

Philips Medical Systems

DICOM

CONFORMANCE STATEMENT



iU22

SW Version 1.1.2.x

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0.1

REVISION HISTORY

| Document Version | Date of Issue | Author | Description |
|------------------|--------------------|---------|---|
| A | January 27, 2004 | M. Leif | Initial Release |
| B | August 18, 2004 | M. Leif | DCS Release supporting 1.1.x.x software Adds Monochrome image support for most single frame and Uncompressed RGB for Multiframe images, added VOI LUT for Window Center and Level; various updates throughout document |
| C | September 30, 2004 | M. Leif | DCS Release supporting 1.1.2.x software Association does not require successful Ping response for operation, Association Retry behavior expanded for associations dropped by SCP or by topology failure, Added ability to Auto Select between BW and Color printers, if both are attached during exam with Send After Each Image, Added Study Description field in UI and added tag mapping support for Scheduled Procedure Step Description from MWL to C-Store objects, Added the ability to select sending C-Store image objects using Retired US Image or US Multiframe image SOP Classes, added user selectable Export Map Configuration curves for optimal image quality on softcopy review. Added printer configuration controls and tags. Cleaned up several sections. |

1 CONFORMANCE STATEMENT OVERVIEW

iU22 implements the necessary DICOM services to download worklists from an information system, save acquired US images and associated Structured Reports to a network storage device, CD or DVD, print to a networked hardcopy device and inform the information system about the work actually done.

Table 1 provides an overview of the supported network services.

**Table 1
NETWORK SERVICES**

| Networking SOP Classes | User of Service (SCU) | Provider of Service (SCP) |
|-------------------------------------|------------------------------|----------------------------------|
| Image Transfer | | |
| Ultrasound Image Storage | Yes | No |
| Ultrasound Multiframe Image Storage | Yes | No |
| Storage Commitment Push Model | Yes | No |
| Structured Report Transfer | | |
| Comprehensive SR | Yes | No |
| Workflow | | |
| Modality Worklist | Yes | No |
| Modality Performed Procedure Step | Yes | No |
| Print | | |
| Basic Grayscale Print Management | Yes | No |
| Basic Color Print Management | Yes | No |
| General | | |
| Verification | Yes | Yes |

Table 2 specifies the Media Storage Application Profiles supported.

**Table 2
MEDIA SERVICES**

| Media Storage Application Profile | Write Files (FSC or FSU) | Read Files (FSR) |
|--|---------------------------------|-------------------------|
| DVD-Rewriteable | | |
| STD-US-SC-SF-DVD | Yes / Yes | Yes |
| STD-US-SC-MF-DVD | Yes / Yes | Yes |

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3 INTRODUCTION

3.1 AUDIENCE

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

3.2 REMARKS

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 Philips Medical Systems and other vendors' Medical equipment. 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 Philips Medical Systems and non - Philips Medical Systems equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. Philips Medical Systems is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

3.3 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 |
| ASCE | Association Control Service Element |
| CD-R | Compact Disk Recordable |
| CSE | Customer Service Engineer |
| FSC | File-Set Creator |
| FSU | File-Set Updater |
| FSR | File-Set Reader |
| GSDf | Grayscale Standard Display Function |
| IOD | (DICOM) Information Object Definition |
| ISO | International Standard Organization |
| 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 |
| PDE | Patient Data Entry |
| SCU | DICOM Service Class User (DICOM client) |
| SCP | DICOM Service Class Provider (DICOM server) |
| SOP | DICOM Service-Object Pair |
| U | Unique Key Attribute |

3.4 REFERENCES

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.16, 2003

Integrated Healthcare Enterprise (IHE) Technical Framework, version 5.5 04-07-2003

4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

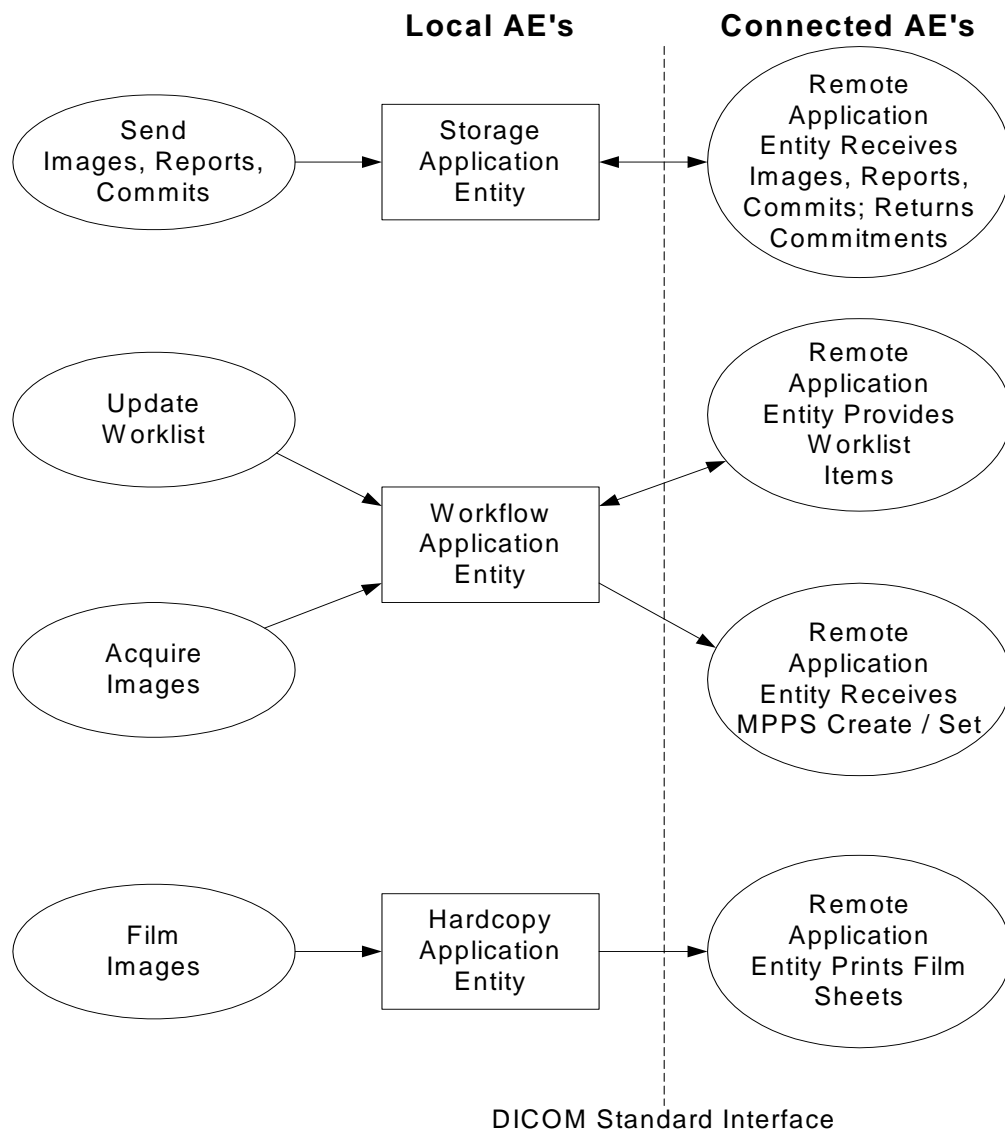


Figure 1
APPLICATION DATA FLOW DIAGRAM

- The Storage Application Entity sends images and Structured Reports to a remote AE. It is associated with the local real-world activity "Print" for single frame and "Capture" for Multiframe or Cineloops. Sending of images depends on user configuration, either "After Each Print/Capture" or "At End of Exam." Sending Structured Reports occurs only at End of Exam. An exam may be sent by user selection from the Patient Directory using "Review". If configured for After Each, images are transferred immediately after acquisition, and the association is closed. If

the remote AE is configured as an archive device, the Storage AE will request Storage Commitment and if a commitment is successfully obtained, will record this information in the local database, signaling the Auto-delete function that the exam qualifies for deletion.

- The Workflow Application Entity receives Worklist information from and sends MPPS information to a remote AE. It is associated with the local real-world activities “Update Worklist” and “Acquire Images”. When the “Update Worklist” local real-world activity is performed, the Workflow Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed as a result of an operator request or can be performed automatically at specific time intervals. . Acquisition of images using “Print” or “Capture” will result in automated creation of an MPPS Instance managed by a remote AE. Completion of the MPPS is performed as the result of an operator action of ending the exam. A “Paused” exam does not initiate an MPPS event.
- The Hardcopy Application Entity prints images on a remote AE (Printer). It is associated with the local real-world activity “Print”. “Print” creates a print queue containing one or more virtual film sheets composed from images acquired by the user. It creates and sends fully rendered pages already containing the user’s selected formatting choices. Only a single image per sheet is sent to the printer. This print object is rather large compared to other methods of DICOM printing. If the user has both a BW and Color DICOM printer configured and selected, and is using “After Each Print/Capture”, the images containing no Color Flow or Chroma data will be sent to the BW printer, all others will be sent to the Color printer.
- Exam data is sent to all selected Store, Print and media destinations simultaneously in accordance with system configuration of “After Each Print/Capture” or “At End of Exam”, with the exception of Structured Reports, which only are sent at End of Exam.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of Storage Application Entity

The existence of a Network Store queue with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related queue is set to a “Failed” state, indicated by a Red dot on the Network Icon, and can be restarted by the user via the queue management interface. Multiframe (loop) objects may be transferred as uncompressed using RGB Photometric Interpretation. When “Image Export Format” is selected as “monochrome”, single frame images that have no Color Flow Doppler or Chroma maps applied, will export as grayscale using Monochrome2 Photometric Interpretation. Single frame images that include Color Flow Doppler will be sent as RGB. If the non-active region of a 2D/scrolling image has a chroma map, it will be sent as monochrome. The “Image Export Format” selection has no effect on loop images.

4.1.2.2 Functional Definition of Workflow Application Entity

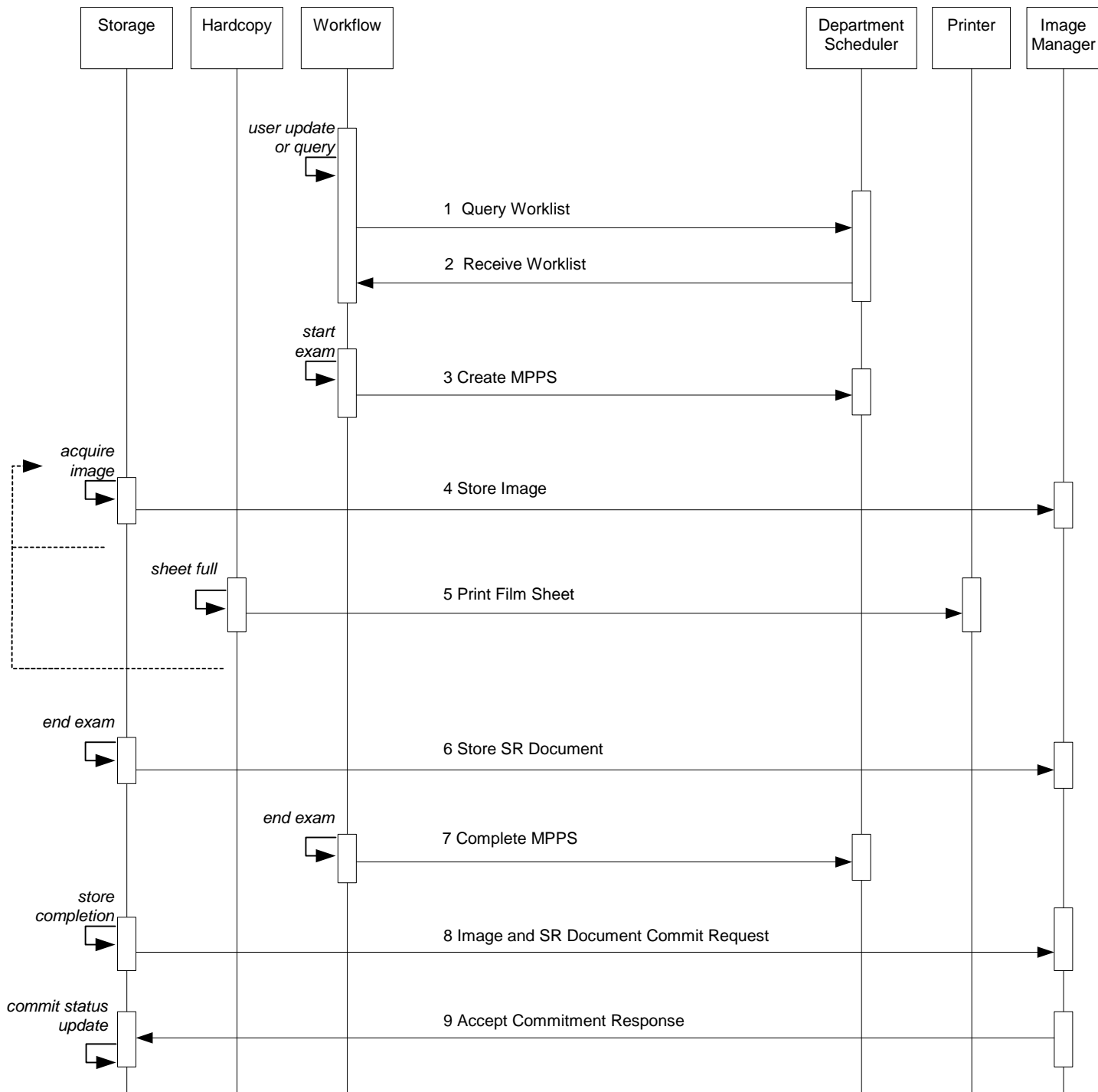
Update Worklist attempts to download a Modality Worklist from a Modality Worklist server with studies matching US for ultrasound and the current date. If the Workflow AE establishes an Association to a remote AE, it will transfer all worklist items via the open Association. The results of a successful Worklist Update will overwrite the data in the Worklist display. Specific queries for Patient Last Name, Patient ID, Accession #, Date, and Requested Procedure ID may be performed using the Patient Search. There is no queue management for Worklist.

The Workflow AE performs the creation of a MPPS Instance automatically when the first image of a study is acquired. MPPS status is displayed in the Network queue management Icon.

4.1.2.3 Functional Definition of Hardcopy Application Entity

The existence of a print queue will activate the Hardcopy AE. An association is established with the printer(s) and the printer’s status determined. If the printer is operating normally, the film sheets will be printed. If the printer is not operating normally, the print queue will set to a “Failed” state and can be restarted by the user via the queue management interface. In the case that a user has both a BW and a Color DICOM printer configured, during an exam with “After Each Print/Capture” selected, the images that contain color data, i.e., Color Flow Doppler or Chroma, will be sent to the Color printer only, and all other images sent only to the BW printer.

4.1.3 Sequencing of Real-World Activities



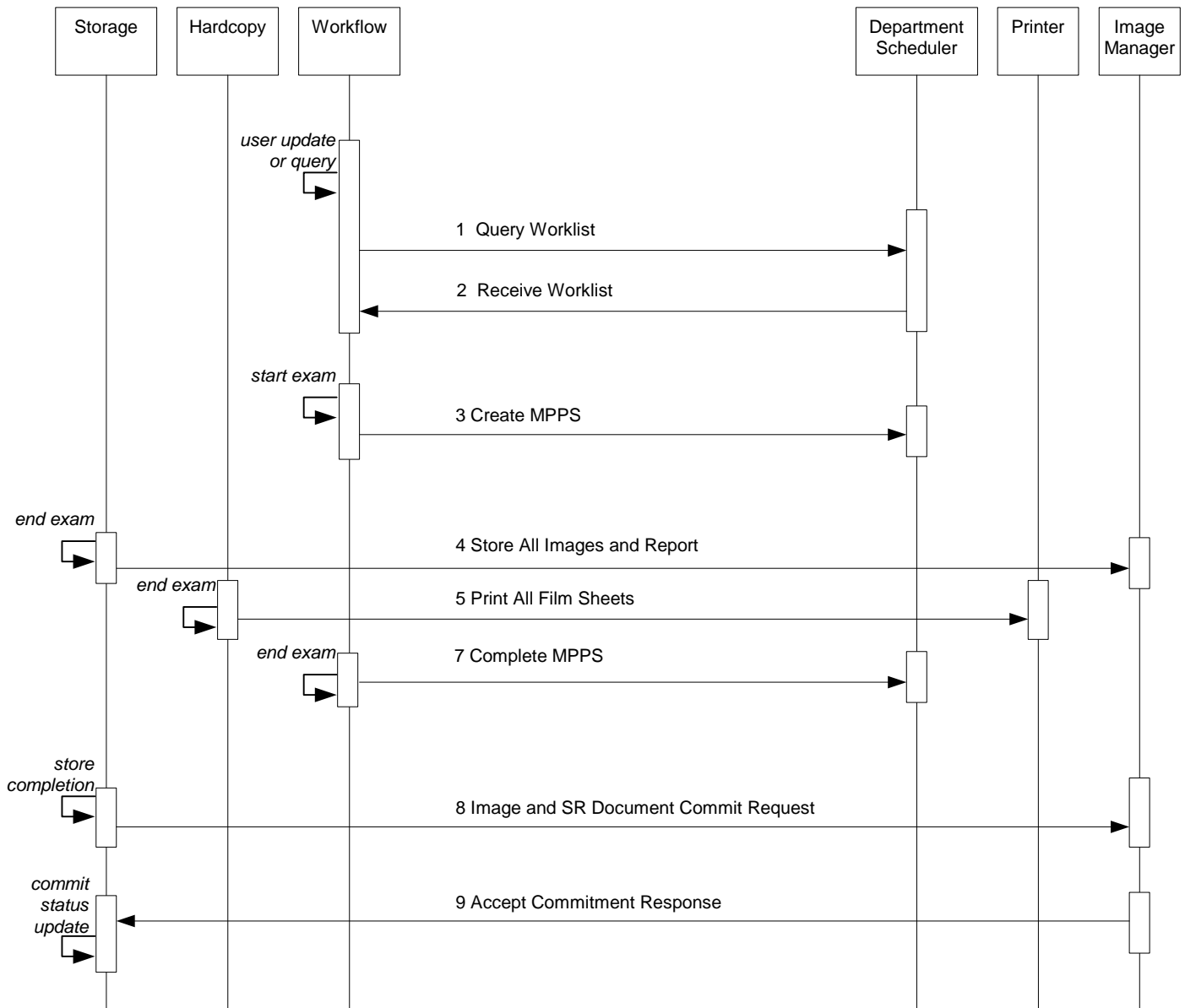
**Figure 2a:
SEQUENCING CONSTRAINTS – AFTER EACH CONFIGURATION**

Figures 2a and 2b illustrate normal scheduled workflow conditions.

