DICOM Conformance Statement

EPIQ and Affiniti Family of Products, Release 13.0.x

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1. DICOM Conformance Statement Overview

This DICOM Conformance Statement reports the implementation of nine ultrasound systems: The EPIQ and Affiniti families of products:

- EPIQ Elite, EPIQ Elite Advanced, EPIQ 7 and EPIQ 5, EPIQ CVx, EPIQ CVxi, Affiniti 70, Affiniti 50 and Affiniti 30. Also referred to as EPIQ Elite, EPIQ Elite Advanced, 7, 5, CVx and CVxi; A70, A50 and A30.

The Philips EPIQ and Affiniti Ultrasound systems implement the necessary DICOM® services to download worklists from an information system, store images and Structured Reports to a network storage device, commit previously stored US images, store images and Structured Reports to CD or removable USB media storage devices, print to a networked DICOM printer device, receive previously stored Ultrasound and other modality images, and inform the information system about the work actually done.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	UID			
Others				
Verification SOP Class	1.2.840.10008.1.1	Yes	No	N/A
Print Management				
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No	N/A
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	N/A
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	N/A
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	N/A
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	N/A
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No	N/A
>Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No	N/A
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	N/A
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	N/A
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	N/A
Workflow Management				
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes*	No	N/A
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes*	No	N/A
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes*	No	N/A
Query/Retrieve				
Study Root Query/Retrieve-FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes**	No	N/A
Study Root Query/Retrieve-MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes**	No	N/A
Transfer				
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes*	Yes*	N/A
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes*	Yes*	N/A
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes*	Yes*	N/A
Ultrasound Multiframe Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes*	Yes*	N/A
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes*	Yes*	N/A

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	UID			
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes*	Yes*	N/A
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes*	Yes*	N/A
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes*	Yes*	N/A
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes*	Yes*	N/A
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes*	Yes*	N/A
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes*	Yes*	N/A
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes*	Yes*	N/A
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes*	Yes*	N/A
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes*	Yes*	N/A
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes*	Yes*	N/A
Private 3D Presentation State Storage	1.3.46.670589.2.5.1.1	Yes*	Yes*	N/A
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes*	Yes***	N/A

* Purchasable option “Netlink DICOM 3.0”. DICOM Printing does not require an option.
** Requires option “Ultrasound Query Retrieve” or “Multi-Modality Query Retrieve.”
*** System will accept and can import and export SR objects with a study. No display of imported SR.

A table of Supported Media Storage Application Profiles (with roles) is provided.

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
STD-GEN-USB-JPEG			
STD-GEN-USB-JPEG	Yes	Yes	Yes
Media Storage Application Profile	**File-set Creator (FSC)**	**File-set Updater (FSU)**	**File-set Reader (FSR)**
STD-US-SC-SF&MF-CDR			
STD-US-SC-SF&MF-CDR	Yes	No	Yes
Media Storage Application Profile	**File-set Creator (FSC)**	**File-set Updater (FSU)**	**File-set Reader (FSR)**
STD-GEN-DVD-JPEG			
STD-GEN-DVD-JPEG	Yes	No	Yes

2. Contents

3. Introduction

Revision History

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

Table 3: Revision History

Document Version	Date of Issue	Description of change
01	22-Apr-2025	First release for EPIQ and Affiniti Family of Products, R 13.0.x

Audience

This Conformance Statement is intended for:

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

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

Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

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

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

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

Definitions, Terms and Abbreviations

Table 4: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
BOT	Basic Offset Table
CD	Compact Disc
CD-R	CD-Recordable
CD-M	CD-Medical
CR	Computed Radiography
CT	Computed Tomography
DCR	Dynamic Cardio Review
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level Seven
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RT	Radiotherapy
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol

Abbreviation/Term	Explanation
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound multi-frame
WLM	Worklist Management
XA	X-Ray Angiographic

References

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

4. Networking

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

4.1. Implementation model

The implementation model consists of three sections:

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

4.1.1. Application Data Flow

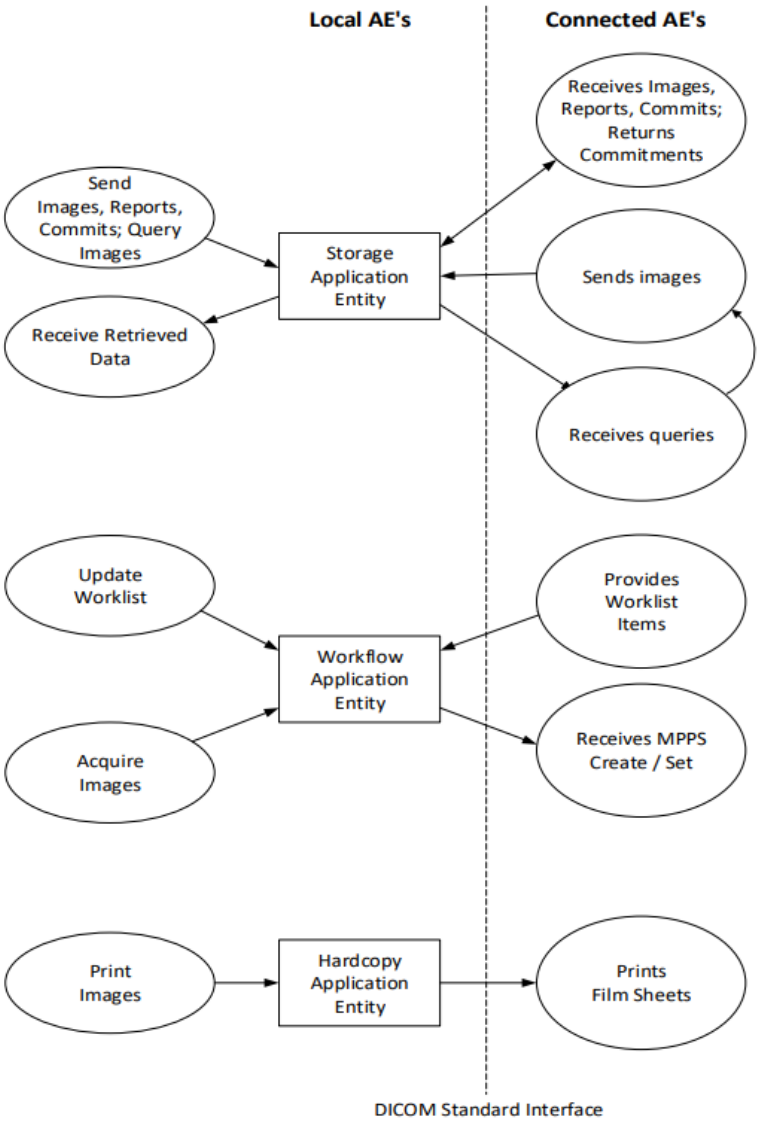

Figure 1: Application Data Flow

Application Entities are:

Storage Application Entity: Responsible for Storing images, Presentation States, and Structured Reports to remote Storage SCPs and media, request commitment of instances and receiving commit responses from a remote Storage Commitment SCP, performing Query and Retrieve requests to a remote Query/Retrieve SCP, and accepting imports of images from remote Storage SCUs or media.

Workflow Application Entity: Responsible for Modality Worklist queries of a remote Modality Worklist SCP and Modality Performed Procedure Step notifications to a remote Modality Performed Procedure Step SCP.

Hardcopy Application Entity: Responsible for making Print requests of remote Grayscale and Color Print Meta-SCPs.

> **Note:** The ultrasound system uses one AE Title for all its entities. See section 4.4.1.1 for where and how to configure the local system's AE Title.

Exam data is sent to all selected Store, Workflow, and Hardcopy destinations simultaneously in accordance with system configuration of send "After Each Print/Acquire" or "At End of Exam". If Send on Demand had been invoked, images and Structured Reports modified since the last Send on Demand are sent at End Exam.

4.1.2. Functional Definition of AE's

Verification Service Class
Storage Application Entity AE provides the Verification service as SCU and will request an association with remote SCP for Verification SOP Class. After accepting the association, the US EPIQ and Affiniti AE shall send the request for the verification request and release the association when requested

Basic Worklist Management Service Class
The Workflow Application Entity use the Basic Worklist Management service as SCU and shall request an association with the configured remote Basic Worklist Management SCU. After accepting the association, Workflow Application Entity shall send worklist query, wait for response, and then release the association.

The Workflow Application Entity receives **Modality Worklist (MWL)** information from and sends **Modality Performed Procedure Step (MPPS)** information to remote AEs. It is associated with the local real-world activities "Update Worklist", "Patient Search" and "Acquire Images".

When either the "Update Worklist" or "Patient Search", equivalent to IHE terms "Broad" and "Patient-based" queries in 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 is performed automatically at specific time intervals or at the end of each exam. Default query criteria are **Modality** of **US** (Ultrasound) and **Scheduled Procedure Step Start Date** of the **current date**. Additional changes to Modality Worklist search include customizing to search for a different AE Title, Station Name, System Location and Custom Modality. These configuration options are found in the Advance settings for the MWL Device in DICOM Device setup.
- **"Patient Search"** is manually initiated. The user may search by **Patient Last Name**, **Patient ID**, **Accession #**, **Exam Date or Date Range**, and/or **Requested Procedure ID**. A wildcard patient query can be performed by entering a * in the Patient Name field. These criteria are located in the Worklist Tab, Patient Search.

Note: These two query options send messages to the Modality Worklist server which will provide all matches for the query parameters. After a list from the worklist is displayed, the "Find" dialog will search only within the returned results. It is not another query.

If the Workflow AE establishes an Association to a remote AE, the server will transfer all matching worklist items via the open Association. The results of a successful Worklist Update will overwrite the data in the Worklist display. There is no queue management for Modality Worklist.

Storage Service Class

Storage Application Entity sends Images, Presentation States, and Structured Reports to a remote AE. It is associated with the local real-world activity "Acquire" hard keys and configured Touch Screen buttons on EPIQ/Affiniti. To configure for auto export, the Acquisition buttons must be associated with the destination device(s) by configuring in touch screen "Utilities", Setups, Acquisition/Capture, Archive/Printer. If not selected, the exams may be sent from review. Sending of images will occur automatically when configured to do so, either "After Each Print/Acquire" or "At End of Exam" with or without "Send on Demand". If configured to send "After Each Print/Acquire", images are transferred immediately after acquisition and Structured Reports are transferred when the exam is ended. If configured for send "At End Exam", images and Structured Reports are transferred when the exam is ended. Private Presentation States are always transferred when the exam is ended.

While configured for send "At End Exam", "Send on Demand" allows for sending acquired images and/or Structured Report during an active exam without ending the exam or in-progress MPPS. Print images will be sent without requiring a full print page to be filled. Send on Demand is invoked by clicking an icon located at the bottom centre of the system display after acquiring the first image of the study. If Send on Demand is invoked during an exam, remaining images and the final Structured Report are transferred when the exam is ended.

The system can be configured to automatically end and send an exam after a specified time of system inactivity without the user hitting "End Exam".

An exam may be sent manually by user selection from the Patient Directory via "Review", including exams that have been imported or retrieved into EPIQ/Affiniti from other sources. Further, individually selected images acquired on EPIQ/Affiniti may be sent manually from image review.

The existence of a Network Store queue with associated network destination will activate the Storage AE. An activated Network Store Queue will be represented by a green dot next to the Network Queue icon. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context, then the image transfer is started. If certain transient network problems are detected, the Storage AE will automatically retry the storage job at 30-second intervals. Under other error conditions, the related queue is set to a "Failed" state, indicated by a red dot on the Network Queue Icon, and can be restarted by the user via the queue management interface. The user may need to cancel the queue, and then restart manually. When configured for "Send at End Exam", instances are not necessarily sent in the order they are acquired. Typically, Structured Reports are sent first, followed by multi-frame (loop) images, and then single frame images. When "Image Export Format" is selected as "Monochrome", single frame images that have Color content (such as Color Flow, CPA, TDI, or elastography, or with Chroma applied), will export as grayscale using Monochrome2 Photometric Interpretation. If the non-active region of a 2D/scrolling image has a chroma map, it will be sent as monochrome.

Storage Commitment Service Class

If the remote AE is configured for Storage Commitment and a selection is made to associate it with the appropriate Storage Server, Storage Commitment N-ACTION requests are normally sent at the end of the exam. If instances are sent during the exam, either by selecting send “After Each Print/Acquire” or by using “Send on Demand”, the “Storage Commit image-by-image” selection determines when the associated Storage Commit N-ACTION requests are sent:

- If “Storage Commit image-by-image” is enabled, a storage association is initiated for C-STORE requests and then released, followed by the initiation of a storage commit association for the associated N-ACTION requests which is then released. This sequence is repeated for each storage event.
- If “Storage Commit image-by-image” is disabled, Storage Commit N-ACTION requests are sent at the end of the exam after all C-STORE requests are sent to the Storage SCP associated with the Storage Commitment SCP.

If a Storage Commitment N-EVENT-REPORT is successfully obtained for all instances acquired in the exam, this information is recorded in the local database, placing a checkmark in the commit portion of the Patient Directory display and signalling the Auto-delete function that the exam qualifies for deletion, if configured for Auto-Delete after Commit. If not, no auto delete will occur even after successful commit notification is received.

Note: Storage Commitment will only complete successfully if all objects of the study are sent to the Storage device associated with the Storage Commit Server. If other destinations are designated for storage of specific objects in the study, the Commit checkmark and auto delete will not occur.

The Storage AE is also responsible for accepting images for storage in EPIQ/Affiniti, through any of the following mechanisms:

- Import from removable media
- Retrieve using the Query/Retrieve service
- Unsolicited push from a Storage SCU to EPIQ/Affiniti acting as a Storage SCP. This mechanism requires that the Storage SCU AE Title and IP Address to have previously been configured as an acceptable DICOM Storage Device.

Query Retrieve Service Class

The Storage Application Entity also support Query Retrieve functionality. See details in section 4.2.1.2.4 and section 4.2.1.2.5, Query and Request Retrieval of Studies. The functionality is found when an appropriate set of configurations is completed:

- A “DICOM Storage Server” device type is used to configure the AE Title, Port and IP Address of the server that supports Study-Level Query Retrieve Find and Move.
- A second “DICOM Storage Server” device on the ultrasound system must be used to add the server’s sending AE Title for the C-Store association initiated by the C-Move request sent to the Query Retrieve server. Without this second device, the query will be successful, but retrieve will fail because the ultrasound system will reject any association request from an “unknown” AE Title.

To perform a query, the user selects the “Review” button on the touchscreen. Under “Source” – select the “Hard Drive” selection to get the list of configured storage servers for the Query Retrieve server. That will open the query page. Query options including automatic searching to each Series level or also to Image Level for each matching Study. Note that Image level query for many studies will take longer.

Modality Performed Procedure Step Service Class

The Workflow Application Entity AE performs the creation of a **Modality Performed Procedure Step (MPPS)** instance automatically when the first image of a study is acquired. MPPS message queues are listed along with Image and Structured Report queues in the Network status window.

Modality Performed Procedure Steps are created and updated with the following real-world events:

- MPPS N-Create, Status = IN PROGRESS:
  - Acquisition of images will result in automated creation of an MPPS Instance managed by a remote AE.
- MPPS N-Set, Status = COMPLETE
  - Completion of the MPPS is performed as the result of an operator action of ending the exam.
- MPPS N-Set, Status = DISCONTINUED
  - "Cancel Exam" causes the "Discontinued" status to be sent.
  - Note: A "Paused" exam does not initiate an MPPS event.

Note: If the MPPS messages were not received by the MPPS server, they may be "re-sent" by selecting the study in Review and selecting "Export". In Export, select the MPPS server. The MPPS messages associated with that study will be resent.

The Workflow Application Entity performs the creation of a Modality Performed Procedure Step (MPPS) instance automatically when the first image of a study is acquired. MPPS message queues are listed along with Image and Structured Report queues in the Network status window.

The user may also change patient identification information while a MPPS is in progress. If this is done, the previous MPPS is discontinued and a new MPPS is created with the changed patient information. The Workflow Application Entity is informed, and if images acquired under the previous patient information have already been transferred (because send "After Each Print/Acquire" or "Send on Demand") the images are regenerated and sent again with updated patient information and new DICOM UID's.

Print Management Meta Class

The Hardcopy Application Entity The prints images to a remote AE (Printer or print server). It is associated with the" Acquire" local real-world activity, depending on configuration. The user action creates a Film Session containing one or more Film Boxes and Image Boxes composed from images acquired by the user. The AE creates and sends fully rendered pages according to the user's selected formatting choices in a single Image Box per page. This Image Box is rather large compared to sending individual Image Boxes to the printer.

If the user has both BW and Color DICOM printers configured and selected, and "Automatic Printer Choice" is enabled, images containing Color content (such as Color Flow, CPA, TDI, or elastography, or with Chroma applied) are sent to the Color printer, and all others are sent to the BW printer. If both printers are configured and selected and "Automatic Printer Choice" is disabled, each image will be printed to both printers.

The existence of a print queue will activate **Hardcopy Application Entity**. 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.

4.1.3. Sequencing of Real-World Activities

The following sequence diagrams illustrate the order of network operations during a number of imaging scenarios. If Modality Worklist is not being used, the user enters patient identification manually at the start of exam and the Query/Receive Worklist steps do not occur

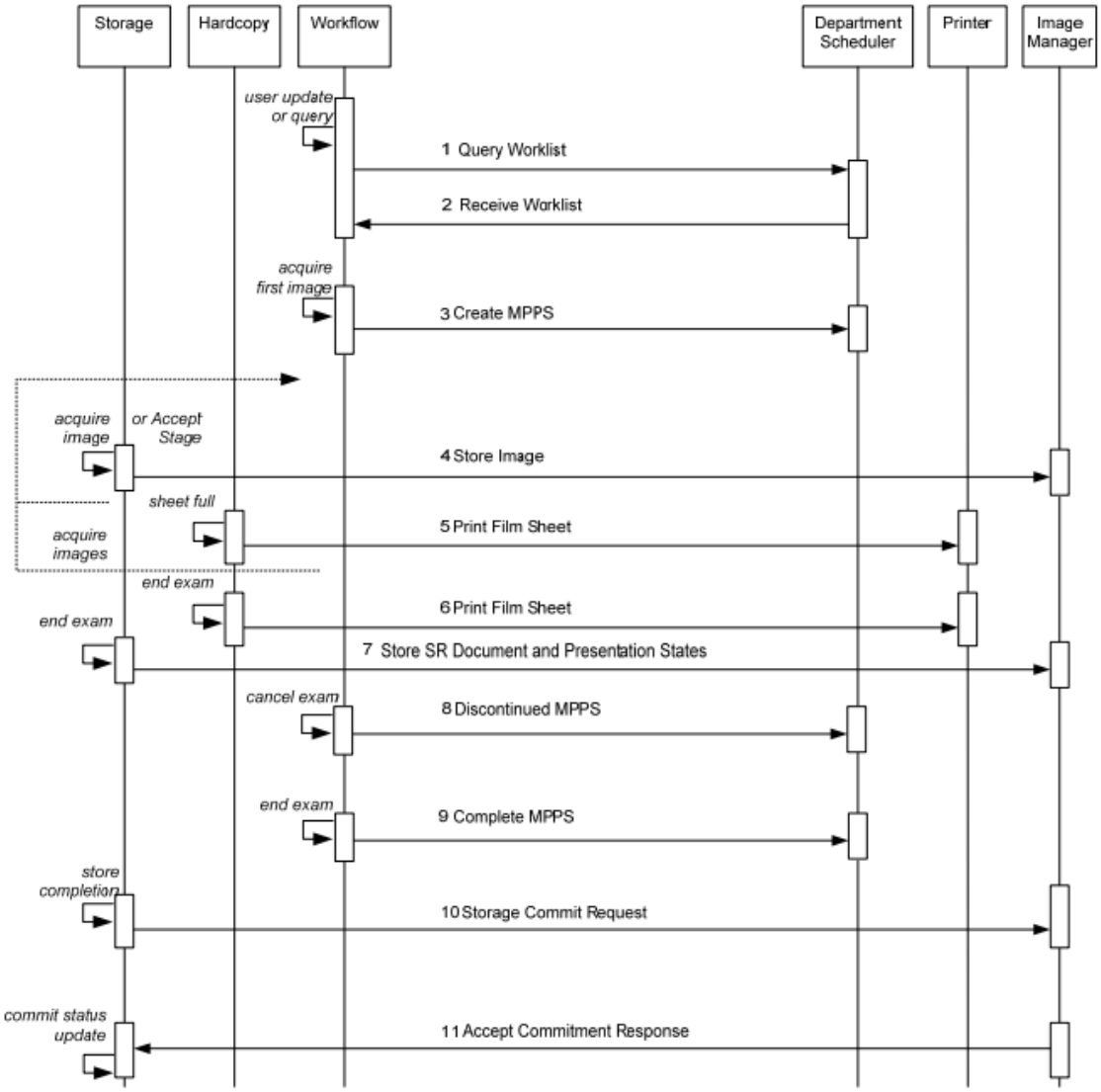

Figure 2: Send after each print/acquire, image-by-image commit disabled

Figures 2 through 4 illustrate exam acquisition with send “After Each Print/Acquire”, “At End Exam”, and “At End Exam” with “Send on Demand”, respectively, with “Storage Commit image-by-image” disabled.

