, 106E)	FD	1	

8. 3 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES

The Equipments will create a Standard Extended Ultrasound Image Storage SOP Class.

8. 3. 1 Ultrasound Image Storage SOP Class

The Ultrasound Image Storage SOP Classes are extended to create a Standard Extended SOP Classes by addition of standard and private attributes to the created SOP Instances as documented in section 8. 1.

8. 4 PRIVATE TRANSFER SYNTAXES

No Private Transfer Syntaxes are supported.