Notes:

- Printing to DICOM printers may occur independent of any other DICOM activity.
- All selected store, print and DVD devices will be sent data during the exam when configured for “Send After Each Print/Capture” or at “At End of Exam.”
- Selecting a study from Review for export will send to all selected devices.

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



**Figure 2b:
SEQUENCING CONSTRAINTS – END EXAM CONFIGURATION**

4.2 AE SPECIFICATIONS

4.2.1 Storage Application Entity Specification

4.2.1.1 SOP Classes

iU22 provides Standard Conformance to the following SOP Classes:

Table 3
SOP CLASSES FOR AE STORAGE

| SOP Class Name | SOP Class UID | SCU | SCP |
|---|-------------------------------|-----|-----|
| US Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Yes | No |
| US Multiframe Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Yes | No |
| Comprehensive Structured Report Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Yes | No |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Yes | No |

4.2.1.2 Association Establishment Policy

4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 4
DICOM APPLICATION CONTEXT FOR AE STORAGE

| | |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.1.2.2 Number of Associations

iU22 initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Three 'Archive' destinations may be selected simultaneously, but only one job will be active at a time, the other(s) remain pending until the active job is completed or failed.

Table 5
NUMBER OF ASSOCIATIONS INITIATED FOR AE STORAGE

| | |
|---|---|
| Maximum number of simultaneous Associations | 5, 1 for each configured storage device |
|---|---|

1 for each store destination, 1 Structured Report and 1 Storage Commitment

iU22 accepts Associations for N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class.

Table 6
NUMBER OF ASSOCIATIONS ACCEPTED FOR AE STORAGE

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

4.2.1.2.3 Asynchronous Nature

iU22 does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 7
ASYNCHRONOUS NATURE AS A SCU FOR AE STORAGE

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

4.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 8
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE

| | |
|-----------------------------|----------------------|
| Implementation Class UID | 1.3.46.670589.5.2.10 |
| Implementation Version Name | ACP1.1L4 |

4.2.1.3 Association Initiation Policy

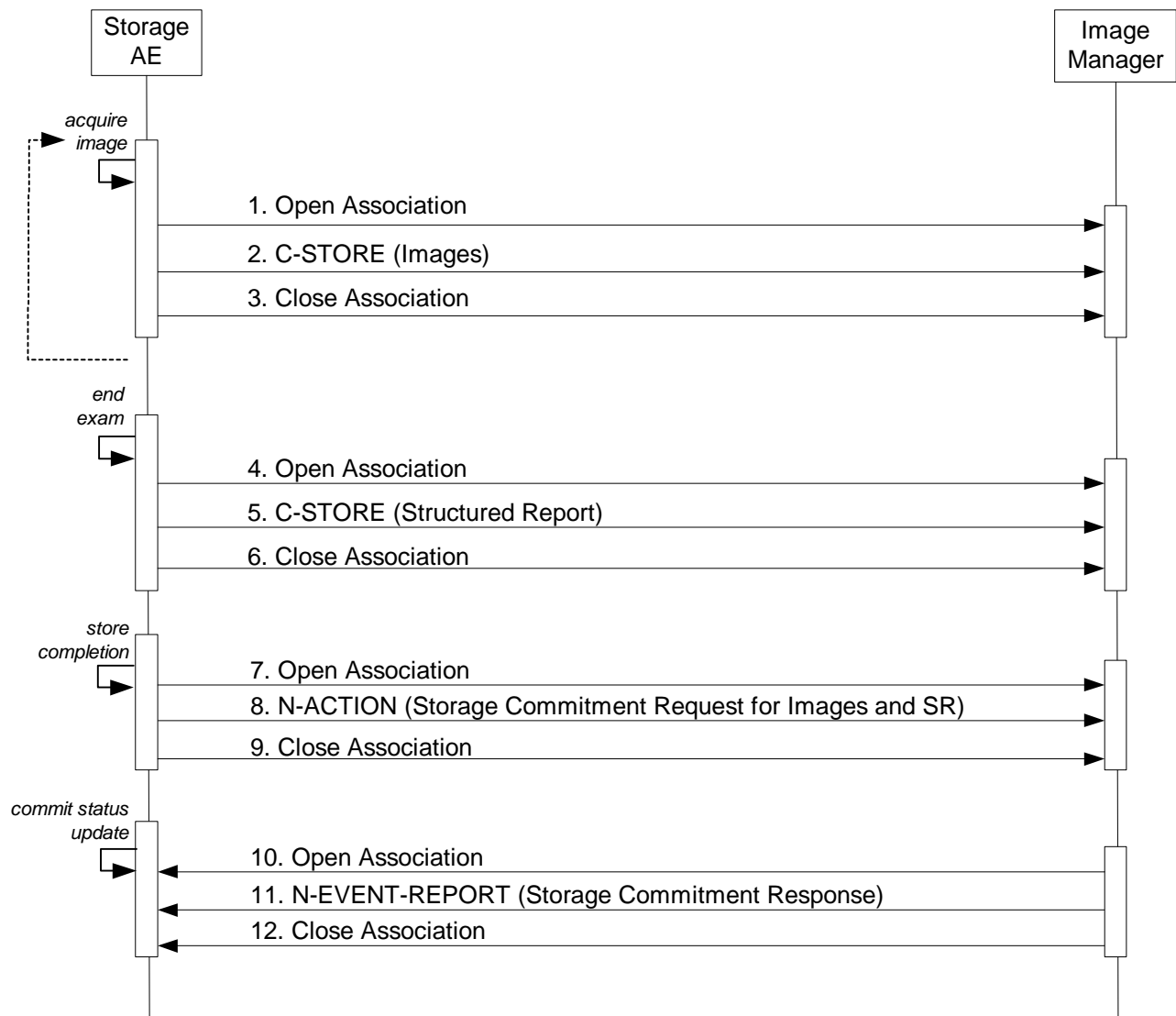
4.2.1.3.1 Activity – Store Images, Loops and Structured Reports

4.2.1.3.1.1 Description and Sequencing of Activities

A user can select exams or individual images from Review and request them to be sent to multiple destinations (up to 3). Reports may not be selected individually, but are sent when “End Exam” is pressed, and when an entire study is selected from the Review Directory. Each object (single frame, Multiframe, 3D, report) is entered into the job queue. When the “Send After Each Print/Capture” option is active, the queue is serviced continuously during the exam. There is a default 10-minute timeout for “Send After Each,” after which the association is closed. Any additional images acquired during the exam will be sent on a subsequent association.

The Network Status icon reports the status of the job, Green is ok, Yellow is paused, and Red is failed. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction. When a system configured with selected network destinations is used without the network connected, it is considered in “Portable” mode. Each network status Icon will be Yellow with status of “Pending” for each study acquired while the network was not connected. When returning from portable, reconnecting the network cable will initiate transfer beginning again.

If a device is configured for Storage Commitment service, the Storage AE will, after all images and reports have been sent, transmit a single Storage Commitment request (N-ACTION) over a separate Association. The Storage AE can only receive an N-EVENT-REPORT request in a subsequent association initiated by the SCP.



**Figure 3
SEQUENCING OF ACTIVITY – SEND IMAGES**

The sequence of interactions between the Storage AE and an Image Manager is illustrated in Figure 3 for the “Store” configuration option “After Each.” The alternative option, “End Exam” differs only in the removal of the loop symbol on the ‘acquire images’ activity

NOTE: Message sequences vary depending on the relative time of the SCP AE’s. The N-EVENT-REPORT must be sent over a separate association initiated by the Image Manager (see Section 4.2.1.4.1 on Activity – Receive Storage Commitment Response).

4.2.1.3.1.2 Proposed Presentation Contexts

iU22 is capable of proposing the Presentation Contexts shown in the following table:

**Table 9
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES**

| Presentation Context Table | | | | | |
|---|-------------------------------|---|--|------|-----------|
| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
| Name | UID | Name List | UID List | | |
| US Image Storage* | 1.2.840.10008.5.1.4.1.1.6.1 | Implicit VR Little Endian Explicit VR Little Endian | 1.2.840.10008.1.2 1.2.840.10008.1.2.1 | SCU | None |
| US Image Storage* (Retired) | 1.2.840.10008.5.1.4.1.1.6 | Implicit VR Little Endian Explicit VR Little Endian | 1.2.840.10008.1.2 1.2.840.10008.1.2.1 | SCU | None |
| US Multiframe Image Storage** | 1.2.840.10008.5.1.4.1.1.3.1 | Implicit VR Little Endian Explicit VR Little Endian JPEG Lossy Baseline | 1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 | SCU | None |
| US Multiframe Image Storage** (Retired) | 1.2.840.10008.5.1.4.1.1.3 | Implicit VR Little Endian Explicit VR Little Endian JPEG Lossy Baseline | 1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 | SCU | None |
| Comprehensive Structured Report Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Implicit VR Little Endian Explicit VR Little Endian | 1.2.840.10008.1.2 1.2.840.10008.1.2.1 | 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 |

* All single frame images are RGB unless Image Export option "Monochrome" is selected in setups. The following table describes which images will be exported in Monochrome2 and which will be in RGB. Same behavior for Chroma.

| Imaging Mode | Monochrome2 | RGB |
|--------------------|-------------|-----|
| 2D Only | x | |
| 2D – MLine | x | |
| 2D/MMode | x | |
| 2D – DopplerLine | x | |
| 2D- PDop Active | x | |
| 2DCF | | x |
| 2DCF – DopplerLine | | x |
| 2DCF – PDop Active | | x |
| 2DCF Active - PDop | | x |
| 2DCF – PDop Simul | | x |

NOTE: If 'Full Screen' is selected, all images RGB.

** Loops will be YBR_FULL_422 unless "Uncompressed" is selected in setups, which will produce RGB loops.

All Presentation Contexts are proposed for all Archive devices. Storage Commitment N-Action Requests are only sent to devices that are also configured as the Storage Commitment server, and a target archive is selected that images are sent to.

“Target Archive” is one of the three possible archives that images are sent to. “Commit Server” may be the same device but must be configured in Global Config/Devices.

4.2.1.3.1.3 SOP Specific Conformance for Image and Comprehensive Structured Report Storage SOP Classes

All Image and Comprehensive Structured Report Storage SOP Classes supported by the Storage AE exhibit the same behavior, except where stated, and are described together in this section.

Table 10 describes C-Store response behavior.

**Table 10
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|-----------------|------------------------|--|
| Success | Success | 0000 | The SCP successfully stored the SOP Instance. If all SOP Instances succeed, the job is marked as complete. |
| * | * | Any other status code. | The Association is aborted using A-ABORT and the transfer fails. The status is logged. |

The behavior of Storage AE during communication failure is summarized in Table 11.

**Table 11
STORAGE COMMUNICATION FAILURE BEHAVIOR**

| Exception | Behavior |
|--|---|
| Timeout | Same as Service Status “Refused” in Table 10 above. |
| Association aborted by the SCP or network layers | Same as Service Status “Refused” in Table 10 above. |

An Association that is broken due to SCP Timeout or a broken and reestablished network topology will automatically retry connection 25 times with a 10 second delay before reporting a connection failure. Connection retry is initiated when a queue exists, and when a new image is acquired.

A green dot on the Network Transfer Icon indicates a successful transfer or an active queue. A red dot indicates failure. By using the Queue Manager, the user can restart a failed transfer. Open the Queue Manager by clicking on the Network Transfer Icon. Select the failed transfer and click Resume.

The contents of US Image, US Multiframe Storage and Comprehensive Structured Report Storage SOP Instances conform to the DICOM IOD definitions described in Section 8.1.

4.2.1.3.1.4 SOP Specific Conformance for Storage Commitment Push Model SOP Class

4.2.1.3.1.4.1 Storage Commitment Operations (N-ACTION)

The Storage AE will request storage commitment for the configured device.

Table 12 summarizes the behavior of Storage AE when receiving response status codes.

**Table 12
STORAGE COMMITMENT N-ACTION RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|-----------------|------------------------|---|
| Success | Success | 0000 | The system waits for the N-Event-Report. |
| * | * | Any other status code. | The commit status remains incomplete for all objects. |

Table 13 summarizes the behavior of Storage AE during communication failure.

**Table 13
STORAGE COMMITMENT COMMUNICATION FAILURE BEHAVIOR**

| Exception | Behavior |
|--|---|
| Timeout | Same as non-success status in Table 12. |
| Association aborted by the SCP or network layers | Same as non-success status in Table 12. |

4.2.1.3.1.4.2 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage AE can receive an N-EVENT-REPORT notification received from the SCP via Reverse-role negotiation.

Table 14 summarizes the behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT.

**Table 14
STORAGE COMMITMENT N-EVENT-REPORT BEHAVIOUR**

| Event Type Name | Event Type ID | Behavior |
|--|---------------|---|
| Storage Commitment Request Successful | 1 | The commit status is set to complete for each object. |
| Storage Commitment Request Complete – Failures Exist | 2 | The commit status remains incomplete. The commit comment for each object is logged. |

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in Table 15.

**Table 15
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. |

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity – Receive Storage Commitment Response

4.2.1.4.1.1 Description and Sequencing of Activities

The Storage AE accepts associations for pending responses to a Storage Commitment Request only using SCP/SCU Role Negotiation; explicitly stating the association is initiated by the SCP to the SCU. Any other will be rejected.

4.2.1.4.1.2 Accepted Presentation Contexts

Table 17 summarizes Presentation Contexts that the Storage AE accepts.

**Table 17
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 | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |

4.2.1.4.1.3 SOP Specific Conformance for Storage Commitment Push Model SOP Class

4.2.1.4.1.3.1 Storage Commitment Notifications (N-EVENT-REPORT)

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

Table 14 summarizes the behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT.

Table 15 summarizes the reasons for returning specific status codes in a N-EVENT-REPORT response.

4.2.2 Workflow Application Entity Specification

4.2.2.1 SOP Classes

iU22 provides Standard Conformance to the following SOP Classes:

**Table 18
SOP CLASSES FOR AE WORKFLOW**

| SOP Class Name | SOP Class UID | SCU | SCP |
|-----------------------------------|-------------------------|-----|-----|
| MWL 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 |

4.2.2.2 Association Establishment Policy

4.2.2.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 19
DICOM APPLICATION CONTEXT FOR AE WORKFLOW**

| | |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.2.2.2 Number of Associations

iU22 initiates one Association at a time for a Worklist request.

**Table 20
NUMBER OF ASSOCIATIONS INITIATED FOR AE WORKFLOW**

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

4.2.2.2.3 Asynchronous Nature

iU22 does not support asynchronous communication.