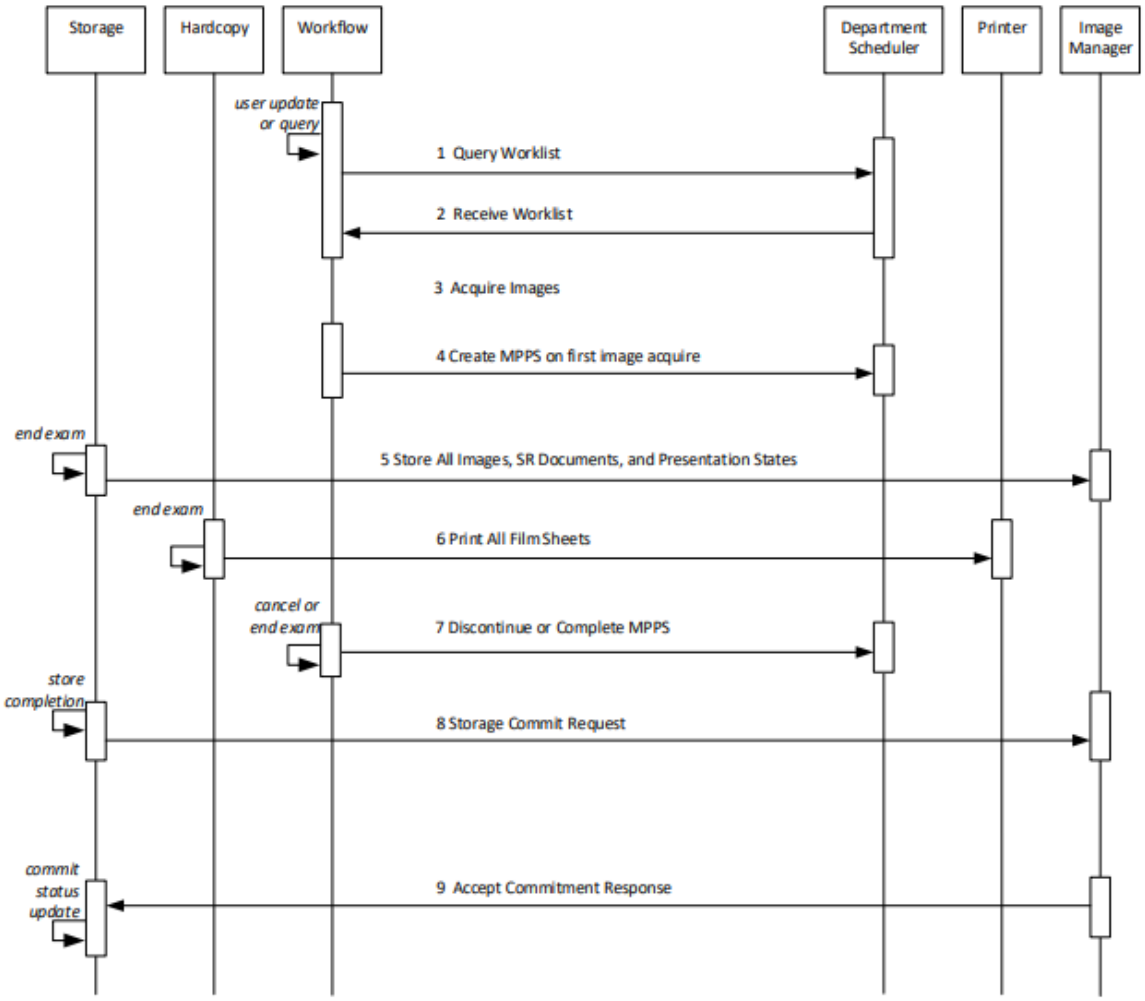

Figure 3: Send At End Exam

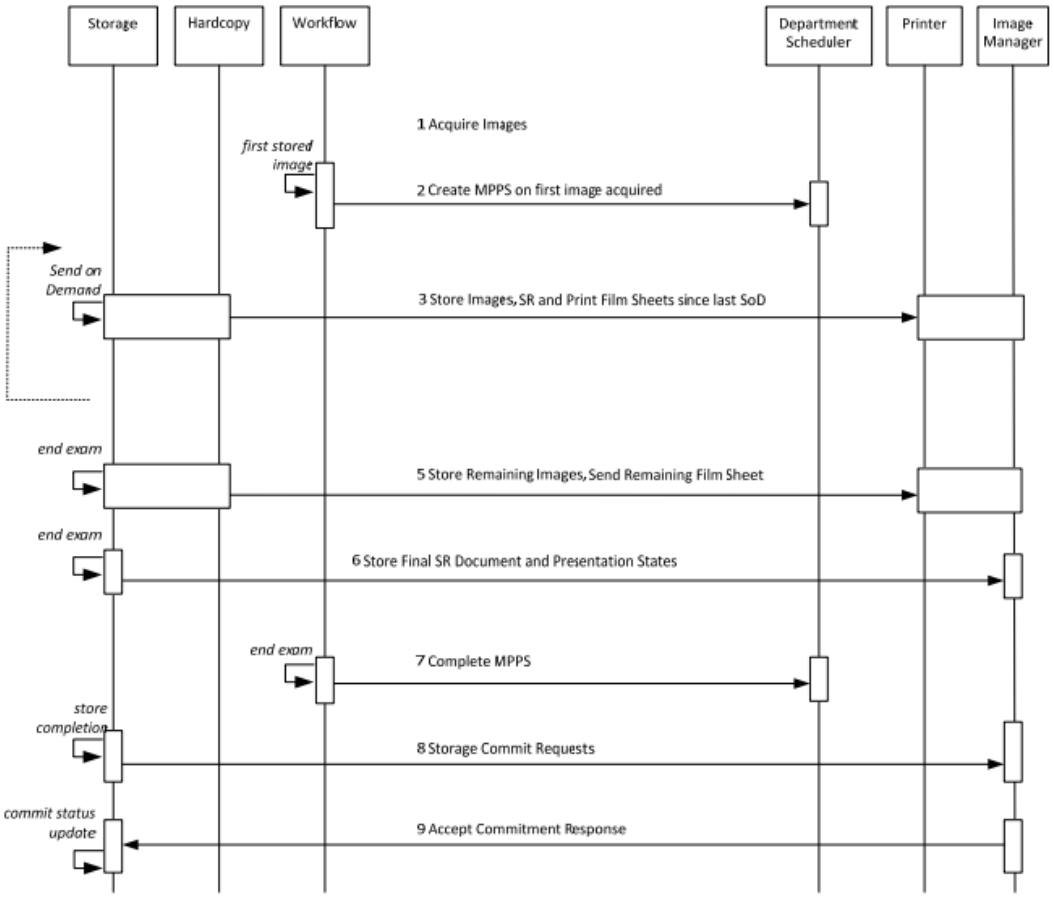

Figure 4: Send on demand, image-by-image commit disabled

Figures 5 and 6 illustrate exam acquisition with send “After Each Print/Acquire” and “At End Exam” with “Send on Demand”, respectively, with “Storage Commit image-by-image” enabled.

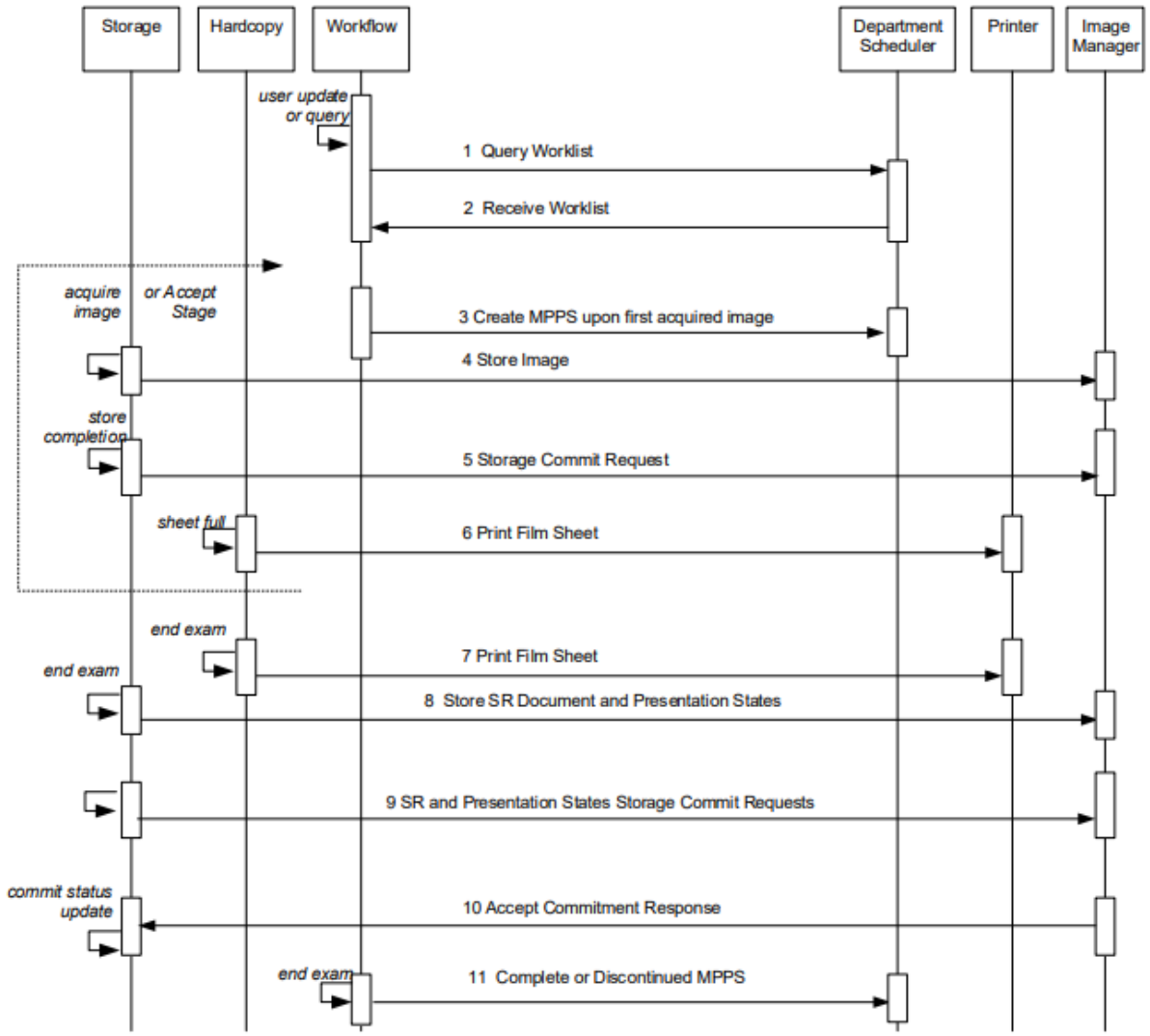

Figure 5: Send after each print/acquire, image-by-image commit enabled

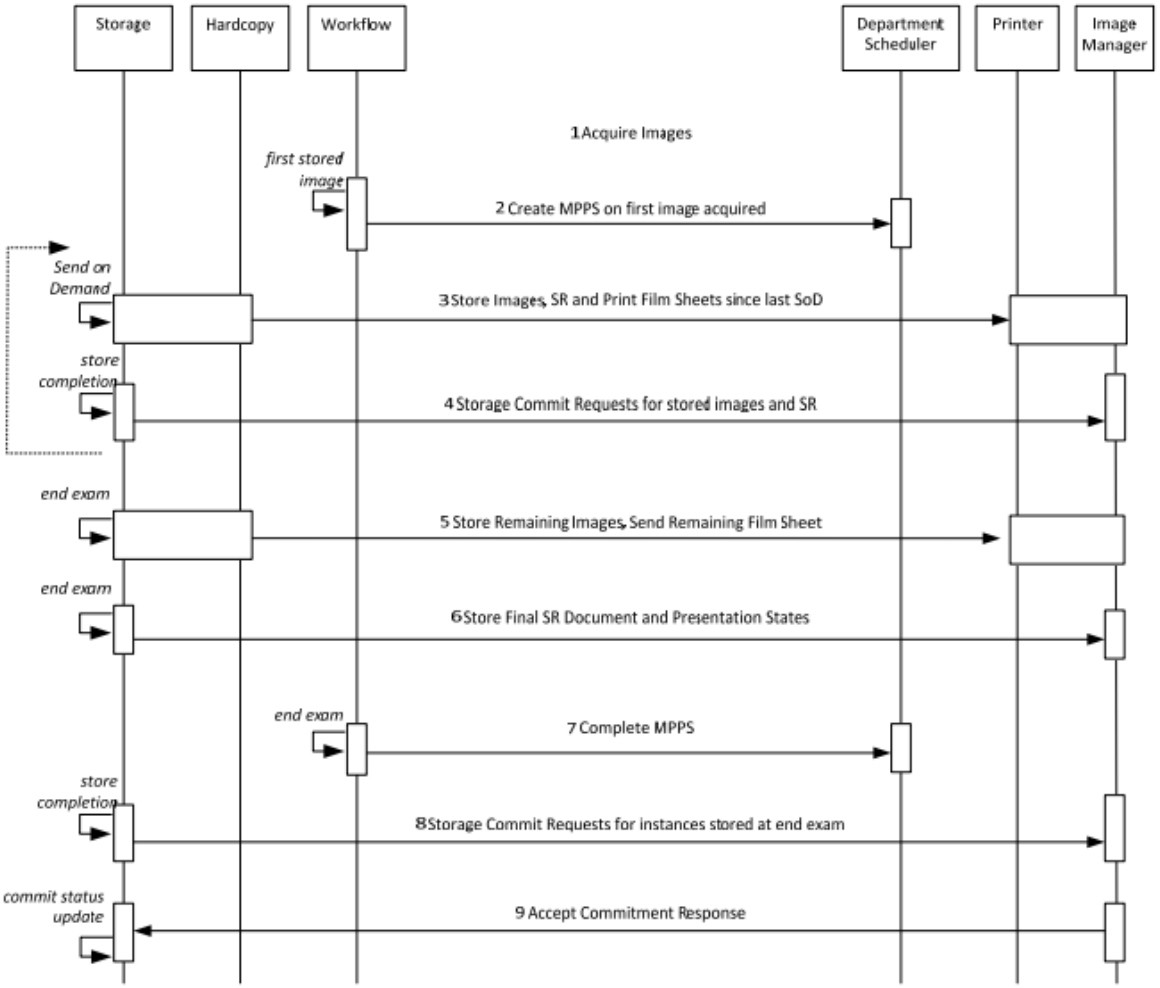

Figure 6: Send after each print/acquire, image-by-image commit enabled

AE Specifications

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

4.1.4. US EPIQ and Affiniti Network AE

Detail of this specific Application Entity is specified in this section combining Storage Application, Workflow Application and Hardcopy Application Entity as US EPIQ and Affiniti AE.

4.1.4.1. SOP Classes

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

Table 5: SOP Classes for US Affinity and EPIC Network AE

SOP Class Name	SOP Class UID	SCU	SCP
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
US Multiframe Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
Private 3D Presentation State Storage	1.3.46.670589.2.5.1.1	Yes	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes*
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Study Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No
>Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No

Note:
Use of Retired SOP Classes only is user configurable for the system on the PSC – Network/DICOM – DICOM Settings – DICOM Storage Device – Advanced Settings configuration page. Image storage will use Retired SOP Classes only when selected.

* System will accept and can import and export SR objects with a study. No display of imported SR

4.1.4.2. Association Policies

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

4.1.4.2.1 General

The DICOM standard application context is specified below.

Table 6: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.1.4.2.2 Number of Associations

EPIQ/Affiniti initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Five storage destinations, one Structured Report storage destination, and one Storage Commitment destination 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 7: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	1

Table 8: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	5

4.1.4.2.3 Asynchronous Nature

EPIQ/Affiniti does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.1.4.2.4 Implementation Identifying Information

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

Table 9: DICOM Implementation Class and Version for US EPIQ and Affiniti AE

Implementation Class UID	1.3.46.670589.14.10000.1300
Implementation Version Name	EPIQ-AFFIN_13.00

4.1.4.2.5 Communication Failure Handling

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

Table 10: Communication Failure Behaviour

Exception	Behaviour
Association aborted by the SCP or network layers	The Association is aborted using A-ABORT and the transfer fails.

4.1.4.3. Association Initiation Policy

The behaviour of this Application Entity is summarized in the below table.

Table 11: Response Status Handler Behaviour

Service Status	Error Code	Further Meaning	behaviour
Success	0000	Matching is complete	The SCP has successfully returned all matching information

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

Table 12: Association Rejection response

Result	Source	Reason/Diagnosis	Behaviour
1 - rejected permanent	1 - DICOM UL service-user	1 - no-reason-given	Connection closed. "Failed to connect to remote Device: Association request has been rejected" popup message is displayed in UI.
		2 - application-context-name-not supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service provider (ACSE related function)	1 - no-reason-given	Connection closed. "Failed to connect to remote Device: Association request has been rejected" popup message is displayed in UI.
		2 - protocol-version-not-supported	
	3 - DICOM UL service provider (Presentation related function)	1 - temporary-congestion	Connection closed. "Failed to connect to remote Device: Association request has been rejected" popup message is displayed in UI.
		2 - local-limit-exceeded	
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Connection closed. "Failed to connect to remote Device: Association request has been rejected" popup message is displayed in UI.
		2 - application-context-name-not-supported	
		3 - calling-AE-title-not-recognized	
		7 - called-AE-title-not-recognized	
	2 - DICOM UL service provider (ACSE related function)	1 - no-reason-given	Connection closed. "Failed to connect to remote Device: Association request has been rejected" popup message is displayed in UI.
		2 - protocol-version-not-supported	
	3 - DICOM UL service provider (Presentation related function)	1 - temporary-congestion	

Result	Source	Reason/Diagnosis	Behaviour
		2 - local-limit-exceeded	

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

Table 13: Association Abort Handling

Source	Reason/Diagnosis	Behaviour
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the Console Network AE terminates the connection
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Console Network AE terminates the connection
	1 - unrecognized-PDU	When received, the Console Network AE terminates the connection
	2 - unexpected-PDU	When received, the Console Network AE terminates the connection
	4 - unrecognized-PDU parameter	When received, the Console Network AE terminates the connection
	5 - unexpected-PDU parameter	When received, the Console Network AE terminates the connection
	6 - invalid-PDU-parameter value	When received, the Console Network AE terminates the connection

4.1.4.3.1 (Real-World) Activity – Verification as SCU

4.1.4.3.1.1 Description and Sequencing of Activities

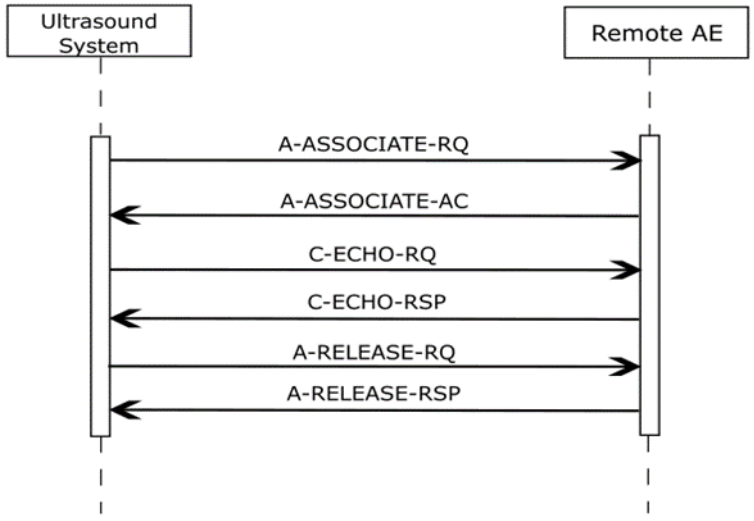

Figure 7: (Real World) Activity - Verification as SCU

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 (AE Title, Port and IP Address) 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.
EPIQ/Affiniti initiates an Association in order to issue:

- C-ECHO request according to the Verification SOP Class

4.1.4.3.1.2 Proposed Presentation Contexts

The presentation contexts are defined in the below table.