Table 21
ASYNCHRONOUS NATURE AS A SCU FOR AE WORKFLOW

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

4.2.2.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 22
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE WORKFLOW

| | |
|-----------------------------|----------------------|
| Implementation Class UID | 1.3.46.670589.5.2.10 |
| Implementation Version Name | ACP1.1L4 |

4.2.2.3 Association Initiation Policy

4.2.2.3.1 Activity – Worklist Update

4.2.2.3.1.1 Description and Sequencing of Activities

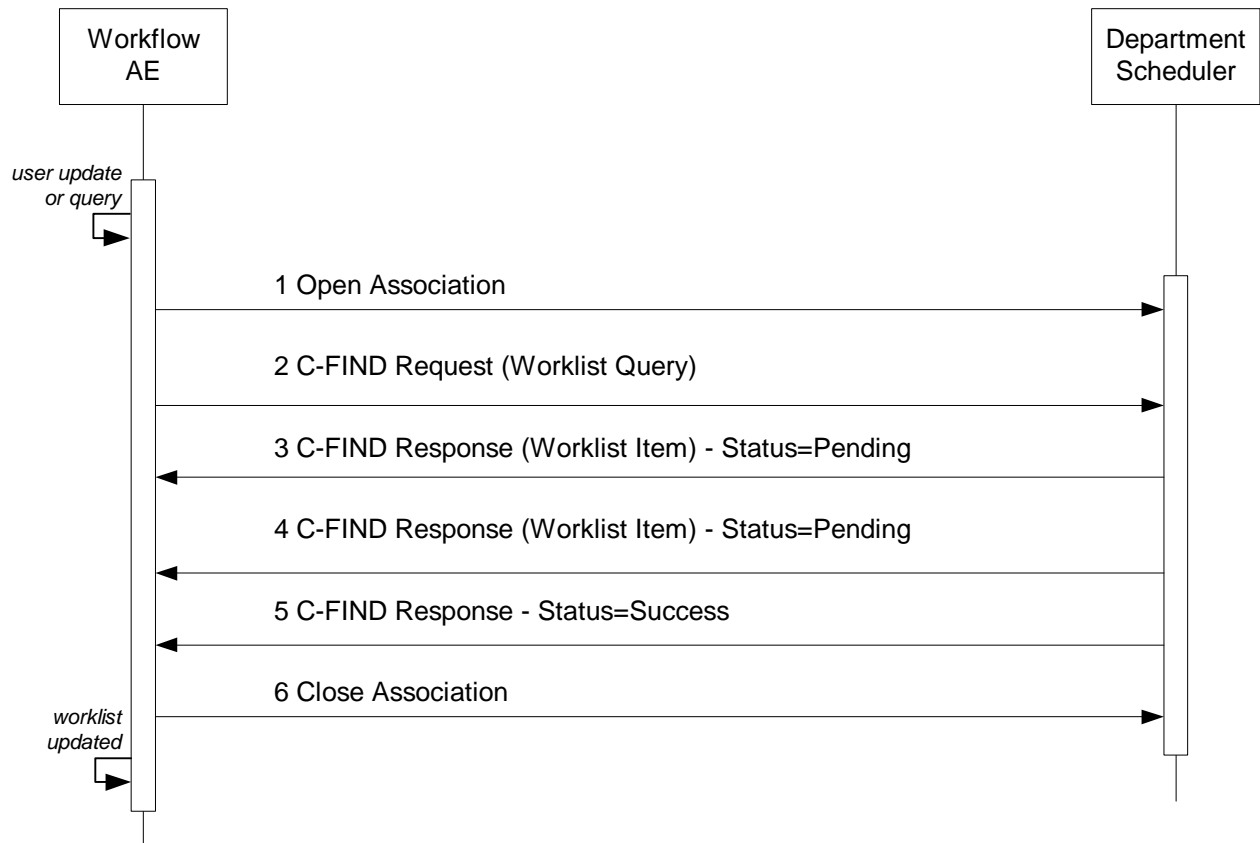
Two events may initiate worklist queries for Modality (US) only:

- User may key “Update Worklist” or “Patient Search...” and enter matching fields to start a query: Patient Name, Patient ID, Accession #, Exam Date or Requested Procedure ID
- The system may periodically update with a configurable time interval (between 15 and 120 minutes at 15 minute increments) and configured query fields: System AE Title, Station Name, Current Date, System Location

The user at may cancel a worklist update anytime between sending the update request and receiving the final response.

“Update Worklist” sends:
Modality = US and Current Date

“Patient Search,,,” sends:
Modality = US and any combination of
Last Name (Wild Card (*) or Matching
Leading Letters)
Patient ID (Exact Match)
Accession # (Exact Match)
Exam Date (Exact Match)
Procedure ID (Exact Match)



**Figure 5
SEQUENCING OF ACTIVITY – WORKLIST UPDATE**

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 MWL SOP Class as an SCP) is illustrated in Figure 5:

4.2.2.3.1.2 Proposed Presentation Contexts

iU22 will propose Presentation Contexts as shown in the following table:

**Table 23
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY WORKLIST UPDATE**

| 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 |

4.2.2.3.1.3 SOP Specific Conformance for Modality Worklist

Table 24 summarizes the behavior of iU22 when encountering status codes in a MWL C-FIND response.

A message “query failed” will appear on the user interface if iU22 receives any other SCP response status than “Success” or “Pending.”

**Table 24
MODALITY WORKLIST C-FIND RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code | Behavior |
|-----------------------|--|------------------------|---|
| Success | Matching is complete | 0000 | The system replaced the worklist from the response. |
| Refused | Out of Resources | A700 | The Association is aborted using A-ABORT. The worklist is not replaced. |
| Failed | Identifier does not match SOP Class | A900 | Same as “Refused” above. |
| Failed | Unable to Process | C000 – CFFF | Same as “Refused” above. |
| Cancel | Matching terminated due to Cancel request | FE00 | The retrieved items are ignored. |
| Pending | Matches are continuing | FF00 | Continue. |
| Pending | Matches are continuing – Warning that one or more Optional Keys were not supported | FF01 | Continue. |
| * | * | Any other status code. | Same as “Refused” above. |

Table 25 summarizes the behavior of iU22 during communication failure.

**Table 25
MODALITY WORKLIST COMMUNICATION FAILURE BEHAVIOR**

| Exception | Behavior |
|--|--|
| Timeout | Same as Service Status “Refused” in the table above. |
| Association aborted by the SCP or network layers | Same as Service Status “Refused” in the table above. |

Table 26 describes the iU22 Worklist Matching Keys and requested attributes. Unexpected attributes returned in a C-FIND response are ignored.

Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored.

| | | | | | | | |
|------------------------------|-------------|----|--|---|--|--|---|
| Patient Medical | | | | | | | |
| Medical Alerts | (0010,2000) | LO | | | | | |
| Additional Patient's History | (0010,21B0) | LT | | x | | | x |
| Pregnancy Status | (0010,21C0) | US | | x | | | x |
| Last Menstrual Date | (0010,21D0) | DA | | | | | |

X* = Additionally mapped to "Study ID" (0020,0010) in Composite Objects

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 iU22 Worklist Request Identifier.

Tag: DICOM tag for this attribute.

VR: DICOM VR for this attribute.

M: Matching keys for (automatic) Worklist Update. An "S" indicates that iU22 supplies an attribute value for Single Value Matching or additional specific tags indicated by "(S)". See ¹ below.

R: Return keys. An "x" indicates that iU22 supplies this attribute as a Return Key with zero length for Universal Matching.

Q: Interactive Query Key. An "x" indicates that iU22 supplies this attribute as matching key, if entered in the Patient Search dialog.

D: Displayed keys. An "x" indicates that this worklist attribute is displayed to the user in the Worklist tab of the Patient Data screen.

IOD: An "x" indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step.

¹ Entered in Global Configuration – System tab, "AE Title", selected in Device Selection – Worklist tab, Define Query section

² From Patient Search tab in Patient Data Entry – "Exam Date" field

³ Fixed at "US"

⁴ From Global Configuration – System tab, "Station Name", selected in Device Selection – Worklist tab, Define Query section

⁵ From Global Configuration – System tab, "System Location", selected in Device Selection – Worklist tab, Define Query section

⁶ From Patient Search tab in Patient Data Entry – "Procedure ID" field.

⁷ From Patient Search tab in Patient Data Entry – "Accession #" field

⁸ From Patient Search tab in Patient Data Entry – "Last Name" field

⁹ From Patient Search tab in Patient Data Entry – "Patient ID" field

4.2.2.3.2 Activity –Acquire Images

4.2.2.3.2.1 Description and Sequencing of Activities

An Association to the configured MPPS SCP system is established immediately after the first image is acquired to send the MPPS N-Create message.

The "End Exam" button causes a "COMPLETED" message. An exam for which an MPPS Instance is sent with a state of "COMPLETED" can no longer be updated.

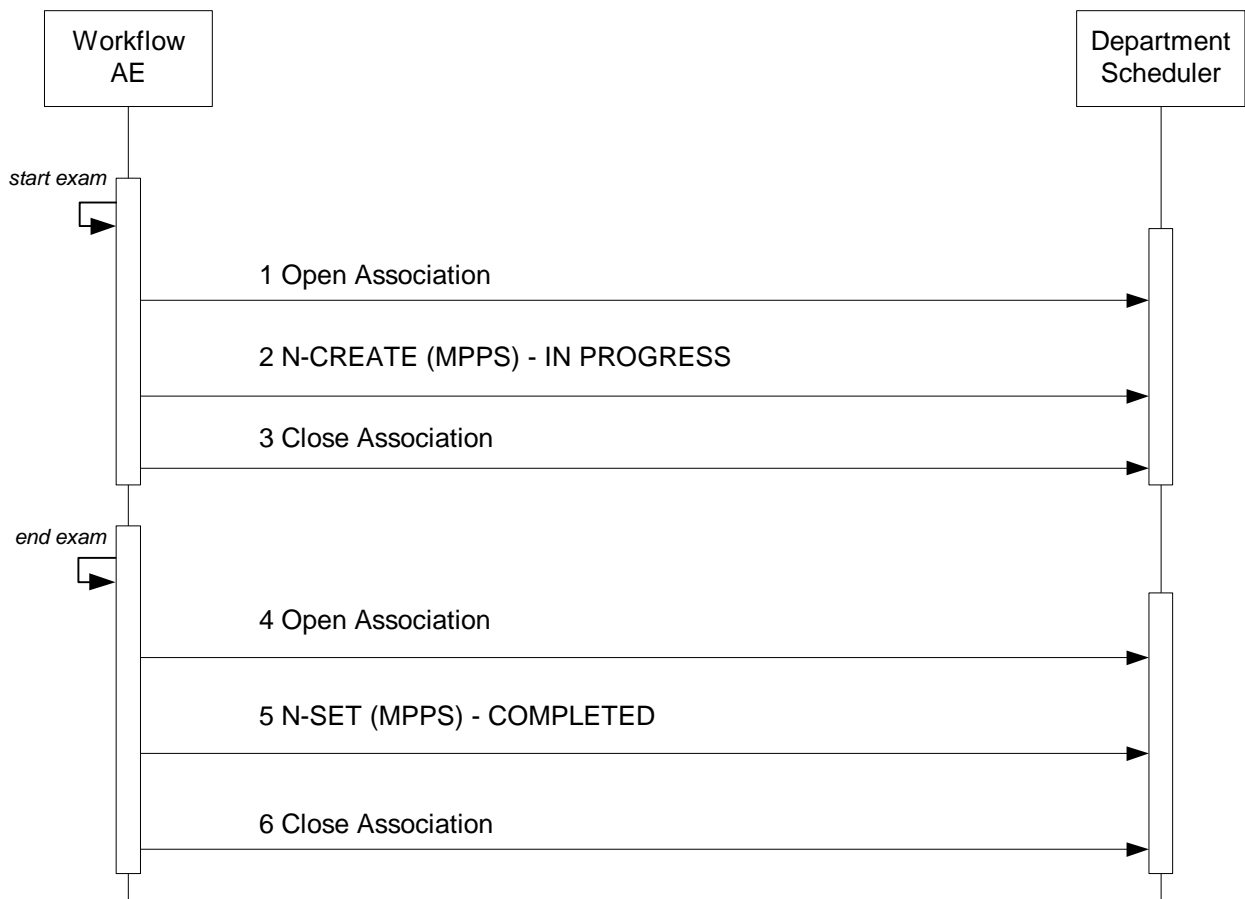
The system will support creation of "unscheduled cases" by allowing MPPS Instances to be communicated for locally registered Patients.

The system only supports a 0-to-1 relationship between Scheduled and Performed Procedure Steps.

iU22 will initiate an Association to issue an:

— N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation or a

- N-SET request to finalize the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.



**Figure 6
SEQUENCING OF ACTIVITY – ACQUIRE IMAGES**

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 MPPS SOP Class as an SCP) is illustrated in Figure 6:

4.2.2.3.2.2 Proposed Presentation Contexts

iU22 will propose Presentation Contexts as shown in the following table:

**Table 27
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY ACQUIRE IMAGES**

| 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 |

4.2.2.3.2.3 SOP Specific Conformance for MPPS

Table 28 summarizes the behavior of iU22 when encountering status codes in an MPPS N-CREATE or N-SET response.

The message “MPPS update failed” will appear in the Network Queue Management when and the Icon’s dot turns red, if iU22 receives any other SCP response status than “Success” or “Warning”.

**Table 28
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 aborted. |
| Warning | Attribute Value Out of Range | 0116H | The error message is displayed. |
| * | * | Any other status code. | Same as “Failure” above. |

Table 29 summarizes the behavior of iU22 during communication failure.

**Table 29
MPPS COMMUNICATION FAILURE BEHAVIOR**

| Exception | Behavior |
|--|--------------------------|
| Timeout | Same as “Failure” above. |
| Association aborted by the SCP or network layers | Same as “Failure” above. |

Table 30 provides a description of the MPPS N-CREATE and N-SET request identifiers. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent.

**Table 30
MPPS N-CREATE / N-SET REQUEST IDENTIFIER**

| Attribute Name | Tag | VR | N-CREATE | N-SET |
|------------------------------|-------------|----|--|-------|
| Specific Character Set | (0008,0005) | CS | Not Sent, unless replacement character set is used. | |
| Modality | (0008,0060) | CS | US | |
| Referenced Patient Sequence | (0008,1120) | SQ | | |
| > Referenced SOP Class UID | (0008,1150) | UI | 1.2.840.10008.3.1.2.1.1 | |
| >Referenced SOP Instance UID | (0008,1155) | UI | | |
| Patient’s Name | (0010,0010) | PN | As received from MWL or entered in PDE. | |
| Patient ID | (0010,0020) | LO | From Modality Worklist or user input. MWL value may be edited. | |
| Patient’s Birth Date | (0010,0030) | DA | Same as above. | |
| Patient’s Sex | (0010,0040) | CS | Same as above. | |
| Study ID | (0020,0010) | SH | From Requested Procedure ID from MWL, else System | |

| | | | | |
|--|-------------|----|---|----------------------|
| | | | Generated <yyyymmdd.hhmmss> | |
| Performed Station AE Title | (0040,0241) | AE | AE Title from configuration | |
| Performed Station Name | (0040,0242) | SH | From Ultrasound System Configuration | |
| Performed Location | (0040,0243) | SH | From Ultrasound System Configuration | |
| Performed Procedure Step Start Date | (0040,0244) | DA | Actual start date | |
| Performed Procedure Step Start Time | (0040,0245) | TM | Actual start time | |
| Procedure Code Sequence | (0008,1032) | SQ | As received from MWL | As received from MWL |
| >Code Value | (0008,0100) | SH | As received from MWL | As received from MWL |
| >Coding Scheme Designator | (0008,0102) | SH | As received from MWL | As received from MWL |
| >Coding Scheme Version | (0008,0103) | SH | As received from MWL | As received from MWL |
| >Code Meaning | (0008,0104) | LO | As received from MWL | As received from MWL |
| 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 |
| Performed Procedure Step ID | (0040,0253) | SH | Auto generated | |
| Performed Procedure Step Description | (0040,0254) | LO | MWL Scheduled Procedure Step Description (0040,0007) or PDE input if any. | |
| Performed Protocol Code Sequence | (0040,0260) | SQ | Zero length | Zero or more items |
| Scheduled Step Attributes Sequence | (0040,0270) | SQ | | |
| > Accession Number | (0008,0050) | SH | From MWL or user PDE input. MWL value may be edited. | |
| > Referenced Study Sequence | (0008,1110) | SQ | One item per item in the MWL Reference Study Sequence. Absent if unscheduled. | |
| >> Referenced SOP Class UID | (0008,1150) | UI | Same value as in of the Reference Study Sequence in the MWL | |
| >> Referenced SOP Instance UID | (0008,1155) | UI | Same value as in of the Reference Study Sequence in the MWL | |
| > Study Instance UID | (0020,000D) | UI | Same value as in MWL attribute or auto generated | |
| > Requested Procedure Description | (0032,1060) | LO | Same value as in MWL attribute | |
| > Scheduled Procedure Step Description | (0040,0007) | LO | Same value as in MWL attribute | |

| | | | | |
|------------------------------------|-------------|----|--------------------------------|---------------------------------------|
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | Same value as in MWL attribute | |
| > Scheduled Procedure Step ID | (0040,0009) | SH | Same value as in MWL attribute | |
| > Requested Procedure ID | (0040,1001) | SH | Same value as in MWL attribute | |
| Performed Series Sequence | (0040,0340) | SQ | | One item per acquired series |
| > Performing Physician's Name | (0008,1050) | PN | See Table 74 | See Table 74 |
| > Operator's Name | (0008,1070) | PN | See Table 74 | See Table 74 |
| > Referenced Image Sequence | (0008,1140) | SQ | | One item per referenced instance |
| >> Referenced SOP Class UID | (0008,1150) | UI | | SOP Class UID of acquired instance |
| >> Referenced SOP Instance UID | (0008,1155) | UI | | SOP Instance UID of acquired instance |
| > Protocol Name | (0018,1030) | LO | | See Table 74 |
| > Series Instance UID | (0020,000E) | UI | | See Table 74 |

4.2.2.4 Association Acceptance Policy

The Workflow Application Entity does not accept Associations.