Table 14: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU

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

4.1.4.3.1.3 SOP Specific Conformance for Verification SOP Class

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

4.1.4.3.1.3.1 Dataset Specific Conformance for Verification C-ECHO SCU

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

Table 15: Status Response

Service Status	Error Code	Further Meaning	Behaviour
Success	0000	Matching is complete	Device Status is set to: Verified

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

4.1.4.3.2.1 Description and Sequencing of Activities

The Worklist Update activity is capable of updating the modality worklist using either a Broad Query or a Patient Query, as described later in this section. 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

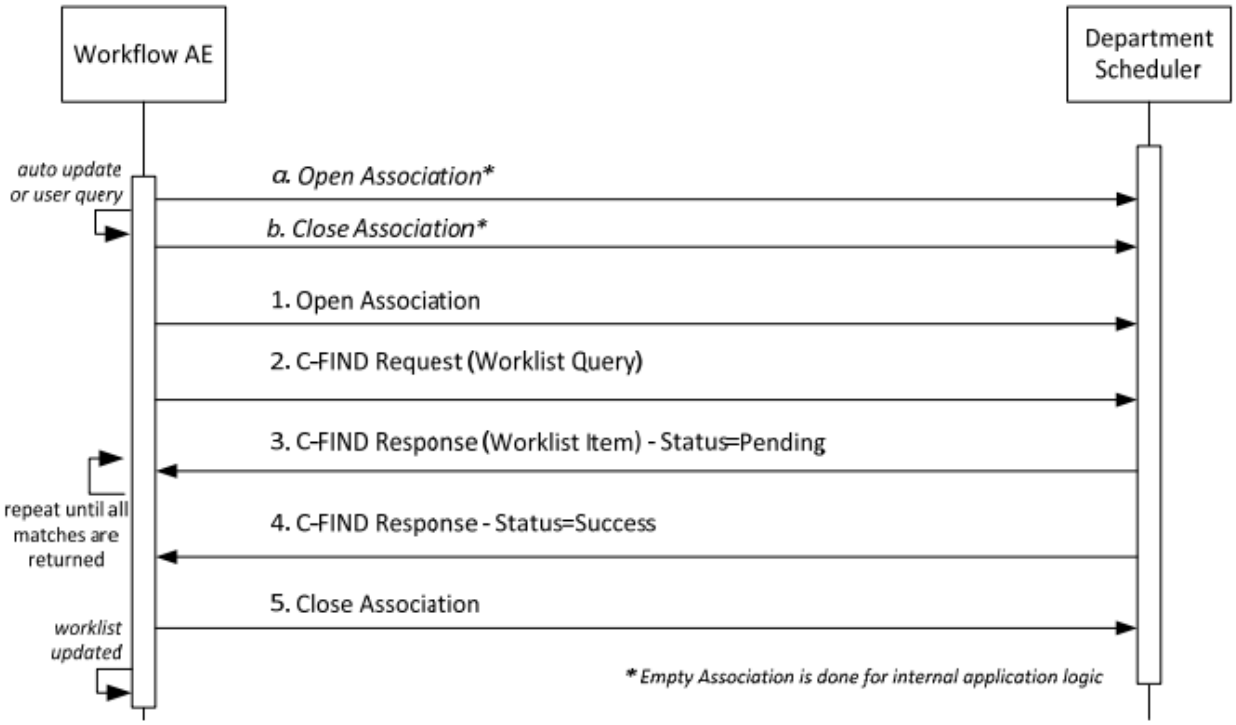

Figure 8: (Real World) Activity - Worklist request

Note:

- The system accepts any number of C-FIND responses, however SUT is capable of displaying 500 responses on the UI.
- When C-FIND responses with missing mandatory attributes are received, Error is displayed on selecting that particular study [Refer Table 17].
- When C-FIND responses with empty values for mandatory attributes are received handled as mentioned below:
  - Empty value for patient ID or patient name-on selecting that study, Patient ID is automatically created with temp patient name.
  - Empty value for Station AE-Station AE is automatically assigned by SUT
- When responses with extra keys are received (like Study Date & Study Time), SUT process the response successfully.
- When started a procedure for C-FIND responses which is not supported, procedure could not be started.
- When there are multiple Scheduled Procedures are available for a single patient, All scheduled procedures are available separately.

4.1.4.3.2.2 Proposed Presentation Contexts

The presentation contexts are defined in the below table.

Table 16: Proposed Presentation Contexts for (Real-World) Activity – Modality Worklist as SCU

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

4.1.4.3.2.3 SOP Specific Conformance for Modality Worklist

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

Below table summarizes the behavior of EPIQ/Affiniti when encountering status codes in a MWL C-FIND response. A message “query failed” will appear on the user interface if EPIQ/Affiniti receives any other SCP response status than “Success” or “Pending.”

Table 17: Status Response

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

Table 18: Modality Worklist Communication Failure Behavior

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

4.1.4.3.2.3.1 Dataset Specific Conformance for Modality Worklist Information Model (Broad Query) - FIND SOP Class C-FIND-SCU

In Broad Query, the Modality Worklist SCP is queried based on a set of pre-defined query attributes (see below table Worklist Request Identifier (Broad Query) in Column “M” for DICOM Attributes corresponding to each parameter):

- Scheduled Date = today’s date
- Station Name = this system’s name or a user-specified value
- Station Location = this system’s location or a user-specified value
- AE Title = this system’s AE Title or a user-specified value
- Modality = “US” or a user- specified value

The user may configure one of the following schemes for updating the worklist using Broad Query:

- The worklist may be updated when the user presses “Update Worklist” on the patient data entry screen
- The worklist may be updated automatically each time an exam is ended
- The worklist may be updated periodically at a configurable time interval between 15 and 120 minutes in 15-minute increments

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

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

Attribute Name:	Attributes supported to build a Modality Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.
M:	Matching Keys for (automatic) Worklist Update.
R:	Return Keys. An “X” will indicate that Modality will supply this attribute as Return Key with zero length for Universal Matching.
Q:	Interactive Query Key. An “X” will indicate that this attribute as matching key can be used.
D:	Displayed Keys. An “X” indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD:	An “X” indicates that the value of this Worklist attribute will be used in the created Instances of this Performed Procedure Step.
Type of matching:	The following type of matching exists: Single Value Matching List of UID Matching Wild Card Matching Range Matching Sequence Matching Universal Matching
S & (S):	"S" indicates that EPIQ/Affiniti supplies an attribute value for Single Value Matching or additional specific attributes indicated by “(S)”. Criteria are specified in PSC - Network/DICOM - DICOM Settings - Worklist device - Advanced Settings dialog.
SD:	A numeric value in this column indicates the attribute is a possible value of Study Description (0008,1030). Starting with attribute marked “1”, the first non-empty attribute value found becomes the value of Study Description in exported objects

EPIQ/Affiniti 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.

Table 19 and Table 20 describes the EPIQ/Affiniti 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.

Table 19: Worklist Request Identifier (Broad Query)

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
SOP Common Module										
Specific Character Set	0008,0005	CS		X			X			
Patient Identification Module										
Patient's Name	0010,0010	PN		X	X	X	X	S,*,U		
Patient ID	0010,0020	LO		X	X	X	X	S,*,U		
Patient Identification Module										
Scheduled Procedure Step Sequence	0040,0100	SQ		X						
>Modality	0008,0060	CS	X	X	S, (S)		X	S,U	Always value CT used	
>Scheduled Station AE Title	0040,0001	AE	X	X	(S)			S,U		
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X	S	X		S,R,U	Supported values: Any Time, Next 7 days, Tomorrow, Today, Last 2 days, Last 3 days, Last week, Last 2 weeks	
>Scheduled Procedure Step Start Time	0040,0003	TM		X		X		U		
>Scheduled Performing Physician's Name	0040,0006	PN		X						
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X	U	Displayed as Study Description.	2
>Scheduled Procedure Step ID	0040,0009	SH	X	X			X	U		
>Scheduled Station Name	0040,0010	SH	X	X	(S)			S,U	Station name configured in Hospital information.	
>Scheduled Protocol Code Sequence	0040,0008	SQ	X	X			X			
>> Code Value	0008,0100	SH	X	X			X	U		
>>Coding Scheme Designator	0008,0102	SH	X	X			X	U		

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
>>Code Meaning	0008,0104	LO	X	X			X	U		3
> Scheduled Procedure Step Location	0040,0011	SH	X	X	(S)					
> Pre-Medication	0040,0012	LO		X			X			
Requested Procedure Module										
Requested Procedure Description	0032,1060	LO		X		X		U		
Requested Procedure ID	0040,1001	SH	X - Note-3	X	X	X	X - Note-3	S,*,U	Mapped to Study ID	
Requested Procedure Priority	0040,1003	SH		X			X			
Patient Transport Arrangements	0040,1004	LO		X			X			
Requested Procedure Description	0032,1060	LO	X	X		X - Note-1	X			1
Study Instance UID	0020,000D	UI	X	X			X	U		
Referenced Study Sequence	0008,1110	SQ	X	X			X	U		
>Referenced SOP Class UID	0008,1150	UI	X	X			X			
>Referenced SOP Instance UID	0008,1155	UI	X	X			X			
Requested Procedure Code Sequence	0032,1064	SQ	X - Note-2	X			X - Note-2	U		
>Code Value	0008,0100	SH	X	X			X	U		
>Coding Scheme Designator	0008,0102	SH	X	X			X	U		
>Code Meaning	0008,0104	LO	X	X		X	X	U		
Reason For the Requested Procedure	0040,1002	LO		X				U		
Reason For Requested Procedure Code Sequence	0040,100A	SQ		X				U		
Names of Intended Recipients of Results	0040,1010	PN		X		X	X			
Imaging Service Request Module										
Accession Number	0008,0050	SH		X	X	X	X	S		

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
Referring Physician's Name	0008,0090	PN	X	X	X	X	X	S,*,U		
Requesting Physician	0032,1032	PN		X		X		U		
PlacerOrderNumber ImagingServiceRequest	0040,2016	SH		X				U		
FillerOrderNumberImagingServiceRequest	0040,2017	SH		X				U		
Visit Identification Module										
Admission ID	0038,0010	LO		X				U		
Visit Relationship Module										
Current Patient Location	0038,0300	LO		X				U		
Visit Relationship Module										
Referenced Patient Sequence	0008,1120	SQ		X			X	U		
Patient Medical Module										
PatientState	0038,0500	LO		X				U		
Allergies	0010,2110	LO		X			X			
Pregnancy Status	0010,21C0	US		X				U		
Medical Alerts	0010,2000	LO		X			X	U		
ContrastAllergies	0010,2110	LO		X				U		
SpecialNeeds	0038,0050	LO		X				U		
Additional Patient's History	0010,21B0	LT		X			X			
Visit Admission Module										
AdmittingDiagnosesDescription	0008,1080	LO		X			X	U		
AdmittingDiagnosesCodeSequence	0008,1084	SQ		X				U		

- Note 1: If present, Requested Procedure Description (0032,1060) is displayed as Study Description.
- Note 2: Requested Procedure Code Sequence (0032,1064) is exported as Procedure Code Sequence (0008,1032)
- Note 3: Additionally mapped to "Study ID" (0020,0010) in Composite Objects Types of Matching: The types of Matching supported by the C-FIND SCU. An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, an "*" indicates wild card matching, a 'U' indicates Universal Matching.

4.1.4.3.2.3.2 Dataset Specific Conformance for Modality Worklist Information Model (Patient Query) - FIND SOP Class C-FIND-SCU

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

Attribute Name: Attributes supported to build a Modality Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching Keys for (automatic) Worklist Update.

R: Return Keys. An “X” will indicate that Modality will supply this attribute as Return Key with zero length for Universal Matching.

Q: Interactive Query Key. An “X” will indicate that this attribute as matching key can be used.

D: Displayed Keys. An “X” indicates that this Worklist attribute is displayed to the user during a patient registration dialog.

IOD: An “X” indicates that the value of this Worklist attribute will be used in the created Instances of this Performed Procedure Step.

Type of matching: The following type of matching exists:
Single Value Matching
List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

S & (S): "S" indicates that EPIQ/Affiniti supplies an attribute value for Single Value Matching or additional specific attributes indicated by “(S)”. Criteria are specified in PSC - Network/DICOM - DICOM Settings - Worklist device - Advanced Settings dialog.

Table 20: Worklist Request Identifier (Patient Query)

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
SOP Common Module										
Specific Character Set	0008,0005	CS		X			X			
Patient Identification Module										
Patient's Name	0010,0010	PN		X	X	X	X	S,*,U		
Patient ID	0010,0020	LO		X	X	X	X	S,*,U		
Patient Identification Module										
Scheduled Procedure Step Sequence	0040,0100	SQ		X						
>Modality	0008,0060	CS	X	X	X		X	S,U	Always value CT used	
>Scheduled Station AE Title	0040,0001	AE	X	X				S,U		
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X	X	X		S,R,U	Supported values: Any Time, Next 7 days, Tomorrow, Today, Last 2 days, Last 3 days, Last	

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
									week, Last 2 weeks	
>Scheduled Procedure Step Start Time	0040,0003	TM		X		X		U		
>Scheduled Performing Physician's Name	0040,0006	PN		X						
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X	U	Displayed as Study Description.	2
>Scheduled Procedure Step ID	0040,0009	SH	X	X			X	U		
>Scheduled Station Name	0040,0010	SH	X	X				S,U	Station name configured in Hospital information.	3
>Scheduled Protocol Code Sequence	0040,0008	SQ	X	X			X			
>> Code Value	0008,0100	SH	X	X			X	U		
>>Coding Scheme Designator	0008,0102	SH	X	X			X	U		
>>Code Meaning	0008,0104	LO	X	X			X	U		
> Scheduled Procedure Step Location	0040,0011	SH	X	X						
> Pre-Medication	0040,0012	LO		X			X			
Requested Procedure Module										
Requested Procedure Description	0032,1060	LO		X		X Note -1		U		1
Requested Procedure ID	0040,1001	SH	X Note -3	X	X	X	X Note -3	S,*,U	Mapped to Study ID	
Requested Procedure Priority	0040,1003	SH		X			X			
Patient Transport Arrangements	0040,1004	LO		X			X			
Requested Procedure Description	0032,1060	LO	X	X		X	X			
Study Instance UID	0020,000D	UI	X	X			X	U		
Referenced Study Sequence	0008,1110	SQ	X	X			X	U		
>Referenced SOP Class UID	0008,1150	UI	X	X			X			
>Referenced SOP Instance UID	0008,1155	UI	X	X			X			

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment	SD
Requested Procedure Code Sequence	0032,1064	SQ	X Note -2	X			X Note -2	U		
>Code Value	0008,0100	SH	X	X			X	U		
>Coding Scheme Designator	0008,0102	SH	X	X			X	U		
>Code Meaning	0008,0104	LO	X	X		X	X	U		
Reason For the Requested Procedure	0040,1002	LO		X				U		
Reason For Requested Procedure Code Sequence	0040,100A	SQ		X				U		
Names of Intended Recipients of Results	0040,1010	PN		X		X	X			
Imaging Service Request Module										
Accession Number	0008,0050	SH		X	X	X	X	S		
Referring Physician's Name	0008,0090	PN	X	X		X	X	S,*,U		
Requesting Physician	0032,1032	PN		X		X		U		
PlacerOrderNumber ImagingServiceRequest	0040,2016	SH		X				U		
FillerOrderNumberImagingServiceRequest	0040,2017	SH		X				U		
Visit Identification Module										
Admission ID	0038,0010	LO		X				U		
Visit Relationship Module										
Current Patient Location	0038,0300	LO		X				U		
Visit Relationship Module										
Referenced Patient Sequence	0008,1120	SQ		X			X	U		
Patient Medical Module										
PatientState	0038,0500	LO		X				U		
Allergies	0010,2110	LO		X			X			
PregnancyStatus	0010,21C0	US		X				U		
MedicalAlerts	0010,2000	LO		X			X	U		
ContrastAllergies	0010,2110	LO		X				U		
SpecialNeeds	0038,0050	LO		X				U		
Additional Patient’s History	0010,21B0	LT		X			X			
Visit Admission Module										
AdmittingDiagnosesDescription	0008,1080	LO		X			X	U		
AdmittingDiagnosesCodeSequence	0008,1084	SQ		X				U		

- Note 1: If present, Requested Procedure Description (0032,1060) is displayed as Study Description.
- Note 2: Requested Procedure Code Sequence (0032,1064) is exported as Procedure Code Sequence (0008,1032)
- Note 3: Additionally mapped to “Study ID” (0020,0010) in Composite Objects Types of Matching:

The types of Matching supported by the C-FIND SCU. An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, an "*" indicates wild card matching, a 'U' indicates Universal Matching.

4.1.4.3.3 (Real-World) Activity – Modality Performed Procedure Step As SCU

4.1.4.3.3.1 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 with status of “IN PROGRESS”.

The “End Exam” button causes a “COMPLETED” status in the N-SET message. An exam for which an MPPS Instance is sent with a status of “COMPLETED” can no longer be updated. The only exception is when a scheduled study is reselected from Modality Worklist to append additional images. A new set of MPPS messages will be generated for the append study.

The “Cancel Exam” button causes a “DISCONTINUED” message. An exam for which an MPPS Instance is sent with a state of “DISCONTINUED” can also no longer be updated.

The system supports creation of “unscheduled cases” by allowing MPPS Instances to be communicated for locally registered Patients.

The system performs a single Performed Procedure Step at a time per Scheduled Procedure Step. EPIQ/Affiniti 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.

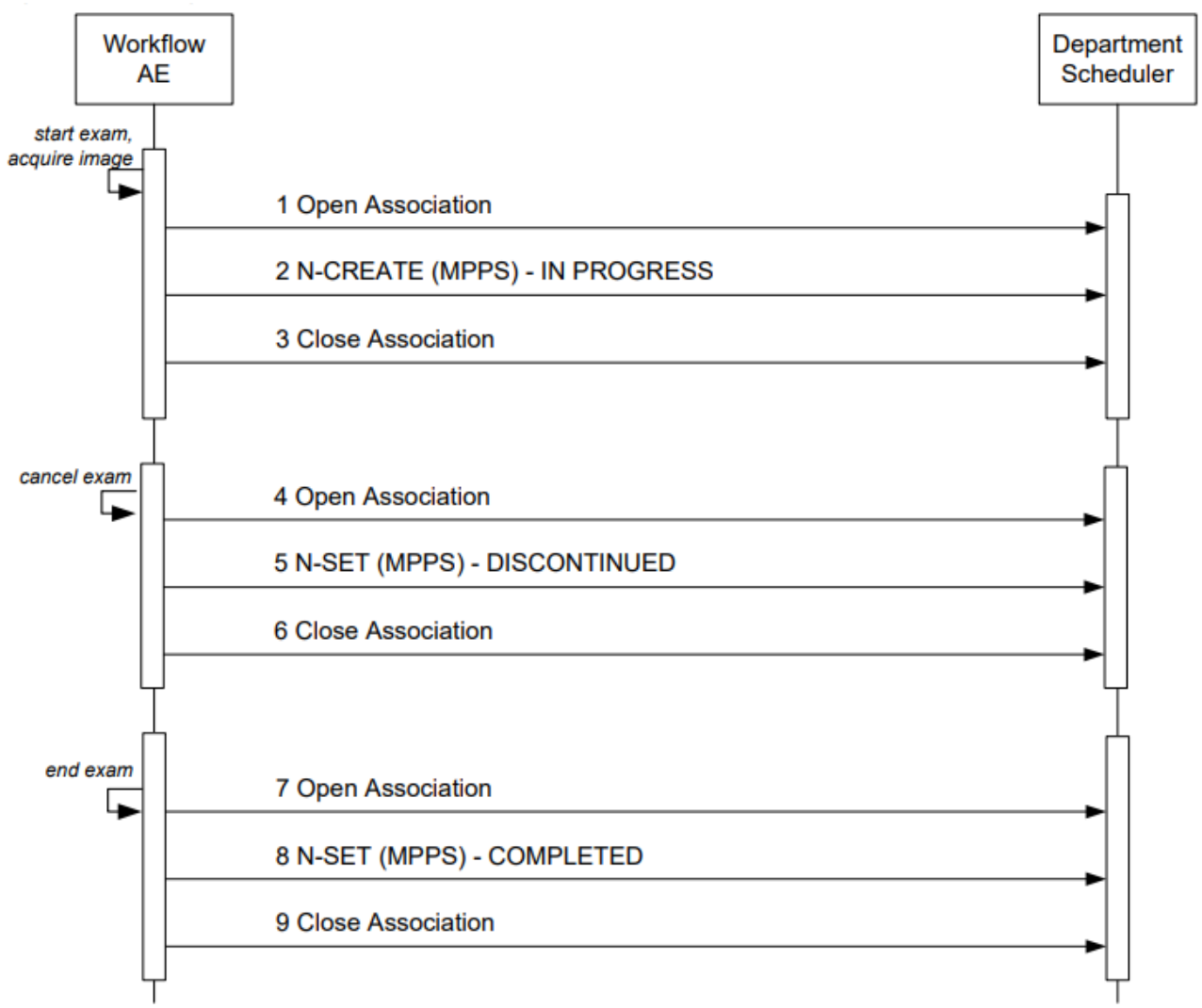

Figure 9: (Real World) Activity - MPPS as SCU

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.

Note: The Cancel and End Exam commands are mutually exclusive. They are both represented here for illustration purposes only. Actual workflow uses one or the other for a given exam. No PPS message for "Paused" exam.

4.1.4.3.3.2 Proposed Presentation Contexts

Table 21: Acceptable Presentation Contexts for (Real-World) Activity – Modality performed procedure step as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.1.4.3.3.3 SOP Specific Conformance for MPPS

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

4.1.4.3.3.3.1 Dataset Specific Conformance for MPPS

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

Table 22: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The SCU has successfully returned all matching information
Error	0110	Processing Failure – Performed Procedure Step Object may no longer be updated	The Association is aborted.
Warning	0116H	Attribute Value Out of Range	The error message is displayed
*	*	Any other status code.	Same as “Failure” above.

Table 23: Mpps Communication Failure Behavior

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

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

Table 24: Mpps N-Create / N-Set Request Identifier

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character Set	(0008,0005)	CS	Sent only if replacement character set is used.	Sent only if replacement character set is used.
Modality	(0008,0060)	CS	US	
Referenced Patient Sequence	(0008,1120)	SQ	Zero length	
Patient’s Name	(0010,0010)	PN	From Modality Worklist or user input.	
Patient ID	(0010,0020)	LO	From Modality Worklist or user input.	

Attribute Name	Tag	VR	N-CREATE	N-SET
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input.	
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input.	
Study ID	(0020,0010)	SH	From Requested Procedure ID from MWL, else System Generated <yyyymmdd.hhmmss>	
Performed Station AE Title	(0040,0241)	AE	From Ultrasound System Configuration, see 4.4.2	
Performed Station Name	(0040,0242)	SH	From Ultrasound System Configuration, see 4.4.2	
Performed Location	(0040,0243)	SH	From Ultrasound System Configuration, see 4.4.2	
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	Mapped from Requested Procedure Code Sequence (0032,1064) from MWL	Mapped from Requested Procedure Code Sequence (0032,1064) 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 or DISCONTINUED
Performed Procedure Step ID	(0040,0253)	SH	Auto generated <yyyymmdd.hhmmss>	
Performed Procedure Step Description	(0040,0254)	LO	Mapped from Scheduled Procedure Description (0040,0007) from MWL or user entered	Same
Performed Procedure Type Description	(0040,0255)	LO	Zero length	
Performed Protocol Code Sequence	(0040,0260)	SQ	Zero length OR corresponding to built-in Staged Protocols OR mapped from MWL Scheduled Protocol Code Sequence (0040,0008)	Same
Scheduled Step Attributes Sequence	(0040,0270)	SQ		

Attribute Name	Tag	VR	N-CREATE	N-SET
> Accession Number	(0008,0050)	SH	From MWL or user entered. 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 system 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	Zero length	One item per acquired series
> Retrieve AE Title	(0008,0054)	AE		
> Series Description	(0008,103E)	LO		Study Description derived from MWL, or user entered
> Performing Physician's Name	(0008,1050)	PN		Empty
> Operator's Name	(0008,1070)	PN		MWL Scheduled Performing Physician's Name (0040,0006) From PDE "Exam Performed By" field
> Referenced Image Sequence	(0008,1140)	SQ		One item per referenced image 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

Attribute Name	Tag	VR	N-CREATE	N-SET
> Protocol Name	(0018,1030)	LO		See Table 9.9
Scheduled Step Attributes Sequence	(0040,0270)	SQ		
> Accession Number	(0008,0050)	SH	From MWL or user entered. 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 system 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	Zero length	One item per acquired series
> Retrieve AE Title	(0008,0054)	AE		
> Series Description	(0008,103E)	LO		Study Description derived from MWL, or user entered
> Performing Physician's Name	(0008,1050)	PN		Empty
> Operator's Name	(0008,1070)	PN		MWL Scheduled Performing Physician's Name (0040,0006) From PDE "Exam Performed By" field
> Referenced Image Sequence	(0008,1140)	SQ		One item per referenced image instance

Attribute Name	Tag	VR	N-CREATE	N-SET
>> 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 9.9
> Series Instance UID	(0020,000E)	UI		System generated
> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	SQ		One item per referenced non-image 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

Table 25: Status Response for N-SET

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed. Association is released.
Failure	xxxx	All other error codes	Error code is logged. Association is released
	0213	Resource Limitation	Error code is logged. Association is released
	0121	Missing Attribute Value	Error code is logged. Association is released
	0116	Attribute Value Out of Range	Error code is logged. Association is released
	0111	Duplicate SOP Instance	Error code is logged. Association is released
	0110	Processing Failure	Error code is logged. Association is released
	0117	Invalid Object Instance	Error code is logged. Association is released
	0124	Refused: Not Authorized	Error code is logged. Association is released
	0120	Missing Attribute	Error code is logged. Association is released
	0118	No Such SOP Class	Error code is logged. Association is released
	0211	Unrecognized Operation	Error code is logged. Association is released
	0210	Duplicate Invocation	Error code is logged. Association is released

Service Status	Error Code	Further Meaning	Behavior
	0106	Invalid Attribute Value	Error code is logged. Association is released
	0107	Attribute List Error	Error code is logged. Association is released
	0212	Mistyped Argument	Error code is logged. Association is released
	0105	No Such Attribute	Error code is logged. Association is released

Table 26: Status Response for N-Create

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed. Association is released.
Failure	<xxxx>	All other error codes	Error code is logged. Association is released
	0213	Resource Limitation	Error code is logged. Association is released
	0121	Missing Attribute Value	Error code is logged. Association is released
	0116	Attribute Value Out of Range	Error code is logged. Association is released
	0111	Duplicate SOP Instance	Error code is logged. Association is released
	0110	Processing Failure	Error code is logged. Association is released
	0117	Invalid Object Instance	Error code is logged. Association is released
	0124	Refused: Not Authorized	Error code is logged. Association is released
	0120	Missing Attribute	Error code is logged. Association is released
	0118	No Such SOP Class	Error code is logged. Association is released
	0211	Unrecognized Operation	Error code is logged. Association is released
	0210	Duplicate Invocation	Error code is logged. Association is released
	0106	Invalid Attribute Value	Error code is logged. Association is released

	0107	Attribute List Error	Error code is logged. Association is released
	0212	Mistyped Argument	Error code is logged. Association is released
	0105	No Such Attribute	Error code is logged. Association is released

4.1.4.3.4 (Real-World) Activity – FIND as SCU

4.1.4.3.4.1 Description and Sequencing of Activities

The user may set a filter in Review when selecting a configured Query Retrieve device in the “Source” dropdown, to specify the criteria used in querying the Query/Retrieve SCP. When the user initiates the query, the system sends a Study Root C-FIND request using the filter parameters set by the user. The user may then select from the query results one or more of the studies to initiate a Study Root C-MOVE request for the selected exam(s).
Additional Query options are user selectable for the initial query and after query results are displayed. The initial query is only at the Study level. The user may select Series level to be automatically performed for each Study level returned. The user may also select that each series is automatically queried for contents as well. Each additional level of query selected at the main query page will increase the time required for result display.

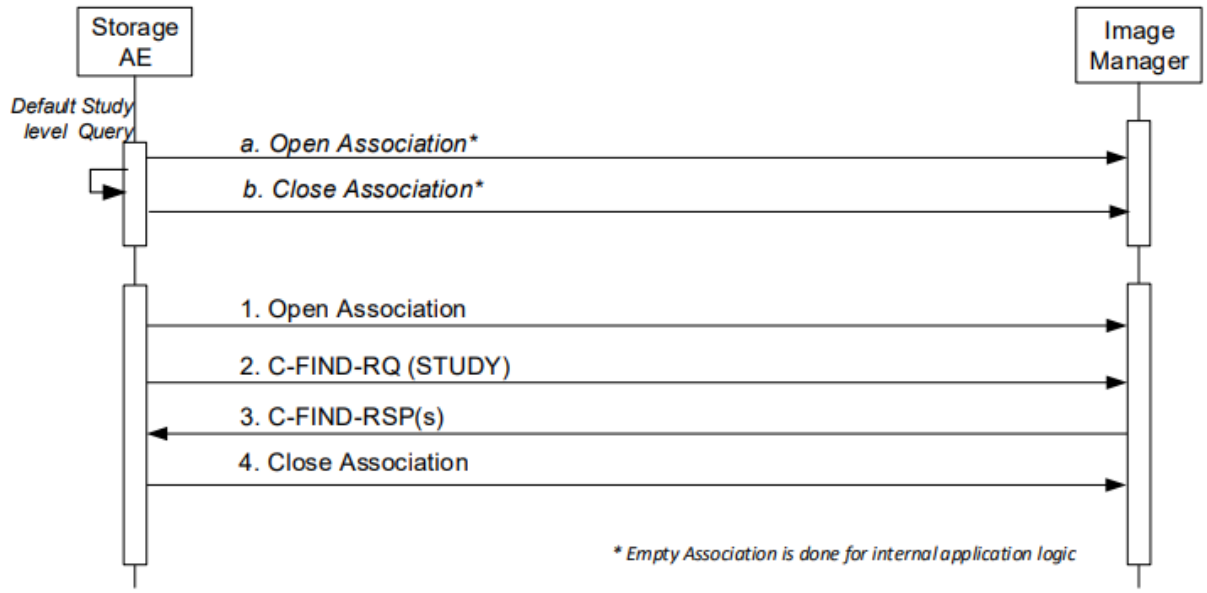

Figure 10: Default Study level query sequence diagram

The Default Query, at Study Level, settings are for Any Patient Name, indicated by the “*” wildcard in the “Last Name” field and the “Date Range” left with no entered values, in the “Query Retrieve Filter Parameters”

The result will be all Patient's for any date, up to the displayable limit. The query parameters that may be selected for Study level queries are:

- Patient Last Name and First Name
- Patient ID
- Accession Number
- Date Range
- Today and 1-7 days before.

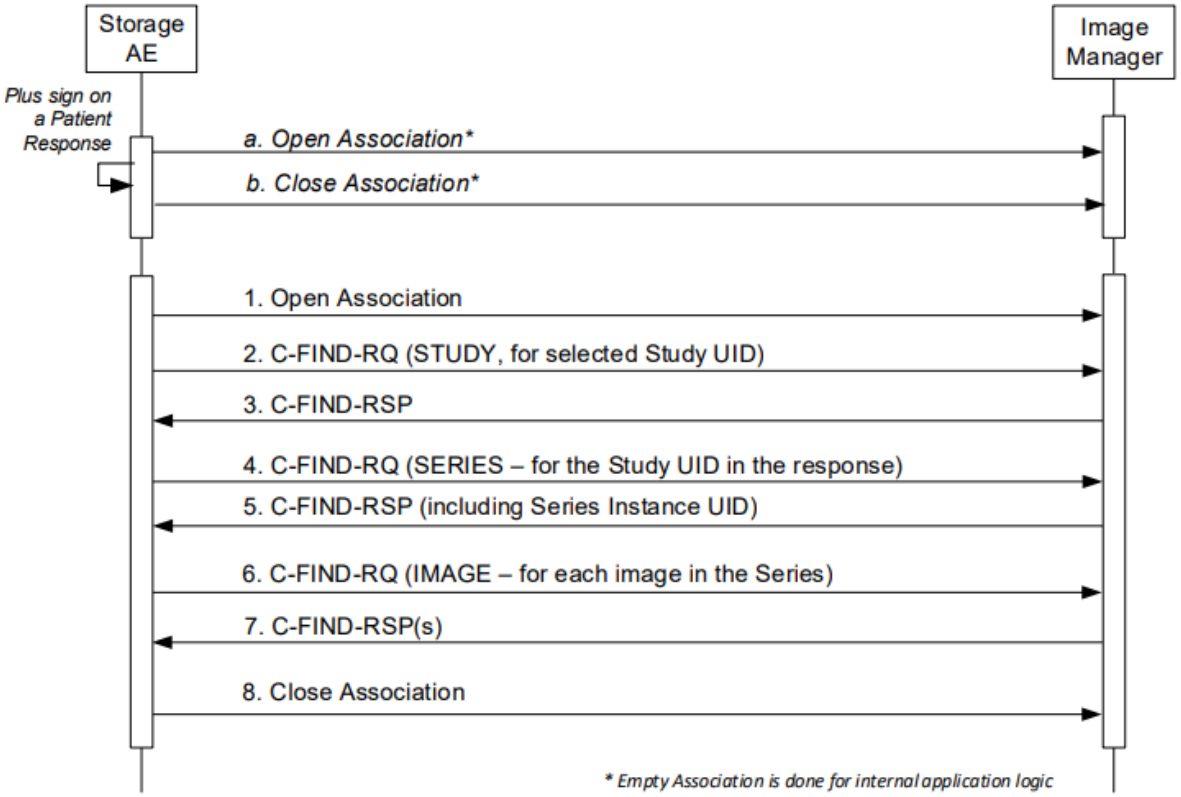

Figure 11: Plus sign query sequence diagram

The list of returned Patient Names includes a "+" plus sign next to it. If the plus sign is clicked for a patient, the result will be to send additional Queries for all Series for that patient, and all Image objects associated with that patient.

When completed, the entry in the display will show the Modality, Number of Images, number of Series and Series Description.

This feature allows for immediate display of information for a single patient to determine the appropriateness of the study for Retrieval to the system.

The net effect of using the Plus sign is to query to the image level directly, and only for one selected result. If not the correct study, re-perform the Study level query.

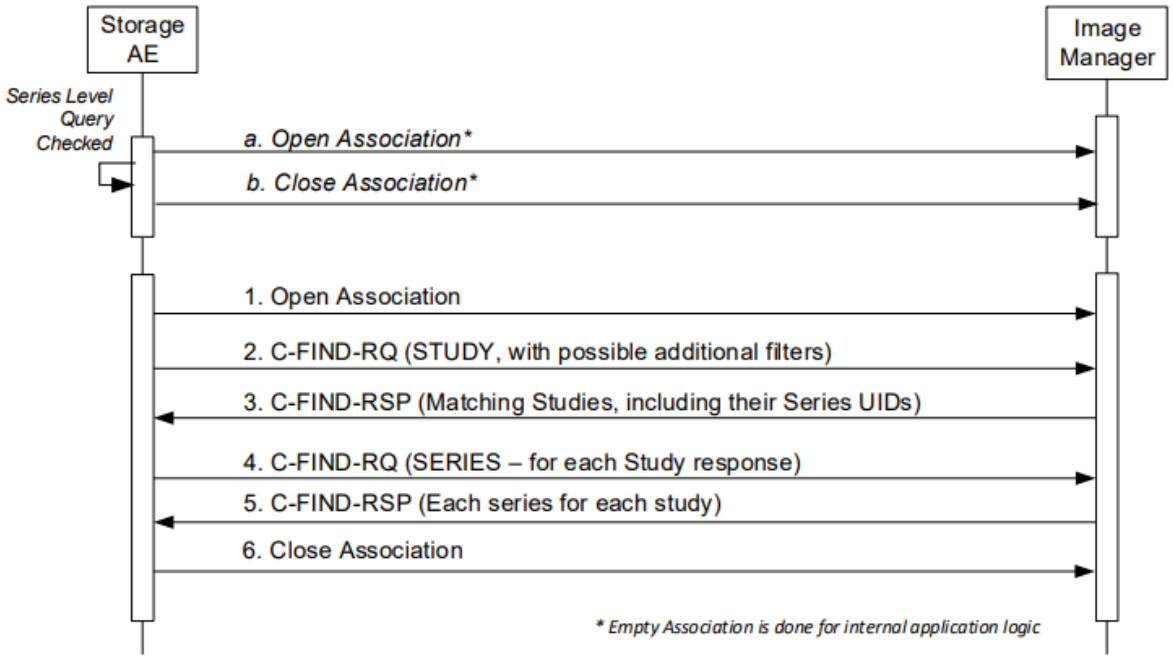

Figure 12: Series level query sequence diagram

When the "Series Level Query" box is checked, the system performs Study and Series level queries automatically for each response matching the query parameters. In addition to the query filter parameters listed for Default Study Level query, the user may make the following choices for Modality:

- All [2]
- Ultrasound
- CT
- MR
- Mammography
- PET
- X-Ray Angiography

[2] The "All" selection will return all available modality data associated with the patient. However, the system will only allow import of the list of modality images listed here. A study that contains an unsupported modality will fail to import.

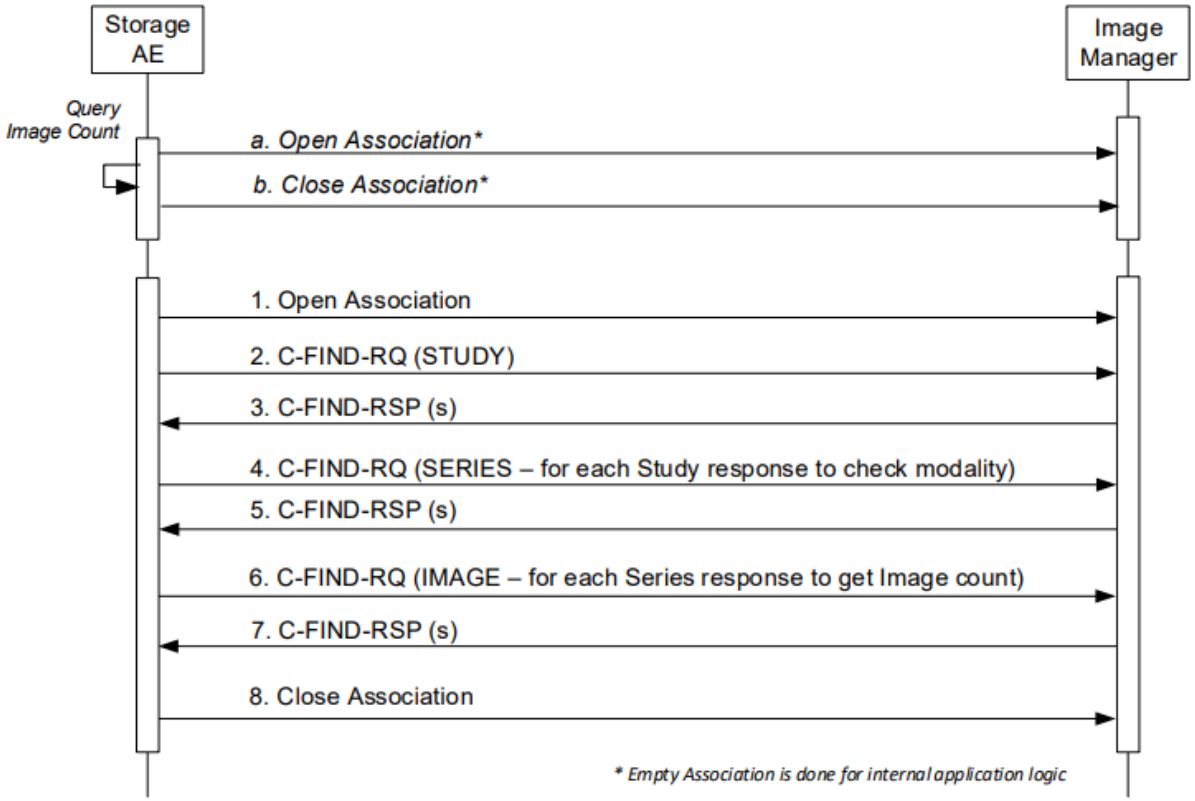

Figure 13: Query image count query sequence diagram

When "Query Image Count" is selected, the query behaviour is like previous versions of Query Retrieve. For each Study response, each series contained in each series will be queried for all Images in each Series response.

Notes:

1. This behaviour will take more time depending on the number of Study responses.
2. Structured Reports will not be included in the Series counts. Structured Reports are not imported into the system.

4.1.4.3.4.2 Proposed Presentation Contexts

The presentation contexts are defined in the below table.

Table 27: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve (CFIND)	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.1.4.3.4.3 SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

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

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

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

Table 28: Supported Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	Tag	VR	Type Of Matching	Comment
Query/Retrieve Level	0008,0052	CS	Universal	STUDY,SERIES
Q/R Study level				
Study Date	0008,0020	DA	Range, Single Value, Universal	-
Study Time	0008,0030	TM	Range, Single Value, Universal	-
Accession Number	0008,0050	SH	Single Value, Universal, Wildcard	-
Query/Retrieve Level	0008,0052	CS	Single Value, Universal, Range	STUDY
Patient's Name	0010,0010	PN	Single Value, Universal, Wildcard	-
Patient ID	0010,0020	LO	Single Value, Universal, Wildcard	-
Study Instance UID	0020,000D	UI	Single Value, Universal	-

Study ID	0020,0010	SH	Single Value, Universal, Wildcard	-
Q/R Series level				
Query/Retrieve Level	0008,0052	CS	Single Value, Universal, Range	SERIES
Series Date	0008,0021	DA	Single Value, Universal, Range	
Series Time	0008,0031	TM	Single Value, Universal, Range	
Modality	0008,0060	CS	Single Value	
Series Description	0008,103E	LO	Single Value, Universal	
Manufacturer's Model Name	0008,1090	LO	Single Value, Universal	
Study Instance UID	0020,000D	UI	Single Value, Universal	
Series Instance UID	0020,000E	UI	Single Value, UID List	
Series Number	0020,0011	IS	Single Value, Universal	

Table 29: Status Response

Service Status	Error Code	Further Meaning	Behaviour
Success	0000	Matching is complete	The SCU has successfully returned all matching information
Refused	A700	Out of Resources	The SCU stops with processing the C-Find Response(s) from the SCP. The failure is reported to the user.
Pending	FF00	Matches are continuing. - Current Match is supported in the same manner as supplied and any Optional Keys were Required Keys.	Continues with processing of the C-Find Response(s) from the SCP.
Failed	A900	Identifier Does Not Match SOP Class	The SCU stops with processing the C-Find Response(s) from the SCP. The failure is reported to the user.
	Cxxx	Unable to process	The SCU stops with processing the C-Find Response(s) from the SCP. The failure is reported to the user.

Table 30: Query/Retrieve Message Contents

Request Type	Attribute	Tag	Value
C-FIND	Query/Retrieve Level	(0008,0052)	STUDY, SERIES
	Modality	(0008,0060)	User Set, US by default
	Patient Name	(0010,0010)	User Set, Wildcard (‘*’) by default
	Patient ID	(0010,0020)	User Set or empty
	Accession Number	(0008,0050)	User Set or empty

The system performs a number of C-FIND requests at multiple levels in the DICOM object hierarchy to get the data it requires to display a study. The “message” displayed above is the effective combination of the C-FIND requests that are made to get the data in the next table (below).