4.2.3 Hardcopy Application Entity Specification

4.2.3.1 SOP Classes

iU22 provides Standard Conformance to the following SOP Classes:

**Table 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 Establishment Policy

4.2.3.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 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

iU22 initiates one Association at a time for each configured hardcopy device. Multiple hardcopy devices can be configured.

**Table 33
NUMBER OF ASSOCIATIONS INITIATED FOR AE HARDCOPY**

| | |
|---|---|
| Maximum number of simultaneous Associations | 2 (number of configured hardcopy devices) |
|---|---|

4.2.3.2.3 Asynchronous Nature

iU22 does not support asynchronous communication (multiple outstanding transactions over a single Association).

**Table 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 35
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE HARDCOPY**

| | |
|-----------------------------|----------------------|
| Implementation Class UID | 1.3.46.670589.5.2.10 |
| Implementation Version Name | ACP1.1L4 |

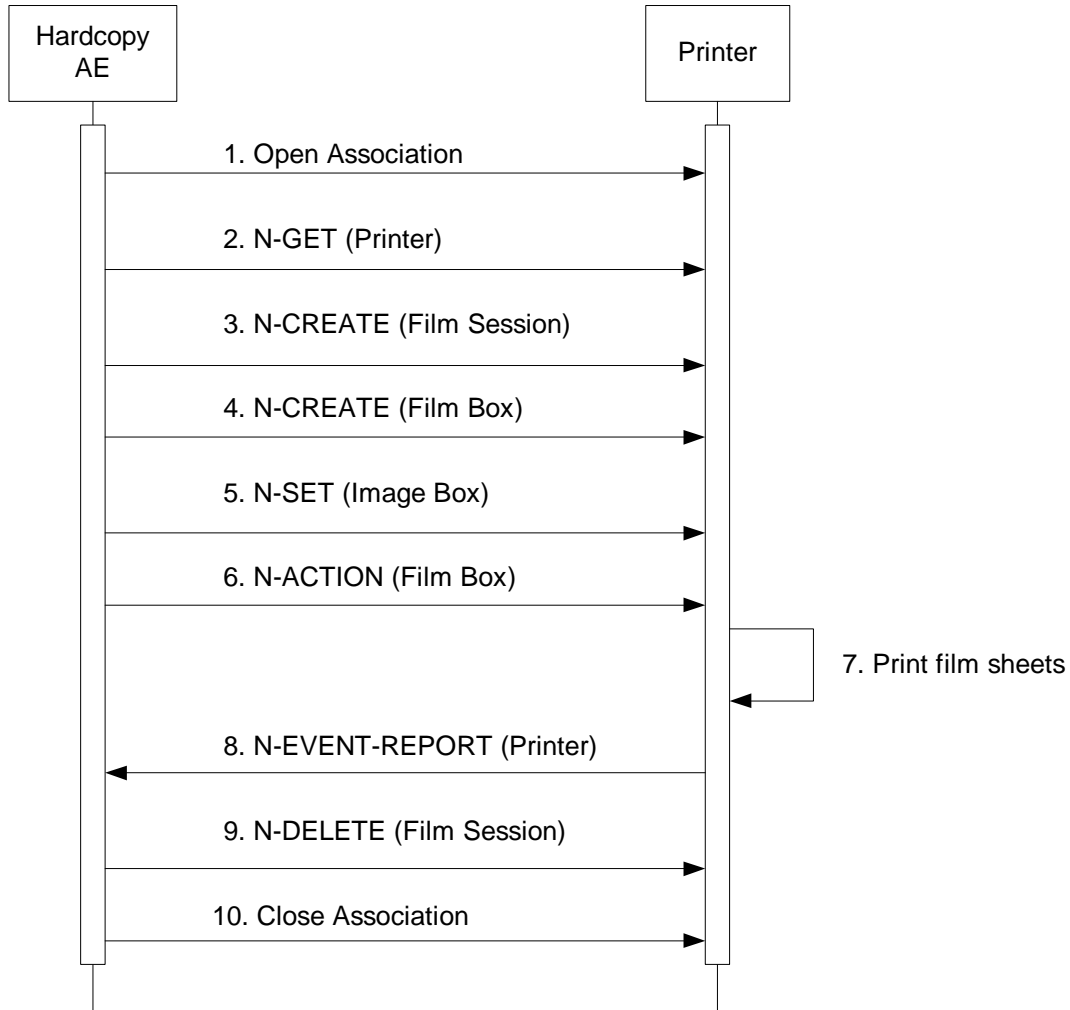
4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity – Film Images

4.2.3.3.1.1 Description and Sequencing of Activities

The system composes images onto film sheets and sends print requests to job queue.

Figure 7 illustrates the print sequence.



**Figure 7
SEQUENCING OF ACTIVITY – FILM IMAGES**

Figure 7 illustrates a typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer.

Status of the print-job is reported through the Printer Queue Manager icon. Only one job will be active at a time for each separate hardcopy device. If any Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction.

4.2.3.3.1.2 Proposed Presentation Contexts

Table 36 shows the Presentation Contexts iU22 is capable of proposing.

**Table 36
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY FILM 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 | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| Basic Color Print Management Meta | 1.2.840.10008.5.1.1.18 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |

4.2.3.3.1.3 Common SOP Specific Conformance for all Print SOP Classes

Table 37 summarizes the general behavior of Hardcopy AE during communication failure. This behavior is common for all SOP Classes supported by Hardcopy AE.

**Table 37
HARDCOPY COMMUNICATION FAILURE BEHAVIOR**

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted and reported as "Failed." |
| Association aborted by the SCP or network layers | "Network Communication Failure" is reported. |

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

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. Table 38 lists the attributes obtained via N-GET.

**Table 38
PRINTER SOP CLASS N-GET RESPONSE ATTRIBUTES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------|-------------|----|---------------------|-------------------|---------|
| Printer Status | (2110,0010) | CS | Provided by Printer | ALWAYS | Printer |
| Printer Status Info | (2110,0020) | CS | Provided by Printer | ALWAYS | Printer |

The Printer Status information is evaluated as follows:

1. If Printer status (2110,0010) is NORMAL, the print-job continues to be printed.
2. If Printer status (2110,0010) is FAILURE, the print-job is marked as failed.
3. If Printer status (2110,0010) is WARNING, the print-job continues to be printed.

Table 39 summarizes the behavior of Hardcopy AE when encountering status codes in a N-GET response.

**Table 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. | Same as Timeout above. |

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.

Table 40 summarizes the behavior of Hardcopy AE when receiving Event Types within the N-EVENT-REPORT.

**Table 40
PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOUR**

| Event Type Name | Event Type ID | Behavior |
|-----------------|---------------|--|
| Normal | 1 | The print-job continues to be printed. |
| Warning | 2 | The print-job. For user-recoverable warnings, the job fails and a 1-hour retry period starts, retrying every 20 seconds. |
| Failure | 3 | The print-job is marked as failed. |
| * | * | Status code of 0113H |

Table 41 summarizes the reasons for returning specific status codes in a N-EVENT-REPORT response.

**Table 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

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)

Table 42 lists the attributes supplied in an N-CREATE Request.

**Table 42
FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------|-------------|----|--|-------------------|--------|
| Number of Copies | (2000,0010) | IS | Default 1. User defined in Device Configuration. | ALWAYS | USER |
| Medium Type | (2000,0030) | CS | BLUE FILM, CLEAR FILM or PAPER* | ALWAYS | USER |
| Film Destination | (2000,0040) | CS | MAGAZINE or PROCESSOR* | ALWAYS | USER |

* Dependent on the specific printer selected

Table 43 summarizes the behavior of Hardcopy AE when encountering status codes in a N-CREATE response.

**Table 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 | System continues operations. |
| Warning | Attribute List Error | 0107H | Same as above. |
| * | * | Any other status code. | The Association is aborted and the print-job fails. |

4.2.3.3.1.7 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.

4.2.3.3.1.7.1 Film Box SOP Class Operations (N-CREATE)

Table 47 lists the attributes supplied in an N-CREATE Request.

**Table 47
FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------------|-------------|----|---|-------------------|-----------|
| Image Display Format | (2010,0010) | ST | STANDARD\1,1 or CUSTOM\xxx depending on printer. Default is displayed, and is user editable. Use only when substitute value is known. | ALWAYS | AUTO/USER |
| 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 |
| Film Orientation | (2010,0040) | CS | PORTRAIT or LANDSCAPE | ALWAYS | USER |

| | | | | | |
|---------------------------|-------------|----|---|--------|-----------|
| Film Size ID | (2010,0050) | CS | Depends on configuration file selected. DICOM Defined Terms plus US_Letter. | ALWAYS | USER |
| Magnification Type | (2010,0060) | CS | Default Value = NONE | ALWAYS | AUTO |
| Border Density | (2010,0100) | CS | BLACK | ALWAYS | AUTO |
| Empty Image Density | (2010,0110) | CS | BLACK | ALWAYS | AUTO |
| Min Density | (2010,0120) | US | Default value displayed, user editable | ALWAYS | AUTO/USER |
| Max Density | (2010,0130) | US | Default value displayed, user editable | ALWAYS | AUTO/USER |
| Configuration Information | (2010,0150) | ST | Default value displayed, user editable | ALWAYS | AUTO/USER |

Table 48 summarizes the behavior of Hardcopy AE when encountering status codes in a N-CREATE response.

**Table 48
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 Max Density outside of printer's operating range | B605H | The N-CREATE operation is considered successful but the status meaning is logged. |
| * | * | Any other status code. | The Association is aborted and the job failed. |

4.2.3.3.1.7.2 Film Box SOP Class Operations (N-ACTION)

The Hardcopy AE issues an N-ACTION Request to instruct the Print SCP to print the contents of the Film Box.

Table 49 summarizes the behavior of Hardcopy AE when encountering status codes in an N-ACTION response.

**Table 49
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) | B603H | The Association is aborted and the job is failed. |
| Failure | Unable to create Print Job SOP Instance; print queue is full. | C602 | Same as B603H above. |
| * | * | Any other status code. | Same as B603H above. |

4.2.3.3.1.8 SOP Specific Conformance for the Image Box SOP Class

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

— N-SET

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

4.2.3.3.1.8.1 Image Box SOP Class Operations (N-SET)

Table 50 lists the attributes supplied in an N-SET Request.

**Table 50
IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--------------------------------|-------------|----|--|-------------------|----------------------------|
| Image Position | (2020,0010) | US | 1 | ALWAYS | AUTO |
| Polarity | (0020,0020) | CS | NORMAL | ALWAYS | AUTO |
| Basic Grayscale Image Sequence | (2020,0110) | SQ | Used for BW (Monochrome2) print | ALWAYS* | AUTO |
| Basic Color Image Sequence | (2020,0111) | SQ | Used for Color (RGB) print | ALWAYS* | AUTO |
| >Samples Per Pixel | (0028,0002) | US | 1 for Monochrome2, 3 for Color | ALWAYS | AUTO |
| >Photometric Interpretation | (0028,0004) | CS | MONOCHROME2 or RGB | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | Always "00", only used in Color print. | ANAP | AUTO |
| >Rows | (0028,0010) | US | Depends on film size, number of rows for entire sheet of film | ALWAYS | Printer Configuration File |
| >Columns | (0028,0011) | US | Depends on film size, number of columns for entire sheet of film | ALWAYS | Printer Configuration File |
| >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 of rendered film sheet. | ALWAYS | AUTO |

* Mutually exclusive attributes

Table 51 summarizes the behavior of Hardcopy AE when encountering status codes in a N-SET response.

**Table 51
IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|--|------------------------|---|
| Success | Success | 0000 | The SCP has completed the operation successfully. |
| Failure | Insufficient memory in printer to store the image. | C605 | The Association is aborted and the job is failed. |
| * | * | Any other status code. | Same as C605 above. |

4.2.3.4 Association Acceptance Policy

The Hardcopy Application Entity does not accept Associations.

4.2.4 Verification Application Entity specification

4.2.4.1 SOP Class

iU22 provides Standard Conformance to the following SOP Class:

**Table 51.1
SOP CLASSES FOR AE VERIFICATION**

| SOP Class Name | SOP Class UID | SCU | SCP |
|----------------|-------------------|-----|-----|
| Verification | 1.2.840.10008.1.1 | Yes | Yes |

4.2.4.2 Association Establishment Policy

4.2.4.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 51.2
DICOM APPLICATION CONTEXT FOR AE VERIFICATION**

| | |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.4.2.2 Number of Associations

iU22 initiates one Association at a time for a Verification request.

**Table 51.31
NUMBER OF ASSOCIATIONS INITIATED FOR AE VERIFICATION**

| | |
|---|---|
| Maximum number of simultaneous Associations | Up to 10, one for each configured remote device |
|---|---|

**Table 51.32
NUMBER OF ASSOCIATIONS ACCEPTED FOR AE VERIFICATION**

| | |
|---|--|
| Maximum number of simultaneous Associations | Unlimited, however, calling AE must be already configured in iU22. |
|---|--|

4.2.4.2.3 Asynchronous Nature

iU22 does not support asynchronous communication (multiple outstanding transactions over a single Association).

**Table 51.4
ASYNCHRONOUS NATURE AS A SCU FOR AE VERIFICATION**

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

4.2.4.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**Table 51.5
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE VERIFICATION**

| | |
|-----------------------------|----------------------|
| Implementation Class UID | 1.3.46.670589.5.2.10 |
| Implementation Version Name | ACP1.1L4 |

4.2.4.3 Association Initiation Policy

4.2.4.3.1 Activity – Verify as SCU and SCP

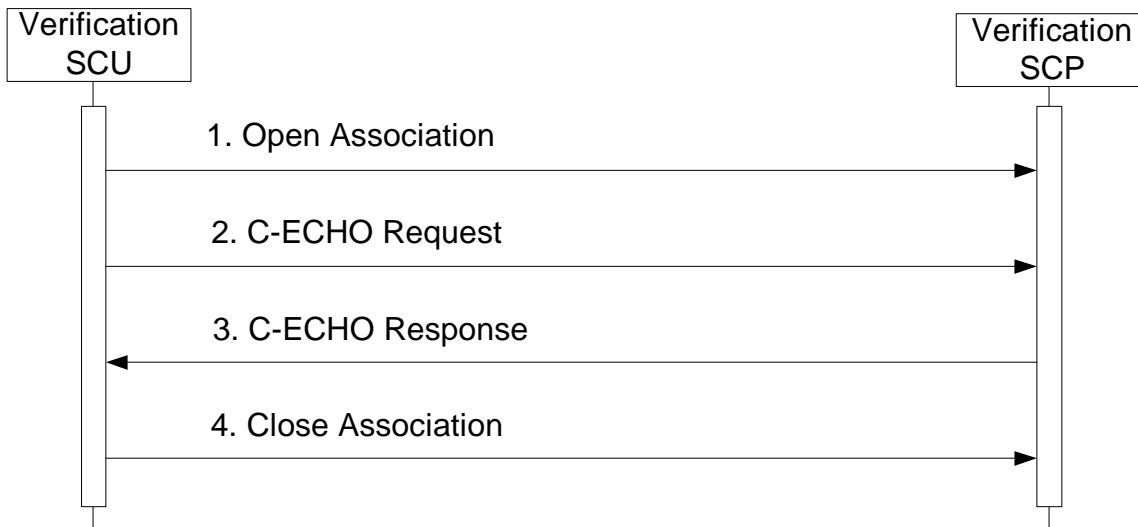
4.2.4.3.2 Description and Sequencing of Activities

SCU: The user selecting the “Verify” button on the Device configuration page initiates the verification request to the device whose data has just been configured. This tool allows the user to ensure all data was correctly entered and the remote device may be contacted. It uses C-Echo and verifies the remote device supports all configured SOP Classes. Any SOP Classes requested that are not supported will report, “failed”. Operations may continue, but objects of the type that are not supported will not be exported. See note in 4.2.4.3.5.1 Verification SOP Class Notifications.