Table 31: C-Find Message Results (Attributes) Requested

Attribute	Tag
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Patient Name	(0010,0010)
Patient ID	(0010,0020)
Study Instance UID	(0020,000D)
Study ID	(0020,0010)
Query/Retrieve Level	(0008,0052)

4.1.4.3.5 (Real-World) Activity – MOVE as SCU

4.1.4.3.5.1 Description and Sequencing of Activities

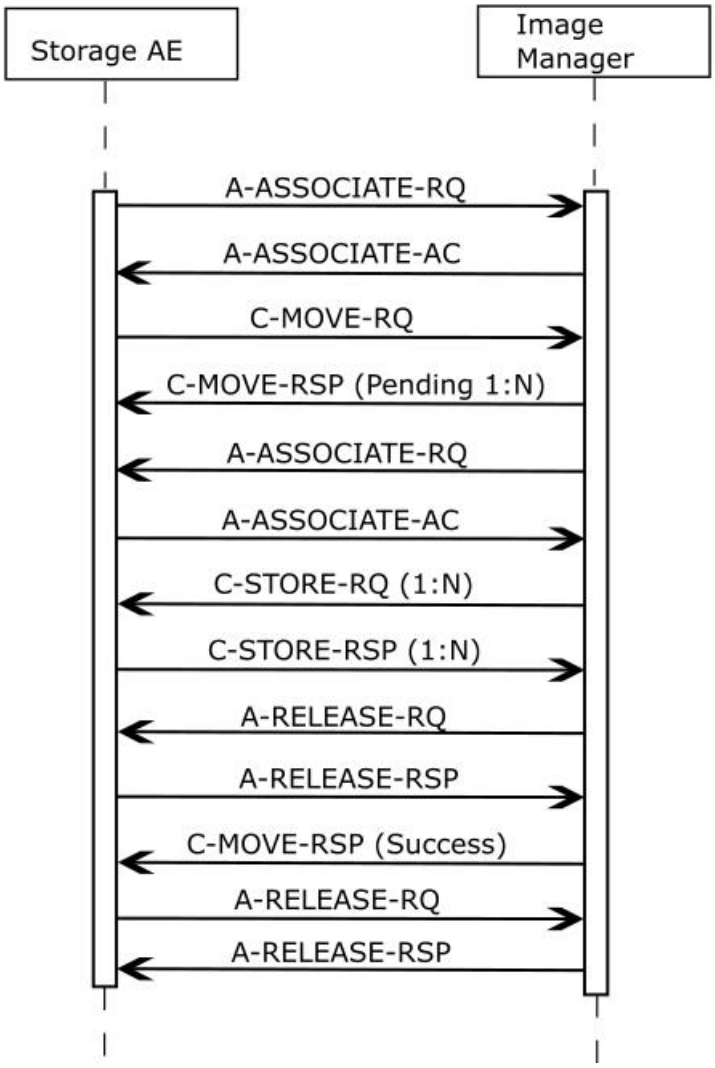

Figure 14: Study level retrieve sequence diagram

Pressing “Retrieve” for a Default Study Level query will result in sending a C-MOVE-RQ message for that Study to the Image Manager. It will respond with the matching pending C-MOVE-RSP messages for that Study.

The Image Manager will then open an association with the ultrasound system to perform C-STORE operations to store the images to the system for the images listed in the C-MOVE-RSP messages.
Once the transfers are completed, the study will appear in “Review” on the system’s “Hard Drive” selection under “Source” and have the status “IMPORTED”.

Note again, Structured Reports are included in the Import but will not be displayed with the studies in Review. They will be included in a subsequent export of the study.

After completing a Series Level query, not pressing the “plus” sign, and selecting Retrieve, the system will send a CMOVE-RQ message containing the SERIES for retrieval. A C-MOVE-RSP for each image in that series will be returned identifying each object for the Image Manager to send to the system using C-STORE-RQ

messages. As with Study Level Retrieve, the study will appear on the system in “Review” when Source is “Hard Drive” with Status of IMPORTED.

4.1.4.3.5.2 Proposed Presentation Contexts

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

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

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

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

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

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

Table 33: Status Response

Service Status	Error Code	Further Meaning	Behaviour
Success	0000	Sub-operations completed	Association is released and User is notified.
Refused	A701	Out of resources. Unable to calculate number of matches	User is notified with the failure on the UI from Job Viewer. Association is released
	A702	Out of resources. Unable to perform sub-operations	User is notified with the failure on the UI from Job Viewer. Association is released
	A801	Move destination Unknown	User is notified with the failure on the UI from Job Viewer. Association is released
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as cancelled. User is notified with the failure on the UI from Job Viewer. Association is released
Failed	A900	Identifier does not match SOP class	User is notified with the failure on the UI from Job Viewer. Association is released
	Cxxx	Unable to process	User is notified with the failure on the UI from Job Viewer. Association is released
Warning	B000	Sub-operations completed. One or more failures	User is notified with the failure on the UI from Job Viewer. Association is released

Service Status	Error Code	Further Meaning	Behaviour
Pending	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier.	Retrieval Job Continues.
	FF00	Sub Operations are Continuing	Retrieval Job Continues

Table 34: Identifiers For Move Study Root Information Model As SCU

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS		Series
Series level attributes				
Series Instance UID	0020,000E	UI	L, U	Series UID to Send
Study Instance UID	0020,000D	UI	U	Study UID to Send

Types of Matching:
The types of Matching supported by the C-MOVE SCU. A 'U' indicates UNIQUE Matching (single UID), and an 'L' indicates that UID lists are sent.

4.1.4.3.6 (Real-World) Activity – Image Export

4.1.4.3.6.1 Description and Sequencing of Activities

A user may select exams or individual images from review and request them to be sent to multiple destinations (up to five). Reports may not be selected individually but are sent when “End Exam” is pressed, and when an entire exam is selected for export from the Review Directory and exported to a Storage device with “Export Structured Report” enabled. Each object (image, private presentation state, or structured report) is entered into the job queue.
When send “After Each Print/Acquire” is enabled, the acquired images are sent to the selected destinations immediately after acquisition.

The Network Status icon reports the status of the job, Green is ok, yellow exclamation point is pending until a network connection is available, and Red X indicates failed.

If the C-STORE response from the remote Application Entity contains a status other than Success, 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. Reconnecting the network cable will initiate transfer again.

Structured Reports will contain all supported measurements and calculations created by EPIQ/Affiniti even if they are not selected for display in the on-system report. One Structured Report instance is created for each template that is used. In this context, “template” refers to the DICOM Structured Report templates listed in PS3.16 of the DICOM Standard.

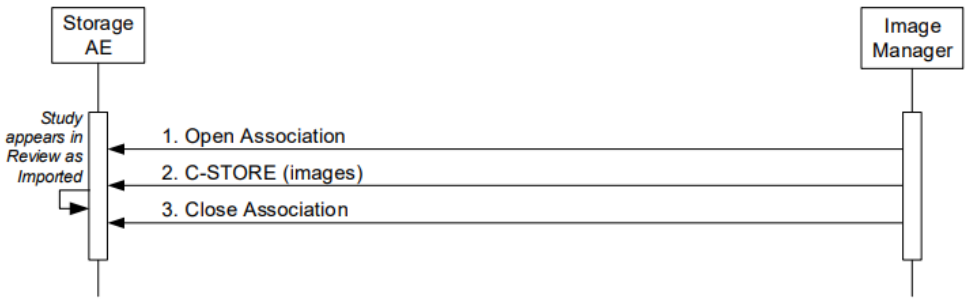

Figure 15: Sequencing of Activity – Image Export

The sequence of interactions between the Storage AE and an Image Manager is illustrated in Figure 3 for the “Store” configuration option “After Each Print/Acquire”. If the “At End Exam” configuration option is selected, no C-STORE is sent at the Acquire Image event and instead all image C-STOREs are sent after end exam.

NOTES: Pausing an exam will close the current association. A new association will be created when resumed. Similar behaviour when the association times out.

4.1.4.3.6.2 Proposed Presentation Contexts

The presentation contexts proposed by the Console AE for Image Export are defined in the below table.

Table 35: Proposed presentation context(Real Word Actiivty)- Image Export

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
US Multiframe Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Digital Mammography Xray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Digital Mammography Xray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
Private 3D Presentation State*	1.3.46.670589.2.5.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Note: Use of Retired SOP Classes only is user configurable for the system on the PSC – Network/DICOM – DICOM Settings – DICOM Storage Device – Advanced Settings configuration page. Image storage will use Retired SOP Classes only when selected.

*Intended for use only on Q-Station workstations and anywhere QLAB is installed.

Presentation Contexts are proposed for each Storage device based on selected options. Contexts are proposed for images for all Storage devices, unless the user selects “Implicit Little Endian Only” in the

Advanced Configuration tab for the configured device. Then only Implicit Little Endian is negotiated for that device, provided the study contains no JPEG Lossy compressed loops. The Implicit Little Endian Only selection will override the Single Frame Compression setting, resulting in only uncompressed export. RLE Lossless and JPEG Lossless are only negotiated for Image Presentation Contexts if configured for use by the user. JPEG Extended 12-bit Lossy will only be negotiated if images are present that require that transfer syntax, this is not selectable by the user.

Storage Commitment N-ACTION requests are only sent to the device that is configured as the Storage Commitment server. Storage Commitment always works in conjunction with a designated Storage SCP configured to receive storage of the objects to be committed.

4.1.4.3.6.2.1 Dataset Specific Conformance for C-STORE-RQ

All Image and Comprehensive Structured Report Storage SOP Classes supported by the Storage AE exhibit the same behaviour, except where stated, and are described together in this section.
Table 4.8 describes C-Store response behaviour.

Table 36: C-STORE-RQ Status Response

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful stored	The SCP successfully stored the SOP Instance. If all SOP Instances succeed, the job is marked as complete.
Failure	A7xx	Refused: Out of Resources	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	A9xx	Error: Data Set does not match SOP Class	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	Cxxx	Error: cannot understand	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	0210	Duplicate Invocation	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	0117	Invalid Object Instance	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	0212	Mistyped Argument	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
Warning	B000	Coercion of Data Elements	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	B007	Data Set does not match SOP Class	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.

	B006	Elements Discarded	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.
	0107	Attribute List Error	User is notified with failure message on the UI for the export failure in the job viewer. the export job fails. Connection is released.

The status can be inspected via the user interface (queue manager).
The possible communication failures during a C-STORE-RQ are listed in the table below.

Table 37: DICOM Command Communication Failure Behavior

Exception	Behavior
Association aborted by the SCP or network layers	The Association is aborted using A-ABORT and the transfer fails. The User is notified.

4.1.4.3.7 Real-World) Activity – Storage Commitment Push Model AS SCU

4.1.4.3.7.1 Description and Sequencing of Activities

The Storage AE will request storage commitment for the configured device. If “Storage Commit image-by-image” is selected, Storage Commitment is requested automatically by the system immediately after the instance is stored (but not necessarily one-to-one with each storage request).
Table 34 summarizes the behaviour of Storage AE when receiving response status codes.

If Storage Commit Auto-Retry is enabled, the N-ACTION request is retried if the N-ACTION has completed successfully but no N-EVENT-RESPONSE received within the configured “no-response” period. Further, the N-ACTION request is retried if N-EVENT-RESPONSE is received with one or more instances that fail commit; in that case, C-STORE requests are also resent for all instances that failed to commit.

If a device is configured for Storage Commitment service, the Storage AE will transmit a separate Storage Commitment N-ACTION request for images and one for the report. The Storage AE can only receive an N-EVENT-REPORT request in a separate subsequent association initiated by the SCP employing PDU 54H SCP/SCU Role Negotiation of “SCP” in the SCP’s Association Request. It cannot receive N-EVENT-REPORT request messages on the same association as the N-ACTION request.

Storage commitment request is marked as failure when:

1. Storage Commitment fail for any one or few of the objects.
2. Storage Commitment missing for any one or few of the objects.

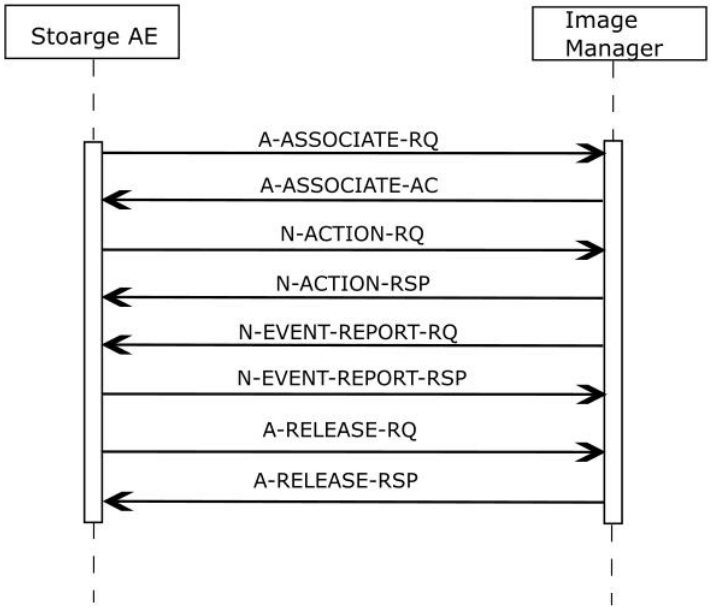

Figure 16: (Real World) Activity - Synchronous Storage Commitment Push model as SCU

4.1.4.3.7.2 Proposed Presentation Contexts

The proposed presentation contexts for Storage Commitment Push Model as SCU are defined in Table below.

Table 38: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model AS SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	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		

*Intended for use only on Q-Station workstations and anywhere QLAB is installed.

Storage Commitment N-ACTION requests are only sent to the device that is configured as the Storage Commitment server. Storage Commitment always works in conjunction with a designated Storage SCP configured to receive storage of the objects to be committed.

4.1.4.3.7.3 SOP Specific Conformance for Storage Commitment Push Model SOP Class

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

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

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 39: Storage commitment N-ACTION response status handling behavior

Service Status	Error Code	Further Meaning	Behavior
Success	Success	0000	The system waits for the N-Event-Report.
*	*		Any other status code. The commit status remains unchanged for all objects.
Failure	0213	Resource Limitation	Error code is logged. Association is released
	0123	No Such Action	Error code is logged. Association is released
	0211	Unrecognized Operation	Error code is logged. Association is released
	0110	Processing Failure	Error code is logged. Association is released
	0117	Invalid Object Instance	Error code is logged. Association is released
	0124	Refused: Not Authorized	Error code is logged. Association is released
	0114	No Such Argument	Error code is logged. Association is released
	0118	No Such SOP Class	Error code is logged. Association is released
	0211	Unrecognized Operation	Error code is logged. Association is released
	0210	Duplicate Invocation	Error code is logged. Association is released
	0212	Mistyped Argument	Error code is logged. Association is released
	0119	Class Instance Conflict	Error code is logged. Association is released
	0112	No Such SOP Instance	Error code is logged. Association is released
	0115	Invalid Argument Value	Error code is logged. Association is released

The possible communication failures are shown in the below table.

Table 40: DICOM Command Communication Failure Behavior N-ACTION.

Exception	Behavior
Association Aborted	The association is released. Storage commitment response is expected on a new association

Table 41: Storage commitment N-ACTION request message contents

Action Type Name	Action Type ID	Attribute	Tag	Requirement Type SCU
Request Storage Commitment	Success	Transaction UID	(0008,1195)	1
		Storage Media File-Set ID	(0088,0130)	3
		Storage Media File-Set UID	(0088,0140)	3
		Referenced SOP Sequence	(0008,1199)	1
		>Referenced SOP Class UID	(0008,1150)	1
		>Referenced SOP Instance UID	(0008,1155)	1
		>Storage Media File-Set ID	(0088,0130)	3
		>Storage Media File-Set UID	(0088,0140)	3

If Storage Commit Auto-Retry is enabled, the N-ACTION request is retried if the N-ACTION has completed successfully but no N-EVENT-RESPONSE received within the configured “no-response” period. Further, the NACTION request is retried if N-EVENT-RESPONSE is received with one or more instances that fail commit; in that case, C-STORE requests are also resent for all instances that failed to commit.

4.1.4.3.7.3.2 Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-EVENT-REPORT-SCU

The Storage AE can receive an N-EVENT-REPORT notification received from the SCP via an association requested by the SCP with reverse-role negotiation.

Upon receipt of an N-EVENT-REPORT the timer associated with the Transaction UID will be cancelled. Table 34 summarizes the behaviour of Storage AE when receiving Event Types within the N-EVENT-REPORT.

Table 42: Storage commitment N-EVENT-report behavior

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.

Table below table lists the attributes that are supported within the N-EVENT-REPORT

Table 43: Storage Commitment N-EVENT-Report Message Contents

Action Type Name	Action Type ID	Attribute	Tag	Requirement Type SCU
Request Storage Commitment	1	Transaction UID	(0008,1195)	1
		Storage Media File-Set ID	(0088,0130)	3
		Storage Media File-Set UID	(0088,0140)	3
		Referenced SOP Sequence	(0008,1199)	1
		>Referenced SOP Class UID	(0008,1150)	1
		>Referenced SOP Instance UID	(0008,1155)	1
		>Storage Media File-Set ID	(0088,0130)	3
		>Storage Media File-Set UID	(0088,0140)	3
		Transaction UID	(0008,1195)	1
		Storage Media File-Set ID	(0088,0130)	3
Action Type Name	**Action Type ID**	**Attribute**	**Tag**	**Requirement Type SCU**
Storage Commitment Request Complete – Failures Exist	2	Transaction UID	(0008,1195)	None
		Retrieve AE Title	(0008,0054)	None
		Storage Media File-Set ID	(0088,0130)	None
		Storage Media File-Set UID	(0088,0140)	None
		Referenced SOP Sequence	(0008,1199)	None
		>Referenced SOP Class UID	(0008,1150)	None
		>Referenced SOP Instance UID	(0008,1155)	None
		>Retrieve AE Title	(0008,0054)	None
		>Storage Media File-Set ID	(0088,0130)	None
		>Storage Media File-Set UID	(0088,0140)	None

4.1.4.3.8 (Real-World) Activity – Print Management as SCU

4.1.4.3.8.1 Description and Sequencing of Activities

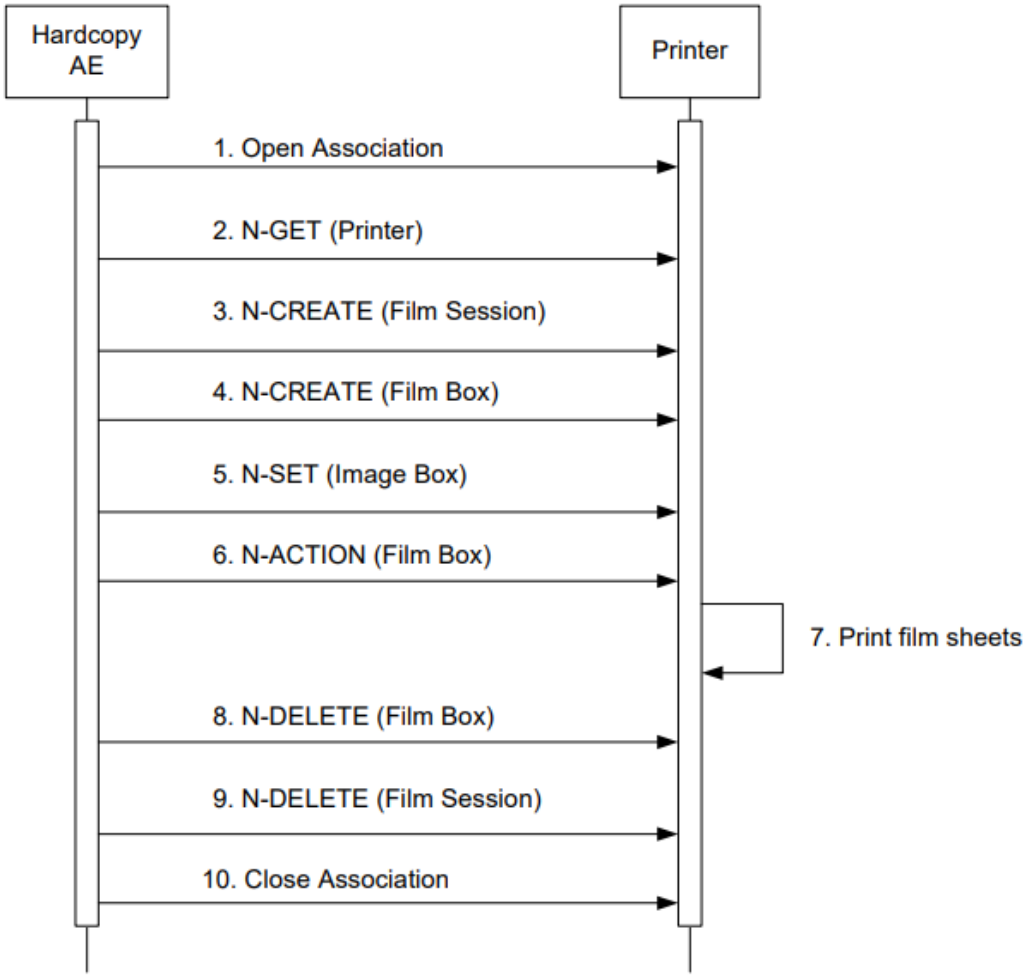

Figure 17: (Real World) Activity - Print Management as SCU

Above Figure illustrates a typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer. Two DICOM Printers may be simultaneously configured, one for BW and one for Color prints.
If both BW and Color printers are configured and selected, the user may choose to automatically send BW prints only to the BW printer and color prints only to the color printer. This feature may only be used while configured for “After Each Print/Acquire”.
When using the “Send on Demand” feature with print, page(s) that have not been exported will be sent, according to the formatting configuration. If less than a full page is sent, then the remaining space on the page will be left blank.