SCP: The system listens on the port configured on the Global System Configuration screen for Verification requests initiated by other remote devices. The calling device AE must already be configured as a remote device in order for iU22 to respond.

iU22 initiates an Association in order to issue:

- C-ECHO request according to the Verification SOP Class.



**Figure 8a
SEQUENCING OF ACTIVITY – ISSUE VERIFY**

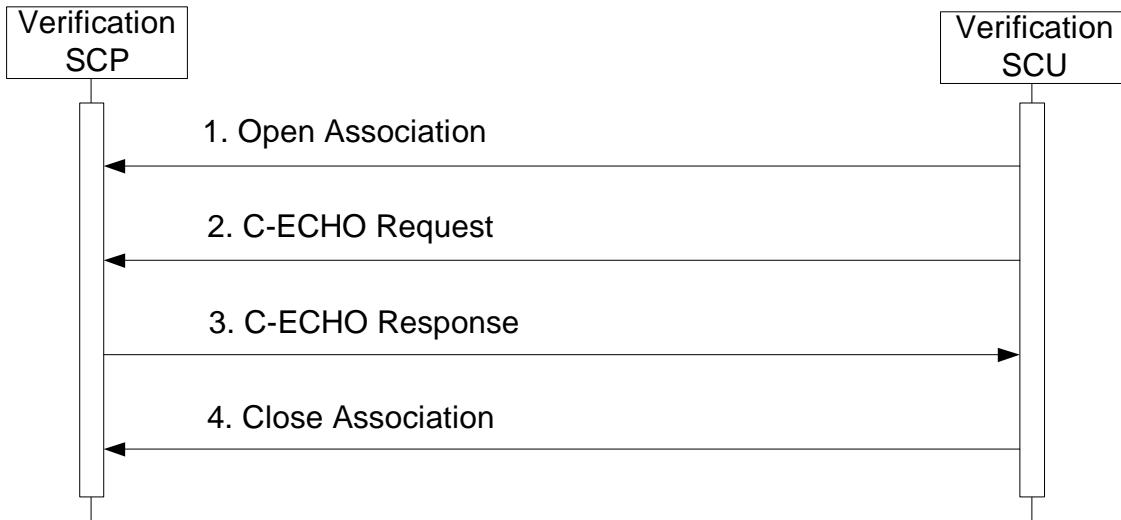


Figure 8b
SEQUENCING OF ACTIVITY – RECEIVE VERIFY

4.2.4.3.3 Proposed Presentation Contexts

iU22 will propose Presentation Contexts as shown in the following table:

Table 51.6
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 /SCP | None |

4.2.4.3.4 SOP Specific Conformance for Verification

Table 51.7 summarizes the behavior of iU22 when encountering status codes in a Verification C-ECHO response.

A message will appear on the user interface if iU22 receives any other SCP response status than “Success.”

Table 51.7
VERIFICATION C-ECHO RESPONSE STATUS HANDLING BEHAVIOR

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|-------------------|------------------------|---------------------------------------|
| Success | | 0000 | Device Status is set to: Verified |
| Refused | Out of Resources | A700 | Device Status is set to: Not Verified |
| Failed | Unable to Process | C000 – CFFF | Same as “Refused” above. |
| * | * | Any other status code. | Same as “Refused” above. |

4.2.4.3.4.1 Verification SOP Class Operations (C-ECHO)

4.2.4.3.5 Association Acceptance Policy

4.2.4.3.5.1 Verification SOP Class Notifications

Possible Responses:

| | |
|----------------------------------|--------------------------------------|
| Device Verification Succeeded | Device Verification Failed |
| {SOP Class(es)}: Verified | {SOP Class(es)}: Not Verified |
| Verification: Verified | |

Note: A given "Archive" server may not support all of the SOP Classes requested in the Verification request. Receiving failures ("Not Verified") responses for SOP Classes outside the scope or capability of the server will not result in a communications failure. For example, if the correct Image Store SOP Classes are supported and Structured Report is not, then Image Storage will work successfully, and SRs will not be sent to the server. If multiframe is not supported and loops are acquired, the transfer will fail. In this case however, the single frame images will transfer.

4.3 PHYSICAL NETWORK INTERFACES

4.3.1 Supported Communication Stacks

4.3.1.1 TCP/IP Stack

All iU22 DICOM applications provide DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.3.2 Physical Network Interface

iU22 supports a single network interface. The following physical network interface is available:

Table 52
SUPPORTED PHYSICAL NETWORK INTERFACES

| |
|---|
| Ethernet 10/100BaseT, RJ-45, UTP, STP; AutoDetect Duplex, Full or Half Duplex |
|---|

4.4 CONFIGURATION

4.4.1 AE Title/Presentation Address Mapping

The Devices Configuration section allows the following device types to be configured:

| Device Type | Supported SOPs |
|--------------------------------|--|
| DICOM Archive Server | Ultrasound Store Ultrasound Multiframe Store Comprehensive Structured Report Store* Storage Commitment Push Model** |
| DICOM Commit Server | Storage Commitment Push Model** |
| DICOM PPS Server | Modality Performed Procedure Step |
| DICOM Worklist Server | Modality Work List |
| DICOM Structured Report Server | Comprehensive Structured Report Store* |
| DICOM BW Printer | Basic Grayscale Print Meta |
| DICOM Color Printer | Basic Color Print Meta |

* See section 4.4.1.2.1 below.

** Storage Commitment must only be configured if supported by the Archive Server or a stand-alone server. In either case, the "Commit Server" and "Target Archive Server" must ONLY be configured if commitment is used.

To configure a single server that supports image store, commitment and PPS, then a separate Device must be configured using the appropriate AE Title, IP Address and Port data.

4.4.1.1 Local AE Title

All local AEs use the AE Title and TCP/IP Port configured via the Global Configuration Screen. All local AEs use the same AE Title. The system listens for Verification requests and Storage Commitment reports on the configured Port. All devices also support Verification as an SCU, allowing the use of the Verify button.

4.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Titles, IP Addresses and Port numbers of remote applications are configured using the Devices Configuration Screen.

4.4.1.2.1 Storage

The New Device button on the Global Config Setup screen opens the Add Device dialog that allows configuration of the AE Titles, Port numbers, and IP Addresses for the remote Storage SCPs. Multiple remote Storage SCPs can be defined.

* Structured Reports will be sent to an Archive device if SR support is confirmed using Verify. If the Archive does not support SR, configure the DICOM Structured Report Server. If SR support is confirmed using verify and measurements are made during the exam, a Structured Report will be sent to the archive. OB and Gyn measurements generate an OB SR report; Vascular and Abdominal measurements generate a Vascular SR report.

Custom or User Defined measurements will not be sent in an SR. No SR is sent for Small Parts or Breast measurements. If no separate SR server is configured and the SOP Class fails negotiation on the Archive, then no SR objects will be created.

4.4.1.2.2 Workflow

Setup is used to set the AE Title, port-number and IP Address the remote MWL SCP. Multiple MWL SCPs may be defined, but only a single remote MWL SCP can be selected at a time.

All MWL queries use Modality = US. This cannot be changed.

Automated queries may be set for a specific time interval, Startup and every 15, 30, 45, 60, 75, 90, 105 or 120 minutes, or at End of Exam. Automated queries use the current data and Modality = US. They may additionally use "Station Name", "System Location" and "AE Title" to further refine the search.

Setup is used to set the AE Title, port-number and IP Address of the remote MPPS SCP. Multiple MPPS SCPs may be defined, but only a single remote MPPS SCP can be selected at a time.

4.4.1.2.3 Hardcopy

Setup is used to set the AE Titles, Port numbers and IP Addresses for the remote Print SCPs.

Multiple remote Print SCPs can be defined, but up to one Grayscale and one Color Print SCP may be selected at a time.

5 MEDIA STORAGE

5.1 IMPLEMENTATION MODEL

5.1.1 Application Data Flow

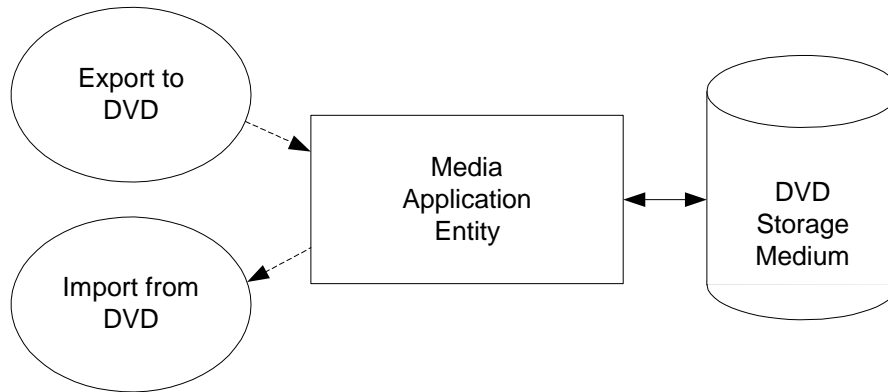


Figure 9
APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE

- The Media Application Entity exports images and Presentation States to a DVD Storage medium. It is associated with the local real-world activity “Export to DVD”. “Export to DVD” is performed upon user request for selected patients, studies, series or instances (images or structured reports).

Note: iU22 will support the use of most writable media including CD-R, CD-RW, DVD-R, DVD+R, DVD-RW and DVD+RW. DICOM structure will be the same regardless of media used. CD-R media will be initially formatted UDF, but will be ‘closed’ and converted to ISO-9660 format using “**Soft Eject**”, the eject button on the Review Directory screen. After formatting, CD-R media must be soft ejected and reinserted prior to use. The user must not use eject button on the DVD drive to eject media, only to insert. After using CD-R media, it may be returned to the system for further use if the media supports multi-session.

Note that although –R or +R media may be “formatted”, the media cannot be erased. If a –R or +R media is formatted, the previously written data is no longer available, and only the remaining unwritten space on the media is available after format. This restriction does not apply to +RW media. Formatting +RW media allows the entire disk space to be used.

Throughout the remainder of this section, the term “DVD” refers to any of the media listed above that is actually in use.

5.1.2 Functional Definition of AEs

5.1.2.1 Functional Definition of Media Application Entity

Activation of the “Export to DVD” icon or menu entry will pass the currently selected patients exams or individually selected images to the Media Application Entity. The SOP Instances associated with the selection will be collected into one or more export jobs. The contents of each export job will be written to a single DVD media.

5.1.3 Sequencing of Real-World Activities

At least one image must exist and be selected before the Media Application Entity can be invoked. The operator can insert a new DVD media at any time. The Media Application Entity will wait indefinitely for a media to be inserted

before starting to write to the DVD device. If no DVD media is available, the DVD queue management Icon will be Yellow.

5.1.4 File Meta Information Options

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

**Table 65
DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE**

| | |
|-----------------------------|----------------------|
| Implementation Class UID | 1.3.46.670589.5.2.10 |
| Implementation Version Name | ACP1.1L4 |

5.2 AE SPECIFICATIONS

5.2.1 Media Application Entity Specification

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

**Table 66
APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA**

| Application Profiles Supported | Real World Activity | Role | SC Option |
|--------------------------------|---------------------|-----------|-------------|
| STD-US-SC-SF-DVD | Export to DVD | FSC, R, U | Interchange |
| STD-US-SC-MF-DVD | | | |

5.2.1.1 File Meta Information for the Application Entity

The File-Set Identifier included in the File Meta Header is "PHILIPS MIP".

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity – Export to DVD

The Media Application Entity acts as an FSC using the interchange option when requested to export SOP Instances from the local database to a DVD medium.

The contents of the export job will be written together with a corresponding DICOMDIR to a single-session DVD. Writing in multi-session mode is not supported. The user can cancel an export job in the job queue.

5.2.1.2.2 Activity – Read from DVD

The Media Application Entity acts as an FSR using the interchange option when requested to import SOP Instances from a DVD medium to the local database.

The Patient directory UI presents the directory of the system or the offline media. Selected exams are transferred from the media to the system for review. Objects transferred to the system retain their original SOP Instance UIDs.

5.2.1.2.3 Activity – Update to DVD

The Media Application Entity acts as an FSU using the interchange option when requested to export SOP Instances from the local database to a DVD medium.

The system user selects exams from the system's directory for transfer to a DVD that already contains data. The DICOMDIR is updated allowing access to original and new data.

DVD media may be formatted at any time, removing all previously recorded data.

5.2.1.2.3.1 Media Storage Application Profiles

The Media Application Entity supports the STD-US-SC-SF-DVD and STD-US-SC-MF-DVD Application Profiles.

5.2.1.2.3.2 Options

The Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in Table 67.

**Table 67
IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR OFFLINEMEDIA**

| 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 |
| US Image Storage* | 1.2.840.10008.5.1.4.1.1.6.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| US Image Storage (Retired)* | 1.2.840.10008.5.1.4.1.1.6 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| US Multiframe Image Storage* | 1.2.840.10008.5.1.4.1.1.3.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline Lossy Compression | 1.2.840.10008.1.2.4.50 |
| US Multiframe Image Storage (Retired)* | 1.2.840.10008.5.1.4.1.1.3 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline Lossy Compression | 1.2.840.10008.1.2.4.50 |
| Comprehensive Structured Report Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

* See details listed in Table 9

6 SUPPORT OF CHARACTER SETS

All iU22 DICOM applications support the

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

7 SECURITY

DICOM security is not implemented on the iU22 at this time.

iU22 incorporates an internal firewall that only accepts incoming traffic on the designated listening port, as configured in the System tab of the Global Configuration screen.

8 ANNEXES

8.1 CREATED IOD INSTANCES

Table 69 specifies the attributes of an Ultrasound Image transmitted by the iU22 storage application.

Table 70 specifies the attributes of a Comprehensive Structured Reports transmitted by the iU22 storage application.

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

| | |
|--------|--|
| VNAP | Value Not Always Present (attribute sent zero length if no value is present) |
| ANAP | Attribute Not Always Present |
| ALWAYS | Always 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 the Modality Performed Procedure Step service |
| CONFIG | the attribute value source is a configurable parameter |

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

8.1.1 US or US Multiframe Image IOD

**Table 69
IOD OF CREATED US OR US MULTIFRAME SOP INSTANCES**

| IE | Module | Reference | Presence of Module |
|-----------|-----------------------|-----------|---------------------|
| Patient | Patient | Table 71 | ALWAYS |
| Study | General Study | Table 72 | ALWAYS |
| | Patient Study | Table 73 | ALWAYS |
| Series | General Series | Table 74 | ALWAYS |
| Equipment | General Equipment | Table 75 | ALWAYS |
| Image | General Image | Table 76 | ALWAYS |
| | Image Pixel | Table 77 | ALWAYS |
| | Cine | Table 78 | Only if Multi-frame |
| | Multi-frame | Table 79 | Only if Multi-frame |
| | US Region Calibration | Table 80 | ANAP |
| | US Image | Table 81 | ALWAYS |
| | VOI LUT | Table 82 | ALWAYS |
| | SOP Common | Table 83 | ALWAYS |

8.1.2 Comprehensive Structured Report IOD

**Table 70
IOD OF CREATED COMPREHENSIVE STRUCTURED REPORT SOP INSTANCES**

| IE | Module | Reference | Presence of Module |
|-----------|---------------------|-----------|--------------------|
| Patient | Patient | Table 71 | ALWAYS |
| Study | General Study | Table 72 | ALWAYS |
| | Patient Study | Table 73 | ALWAYS |
| Series | SR Document Series | Table 85 | ALWAYS |
| Equipment | General Equipment | Table 75 | ALWAYS |
| Document | SR Document General | Table 86 | ALWAYS |
| | SR Document Content | Table 87 | ALWAYS |
| | SOP Common | Table 88 | ALWAYS |

8.1.3 Common Modules

**Table 71
PATIENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------|-------------|----|--|-------------------|-----------------------|
| Patient's Name | (0010,0010) | PN | Same attribute of MWL or PDE input | ALWAYS | MWL/ USER |
| Patient ID | (0010,0020) | LO | From MWL, user input or system generated. Maximum 64 characters. | ALWAYS | MWL/ USER/ AUTO |
| Patient's Birth Date | (0010,0030) | DA | Same attribute of MWL or PDE input | VNAP | MWL/ USER |
| Patient's Sex | (0010,0040) | CS | Same attribute of MWL or PDE input | VNAP | MWL/ USER |
| Other Patient Ids | (0010,1000) | LO | Same attribute of MWL | VNAP | MWL |
| Ethnic Group | (0010,2160) | SH | Same attribute of MWL | VNAP | MWL |
| Patient Comments | (0010,4000) | LT | Same attribute of MWL or PDE input | VNAP | USER |

**Table 72
GENERAL STUDY MODULE OF CREATED SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|--|-------------------|--------------|
| Study Instance UID | (0020,000D) | UI | Same value as in MWL or auto generated | ALWAYS | MWL/ AUTO |
| Study Date | (0008,0020) | DA | Study's Start Date (0040,0244). | ALWAYS | AUTO |
| Study Time | (0008,0030) | TM | Study's Start Time (0040,0245). | ALWAYS | AUTO |
| Referring Physician's Name | (0008,0090) | PN | Same value as in MWL or PDE input. | VNAP | MWL/ USER |
| Study ID | (0020,0010) | SH | MWL Requested Procedure ID (0040,1001) or auto-generated | ALWAYS | MWL/ AUTO |

| | | | | | |
|----------------------------------|-------------|----|---|------|--------------|
| Accession Number | (0008,0050) | SH | Same attribute of MWL or user PDE input. | VNAP | MWL/ USER |
| Study Description | (0008,1030) | LO | MWL Scheduled Procedure Step Description (0040,0007) or PDE input | VNAP | MWL/ USER |
| Physician(s) of Record | (0008,1048) | PN | Same attribute as MWL | ANAP | MWL |
| Referenced Study Sequence | (0008,1110) | SQ | One item per item in the MWL Reference Study Sequence. Absent if unscheduled. | ANAP | MWL |
| >Referenced SOP Class UID | (0008,1150) | UI | Same value as in of the Reference Study Sequence in the MWL | VNAP | MWL |
| >Referenced SOP Instance UID | (0008,1155) | UI | Same value as in of the Reference Study Sequence in the MWL | VNAP | MWL |
| >Requested Procedure Description | (0032,1060) | LO | Same value as in of the Reference Study Sequence in the MWL | VNAP | MWL |
| Procedure Code Sequence | (0008,1032) | SQ | MWL Requested Procedure Code Sequence (0032,1064) Absent if unscheduled. | ANAP | MWL |
| >Code Value | (0008,0100) | SH | Same value as MWL attribute | VNAP | MWL |
| >Coding Scheme Designator | (0008,0102) | SH | Same value as MWL attribute | VNAP | MWL |
| >Coding Scheme Version | (0008,0103) | SH | Same value as MWL attribute | VNAP | MWL |
| >Code Meaning | (0008,0104) | LO | Same value as MWL attribute | VNAP | MWL |

**Table 73
PATIENT STUDY MODULE OF CREATED SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------------|-------------|----|--|-------------------|--------------|
| Admitting Diagnosis Description | (0008,1080) | LO | Same attribute as MWL attribute | VNAP | MWL |
| Patient Size | (0010,1020) | DS | Same value as MWL attribute or PDE input | VNAP | MWL/ USER |
| Patient's Weight | (0010,1030) | DS | Same value as MWL attribute or PDE input | VNAP | MWL/ USER |
| Additional Patient's History | (0010,21B0) | LT | Same value as MWL attribute | VNAP | MWL |
| Pregnancy Status | (0010,21C0) | US | Same value as MWL attribute | ANAP | MWL |

**Table 74
GENERAL SERIES MODULE OF CREATED SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------|-------------|----|-----------------------------------|-------------------|--------|
| Modality | (0008,0060) | CS | "US" | ALWAYS | AUTO |
| Series Instance UID | (0020,000E) | UI | Auto-generated | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | A number unique within the Study. | ALWAYS | AUTO |
| Series Date | (0008,0021) | DA | Date of first image in series. | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | Time of first image in series. | ALWAYS | AUTO |

| | | | | | |
|--|-------------|----|---|--------|----------|
| Performing Physician's Name | (0008,1050) | PN | MWL Scheduled Performing Physician's Name (0040,0006) | VNAP | MWL |
| Protocol Name | (0018,1030) | LO | "Free Form" | ALWAYS | AUTO |
| Series Description | (0008,103E) | LO | Same as Study Description when from MWL. | ANAP | MWL/USER |
| Operator's Name | (0008,1070) | PN | From PDE "Sonographer" field | VNAP | USER |
| Referenced Performed Procedure Step Sequence | (0008,1111) | SQ | Identifies the MPPS SOP Instance this image is related to | ALWAYS | MPPS |
| >Referenced SOP Class UID | (0008,1150) | UI | PPS SOP Class = "1.2.840.10008.3.1.2.3.3" | ALWAYS | MPPS |
| >Referenced SOP Instance UID | (0008,1155) | UI | PPS Instance UID of the PPS generating this image | ALWAYS | MPPS |
| Request Attributes Sequence | (0040,0275) | SQ | Present if scheduled from MWL. One item. | VNAP | AUTO |
| >Requested Procedure ID | (0040,1001) | SH | Same value as MWL attribute. | ALWAYS | MWL |
| >Scheduled Procedure Step ID | (0040,0009) | SH | Same value as MWL attribute. | ALWAYS | MWL |
| >Scheduled Procedure Step Description | (0040,0007) | LO | Same value as MWL attribute. | VNAP | MWL |
| >Scheduled Protocol Code Sequence | (0040,0008) | SQ | Same value as MWL attribute. | VNAP | MWL |
| Performed Procedure Step ID | (0040,0253) | SH | See Table 30 | ALWAYS | MPPS |
| Performed Procedure Step Start Date | (0040,0244) | DA | See Table 30 | ALWAYS | MPPS |
| Performed Procedure Step Start Time | (0040,0245) | TM | See Table 30 | ALWAYS | MPPS |
| Performed Procedure Step Description | (0040,0254) | LO | See Table 30 | VNAP | MPPS |
| Performed Protocol Code Sequence | (0040,0260) | SQ | See Table 30 | VNAP | MWL |

**Table 75
GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------|-------------|----|-----------------------------------|-------------------|--------|
| Manufacturer | (0008,0070) | LO | Philips Medical Systems | ALWAYS | AUTO |
| Institution Name | (0008,0080) | LO | Setups configuration | VNAP | CONFIG |
| Station Name | (0008,1010) | SH | Setups configuration | VNAP | CONFIG |
| Manufacturer's Model Name | (0008,1090) | LO | iU22 | ALWAYS | AUTO |
| Device Serial Number | (0018,1000) | LO | | ALWAYS | AUTO |
| Software Version | (0018,1020) | LO | PMS2.1.4.1 Ultrasound Gemini1.1.2 | ALWAYS | AUTO |

8.1.4 US or Multiframe Image Modules

**Table 76
GENERAL IMAGE MODULE OF CREATED US SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------|-------------|----|--|-------------------|--------|
| Instance Number | (0020,0013) | IS | Generated by device, increments from "0" in each series | ALWAYS | AUTO |
| Content Date | (0008,0023) | DA | <yyyymmdd> | ALWAYS | AUTO |
| Content Time | (0008,0033) | TM | <hhmmss> | ALWAYS | AUTO |
| Image Type | (0008,0008) | CS | ORIGINAL/PRIMARY for uncompressed, DERIVED/PRIMARY if compressed | ALWAYS | CONFIG |
| Burned In Annotation | (0028,0301) | CS | Set to "YES" | ALWAYS | AUTO |
| Lossy Image Compression | (0028,2110) | CS | Present "01" if image is lossy compressed, "00" if not. | ALWAYS | AUTO |
| Presentation LUT Shape | (2050,0020) | CS | "IDENTITY" Only if "Image Export Format" is GSDF. | ANAP | AUTO |

**Table 77
IMAGE PIXEL MODULE OF CREATED US OR US MULTIFRAME SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|---------|---|-------------------|--------|
| Samples per Pixel | (0028,0002) | US | See US Image Module Table 81 | | |
| Photometric Interpretation | (0028,0004) | CS | See US Image Module Table 81 | | |
| Rows | (0028,0010) | US | Image height in pixels, 480*, 768**, 1024*** | ALWAYS | CONFIG |
| Columns | (0028,0011) | US | Image width in pixels, 640*, 1024**, or 1280*** | ALWAYS | CONFIG |
| Bits Allocated | (0028,0100) | US | 8 Bits per pixel. | ALWAYS | AUTO |
| Bits Stored | (0028,0101) | US | Number of info bits in pixel: "8" Color: 24; BW: 8. | ALWAYS | AUTO |
| High Bit | (0028,0102) | US | High bit is 7 | ALWAYS | AUTO |
| Pixel Representation | (0028,0103) | US | "0" pixels are Unsigned integers | ALWAYS | AUTO |
| Pixel Data | (7FE0,0010) | OW / OB | | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | Present when image is RGB. Value is "0". | ALWAYS | AUTO |

Image Size details: * = Multiframe images, ** = Single Frame Display Area only images and *** = Single Frame Full Screen images (no scaling data).

**Table 78
CINE MODULE OF CREATED US MULTIFRAME SOP**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|----------------------------|-------------------|--------|
| Frame Time | (0018,1063) | DS | Frame time in milliseconds | ANAP | AUTO |

Table 79
MULTI-FRAME MODULE OF CREATED US MULTIFRAME SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------|-------------|----|-----------------------------|-------------------|--------|
| Number of Frames | (0028,0008) | IS | # of frames in object | ANAP | AUTO |
| Frame Increment Pointer | (0028,0009) | AT | (0018,1063) Frame Time only | ANAP | AUTO |

Table 80
US REGION CALIBRATION MODULE OF CREATED US OR US MULTIFRAME SOP INSTANCES

Not sent in Full Screen Single Frame images, or non-motorized 3D images. Motorized 3D images send scaling data for individual planes only.

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------------|-------------|----|---|-------------------|--------|
| Sequence of Ultrasound Regions | (0018,6011) | SQ | A sequence is present for each region on the system display, except for ECG regions. Only when set for "Display Area". No scaling for "Full Screen" images. | ANAP | AUTO |
| >Region Location Min x ₀ | (0018,6018) | UL | Top Left position of region. | ALWAYS | AUTO |
| >Region Location Min y ₀ | (0018,601A) | UL | Top Left position of region | ALWAYS | AUTO |
| >Region Location Max x ₁ | (0018,601C) | UL | Bottom Right position of region | ALWAYS | AUTO |
| >Region Location Max y ₁ | (0018,601E) | UL | Bottom Right position of region | ALWAYS | AUTO |
| >Physical Units X Direction | (0018,6024) | US | Enumerated Value. 2D Image = 0003H = CM Mmode / Doppler = 0004H = SEC | ALWAYS | AUTO |
| >Physical Units Y Direction | (0018,6026) | US | Enumerated Value. 2D Image = 0003H = CM Mmode = 0003H = CM Doppler = 0007H = CM / SEC | ALWAYS | AUTO |
| >Physical Delta X | (0018,602C) | FD | The physical value per pixel increment | ALWAYS | AUTO |
| >Physical Delta Y | (0018,602E) | FD | The physical value per pixel increment | ALWAYS | AUTO |
| >Reference Pixel X ₀ | (0018,6020) | SL | The X pixel value of baseline | ANAP | AUTO |
| >Reference Pixel Y ₀ | (0018,6022) | SL | The Y pixel value of baseline | ANAP | AUTO |
| >Region Spatial Format | (0018,6012) | US | A bit mask 0-5 if: none, 2d, Mmode, spectral Doppler. See DICOM PS3.3 C.8.5.5.1.1 | ALWAYS | AUTO |
| >Region Data Type | (0018,6014) | US | Enumerated Value. See DICOM PS3.3 C.8.5.5.1.2 | ALWAYS | AUTO |
| >Region Flags | (0018,6016) | UL | Bit mask. See DICOM PS3.3 C.8.5.5.1.3: | ALWAYS | AUTO |

**Table 81
US IMAGE MODULE OF CREATED US OR US MULTIFRAME SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------|-------------|----|---|-------------------|--------|
| Samples Per Pixel | (0028,0002) | US | "1" for Monochrome2 "3" for RGB or YBR_FULL_422 | ALWAYS | AUTO |
| Photometric Interpretation | (0028,0004) | CS | Uncompressed: "Monochrome2" or "RGB" Compressed: "YBR_FULL_422" | ALWAYS | CONFIG |
| Bits Allocated | (0028,0100) | US | 8 Bits per pixel. | ALWAYS | AUTO |
| Bits Stored | (0028,0101) | US | Number of info bits in pixel: "8" Color: 24; BW: 8. | ALWAYS | AUTO |
| High Bit | (0028,0102) | US | High bit is 7 | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | Include if not Monochrome2 image with value of "0". | ANAP | AUTO |
| Pixel Representation | (0028,0103) | US | "0" Pixels are Unsigned integers | ALWAYS | AUTO |
| Frame Increment Pointer | (0028,0009) | AT | (0018,1063) "Frame Time" only. | ANAP | AUTO |
| Image Type | (0008,0008) | CS | ORIGINAL/PRIMARY for uncompressed, DERIVED/PRIMARY if compressed | ALWAYS | CONFIG |
| Lossy Image Compression | (0028,2110) | CS | "01" if image is lossy compressed, "00" if not. | ALWAYS | AUTO |
| Ultrasound Color Data Present | (0028,0014) | US | 01 | ALWAYS | AUTO |
| Transducer Data | (0018,5010) | LO | Transducer name. Used in 3D images in media only. | ANAP | AUTO |
| Processing Function | (0018,5020) | LO | Imaging optimization name. Used in 3D images in media only. | ANAP | AUTO |

**Table 82
VOI LUT MODULE OF CREATED US OR US MULTIFRAME SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|--------------|-------------------|--------|
| Window Center | (0028,1050) | DS | Fixed at 127 | ALWAYS | AUTO |
| Window Width | (0028,1051) | DS | Fixed at 254 | ALWAYS | AUTO |

**Table 83
SOP COMMON MODULE OF CREATED US OR US MULTIFRAME SOP INSTANCES**

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------|-------------|----|---|-------------------|--------|
| Specific Character Set | (0008,0005) | CS | Attribute only sent if an Extended or Replacement Character Set is used | ANAP | AUTO |
| Instance Creation Date | (0008,0012) | DA | <yyyymmdd> | ALWAYS | AUTO |
| Instance Creation Time | (0008,0013) | TM | <hhmmss> | ALWAYS | AUTO |

| | | | | | |
|------------------|-------------|----|---|--------|------|
| SOP Class UID | (0008,0016) | UI | 1.2.840.10008.5.1.4.1.1.6.1 or 1.2.840.10008.5.1.4.1.1.6 for US Image 1.2.840.10008.5.1.4.1.1.3.1 or 1.2.840.10008.5.1.4.1.1.3 for US Multiframe Image | ALWAYS | AUTO |
| SOP Instance UID | (0008,0018) | UI | Generated by device | ALWAYS | AUTO |

8.1.5 Comprehensive Structured Report Modules

Table 84

SERIES MODULE OF CREATED COMPREHENSIVE SR SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|-------|-------------------|--------|
| Modality | (0008,0060) | CS | SR | ALWAYS | AUTO |

Table 85

SR DOCUMENT SERIES MODULE OF CREATED COMPREHENSIVE SR SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|---|-------------------|--------|
| Instance Number | (0020,0013) | IS | Auto-generated | ALWAYS | AUTO |
| Series Instance UID | (0020,000E) | UI | Auto-generated | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | A number unique within the Study | ALWAYS | AUTO |
| Referenced Performed Procedure Step Sequence | (0008,1111) | SQ | Identifies the MPPS SOP Instance to which this image is related | ALWAYS | MPPS |
| >Referenced SOP Class UID | (0008,1150) | UI | PPS SOP Class = "1.2.840.10008.3.1.2.3.3" | ALWAYS | MPPS |
| > Referenced SOP Instance UID | (0008,1155) | UI | PPS Instance UID of the PPS generating this document | ALWAYS | MPPS |

Table 86

SR DOCUMENT GENERAL MODULE OF CREATED COMPREHENSIVE SR SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|---|-------------------|--------------|
| Instance Number | (0020,0013) | IS | Unique number within PPS | ALWAYS | AUTO |
| Completion Flag | (0040,A491) | CS | PARTIAL | ALWAYS | AUTO |
| Verification Flag | (0040,A493) | CS | UNVERIFIED | ALWAYS | AUTO |
| Content Date | (0008,0023) | DA | Date content created. | ALWAYS | AUTO |
| Content Time | (0008,0033) | TM | Time content created. | ALWAYS | AUTO |
| >Study Instance UID | (0020,000D) | UI | Same value as in MWL or auto generated | ALWAYS | MWL/ AUTO |
| >Referenced Study Sequence | (0008,1110) | SQ | 1 item per item in MWL, absent if unscheduled | ANAP | MWL |

| | | | | | |
|---|-------------|----|---|------|----------|
| >>Referenced SOP Class UID | (0008,1150) | UI | Use not verified yet | ANAP | MWL |
| >>Referenced SOP Instance UID | (0008,1155) | UI | Use not verified yet | ANAP | MWL |
| >Accession Number | (0008,0050) | SH | Same attribute of MWL or user PDE input. | VNAP | MWL/USER |
| >Requested Procedure ID | (0040,1001) | SH | 1 item per item in MWL, absent if unscheduled | ANAP | MWL |
| >Requested Procedure Description | (0032,1060) | LO | 1 item per item in MWL, absent if unscheduled | ANAP | MWL |
| >Requested Procedure Code Sequence | (0032,1064) | SQ | 1 item per item in MWL, absent if unscheduled | ANAP | MWL |
| Current Requested Procedure Evidence Sequence | (0040,A375) | SQ | Optional | ANAP | AUTO |

Table 87
SR DOCUMENT CONTENT MODULE OF CREATED COMPREHENSIVE SR SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|---|-------------------|--------|
| Content Template Sequence | (0040,A504) | SQ | | ALWAYS | AUTO |
| <i>Template Identification Macro'</i> | | | The Root Content Item identifies TID 5000 (OB-GYN) or 5100 (Vascular). | ALWAYS | AUTO |
| Content Sequence | (0040,A730) | SQ | | ALWAYS | AUTO |
| >Relationship Type | (0040,A010) | CS | See Appendix A.1 for OB-GYN or A.2 for Vascular . | ALWAYS | AUTO |
| <i>Document Relationship Macro Table</i> | | | See Appendix A.1 for OB-GYN or A.2 for Vascular . | ANAP | AUTO |
| <i>Document Content Macro</i> | | | See Appendix A.1 for OB-GYN or A.2 for Vascular . | ALWAYS | AUTO |

Table 88
SOP COMMON MODULE OF CREATED COMPOSITE SR SOP INSTANCES

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------|-------------|----|--|-------------------|--------|
| Specific Character Set | (0008,0005) | CS | "None", unless required by characters used | ALWAYS | CONFIG |
| SOP Class UID | (0008,0016) | UI | 1.2.840.10008.5.1.4.1.1.88.33 | ALWAYS | AUTO |
| SOP Instance UID | (0008,0018) | UI | Generated by device | ALWAYS | AUTO |

8.2 USED FIELDS IN RECEIVED IOD BY APPLICATION

The iU22 storage application does not receive SOP Instances. The usage of attributes received via MWL is described in section 4.2.2.3.1.3 SOP Specific Conformance for Modality Worklist.