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, the Association is aborted, and the related Job is switched to a failed state. It can be restarted any time by user interaction.

4.1.4.3.8.2 Proposed Presentation Contexts

EPIQ/Affiniti will propose Presentation Contexts as shown in the following table:

Table 44: Proposed Presentation Contexts for (Real-World) Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18			SCU	None
>Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Printer SOP Class	1.2.840.10008.5.1.1.16	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9			SCU	None
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
>Printer SOP Class	1.2.840.10008.5.1.1.16	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.1.4.3.8.3 SOP Specific Conformance for Basic Color Image Box SOP Class of the Basic Colour Print Management Met SOP Class

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

4.1.4.3.8.3.1 Dataset Specific Conformance for Basic Color Image Box SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 45 : Image Box Sop Class N-Set Request Attributes

Service Status	Further Meaning	Error Code	Behavior
Image Position	(2020,0010)	US	1
Polarity	(2020,0020)	CS	NORMAL
Basic Grayscale Image Sequence	(2020,0110)	SQ	Used for BW (Monochrome2) print
Basic Color Image Sequence	(2020,0111)	SQ	Used for Color (RGB) print
>Samples Per Pixel	(0028,0002)	US	1 for Monochrome2 3 for RGB
>Photometric Interpretation	(0028,0004)	CS	MONOCHROME2 RGB
Planar Configuration	(0028,0006)	US	Always “01”, only used for RGB print.
>Rows	(0028,0010)	US	Depends on film size, number of rows for entire sheet of film
>Columns	(0028,0011)	US	Depends on film size, number of columns for entire sheet of film
>Bits Allocated	(0028,0100)	US	8
>Bits Stored	(0028,0101)	US	8
>High Bit	(0028,0102)	US	7
>Pixel Representation	(0028,0103)	US	0
>Pixel Data	(7FE0,0010)	OW	Pixels of rendered film sheet.

Table 46 :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.

Service Status	Further Meaning	Error Code	Behavior
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.

4.1.4.3.8.4 SOP Specific Conformance for Basic Film Box SOP Class of the Basic Color Print Management Meta SOP Class

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

4.1.4.3.8.4.1 Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 47: Film Box Sop Class N-Create Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Display Format	2010,0010	ST	STANDARD\1,1 [1] or CUSTOM\xxx depending on printer. Default is displayed and is user editable. Edit only when a valid 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, depending on printer	ANAP	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	
Trim	2010,0140	CS	NO	ALWAYS	AUTO	

Table 48: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully.
Warning	B605H	Requested Max Density outside of printer's operating range	The N-CREATE operation is considered successful.
*	Any other status code.	Success	The Association is aborted, and the job failed.

Note: [1] EPIQ/Affiniti performs page compositing of n-up prints (i.e., 2x2, 2,3, etc.) internally and prints the pages as a single Image Box per page; hence STANDARD\1,1

4.1.4.3.8.4.2 Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

The US EPIQ and Affiniti issues an N-ACTION Request to instruct the Print SCP to print the contents of the Film Box.
The below table summarizes the behaviour of US EPIQ and Affiniti when encountering status codes in an N-ACTION response.

Table 49: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully. The film has been accepted for printing.
Warning	B603H	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	The Association is aborted, and the job is failed.
Failure	C602	Unable to create Print Job SOP Instance; print queue is full.	Same as B603H above.
*	Any other status code.	*	Same as B603H above.

4.1.4.3.8.4.3 Dataset Specific Conformance for Basic Film Box SOP Class N-DELETE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 50: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed successfully	The SCU has successfully returned all matching information
Failure	0112	No such SOP Instance	Print job is failed and reason is recorded in logs.

4.1.4.3.8.5 SOP Specific Conformance for Basic Film Session SOP Class of the Basic Color Print Management Meta SOP Class

US EPIQ and Affiniti supports the following DIMSE operations for the Film Session SOP Class:
— N-CREATE

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

4.1.4.3.8.5.1 Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.
The Below Table lists the attributes supplied in an N-CREATE Request.

Table 51 : 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
Print Priority	(2000,0020)	CS	HIGH	ALWAYS	AUTO
Medium Type	(2000,0030)	CS	BLUE FILM, CLEAR FILM or PAPER*	ALWAYS	USER
Film Destination	(2000,0040)	CS	MAGAZINE or PROCESSOR*	ALWAYS	USER
Film Session Label	(2000,0050)	LO	Philips Medical Systems	ALWAYS	AUTO

Table 52: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully.
Warning	0116H	Attribute Value Out of Range	System continues Print operation.
	B600	Memory allocation not supported	System continues Print operation.
Warning	0107H	Attribute List Error	Same as above.
*	Any other status code.	*	The Association is aborted, and the print-job fails.

4.1.4.3.8.6 SOP Specific Conformance for Printer SOP Class of the Basic Color Print Management Meta SOP Class

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

4.1.4.3.8.6.1 Dataset Specific Conformance for Printer SOP Class Job N-EVENT-REPORT SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 53 : 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.

Table 54: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	e.g. The SCU has successfully returned all matching information
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).

4.1.4.3.8.6.2 Dataset Specific Conformance for Printer SOP Class N-GET-REPORT SCU

US EPIQ and Affiniti uses the Printer SOP Class N-GET operation to obtain information about the current printer status.

Table 55 : 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.

4.1.4.3.8.7 SOP Specific Conformance for Basic Image Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

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

4.1.4.3.8.7.1 Dataset Specific Conformance for Basic Image Box SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 56 : Image Box Sop Class N-Set Request Attributes

Service Status	Further Meaning	Error Code	Behavior
Image Position	(2020,0010)	US	1
Polarity	(2020,0020)	CS	NORMAL
Basic Grayscale Image Sequence	(2020,0110)	SQ	Used for BW (Monochrome2) print
Basic Color Image Sequence	(2020,0111)	SQ	Used for Color (RGB) print
>Samples Per Pixel	(0028,0002)	US	1 for Monochrome2 3 for RGB
>Photometric Interpretation	(0028,0004)	CS	MONOCHROME2 RGB
Planar Configuration	(0028,0006)	US	Always “01”, only used for RGB print.
>Rows	(0028,0010)	US	Depends on film size, number of rows for entire sheet of film
Configuration			
File			
>Columns	(0028,0011)	US	Depends on film size, number of columns for entire sheet of film
Configuration			
File			
>Bits Allocated	(0028,0100)	US	8
>Bits Stored	(0028,0101)	US	8
>High Bit	(0028,0102)	US	7
>Pixel Representation	(0028,0103)	US	0
>Pixel Data	(7FE0,0010)	OW	Pixels of rendered film sheet.

Table 57 : 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.

4.1.4.3.8.8 SOP Specific Conformance for Basic Film Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

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

4.1.4.3.8.8.1 Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 58 : Film Box Sop Class N-Create Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Display Format	2010,0010	ST	STANDARD\1,1 [2] or CUSTOM\xxx depending on printer. Default is displayed and is user editable. Edit only when a valid 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, depending on printer	ANAP	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	
Trim	2010,0140	CS	NO	ALWAYS	AUTO	
Configuration Information	2010,0150	ST		ALWAYS	USER	

Table 59: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully.
Failure	C616	Failed: There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported.	Print job is failed and reason is recorded in logs.
Warning	B605H	Requested Max Density outside of printer's operating range	The N-CREATE operation is considered successful.
*	Any other status code.	Success	The Association is aborted, and the job failed.

Note:[2] EPIQ/Affiniti performs page compositing of n-up prints (i.e., 2x2, 2,3, etc.) internally and prints the pages as a single Image Box per page; hence STANDARD\1,1

4.1.4.3.8.8.2 Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

The US EPIQ and Affiniti issues an N-ACTION Request to instruct the Print SCP to print the contents of the Film Box.
The Below table summarizes the behaviour of US EPIQ and Affiniti when encountering status codes in an N-ACTION response.

Table 60: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully. The film has been accepted for printing.
Warning	B603H	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	The Association is aborted, and the job is failed.
Failure	C602	Unable to create Print Job SOP Instance; print queue is full.	Same as B603H above.
*	Any other status code.	*	Same as B603H above.

4.1.4.3.8.8.3 Dataset Specific Conformance for Basic Film Box SOP Class N-DELETE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 61: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed successfully	The SCU has successfully returned all matching information
Failure	0112	No such SOP Instance	Print job is failed and reason is recorded in logs.

4.1.4.3.8.9 SOP Specific Conformance for Basic Film Session SOP Class of the Basic Grayscale Print Management Meta SOP Class

US EPIQ and Affiniti supports the following DIMSE operations for the Film Session SOP Class:
— N-CREATE

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

4.1.4.3.8.9.1 Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.
The Below Table lists the attributes supplied in an N-CREATE Request.

Table 62 : 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
Print Priority	(2000,0020)	CS	HIGH	ALWAYS	AUTO
Medium Type	(2000,0030)	CS	BLUE FILM, CLEAR FILM or PAPER*	ALWAYS	USER
Film Destination	(2000,0040)	CS	MAGAZINE or PROCESSOR*	ALWAYS	USER
Film Session Label	(2000,0050)	LO	Philips Medical Systems	ALWAYS	AUTO

Table 63: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the operation successfully.
Warning	0116H	Attribute Value Out of Range	System continues Print operation.
	B600	Memory allocation not supported	System continues Print operation.
Warning	0107H	Attribute List Error	Same as above.
*	Any other status code.	*	The Association is aborted, and the print-job fails.

4.1.4.3.8.9.2 Dataset Specific Conformance for Basic Film Session SOP Class N-DELETE-SCU

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

Table 64: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed successfully	The SCU has successfully returned all matching information
Failure	0112	No such SOP Instance	Print job is failed and reason is recorded in logs.

4.1.4.3.8.10 SOP Specific Conformance for Printer SOP Class of the Basic Grayscale Print Management Meta SOP Class

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

4.1.4.3.8.10.1 Dataset Specific Conformance for Printer SOP Class N-EVENT-REPORT SCU

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 65 : 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.

Table 66: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g. The SCU has successfully returned all matching information

4.1.4.3.8.10.2 Dataset Specific Conformance for Printer SOP Class N-GET-REPORT SCU

US EPIQ and Affiniti uses the Printer SOP Class N-GET operation to obtain information about the current printer status.

Table 67 : 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
Manufacturer	(0018,0070)	LO	Provided by Printer	ALWAYS	Printer
Manufacturer's Model Name	(0018,1090)	LO	Provided by Printer	ALWAYS	Printer
Device Serial Number	(0018,1000)	LO	Provided by Printer	ALWAYS	Printer
Software Versions	(0018,1020)	LO	Provided by Printer	ALWAYS	Printer
Date of Last Calibration	(0018,1200)	DA	Provided by Printer	ALWAYS	Printer

Time of Last Calibration	(0018,1201)	TM	Provided by Printer	ALWAYS	Printer
Printer Name	(2110,0030)	LO	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.

4.1.4.4. Association Acceptance Policy

The Application Entity may reject Association attempts as shown in the table below.

Table 68: Association Reject Reasons

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

Result	Source	Reason/Diagnosis	Behavior
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association is not established and the connection is released.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association is not established and the connection is released.
		2 - local-limit-exceeded	Association is not established and the connection is released.

The behaviour of the AE for sending an Association abort is summarized in table.

Table 69: Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the Console Network AE terminates the connection.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Console Network AE terminates the connection.
	1 - unrecognized-PDU	When received, the Console Network AE terminates the connection.
	2 - unexpected-PDU	When received, the Console Network AE terminates the connection.
	4 - unrecognized-PDU parameter	When received, the Console Network AE terminates the connection.
	5 - unexpected-PDU parameter	When received, the Console Network AE terminates the connection.
	6 - invalid-PDU-parameter value	When received, the Console Network AE terminates the connection.

4.1.4.4.1 (Real-World) Activity – Verification as SCP

4.1.4.4.1.1 Description and Sequencing of Activities

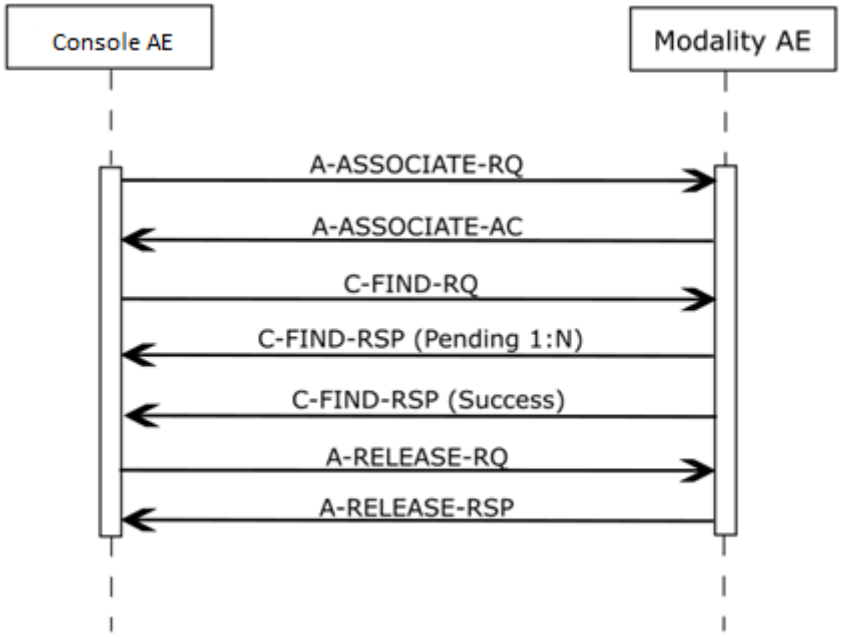

Figure 18: (Real World) Activity - Verification as SCP

4.1.4.4.1.2 Accepted Presentation Contexts

The presentation contexts are defined in below table.

Table 70: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

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

4.1.4.4.1.3 SOP Specific Conformance for Verification SOP Class

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

4.1.4.4.1.3.1 Dataset Specific Conformance for Verification C-ECHO SCP

Detail regarding the Dataset Specific response behaviour will be reported in this section.

Table 71: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The SCU has successfully returned all matching information

4.1.4.4.2 (Real-World) Activity – Image Import (Store as SCP)

4.1.4.4.2.1 Description and Sequencing of Activities

The Storage AE accepts associations for storage from remote Storage SCUs. There are two distinct scenarios in which images are transferred from a remote Storage SCU to EPIQ/Affiniti:

- Fulfilment of a Query/Retrieve C-MOVE request by the Query/Retrieve SCP
- Unsolicited push of images from a remote Storage SCU

For EPIQ/Affiniti to accept associations from a remote Storage SCU, the AE Title of the remote Storage SCU must be configured as a "Storage device" in EPIQ/Affiniti. Studies of images that are received through this mechanism will appear in the Patient Directory, marked as "Imported".

Note: A device may store an image per association – separate associations for each image.

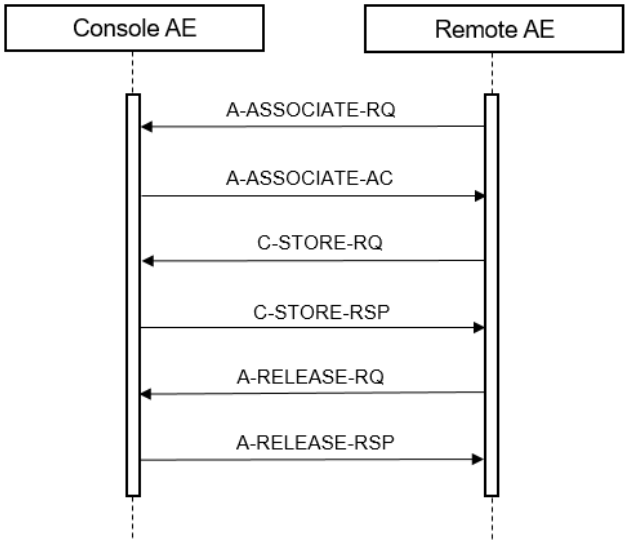

Figure 19: (Real World) Activity - Image Import

4.2.1.4.2.2 Accepted Presentation Contexts

The presentation contexts are defined in the next table.

Table 72: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		RLE Lossless	1.2.840.10008.1.2.5		
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
US Multiframe Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		RLE Lossless	1.2.840.10008.1.2.5		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1			SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Digital Mammography Xray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Digital Mammography Xray Image	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage – For Processing		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
		JPEG Extended 12-bit Lossy	1.2.840.10008.1.2.4.51		
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50		
		JPEG Lossless Baseline	1.2.840.10008.1.2.4.70		
Private 3D Presentation State*	1.3.46.670589.2.5.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

*The use of Explicit Little Endian transfer syntax is preferred.

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Classes

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

4.2.1.4.2.3.1 Dataset Specific Conformance for C-STORE-RSP

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

- US VM 13.0 imported the patient data with missing Study Instance UID or Series Instance UID or SOP Instance UID and 0117 H error code is observed.
- US VM 13.0 will update Patient information on UI when importing patient data after editing patient demographics information.
- US VM 13.0 imports the patient data which contains an illegal SOP Instance UID value (prefix a numeric component with 0)
- US VM 13.0 will import the patient data when Dataset being imported is encoded in a different transfer syntax other than the one which was negotiated in the association.
- US VM 13.0 imports patient data with empty values for attributes - Patient's Name (0010,0010) and Patient ID (0010,0020).
- US VM 13.0 will not import patient data with an invalid value for Modality (0008,0060) attribute.
- US VM 13.0 closes the connection unexpectedly when a different SOP class is used in the C-Store-RQ command set than the one negotiated, during import.
- US VM 13.0 will not import patient data with Study Time which contains value in Retired format (HH:MM:SS)
- US VM 13.0 will not import patient data with Study Date which contains value in Retired format (YYYY.MM.DD)
- US VM 13.0 will not import the second image when importing two images each belonging to a different patient but with identical Patient ID values.
- US VM 13.0 will send A-ABORT message when same patient data is imported twice.
- US VM 13.0 will import patient data which contains non-Philips private attributes.
- when a network disconnect occurs while performing Import operation, the store operation was not completed.
- US VM 13.0 will import patient data with maximum permissible length for attribute of different VRs.

Table 73: Status Response

Service Status	Error Code	Further Meaning	Behavior

Success	0000	Successful stored	Information is automatically updated in the patient list and series list
Failure	A700	Refused: Out of Resources	User is notified with failure message on UI.
	Cxxx	Error: Cannot understand	User is notified with failure message on UI.
	C122	Referenced Transfer Syntax Not Supported	User is notified with failure message on UI.
	0110	Processing Failure	User is notified with failure message on UI.
	0122	Referenced SOP Class Not Supported	User is notified with failure message on UI.
	A900	Error: Data Set does not match SOP Class	User is notified with failure message on UI.
Warning	B000	Coercion of Data Elements	User is notified with failure message on UI.
	B007	Data Set does not match SOP Class	User is notified with failure message on UI.
	B006	Elements Discarded	User is notified with failure message on UI.

Network Interfaces

4.1.5. Physical Network Interfaces

EPIQ/Affiniti supports both wired and wireless network interface as follows:

Table 74:Supported Physical Network Interfaces

1	Ethernet 10/100/1000 Basset, RJ-45; Manual or AutoDetect Speed, Full or Half Duplex
2	Wireless 802.11 g/n/ac using optionally provided wireless adapter or internal wireless adapter.

If both wired and wireless networks are configured, EPIQ/Affiniti will select the best available network automatically as followed:

- The Wired network has priority, and it will be used if available
- The Wireless network will be automatically used if the wired network is not available.

4.1.6. Additional Protocols

EPIQ/Affiniti supports the following additional protocols:

- Dynamic Host Configuration Protocol (DHCP): If enabled by the user, DHCP is used to acquire network configuration parameters, such as IP address, subnet mask, gateway address, and DNS server addresses from the DHCP server.
- Domain Name System (DNS): If configured, DNS is used to lookup server network addresses specified by hostname
- Wi-Fi Protected Access II (WPA2) Personal (PSK): Wireless encryption method with shared-key authentication. Provides reasonable wireless security in small to medium wireless network environments.
- Wi-Fi Protected Access II (WPA2) Enterprise: Wireless encryption method with centralized authentication. Provides very good wireless security in medium to large wireless network environments with centralized authentication server support.

4.1.7. IPv4 and IPv6 Support

EPIQ/Affiniti supports IPv4 and IPv6 internet protocols.
When IPv4 is used

- EPIQ/Affiniti's network address may be specified as either static IP addresses or DHCP
- Remote servers' network addresses may be specified as either IP address or DNS hostname

When IPv6 is used

- EPIQ/Affiniti's network address must be generated automatically as link local address, router discovery address, or assigned by DHCP. Static IPv6 address entry is not supported.
- Remote server's network addresses must be specified by DNS hostname; fixed IPv6 address entry is not supported.
- IPv6 versions of DHCP client, DNS client, ICMP, etc. are supported while IPv6 is being used.
- IPv6 may be disabled if name resolution to an IPv4 device is problematic in a dual-protocol IPv4/IPv6 network.

Configuration

4.1.8. AE Title/Presentation Address Mapping

Philips Support Connect, or PSC, is the primary interface on EPIQ/Affiniti for configuring DICOM services. It is reached by pressing the "Support" key on the EPIQ/Affiniti control panel.

Additional acquisition and export settings are configured in the Setups interface. This interface is found on the touchscreen by selecting Utilities – Setups – Acquisition/Capture. Ensure correct settings are made in "Archive/Print" to associate the selected Acquisition Button(s) to the selected configured devices and continue to the Touchscreen button selections as well. Please note to check each touchscreen button individually.