8.3 ATTRIBUTE MAPPING

Table 89 summarizes the relationships between attributes received via MWL, stored in acquired images and communicated via MPPS. The format and conventions used in Table 89 are the same as the corresponding table in IHE Technical Framework, Rev. 5.5 04-07-2003, vol. II: Transactions.

**Table 89
ATTRIBUTE MAPPING BETWEEN MODALITY WORKLIST, IMAGE AND MPPS**

| Modality Worklist | Image IOD | MPPS IOD |
|--------------------------------------|--|--|
| Patient's Name | Patient's Name | Patient's 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 Weight | Patient's Weight | |
| Referring Physician's Name | Referring Physician's Name | |
| ---- | ---- | Scheduled Step Attributes Sequence |
| 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 > Study Description > Series Description > Performed Procedure Step Description | >Scheduled Procedure Step Description |
| Scheduled Protocol Code Sequence | >Scheduled Protocol Code Sequence | ---- |
| ---- | Performed Protocol Code Sequence | Performed Protocol Code Sequence |
| ---- | Study ID – Requested Procedure ID from MWL, else generated | Study ID – Requested Procedure ID from MWL, else generated |
| ---- | 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 |
| 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 |

8.4 COERCED/MODIFIED FIELDS

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

8.5 CONTROLLED TERMINOLOGY

The Workflow AE is capable of supporting arbitrary coding schemes for Procedure and Protocol Codes. The contents of Requested Procedure Code Sequence (0032,1064) and Scheduled Protocol Code Sequence (0040,0008) supplied in Worklist Items will be mapped to Image IOD and MPPS attributes as described in Table 89.

8.6 GRAYSCALE IMAGE CONSISTENCY

The high-resolution display monitor is calibrated according to the Grayscale Standard Display Function (GSDF).

8.7 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

8.7.1 Standard Extended / Specialized / Private SOPs

The US or US Multiframe Image Storage SOP Classes are extended to create a Standard Extended SOP Class by addition of standard and private attributes to the created SOP Instances as documented in section 8.1.

3D objects stored to network using the "Print" or "Save 3D" contain in Pixel Data (7FE0,0010) a 2D image of the screen being displayed. No 3D volume data is transferred. "Print" results in an image whose size is determined by the Print Format setting. "Save 3D" will always be a 640x480 'thumbnail' image.

3D objects stored to media include the same Pixel Data contents as above and 3D volume data in Private Tags solely for use by iU22 for redisplay of the volume information. Private tag ranges are:

2001,xxxx.
200D,xxxx.

8.8 PRIVATE TRANSFER SYNTAXES

There are no Private Transfer Syntaxes.

APPENDIX A – Structured Report Templates

A.1 OB-GYN STRUCTURED REPORTS (SR) TEMPLATE

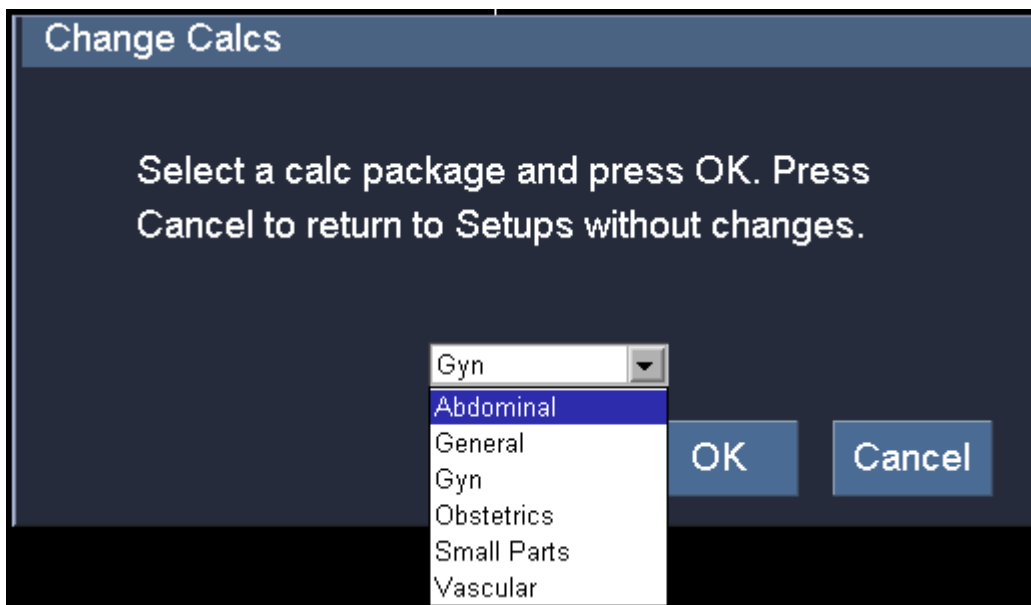
A.1.1 Introduction

iU22 implements the OB-GYN template (TID 5000) from DICOM Supplement 26. This appendix describes the scope and manner that iU22 measurements appear in DICOM reports.

The code tables of this Appendix follow the format convention of the DICOM Standard, Part 16 Annex C.

A.1.2 Clinical Scope

The supported measurements are in the Obstetrics and GYN Calcs packages accessed with the “Calc” hard key and selecting the calculations package with the “Change Calcs” dialog and report pages. Measurements for a given SR section may come from several calcs sidebars.



NOTE: OB and Gyn measurements generate an OB SR report; Vascular and Abdominal measurements generate a Vascular SR report. Custom or User Defined measurements will not be sent in an SR. No SR is sent for Small Parts or Breast measurements.

A.1.3 Measurements

The report contains select information entered and reported on the OB report and summary report pages.

- In the case of multiples fetuses the EDD exported is the earliest EDD.
- The comment originates from the comment on the GYN Report Page.
- The LMP comes from the Worklist or user entered from the Study Data entry form.
- EDD comes from the Worklist or user entered from the Study Data entry form.

Dates of the Summary section are from CID 12003 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11955-2 | LMP |
| LN | 11778-8 | EDD |
| LN | 11779-6 | EDD from LMP |
| LN | 11781-2 | EDD from average ultrasound age |

Fetus-specific measurement codes are from CID 12002 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11885-1 | Gestational Age by LMP |
| LN | 11888-5 | Composite Ultrasound Age |
| LN | 11727-5 | Estimated Weight |
| LN | 11948-7 | Fetal Heart Rate |

Equations from CID 12014 used for Estimated Fetal Body Weight

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|--------------------------------------|
| LN | 11756-4 | EFW by AC, Campbell 1975 |
| LN | 11735-8 | EFW by AC, BPD, FL, Hadlock 1985 |
| LN | 11732-5 | EFW by AC, BPD, FL, HC, Hadlock 1985 |
| LN | 11751-5 | EFW by AC, FL, Hadlock 1985 |
| LN | 11746-5 | EFW by AC, FL, HC, Hadlock 1985 |
| LN | 11739-0 | EFW by AC and BPD, Shepard 1982 |

The following code identifies the fetus comments of the fetus summary template (TID 5003).

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| DCM | 121106 | Comment |

Comments from GYN report page are included in the report summary (TID 5002) using (121106, DCM, "Comment").

A.1.3.1 Fetal Biometry Ratios

The biometry ratios from the report page use codes from CID 12004 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11947-9 | HC/AC |
| LN | 11871-1 | FL/AC |
| LN | 11872-9 | FL/BPD |
| LN | 11823-2 | Cephalic Index |

A.1.3.2 Fetal Biometry Measurements

The measurement codes are from CID 12005 listed below. The report also includes the Mean indicated with a modifier of concept name (121401, DCM, "derivation") and value of (R-00317, SRT, "Mean")

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11979-2 | Abdominal Circumference |
| LN | 11820-8 | Biparietal Diameter |
| LN | 11824-0 | BPD area corrected |
| LN | 11963-6 | Femur Length |
| LN | 11984-2 | Head Circumference |
| LN | 11851-3 | Occipital-Frontal Diameter |
| LN | 33068-8 | Thoracic Area |
| LN | 11988-3 | Thoracic Circumference |

The code (18185-9, LN, "Gestational Age") identifies gestational age. The "Equation" or "Table of Values" concept modifier specifies the method of estimation from the list below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11892-7 | AC, Hadlock 1984 |
| LN | 11902-4 | BPD, Hadlock 1984 |
| LN | 33538-0 | BPD, Hansmann 1986 |
| LN | 11905-7 | BPD, Jeanty 1984 |
| LN | 11907-3 | BPD, Sabbagha 1978 |
| LN | 11901-6 | BPDa, Hadlock 1982 |
| LN | 33086-0 | BPD-oi, Chitty 1997 |
| LN | 33087-8 | BPD-oo, Chitty 1997 |
| LN | 33098-5 | FL, Chitty 1997 |
| LN | 11920-6 | FL, Hadlock 1984 |
| LN | 33541-4 | FL, Hansmann 1986 |
| LN | 11922-2 | FL, Hohler 1982 |
| LN | 11923-0 | FL, Jeanty 1984 |
| LN | 11932-1 | HC, Hadlock 1984 |
| LN | 33543-0 | HC, Hansmann 1986 |
| LN | 11910-7 | CRL, Hadlock 1992 |

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|--------------------------|
| LN | 33540-6 | CRL, Hansmann 1986 |
| LN | 11913-1 | CRL, Nelson 1981 |
| LN | 11914-9 | CRL, Robinson 1975 |
| LN | 33107-4 | GS, Nyberg 1992 |
| LN | 33110-8 | HC measured, Chitty 1997 |
| LN | 33111-6 | HC derived, Chitty 1997 |
| LN | 11936-2 | Humerus, Jeanty 1984 |
| LN | 33132-2 | TCD, Chitty 1994 |

A.1.3.3 Long Bones Measurements

The measurement codes are from CID 12006 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|--------------------------|
| LN | 11966-9 | Humerus length |
| LN | 11963-6 | Femur Length |
| LN | 11967-7 | Radius Length |

A.1.3.4 Fetal Cranium

The measurement codes corresponding to --*Nuch* and *Cereb* -- are from CID 12007 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|---------------------------|
| LN | 12146-7 | Nuchal Fold Thickness |
| LN | 11863-8 | Trans Cerebellar Diameter |
| LN | 33069-6 | Nuchal Translucency |
| LN | 11860-4 | Cisterna Magna |
| LN | 12171-5 | Lateral Ventricle width |
| LN | 11629-3 | Outer Orbital Diameter |

A.1.3.5 Early Gestation Biometry Measurements

The measurement codes are from CID 12009 listed below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|--------------------------|
| LN | 11957-8 | Crown Rump Length |
| LN | 11850-5 | Gestational Sac Diameter |

The gestational age is given by (18185-9, LN, "Gestational Age") with a modifier to identify the method of estimation. The codes from CID 12013 are shown below.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11910-7 | CRL, Hadlock 1992 |
| LN | 33540-6 | CRL, Hansmann 1986 |
| LN | 11913-1 | CRL, Nelson 1981 |
| LN | 11914-9 | CRL, Robinson 1975 |
| LN | 33107-4 | GS, Nyberg 1992 |

A.1.3.6 Multiple Fetus and Fetal Observation Context

A.1.3.6.1 Structure Example of Multiple Fetus and Fetal Observation

For twins there are multiple sections of Summary, Fetal Biometry Ratios, Fetal Biometry, Long Bones, and Early Gestation. The DICOM report segregates fetus measurements into separate sections, and uses the fetus subject context template, TID 1008, to identify the fetus with the user entered identifier.

In this case, the section heading has a modifier (11951-1, LN, "Fetus ID")

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11951-1 | Fetus ID |

A.1.3.7 BIOPHYSICAL PROFILE

Biophysical Profile measurements appear under the container of concept name (125006, DCM, "Biophysical Profile").

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11631-9 | Gross Body Movement |
| LN | 11632-7 | Fetal Breathing |
| LN | 11635-0 | Fetal Tone |
| LN | 11630-1 | Amniotic Fluid Volume |
| LN | 11634-3 | Biophysical Profile Sum Score |

A.1.3.8 AMNIOTIC SAC

The Amniotic Sac measurement appears under the container of concept name (121070, DCM, "Findings").

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11627-7 | Amniotic Fluid Index |

A.1.3.9 OB-GYN Ultrasound Ovary Measurements

The codes below identify the ovary measurements using codes from CID 12010

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 12164-0 | Left Ovary Volume |
| LN | 11840-6 | Left Ovary Length |
| LN | 11829-9 | Left Ovary Width |
| LN | 11857-0 | Left Ovary Height |
| LN | 12165-7 | Right Ovary Volume |
| LN | 11841-4 | Right Ovary Length |
| LN | 11830-7 | Right Ovary Width |
| LN | 11858-8 | Right Ovary Height |

A.1.3.10 Uterus Measurements

These measurements appear under the (125011, DCM, "Pelvis and Uterus") container.

Uterus size measurements appear under a subcontainer (T-83000, SRT, "Uterus").

Length, Height, and Width values of TID 5015 are used.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 33192-6 | Uterus Volume |
| LN | 11842-2 | Uterus Length |
| LN | 11859-6 | Uterus Height |
| LN | 11865-3 | Uterus Width |

Other measurements in the section include the following

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| LN | 11961-0 | Cervix Length |
| LN | 12145-9 | Endometrium Thickness |

A.1.3.11 Follicles

Two Sections may be present, one for each laterality. Up to 15 content items may appear in each Follicles Section. Each group has

- an identifier of the follicle group
- a mean diameter and volume for each follicle

The following codes from TID 5014 are used.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|---|-------------------------------|---------------------------------|
| DCM | 12510 | Identifier |
| SRT | G-D705 | Volume |
| LN | 11793-7 | Follicle Diameter |

A.1.3.12 Data not Exported in Structured Report

- User-defined measurements not supported
- User-defined tables / equations not supported

A.2 VASCULAR STRUCTURED REPORT TEMPLATE

According to the DICOM Vascular Template (TID 5100), vascular measurements appear in a hierarchy of regional sections (e.g. Left Vein of Lower Extremity) that contain groups of anatomically specific containers (e.g. Common Femoral Vein). The groups contain the measurements or calculations that apply to that group. A group may contain measurement when it is an anatomically non-specific, such as a ratio of velocities from different vessels.