4.1.8.1. Local AE Titles

All local AEs use the same AE Title and TCP/IP Port configured via the PSC – Network/DICOM – DICOM Settings,
"This System" screen. The system listens on the configured Port for Verification requests from remote AE's, Storage Commitment N-Event reports, and images received from remote Storage SCP's. In addition, TLS security for incoming DICOM communication may be enabled, optional encryption enabled/disabled, and certificates imported, selected, or removed from this interface.

4.1.8.2. Remote AE Title/Presentation Address Mapping

Remote AE's may be configured on the PSC – Network/DICOM – **DICOM Settings** screen. The screen is organized into DICOM Devices, each specified by

- The Device Type which indicates the services for which the device is to be used
- A Device Name given by the user in order to reference the device elsewhere in the EPIQ/Affiniti user interface
  AE Title for the remote AE Port for the remote AE
- Network address, specified either by IPv4 IP address or a Hostname that is resolved by DNS
- TLS security for outgoing DICOM communication may be enabled, optional encryption enabled/disabled, and certificates imported, selected, or removed
- Additional settings specific to each device type

The local AE title mapping and configuration are specified as:

Table 75: AE Title configuration table

Device Type	Supported SOPs
DICOM Storage Server	Storage SOP Classes defined in Section 4.1.2.1 Study Root Query Retrieve-FIND See details in 4.4.1.2.3 Study Root Query Retrieve-MOVE **Note:** Used to make an entry for any Remote AE that will make an association with the system. Examples include: QR 'sending' AE, any system that will "Store" to the ultrasound system.
DICOM Commit Server	Storage Commitment Push Model
DICOM MPPS Server	Modality Performed Procedure Step
DICOM Worklist Server	Modality Worklist FIND
DICOM Structured Report Server	Comprehensive Structured Report Storage
DICOM BW Printer	Basic Grayscale Print Meta
DICOM Color Printer	Basic Color Print Meta

To configure a single server that supports multiple services, such as image store, storage commitment, and MPPS, a separate "Device" entry must be configured for each service using the correct device type, an appropriate AE Title, Port, and network address. Select the first completed entry and choose "Copy" then select the next "Service" and fill in the appropriate info. For clarity in the Export UI, use "Device Name" to indicate the function.

To configure Storage Commitment, define a Storage Server to which objects to be committed will be stored and a Storage Commitment server (which may or may not be the same physical computer). Then, on the DICOM Selection screen, associate this Storage Server with the associated Storage Commitment server.

Configuration specific to particular Device Types is described below.

4.1.8.2.1 Image Storage Configuration

Multiple remote Storage SCPs can be defined and up to five may be selected simultaneously for export. For automatic export of acquired images during an exam if set to send "After Each Print/Acquire" or at the end

of an exam if set to send “At End of Exam”, a destination device must be enabled in Setups – Acquisition/Capture – Archive/Print screen.
This screen allows each capture control to be separately configured for export destination. If a destination device is not enabled for a capture control, any images acquired through that capture control will not be automatically sent to that destination device. However, all acquired images are saved and may be sent from Review.

Each Storage Server includes a set of Advanced Settings allowing for device-specific control of the data to be stored to that device. These settings include:

- Compression to be used for single-frame images
- Compression to be used for multi-frame images
- Whether to send images in Monochrome or Color photometric interpretations
- Whether to limit export to Implicit VR Little Endian transfer syntax. Generally used only with devices that do not understand any other transfer syntax.
- Whether to send Structured Reports to this destination
- Whether to send Native Data of various imaging modes to this device. Native Data should not be selected unless the data will be displayed by a workstation using Philips’ QLAB analysis software (or imported back to an EPIQ/Affiniti with similar subproduct configuration and licensed options) which is able to understand this data, as the datasets are large and could possibly affect data transfer performance.
- Whether to send Volume data and Philips Proprietary 3D Presentation State to this device. If not enabled, the device would still receive 2D representations of acquired volumes.
- Whether to send Pixel Spacing (0028,0030) with single-mode images to this device. This is in addition to US Region Calibration that automatically sent with all images. Use for allowing measurements to be made on DICOM viewers that don’t understand Ultrasound Region Calibration.

In addition, there is a global setting to use the retired Ultrasound SOP Classes 1.2.840.10008.5.1.4.1.1.3 and 1.2.840.10008.5.1.4.1.1.6 instead of the current standard Ultrasound SOP Classes 1.2.840.10008.5.1.4.1.1.3.1 and 1.2.840.10008.5.1.4.1.1.6.1.

4.1.8.2.2 Structured Report Storage Configuration

Most PACS, **DICOM Storage Server devices**, support Structured Report. If so, and that PACS is where Structured.
Reports are intended to be sent, then select “Export Structured Reports” in Advanced Settings. If sending a Structured Report during an exam is needed, the also select “Export structured report with send on demand” needs to be selected.

For Structured Reports to be sent automatically at end exam, the storage destination must be selected for either the Acquire 1 or Acquire 2, (or Acquire 3 for Affiniti) keys in Setups – Acquisition/Capture – Archive/Print.

If SR support is confirmed using “Verify” and measurements are made during the exam, one or more Structured Reports will be sent to the device. In Support > Network/DICOM > DICOM Settings > Structured Report Global Settings, you may select which Structured Reports to send. Additionally, Link Measurements to Images allows for inclusion of coordinate data with the SR. The only “server” that will allow “resending” of a Structured Report is the “Storage Server” that includes the sending of SRs.The “Structured Report Server” will ONLY allow export of the SR at End of Exam.

A **DICOM Structured Report Server** device is a Storage SCP that only supports and receives reports. To enable this method, create a Structured Report server in PSC – Network/DICOM – DICOM Settings and then select it as the active Structured Report server in PSC – Network/DICOM – DICOM Selection.

OB-GYN study types generate OB-GYN Ultrasound Procedure Reports, Vascular or Abdominal study measurements generate a Vascular Ultrasound Report, and the Adult Echo Study generates an Echocardiography Procedure Report.
Two types of Pediatric Echo Reports are available depending on configuration: DICOM-standard Pediatric, Fetal, and Congenital Cardiac Ultrasound Report or Philips proprietary Pediatric Echo Report.

Note that there may be more than one report instance per exam, so long as they are from different study types. If no separate Structured Report server is configured and the SOP Class fails negotiation on the configured Storage server, then no SR objects will be created, however, a failed job will remain in the queue. This will need to be manually removed.

User Defined measurements will be sent in a Structured report. No Structured Report is sent for General measurements.

4.1.8.2.3 Query Retrieve Configuration

EPIQ and Affiniti ultrasound systems use the DICOM Device type of "DICOM Storage Server" to perform Query Retrieve configuration.
For the remote system that is performing the role of Query Retrieve SCP, a "Storage Device" entry is completed using the AE Title, IP Address/Hostname and Port for the QR server. When the configuration entry is complete and saved, the system will automatically perform a DICOM Verification. The results need to show support for the Query Retrieve Study Root – Find and Move SOP Classes, indicated by 'Passed'.
The Query Retrieve system will usually use a different AE Title when performing the resulting C-Store to the ultrasound system. In order for EPIQ and Affiniti to allow that connection to succeed, the SCU Client AE Title for the server needs to be added to the ultrasound system.
In order to accomplish this, an additional "Storage Device" entry is used. In this entry, the sending AE Title and IP Address/Hostname are required, but since the client will not use a specific port, the user may enter "9999" in order for the form to be completed. Since there is no verification required for a "sending" port, deselect the "Automatically perform DICOM Verification after Saving?" box. Or, if left checked, expect it to fail. That is not an error.
Now, when the retrieve of data is requested, the system is aware of the sending SCU's AE Title and will not reject the incoming storage association.

Advanced DICOM Device Association Configuration
Configuration Settings for all DICOM devices.

Max PDU (Protocol Data Unit) Size

- The maximum PDU size in bytes

4.1.8.2.4 Storage Commit image-by-image

A configuration option is provided in Setups to control when Storage Commitment N-ACTION requests are issued relative to image acquisition:

- Storage Commit Image-by-Image enabled: Storage Commit N-ACTION requests are issued immediately after instances are stored to the Storage SCP associated with Storage Commit when using send "After Each Print/Acquire" or "Send on Demand". A consequence of this selection is that separate associations are initiated

and released for C-STORE requests to the Storage SCP and N-ACTION requests to the Storage Commitment SCP.

- Storage Commit Image-by-Image disabled: Storage Commit N-ACTION requests are issued at end exam after storage is performed. This selection reduces the number of associations used for send "After Each Print/Acquire" and "Send on Demand".

4.1.8.2.5 Additional Configuration Settings for Storage Commit Devices.

There is an option provided for user if automatic retry of Commit job is required or not.
Number of retry attempts before abandoning storage commitment

- Maximum number of retries the system would perform before setting the job to failed state. Factory default value is provided.

Retry delay after failed storage commit (minutes)

- Time interval before a retry attempt when storage commit has failed. Factory default value is provided.

Retry delay after no response from storage commit server (hours)

- Time interval before a retry attempt when no response has been received from the storage commit server. Factory default value is provided.

4.1.8.2.6 Serial Structured Report Storage Configuration

Serial Report data is a non-DICOM representation of Structured Reports which may additionally be exported via a USB – RS-232 adapter cable to a null-modem RS-232 cable to a serial port configured for 115200 baud, 8 bits, No Parity, 1 Stop Bit and Xon-Xoff Flow Control. Output will be an XML representation of the DICOM Structured Report object.

4.1.8.2.7 Workflow Configuration

Multiple Worklist servers may be defined, but only a single Worklist server can be selected at a time on the PSC – Network/DICOM – **DICOM Selection** page. See 4.2.1.3.2 for the specification of query criteria for worklist queries.
Multiple MPPS servers may be defined, but only a single MPPS server can be selected at a time on the PSC – Network/DICOM – **DICOM Selection** page. No other configuration is required for MPPS servers.

4.1.8.2.8 Hardcopy

Multiple remote Print SCPs can be defined, but no more than one Grayscale and one Color Print SCP may be selected at a time.
Automatic sending of color images to the color printer and BW images to the BW printer is selectable in Setups – Acquisition/Capture – Acquisition/Capture – Send Images/Clips – Automatic Printer Choice.

4.1.8.2.8.1 Parameters

The following parameters apply to all local-system Application Entities. The system must be power-cycled after changing any of these values:

Table 76: Configuration Parameters Table

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
AE Title for all AE's	Yes	AETitle

Listening Port	Yes	104*
Station Name	Yes	<empty>
Station Location	Yes	<empty>
Hostname	Yes	<generatedName>
MAX PDU Size	Yes	32768
Max Simultaneous Associations	No	5

*If standard DICOM. If Secure DICOM, default port automatically changes to 2762.

5. Media Interchange

5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

5.1.1. Application Data Flow Diagram

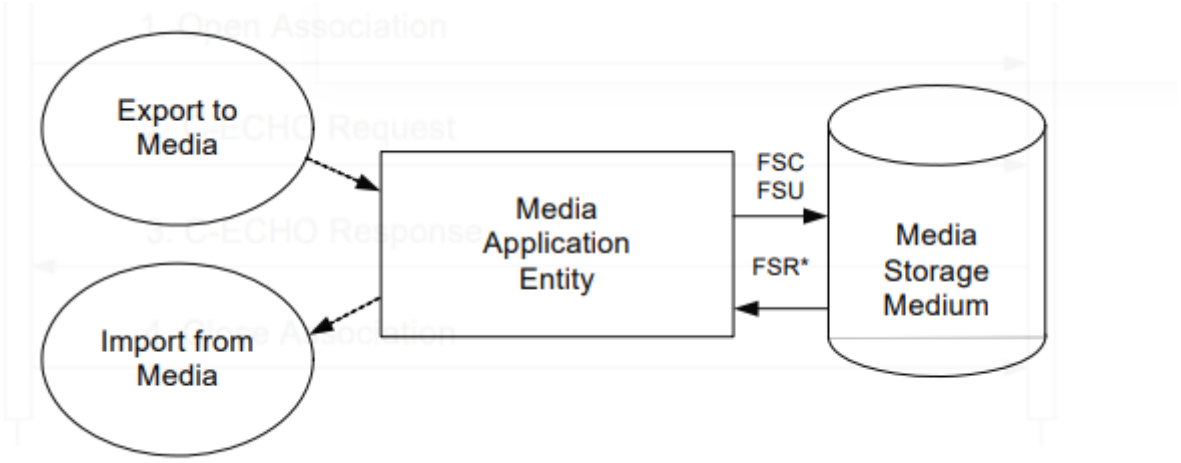

Figure 20: Media Application Data Flow Diagram

The Media Application Entity Exports Images, 3D Presentation States and Structured Reports to a Storage medium. It is associated with the local real-world activity “Export to Media”. “Export to Media” is performed upon user request for selected studies, performed procedures, or instances (images, 3D Volumes, 3D Presentation States, and Structured Reports).

Throughout this section, the term “Media” refers to any of the media listed below which is in use.

- EPIQ/Affiniti will support the use of most writable media including CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW and removable USB Storage Device. DICOM structure will be the same regardless of media used.

Note that although –R or +R media may be erased multiple times using “erase”, the space may not be recovered. If a –R or +R media is “Erased”, the previously written data is no longer available, and only remaining unwritten space on the media is available for use. This restriction does not apply to + / - RW media. Erasing + / - RW media allows the entire disk’s space to be used.

If a –R or +R is erased, it is not usable again for DICOM exports due to reliability concerns associated with DVD media. Only DVD+RW/-RW can be erased and used again for DICOM export

5.1.2. Functional Definitions of AE's

This section contains the functional definition of each individual local Media Application Entity.
Using “Export to… Media” will pass the currently selected studies, 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 the installed media. If the capacity of a disk is exceeded, the user is provided a dialog, stating capacity exceeded and to insert another disk

5.1.3. Sequencing of Real-World Activities

This section contains a description of sequencing of Real-World Activities that the Media Application Entities require.

At least one image must exist and be selected before the Media Application Entity can be invoked. The operator can insert new media at any time. If no writable media is available, the Media queue management Icon will be Yellow.

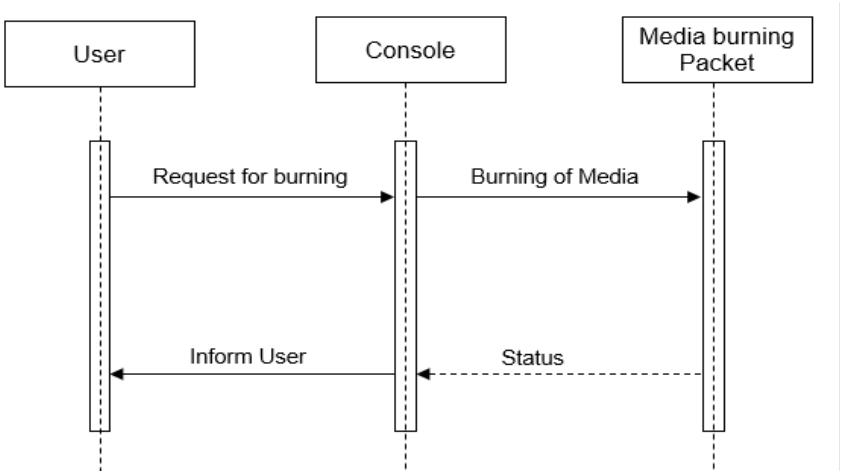

Figure 21: Sequence of Real World Activities - Media

AE Specifications
This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

5.1.4. Media – 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 DICOM PS 3.10 and PS 3.11.

Table 77: AE media related Application Profiles, RWA activities and roles

Application Profiles Supported	Real World Activity	Roles	SC Option
STD-US-SC-SF&MF-CDR	Export to….Media	FSC, FSR	Interchange
STD-GEN-DVD-JPEG		FSC	
STD-GEN-USB-JPEG		FSC, FSU, FSR	

5.1.4.1. File Meta Information for the media

The File-Set ID (0004,1130) included in the File Meta Header of the DICOMDIR is the same as the volume label of the media

Table 78: File Meta Information for the media

Implementation Class UID	1.3.46.670589.14.10000.1200
Implementation Version Name	EPIQ-AFFIN_12.00

5.1.4.2. Real-World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

5.1.4.2.1 RWA - Read File-set

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

The Patient Directory user interface displays the contents of removable media. Exams selected by the user are transferred from the media to the system for review. Objects transferred to the system retain their original SOP Instance UIDs. Patient Directory must be set to display the contents of the Hard Disk before the imported exam information may be displayed.

Note: Structured Reports may not be read back into EPIQ/Affiniti.

5.1.4.2.1.1 Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.
See Table AE media related Application Profiles, RWA activities and roles for supported Application Profiles.

5.1.4.2.2 RWA - Create File-set

This Media Application Entity has a File-set Creator functionality which is described here.

SUT when mix of supported SOP Class/ Supported Transfer Syntax and unsupported SOP Class/ unsupported Transfer Syntax dataset is imported from DICOM media to SUT, Import is unsuccessful, and the job is marked as failed in the Job viewer.

5.1.4.2.2.1 Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.

5.1.4.2.2.1.1 Options

Table 79: AE Related transfer syntax for Media

Transfer Syntax	UID List
Explicit VR Little Endian	1.2.840.10008.1.2.1

The Console AE can write created image to media with the following listed Media Storage SOP Class.

Table 80: AE Media Store SOP Class

Media Storage SOP Class Name	Media Storage SOP Class UID
Media Storage Directory Storage	1.2.840.10008.1.3.10

5.1.4.2.3 RWA - Update File-set

The Media Application Entity acts as an FSU using the interchange option when requested to export SOP Instances from the local database to media upon which DICOM data already resides.

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

DVD/CD +RW media may be erased at any time, removing all previously recorded data.

5.1.4.2.3.1 Media Storage Application Profile

The Application Profile that is used by this Media Application Entity is specified in this section.

5.1.4.2.3.1.1 Options

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

Table 81: IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR REMOVABLE ¬MEDIA

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian JPEG Baseline Lossy Compression	1.2.840.10008.1.2.1 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 JPEG Baseline Lossy Compression	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian JPEG Lossy Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51

		JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.4.70
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Little Endian JPEG Lossy Baseline JPEG Extended 12-bit Lossy JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian JPEG Lossy Baseline JPEG Lossless Baseline	1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70
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
Private 3D Presentation State**	1.3.46.670589.2.5.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1

** For import to Philips QLAB, Xcelera or IntelliSpace for CardioVascular workstations only.

Augmented and Private Application Profiles
Not applicable

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

6. Support of Character Sets

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

Table 82: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
GB18030	GB18030	-	-	-	-
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859
Cyrillic	ISO_IR 144	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 144	G1	Supplementary set of ISO 8859

7. Security

7.1. Security Profiles

EPIQ/Affiniti incorporates an internal firewall that only accepts incoming traffic on the designated listening port, as configured in PSC – Network/DICOM – DICOM Settings. The port is only opened if one or more servers are defined.

7.1.1. Security use Profiles

7.1.2. Security Transport Connection Profiles

Basic TLS Secure Transport Connection Profile and the AES TLS Secure Transport Connection Profile are supported using Transport Layer Security Version 1.2 protocol with the following features:

Character Set Description	Defined Term
Entity Authentication Exchange of Master Secrets	RSA based certificates RSA
Data Integrity	SHA-1 or SHA-2 based certificates
Privacy (Ciphersuite Options)	TLS_RSA_WITH_AES_128_CBC_SHA (preferred) TLS_RSA_WITH_3DES_EDE_CBC_SHA
Entity Authentication	RSA based certificates
Exchange of Master Secrets	RSA
Data Integrity	SHA-1 or SHA-2 based certificates

TLS authentication may be used with or without TLS encryption – default is with TLS encryption.
For outgoing TLS requests where EPIQ/Affiniti acts as a TLS Client, the received server RSA certificate is validated by verifying its digital signature against a certificate in the local Trusted Certificate Authorities store whose Subject matches the Issuer of the received certificate. If requested by the TLS Server, EPIQ/Affiniti will then send the certificate configured for “This System” from the local Personal store.
For incoming TLS connection requests where EPIQ/Affiniti acts as a TLS Server, the certificate configured for “This System” is sent from the personal store to the client as specified in the TLS protocol. EPIQ/Affiniti always requests a client certificate from the TLS Client.

Certificates are locally managed. The site administrator may import certificates from media to the Trusted Certificate Authority store for verifying incoming certificates; these may be either CA certificates or self-signed end-entity certificates. The site administrator may also import certificates from media to the Personal store along with the certificates private key for certificates representing ‘This System’. A wide variety of certificate file formats are supported, including

- Base 64 Text: PEM format (.pem, .crt), usually unencrypted but may be encrypted. If encrypted, the encryption password must be provided when importing.
- ASN.1 Binary: BER, DER, CER formats (.der, .cer, .crt)
- PKCS#12: Encrypted Container for certificates with private keys (.pfx, .p12). This format is used primarily for the “This System” certificate with corresponding private key. The encryption password must be provided when importing.
- PKCS#7: Container for multiple certificates. If there is only one certificate in the container, then the certificate is saved to the user-specified store name. If there are multiple certificates in the container, then the Issuer and Subject names of each certificate are compared; if the names are the same, the

certificate is stored in the Trusted Certificate Authority store, else in the Intermediate Certificate Authority store.

The site administrator may also remove previously imported certificates. The incoming TCP port defaults to port 2762 when TLS security is enabled; this port may be changed by the user if desired.