The table below specifies general measurement terms that appear in a vascular measurement group.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|--------------------------------------|
| LN | 11726-7 | Peak Velocity |
| LN | 11653-3 | End Diastolic Velocity |
| LN | 12008-9 | Pulsatility Index |
| LN | 12023-8 | Resistivity Index |
| LN | 12144-2 | Systolic to Diastolic Velocity Ratio |
| LN | 20168-1 | Acceleration Time |

The table below specifies the laterality terms.

| Coding Scheme Designator (0008,0102) | Code Value (0008,0100) | Code Meaning (0008,0104) |
|--------------------------------------|------------------------|--------------------------|
| SRT | G-A101 | Left |
| SRT | G-A100 | Right |
| SRT | G-A103 | Unilateral |

A.2.1 Extracranial Cerebral Arteries

A.2.1.1 Carotid Arteries

The Findings modifier that identifies the region is (T-45005, SRT, "Artery of neck"). The section appears for each laterality case: right and left. The table specifies the anatomy from Context Group 12104 and the longitudinal modifier for each measurement

The table below specifies the anatomy codes for the velocity measurements.

| Report Label | Anatomy | Longitudinal Modifier |
|--------------|---|---------------------------------|
| Subclav | T-48330, SRT, "Subclavian Artery" | <i>none</i> |
| PCCA | T-45100, SRT, "Common Carotid Artery" | G-A118, SRT, "Proximal" |
| MCCA | T-45100, SRT, "Common Carotid Artery" | G-A188, SRT, "Mid-longitudinal" |
| DCCA | T-45100, SRT, "Common Carotid Artery" | G-A119, SRT, "Distal" |
| Bulb | T-45170, SRT, "Carotid Bulb" | <i>none</i> |
| ECA | T-45200, SRT, "External Carotid Artery" | <i>none</i> |
| PICA | T-45300, SRT, "Internal Carotid Artery" | G-A118, SRT, "Proximal" |
| MICA | T-45300, SRT, "Internal Carotid Artery" | G-A188, SRT, "Mid-longitudinal" |
| DICA | T-45300, SRT, "Internal Carotid Artery" | G-A119, SRT, "Distal" |
| Vert | T-45700, SRT, "Vertebral Artery" | <i>none</i> |

Note: Label "DICA" is equivalent to Label "ICA" in Intracranial Arteries

The ICA/CCA ratio appears directly under the section heading from the Group 121XX.

| Report Label | Measurement |
|--------------|---------------------------------------|
| ICA/CCA | 33868-1, LN, "ICA/CCA velocity ratio" |

A.2.2 Intracranial Cerebral Arteries

The Intracranial Cerebral Arteries appear in the "Intracranial Cerebral Arteries" section heading of TID 5100. The section appears for each laterality case: right and left. The table specifies the anatomy from Context Group 12105 and the longitudinal modifier for each measurement

The table below specifies the anatomy codes for the velocity measurements.

| Report Label | Anatomy | Longitudinal Modifier |
|--------------|---|---------------------------------|
| Prox MCA | T-45600, SRT, "Middle Cerebral Artery" | G-A118, SRT, "Proximal" |
| Mid MCA | T-45600, SRT, "Middle Cerebral Artery" | G-A188, SRT, "Mid-longitudinal" |
| Dist MCA | T-45600, SRT, "Middle Cerebral Artery" | G-A119, SRT, "Distal" |
| Ant Cer | T-45540, SRT, "Anterior Cerebral Artery" | <i>none</i> |
| PCA | T-45900, SRT, "Posterior Cerebral Artery" | <i>none</i> |
| Vert A | T-45700, SRT, "Vertebral Artery" | <i>none</i> |
| Ophthal | T-45400, SRT, "Ophthalmic Artery" | <i>none</i> |
| Siphon | T-45308, SRT, "Carotid Siphon" | <i>none</i> |

Note: Label "ICA" is equivalent to "DICA" in Extracranial Arteries and will appear in that report section.

The table below specifies the anatomy from Context Group 12106 in the "Intracranial Cerebral Arteries" section heading with a laterality of "unilateral."

| Report Label | Anatomy | Longitudinal Modifier |
|--------------|--------------------------------|-----------------------|
| Basilar | T-45800, SRT, "Basilar Artery" | <i>none</i> |

A.2.3 Peripheral Vascular

A.2.3.1 Lower Extremities

The Findings modifier that identifies the region is (T-47040, SRT, "Artery of Lower Extremity"). The section appears for each laterality: left and right. The table specifies the anatomy from Context Group 12109 and the longitudinal modifier for each measurement

The table below specifies the anatomy codes for the velocity measurements.

| Report Label | Anatomy | Longitudinal Modifier |
|--------------|--|---------------------------------|
| Com Il | T-46710, SRT, "Common Iliac Artery" | <i>none</i> |
| Ext Il | T-46910, SRT, "External Iliac Artery" | <i>none</i> |
| Int IL | T-46740, SRT, "Internal Iliac Artery" | <i>none</i> |
| CFA | T-47400, SRT, "Common Femoral Artery" | <i>none</i> |
| Prof Fem | T-47440, SRT, "Profunda Femoris Artery" | G-A118, SRT, "Proximal" |
| Prox SFA | T-47403, SRT, "Superficial Femoral Artery" | G-A118, SRT, "Proximal" |
| Mid SFA | T-47403, SRT, "Superficial Femoral Artery" | G-A188, SRT, "Mid-longitudinal" |
| Dist SFA | T-47403, SRT, "Superficial Femoral Artery" | G-A119, SRT, "Distal" |

| | | |
|----------|---|---------------------------------|
| Pop A | T-47500, SRT, "Popliteal Artery" | G-A118, SRT, "Proximal" |
| Prox PTA | T-47600, SRT, "Posterior Tibial Artery" | G-A118, SRT, "Proximal" |
| Mid PTA | T-47600, SRT, "Posterior Tibial Artery" | G-A188, SRT, "Mid-longitudinal" |
| Dist PTA | T-47600, SRT, "Posterior Tibial Artery" | G-A119. SRT, "Distal" |
| Prox Per | T-47630, SRT, "Peroneal Artery" | G-A118, SRT, "Proximal" |
| Mid Per | T-47630, SRT, "Peroneal Artery" | G-A188, SRT, "Mid-longitudinal" |
| Dist Per | T-47630, SRT, "Peroneal Artery" | G-A119. SRT, "Distal" |
| Prox ATA | T-47700, SRT, "Anterior Tibial Artery" | G-A118, SRT, "Proximal" |
| Mid ATA | T-47700, "SRT, Anterior Tibial Artery" | G-A188, SRT, "Mid-longitudinal" |
| Dist ATA | T-47700, SRT, "Anterior Tibial Artery" | G-A119. SRT, "Distal" |
| Dors Ped | T-47741, SRT, "Dorsalis Pedis Artery" | <i>none</i> |

The Findings modifier that identifies the region is (T-49403, SRT, "Vein of Lower Extremity"). The section appears for each laterality: left and right. The table specifies the anatomy from Context Group 12110 and the longitudinal modifier for each measurement

The table below specifies the anatomy codes for the velocity measurements.

| Report Label | Anatomy | Longitudinal Modifier |
|---------------------|---|---------------------------------|
| Com Il | T-48920, SRT, "Common Iliac Vein" | <i>none</i> |
| Ext Il | T-48930, SRT, "External Iliac Vein" | <i>none</i> |
| CFV | G-035B, SRT, "Common Femoral Vein" | <i>none</i> |
| SFJ | T-D930A, SRT, "Saphenofemoral Junction" | <i>none</i> |
| Prox GSV | T-49530, SRT, "Great Saphenous Vein" | G-A118, SRT, "Proximal" |
| Mid GSV | T-49530, SRT, "Great Saphenous Vein" | G-A188, SRT, "Mid-longitudinal" |
| Dist GSV | T-49530, SRT, "Great Saphenous Vein" | G-A119. SRT, "Distal" |
| Prof Fem | T-49660, SRT, "Profunda Femoris Vein" | G-A118, SRT, "Proximal" |
| Prox SFV | G-035A, SRT, "Superficial Femoral Vein" | G-A118, SRT, "Proximal" |
| Mid SFV | G-035A, SRT, "Superficial Femoral Vein" | G-A188, SRT, "Mid-longitudinal" |
| Dist SFV | G-035A, SRT, "Superficial Femoral Vein" | G-A119. SRT, "Distal" |
| Prox Pop | T-49640, SRT, "Popliteal Vein" | G-A118, SRT, "Proximal" |
| Dist Pop | T-49640, SRT, "Popliteal Vein" | G-A119. SRT, "Distal" |
| Prox PTV | T-49620, SRT, "Posterior Tibial Vein" | G-A118, SRT, "Proximal" |
| Mid PTV | T-49620, SRT, "Posterior Tibial Vein" | G-A188, SRT, "Mid-longitudinal" |
| Dist PTV | T-49620, SRT, "Posterior Tibial Vein" | G-A119. SRT, "Distal" |
| Prox Per | T-49650, SRT, "Peroneal Vein" | G-A118, SRT, "Proximal" |
| Mid Per | T-49650, SRT, "Peroneal Vein" | G-A188, SRT, "Mid-longitudinal" |
| Dist Per | T-49650, SRT, "Peroneal Vein" | G-A119, SRT, "Distal" |
| Prox ATV | T-49630, SRT, "Anterior Tibial Vein" | G-A118, SRT, "Proximal" |

A.2.4 Abdominal Arteries

The Findings modifier that identifies the region is (T-46002, SRT, "Artery of Abdomen"). The section appears for each laterality: left, right or unilateral. The table below specifies the anatomy from Context Group 12112 in the "Abdominal Arteries" section heading with a laterality of "unilateral."

The table below specifies the anatomy codes for the velocity measurements.

| Report Label | Anatomy | Longitudinal Modifier |
|--------------|--|---------------------------------|
| Com Hep A | T-46421, SRT, "Common Hepatic Artery" | <i>none</i> |
| Inf Aorta | T-42520, SRT, "Infra-renal Aorta" | <i>none</i> |
| Supra Aorta | T-42510, SRT, "Supra-renal Aorta" | <i>none</i> |
| Inf Mes A | T-46520, SRT, "Inferior Mesenteric Artery" | <i>none</i> |
| Prox Sup Mes | T-46510, SRT, "Superior Mesenteric Artery" | SRT, G-A118, "Proximal" |
| Mid Sup Mes | T-46510 SRT, "Superior Mesenteric Artery" | SRT, G-A188, "Mid-longitudinal" |
| Dist Sup Mes | T-46510, SRT, "Superior Mesenteric Artery" | SRT, G-A119. "Distal" |
| Splenic A | T-46460, SRT, "Splenic Artery" | <i>none</i> |
| Celiac A | T-46400, SRT, "Celiac Axis" | <i>none</i> |

A.2.5 Abdominal Veins

The Findings modifier that identifies the region is (T-487A0, SRT, " Vein of Abdomen"). The section appears for each laterality: left, right or unilateral. The table below specifies the anatomy codes for the velocity measurements in the "Abdominal Veins" section heading with a laterality of unilateral.

| Report Label | Anatomy | Longitudinal Modifier | Branch Modifier |
|--------------|---|-----------------------|-----------------|
| Inf Vena Ca | T-48710, SRT, "Inferior Vena Cava" | <i>none</i> | <i>none</i> |
| R.Hep V | T-48725, SRT, "Right Hepatic Vein" | <i>none</i> | <i>none</i> |
| M Hep V | T-48726, SRT, "Middle Hepatic Vein" | <i>none</i> | <i>none</i> |
| L Hep V | T-48727, SRT, "Left Hepatic Vein" | <i>none</i> | <i>none</i> |
| L Port V | T-4881F, SRT, "Left Main Branch of Portal Vein" | <i>none</i> | <i>none</i> |
| M Port V | T-48810, SRT, "Portal Vein" | <i>none</i> | <i>none</i> |
| R Port V | T-4882A SRT, "Right Main Branch of Portal Vein" | <i>none</i> | <i>none</i> |
| Super Mese | T-48840, SRT, "Super Mesenteric Vein" | <i>none</i> | <i>none</i> |
| Splenic V | T-48890, SRT, "Splenic Vein" | <i>none</i> | <i>none</i> |

The table below specifies the anatomy codes for the velocity measurements in the "Abdominal Veins" section heading with a laterality of left or right.

| Report Label | Anatomy | Longitudinal Modifier | Branch Modifier |
|--------------|-----------------------------------|-----------------------|-----------------|
| Com Il | T-48920, SRT, "Common Iliac Vein" | <i>none</i> | <i>none</i> |

A.2.6 Renal Vessels

The Findings modifier that identifies the region is (T-71019, SRT, "Vascular Structure Of Kidney"). The section appears for each laterality: left and right. The table below specifies the anatomy from Context Group 12115 and the longitudinal modifier and branch modifier for each velocity measurement.

| Report Label | Anatomy | Longitudinal Modifier | Branch Modifier |
|--------------|--|------------------------------------|----------------------------|
| Orig Ren | T-46600, SRT, "Renal Artery" | G-036A, SRT. "Origin of vessel" | <i>none</i> |
| Prox Ren | T-46600, SRT, "Renal Artery" | SRT, G-A118, "Proximal" | <i>none</i> |
| Mid Ren | T-46600, SRT, "Renal Artery" | SRT, G-A188, "Mid-longitudinal" | <i>none</i> |
| Dist Ren | T-46600, SRT, "Renal Artery" | SRT, G-A119. "Distal" | <i>none</i> |
| Hilar A | G-035C, SRT, "Hilar Artery" | <i>none</i> | <i>none</i> |
| Inf Seg | SRT, T-46659, "Segmental Artery" | <i>none</i> | G-A115, SRT, "Inferior" |
| Mid Seg | SRT, T-46659, "Segmental Artery" | <i>none</i> | G-A109, SRT, "Medial" |
| Sup Seg | SRT, T-46659, "Segmental Artery" | <i>none</i> | G-A116, SRT, "Superior" |
| Inf Arc | SRT, T-4668A, "Arcuate Artery of the Kidney" | <i>none</i> | G-A115 SRT,, "Inferior" |
| Mid Arc | SRT, T-4668A, "Arcuate Artery of the Kidney" | <i>none</i> | G-A109, SRT, "Medial" |
| Sup Arc | SRT, T-4668A, "Arcuate Artery of the Kidney" | <i>none</i> | G-A116, SRT, "Superior" |

The table below lists the ratios for Renal velocities.

| Report Label | Measurement |
|--------------|--|
| RA/Aorta | 33869-9, LN, "Renal Artery/Aorta velocity ratio" |

APPENDIX B – 3D IMAGE PRIVATE SOP CLASS

B.1 3D IMAGE MEDIA PRIVATE TAG DESCRIPTION

The private tags listed in this section are intended for internal use within the iU22 enabling continued analysis of iU22 3D datasets imported from media.

| Tag | VR | Value |
|-------------|----|---------------------------|
| (2001,00FF) | LO | Philips Imaging DD 001 |
| (2001,FF6E) | UN | Series |
| (200D,00FE) | LO | Philips US Imaging DD 017 |
| (200D,00FD) | LO | Philips US Imaging DD 033 |
| (200D,00FC) | LO | Philips US Imaging DD 034 |
| (200D,00FB) | LO | Philips US Imaging DD 035 |
| (200D,00FA) | LO | Philips US Imaging DD 036 |
| (200D,00F9) | LO | Philips US Imaging DD 039 |
| (200D,00F8) | LO | Philips US Imaging DD 040 |
| (200D,FE05) | UN | 3D |
| (200D,FD00) | UN | Private Data |
| (200D,FD01) | UN | Private Data |
| (200D,FD02) | UN | Private Data |
| (200D,FD03) | UN | Private Data |
| (200D,FD04) | UN | Private Data |
| (200D,FD05) | UN | Private Data |
| (200D,FD06) | UN | Private Data |
| (200D,FD07) | UN | Private Data |
| (200D,FD08) | UN | Private Data |
| (200D,FD09) | UN | Private Data |
| (200D,FD0A) | UN | Private Data |
| (200D,FD0B) | UN | Private Data |
| (200D,FC01) | UN | Private Data |
| (200D,FC02) | UN | Private Data |
| (200D,FC03) | UN | Private Data |
| (200D,FC04) | UN | Private Data |
| (200D,FC05) | UN | Private Data |
| (200D,FC06) | UN | Private Data |
| (200D,FC07) | UN | Private Data |
| (200D,FC08) | UN | Private Data |
| (200D,FC09) | UN | Private Data |
| (200D,FC0A) | UN | Private Data |

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|-------------|----|--------------|
| (200D,FC0B) | UN | Private Data |
| (200D,FC0C) | UN | Private Data |
| (200D,FC0D) | UN | Private Data |
| (200D,FC0E) | UN | Private Data |
| (200D,FC0F) | UN | Private Data |
| (200D,FC10) | UN | Private Data |
| (200D,FB01) | UN | Private Data |
| (200D,FB02) | UN | Private Data |
| (200D,FB03) | UN | Private Data |
| (200D,FB04) | UN | Private Data |
| (200D,FB05) | UN | Private Data |
| (200D,FA01) | UN | Private Data |
| (200D,FA02) | UN | Private Data |
| (200D,FA03) | UN | Private Data |
| (200D,FA04) | UN | Private Data |
| (200D,F901) | UN | Private Data |
| (200D,F801) | UN | Private Data |
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| (200D,F803) | UN | Private Data |
| (200D,F804) | UN | Private Data |
| (200D,F805) | UN | Private Data |

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