7.1.3. Digital Signature Profiles

Not Applicable

7.1.4. Media Storage Security Profiles

Not Applicable

7.1.5. Attribute Confidentiality Profiles

Users can configure the Epiq/ Affiniti systems to deprecate/reduce exported image data in alignment with EU/MDR and HIPAA privacy laws/guidelines
The option to de-identify is available at the time of export for the manual send to media workflows.
Table below contains a list of attributes containing patient identification and how EPIQ/Affiniti processing the attribute value when DICOM de-identification is selected on export.

The following action codes are used in table 83:

- Z - replace with a zero length value, or a non-zero length value that may be a dummy value and consistent with the VR
- X - remove
- U - replace with a non-zero length UID that is internally consistent within a set of Instances
- D - replace with a non-zero length value that may be a dummy value and consistent with the VR

Table 83: DICOM Attributes containing patient identifying information

Attribute Name	Tag	De-identification Action Codes
SOP Instance UID	0008,0018	U
Study Date	0008,0020	D
Content Date	0008,0023	Z
Acquisition DateTime	0008,002A	Z
Study Time	0008,0030	D
Series Time	0008,0031	Z
Accession Number	0008,0050	Z
Institution Name	0008,0080	Z
Referring Physician’s Name	0008,0090	Z
Study Description	0008,1030	Z
Series Description	0008,103E	Z
Operators’ Name	0008,1070	Z
Admitting Diagnosis Description	0008,1080	Z
Referenced SOP Instance UID	0008,1155	U
Derivation Description	0008,2111	Z

Attribute Name	Tag	De-identification Action Codes
Patient's Name	0010,0010	D
Patient ID	0010,0020	D
Patient's Birth Date	0010,0030	Z
Patient's Sex	0010,0040	Z
Other Patient IDs	0010,1000	X
Patient's Size	0010,1020	Z
Patient's Weight	0010,1030	Z
Pregnancy Status	0010,21C0	Z
Medical Alerts	0010,2110	Z
Allergies	0010,2000	Z
Device Serial Number	0018,1000	Z
Protocol Name	0018,1030	Z
Study Instance UID	0020,000D	U
Series Instance UID	0020,000E	U
Study ID	0020,0010	Z
Requesting Physician	0032,1032	Z
Performed Procedure Step Start Date	0040,0244	Z
Performed Procedure Step Start Time	0040,0245	Z
Performed Procedure Step ID	0040,0253	Z
Performed Procedure Step Description	0040,0254	Z
Scheduled Procedure Step Description	0040,0007	Z
Comments on Performed Procedure Step	0040,0280	Z
Physician(s) of Record	0008,1048	Z
Series Date	0008,0021	Z
Protocol Name	0018,1030	Z
Station Name	0008,1010	Z
Device Serial Number	0018,1000	Z
Acquisition DateTime	0008,002A	Z
Derivation Description	0008,2111	Z
Instance Creation Date	0008,0012	Z
Instance Creation Time	0008,0013	Z

- EPIQ/Affiniti will replace the Patient Name with an unidentifiable string composed of a prefix 'DeId-' and followed by a unique numeric sequence,
- EPIQ/Affiniti will replace the Patient ID with a new generated unique ID.
- All noted Instance UIDs are modified because the Voyager generated instance UID's are generated at the time of the start of the procedure and suffixed with a date/time string noting the current date and time. Because all manner of dates are considered identifying, the date and time portion of these strings is replaced with a new date and time at the time of export. In this way we can be sure that they cannot be linked back to the original date and time of the study. Referenced SOP instance UID links are maintained.

- The Study ID and Performed Procedure Step ID on EPIQ/Affiniti include date strings, and thus must be removed.

The system exhibits the following behaviours in the context of de-identification:

- Below attributes of type 3 are not removed in the de-identified object
  - Requested Procedure Description (0032,1060)
  - Pre-Medication (0040,0012)
  - Special Needs (0038,0050)ss
- System does not support import of the De-identified image.
- Private attributes are not removed.
- The attributes “De-identification Method Code Sequence (0012,0064)" or “De-identification Method (0012,0063)" is not added to the De-identified object.
- The File Meta information such as Application Entity Titles, Presentation Addresses, implementation information, and private information are retained with original values.

7.1.6. Network Address Management Profiles

Not Applicable

7.1.7. Time Synchronization Profiles

Not Applicable

7.1.8. Application Configuration Management Profiles

Not Applicable

7.1.9. Audit Trail Profiles

Not Applicable

Association Level Security

Not Applicable

Application-Level Security

Not Applicable

8. Annexes of application "EPIQ and Affiniti Family of Products, Release 13.0.x"

8.1. IOD Contents

8.1.1. Created SOP Instance

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

Abbreviations used in the IOD tables for the column "Presence of Module" are:
ALWAYS The module is always present
CONDITIONAL The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:
ALWAYS The attribute is always present with a value
EMPTY The attribute is always present without any value (attribute sent zero length)
VNAP The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP The attribute is present under specified condition – if present then it will always have a value

The abbreviations used in the Module table for the column "Source" are:
AUTO The attribute value is generated automatically
CONFIG The attribute value source is a configurable parameter
COPY The attribute value source is another SOP instance
FIXED The attribute value is hard-coded in the application
IMPLICIT The attribute value source is a user-implicit setting
MPPS The attribute value is the same as that use for Modality Performed Procedure Step
MWL The attribute value source is a Modality Worklist
USER The attribute value source is explicit user input

8.1.1.1. List of created SOP Classes

Table 84: List of created SOP Classes

SOP Class Name	SOP Class UID
US Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
US Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
Secondary Capture Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
Multi-Frame True Colour Secondary Capture Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Comprehensive Structured Report Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.33

8.1.2. Usage of Attributes from Received IOD

The following table lists the functionality supported by this application.

8.1.2.1. US Image IOD

Table 85: IOD OF CREATED US IMAGE SOP

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
	General Image	Always
Image	General Image Module	Always
	General Acquisition Module	Always
	General Reference Module	Conditional
	Image Pixel Module	Always
	US Region Calibration	ANAP
	US Image	Always
	VOI LUT	For Single frame
	SOP Common	Always

Table 86: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	
Patient ID	0010,0020	LO		ALWAYS	MWL, AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO	F, M, O	VNAP	MWL, USER	
Ethnic Group	0010,2160	SH		VNAP	MWL, USER	
Patient Comments	0010,4000	LT		VNAP	MWL, USER	

Table 87: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study ID	0020,0010	SH		ALWAYS	MWL, AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Study Description	0008,1030	LO		VNAP	MWL, USER	
Physicians of Record	0008,1048	PN		ANAP	USER	
Names of Intended Recipients of Results	0040,1010	PN		ANAP	MWL	

Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		VNAP	MWL	
>Referenced SOP Instance UID	0008,1155	UI		VNAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		VNAP	MWL	
>Coding Scheme Designator	0008,0102	SH		VNAP	MWL	
>Coding Scheme Version	0008,0103	SH		VNAP	MWL	
>Code Meaning	0008,0104	LO		VNAP	MWL	

Table 88: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnosis Description	0008,1080	LO		VNAP	MWL	
Patient Size	0010,1020	DS		VNAP	MWL, USER	
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	
Medical Alerts	0010,2000	LO		ANAP	MWL, USER	
Allergies	0010,2110	LO		ANAP	MWL, USER	
Pregnancy Status	0010,21C0	US		ANAP	MWL	

Table 89: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	US	ALWAYS	AUTO	
Presentation Intent Type	0008,0068	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		VNAP	MWL,USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	
Requesting Physician	0032,1032	PN		ANAP	MWL	
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	

Request Attributes Sequence	0040,0275	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Requested Procedure Description	0032,1060	LO		VNAP	MWL	
>Requested Contrast Agent	0032,1070	LO		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO ,MWL	
>Requested Procedure Priority	0040,1003	SH		ANAP	MWL	
>Patient Transport Arrangements	0040,1004	LO		ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	AUTO , MWL	
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	MWL	
>Pre-Medication	0040,0012	LO		ANAP	MWL	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	USER , MWL	
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	MWL	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL	

Table 90: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Description	008,2111	ST		ANAP	AUTO	

Table 91: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	AUTO	
Institution Name	0008,0080	LO		VNAP	CONFIG	
Station Name	0008,1010	SH		VNAP	CONFIG	

Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	A string indicating the product, level, and clinical specialty. Example: EPIQ 7C
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	Decimal representation of system "Chip ID" found in PSC>System Management> System Information. Also used as component of system generated private UIDs
Software Versions	0018,1020	LO		ALWAYS	AUTO	A string indicating the model name and software build version. Example: EPIQ 7G_7.0.0.748

Table 92: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number*	0020,0013	IS		ALWAYS	AUTO	
Image Type	0008,0008	CS	DERIVED\PRIMARY	ANAP	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Acquisition DateTime	0008,002A	DT		ALWAYS	AUTO	
Derivation Description	0008,2111	ST		ALWAYS	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	
> Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
> Referenced SOP Instance UID	0008,1155	UI		ANAP	AUTO	
> Purpose of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	

>> Coding Scheme Designator	0008,0102	SH		ANAP	AUTO	
>> Code Value	0008,0100	SH		ANAP	AUTO	
>> Code Meaning	0008,0104	LO		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Lossy Image Compression Method	0028,2114	CS		ANAP	AUTO	
Presentation LUT Sequence	2050,0010	SQ		ANAP Mutually exclusive with 2050,0020	AUTO	
> LUT Description	0028,3002	US or SS		ANAP	AUTO	
> LUT Data	0028,3006	US or SS or OW		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 93: General Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition DateTime	0008,002A	DT		ANAP	MWL, AUTO	

Table 94: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAP	AUTO	Present when image is RGB and value is 0
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	Image width in pixels. Varies with export resolution configuration,

						normal vs. quad size image, and full-screen vs. image area setting and Normal vs MaxVue setting
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel.
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixe
High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	0" pixels are Unsigned Integers
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 95: US Region Calibration Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Sequence of Ultrasound Regions	0018,6011	SQ		ALWAYS	AUTO	
Region Location Min X0	0018,6018	UL		ALWAYS	AUTO	
Region Location Min Y0	0018,601A	UL		ALWAYS	AUTO	
Region Location Max X1	0018,601C	UL		ALWAYS	AUTO	
Region Location Max Y1	0018,601E	UL		ALWAYS	AUTO	
Physical Units X Direction	0018,6024	US		ALWAYS	AUTO	
Physical Units Y Direction	0018,6026	US		ALWAYS	AUTO	
>Physical Delta X	0018,602C	UL		ALWAYS	AUTO	
>Physical Delta Y	0018,602E	UL		ALWAYS	AUTO	
>Reference Pixel X0	0018,601A	UL		ALWAYS	AUTO	
>Reference Pixel Y0	0018,601C	UL		ALWAYS	AUTO	
>Region Spatial Format	0018,6012	UL		ALWAYS	AUTO	
>Region Data Type	0018,6014	US		ALWAYS	AUTO	
>Region Flags	0018,6016	US		ALWAYS	AUTO	

Table 96: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	CONFIG	
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	CONFIG	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixel

High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Planar Configuration	0028,0006	US	0	ANAP	AUTO	Present when image is RGB. Value is “0”.
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	“0” pixels are Unsigned Integers
Frame Increment Pointer	0028,0009	AT		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Number of Stages	0008,2124	IS		ANAP	AUTO	
Number of Views in Stage	0008,212A	IS		ANAP	AUTO	
R Wave Time Vector***	0018,6060	FL		ANAP	Auto	
Ultrasound Color Data Present	0028,0014	US		ALWAYS	AUTO	
Stage Name	0008,2120	SH		ANAP	AUTO	
Stage Code Sequence	0040,000A	SQ		ANAP	AUTO	
Stage Number	0008,2122	IS		ANAP	AUTO	
View Name**	0008,2127	SH		ANAP	AUTO	
View Number**	0008,2128	IS		ANAP	AUTO	
Number of Event Timers	0008,2129	IS		ANAP	AUTO	
Event Elapsed Times	0008,2130	DS		ANAP	AUTO	
Event Timer Names	0008,2132	LO		ANAP	AUTO	
View Code Sequence	0054,0220	SQ				
Acquisition DateTime	0008,002A	DT		ALWAYS	AUTO	
Trigger Time	0018,1060	DS		ANAP	AUTO	
Heart Rate	0018,1088	IS		ANAP	AUTO	
Transducer Data	0018,5010	LO		ALWAYS	AUTO	
Processing Function	0018,5020	LO		ALWAYS	AUTO	

Table 97: VOI LUT Module

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

Table 98: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Specific Character Set	0008,0005	CS		ANAP	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.6.1	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance	0020,0013	IS		ANAP	AUT	

Number					O	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	

- * Analysis Type selection is determined by the analysis package associated with the transducer / preset selection.
- ** View name and View Number attributes are also in use by General Imaging Protocol
- ***R Wave Time Vector Dicom Attribute persisted only for Ultrasound Multi-Frame Images

8.1.2.2. US Multi-frame Image IOD

Table 99: IOD OF CREATED US MULTIFRAME SOP

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
	General Image	Always
Image	General Image Module	Always
	General Acquisition Module	Always
	General Reference Module	Conditional
	Image Pixel Module	Always
	US Region Calibration	ANAP
	US Image	Always
	SOP Common Module	Always
	Cine	Only if multi-frame
	Multi-frame	Only if multi-frame

Table 100: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	
Patient ID	0010,0020	LO		ALWAYS	MWL, AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO	F, M, O	VNAP	MWL, USER	
Ethnic Group	0010,2160	SH		VNAP	MWL, USER	
Patient Comments	0010,4000	LT		VNAP	MWL, USER	

Table 101: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study ID	0020,0010	SH		ALWAYS	MWL, AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Study Description	0008,1030	LO		VNAP	MWL, USER	
Physicians of Record	0008,1048	PN		ANAP	USER	
Names of Intended Recipients of Results	0040,1010	PN		ANAP	MWL	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		VNAP	MWL	
>Referenced SOP Instance UID	0008,1155	UI		VNAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		VNAP	MWL	
>Coding Scheme Designator	0008,0102	SH		VNAP	MWL	
>Coding Scheme Version	0008,0103	SH		VNAP	MWL	
>Code Meaning	0008,0104	LO		VNAP	MWL	

Table 102: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnosis Description	0008,1080	LO		VNAP	MWL	
Patient Size	0010,1020	DS		VNAP	MWL, USER	
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	
Medical Alerts	0010,2000	LO		ANAP	MWL, USER	
Allergies	0010,2110	LO		ANAP	MWL, USER	
Pregnancy Status	0010,21C0	US		ANAP	MWL	

Table 103: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	US	ALWAYS	AUTO	
Presentation IntentType	0008,0068	CS		ALWAYS	AUTO	

Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MWL, USER	
Operator's Name	0008,1070	PN		VNAP	MWL/ USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	
Requesting Physician	0032,1032	PN		ANAP	MWL	
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	
Request Attributes Sequence	0040,0275	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Requested Procedure Description	0032,1060	LO		VNAP	MWL	
>Requested Contrast Agent	0032,1070	LO		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO , MWL	
>Requested Procedure Priority	0040,1003	SH		ANAP	MWL	
>Patient Transport Arrangements	0040,1004	LO		ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	AUTO , MWL	
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	MWL	
>Pre-Medication	0040,0012	LO		ANAP	MWL	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	

Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	USER , MWL	
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	MWL	
>Code Value	0008,0100	SH		ALWAYS	AUTO, MWL	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO, MWL	
>Coding Scheme Version	0008,0103	SH		ALWAYS	AUTO, MWL	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO, MWL	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL	

Table 104: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Description	008,2111	ST		ANAP		

Table 105: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	AUTO	
Institution Name	0008,0080	LO		VNAP	CONFIG	
Station Name	0008,1010	SH		VNAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	A string indicating the product, level, and clinical specialty. Example: EPIQ 7C
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	Decimal representation of system "Chip ID" found in PSC>System Management> System Information. Also used as component of system

						generated private UIDs
Software Versions	0018,1020	LO		ALWAYS	AUTO	A string indicating the model name and software build version. Example: EPIQ 7G_7.0.0.748

Table 106: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number*	0020,0013	IS		ALWAYS	AUTO	
Image Type	0008,0008	CS	DERIVED\PRIMARY	ANAP	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Acquisition DateTime	0008,002A	DT		ALWAYS	AUTO	
Derivation Description	0008,2111	ST		ALWAYS	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	
> Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
> Referenced SOP Instance UID	0008,1155	UI		ANAP	AUTO	
> Purpose of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	
>> Coding Scheme Designator	0008,0102	SH		ANAP	AUTO	
>> Code Value	0008,0100	SH		ANAP	AUTO	
>> Code Meaning	0008,0104	LO		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Lossy Image Compression Method	0028,2114	CS		ANAP	AUTO	
Presentation LUT Sequence	2050,0010	SQ		ANAP Mutually exclusive with 2050,0020	AUTO	

> LUT Description	0028,3002	US or SS		ANAP	AUTO	
> LUT Data	0028,3006	US or SS or OW		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 107: General Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition DateTime	0008,002A	DT		ANAP	MWL, AUTO	

Table 108: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Planar Configuration	0028,0006	US	0	ANAP	AUTO	Present when image is RGB and value is 0
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	Image width in pixels. Varies with export resolution configuration, normal vs. quad size image, and full-screen vs. image area setting and Normal vs MaxVue setting
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixel
High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	“0” pixels are Unsigned Integers
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 109: US Region Calibration Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Sequence of Ultrasound	0018,6011	SQ		ALWAYS	AUTO	

Regions						
Region Location Min X0	0018,6018	UL		ALWAYS	AUTO	
Region Location Min Y0	0018,601A	UL		ALWAYS	AUTO	
Region Location Max X1	0018,601C	UL		ALWAYS	AUTO	
Region Location Max Y1	0018,601E	UL		ALWAYS	AUTO	
Physical Units X Direction	0018,6024	US		ALWAYS	AUTO	
Physical Units Y Direction	0018,6026	US		ALWAYS	AUTO	
>Physical Delta X	0018,602C	FD		ALWAYS	AUTO	
>Physical Delta Y	0018,602E	FD		ALWAYS	AUTO	
>Reference Pixel X0	0018,601A	UL		ALWAYS	AUTO	
>Reference Pixel Y0	0018,601C	UL		ALWAYS	AUTO	
>Region Spatial Format	0018,6012	UL		ALWAYS	AUTO	
>Region Data Type	0018,6014	US		ALWAYS	AUTO	
>Region Flags	0018,6016	US		ALWAYS	AUTO	

Table 110: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	CONFIG	
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	CONFIG	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixel
High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Planar Configuration	0028,0006	US		ANAP	AUTO	Always “0”, if color
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	“0” pixels are Unsigned Integers
Frame Increment Pointer	0028,0009	AT		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Number of Stages	0008,2124	IS		ANAP	AUTO	
Number of Views in Stage	0008,212A	IS		ANAP	AUTO	
R Wave Time Vector***	0018,6060	FL		ANAP	Auto	
Ultrasound Color Data Present	0028,0014	US		ALWAYS	AUTO	
Stage Name	0008,2120	SH		ANAP	AUTO	
Stage Code Sequence	0040,000A	SQ		ANAP	AUTO	
Stage Number	0008,2122	IS		ANAP	AUTO	
View Name**	0008,2127	SH		ANAP	AUTO	
View Number**	0008,2128	IS		ANAP	AUTO	

Number of Event Timers	0008,2129	IS		ANAP	AUTO	
Event Elapsed Times	0008,2130	DS		ANAP	AUTO	
Event Timer Names	0008,2132	LO		ANAP	AUTO	
View Code Sequence	0054,0220	SQ				
Acquisition DateTime	0008,002A	DT		ALWAYS	AUTO	
Trigger Time	0018,1060	DS		ANAP	AUTO	
Heart Rate	0018,1088	IS		ANAP	AUTO	
Transducer Data	0018,5010	LO		ALWAYS	AUTO	
Processing Function	0018,5020	LO		ALWAYS	AUTO	

Table 111: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Specific Character Set	0008,0005	CS		ANAP	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.3.1	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	

Table 112: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Time	0018,1063	DS		ANAP	AUTO	
Recommended Display Frame Rate	0008,2144	IS		ANAP	AUTO	
Cine Rate	0018,0040	IS		ANAP	AUTO	

Table 113: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ANAP	AUTO	
Frame Increment Pointer	0028,0009	AT		ANAP	AUTO	

- * Analysis Type selection is determined by the analysis package associated with the transducer / preset selection.
- ** View name and View Number attributes are also in use by General Imaging Protocol
- ***R Wave Time Vector Dicom Attribute persisted only for Ultrasound Multi-Frame Images

8.1.2.3. Secondary Capture IOD

Table 114 : IOD Of Created Secondary Capture Sop Instances

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
	SC Equipment	Always
Image	General Image Module	Always
	Image Pixel Module	All attributes are optional and are not present
	SC Image	ALWAYS

Table 115: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	
Patient ID	0010,0020	LO		ALWAYS	MWL, AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO	F, M, O	VNAP	MWL, USER	
Ethnic Group	0010,2160	SH		VNAP	MWL, USER	
Patient Comments	0010,4000	LT		VNAP	MWL, USER	

Table 116: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study ID	0020,0010	SH		ALWAYS	MWL, AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Study Description	0008,1030	LO		VNAP	MWL, USER	
Physicians of Record	0008,1048	PN		ANAP	USER	
Names of Intended Recipients of Results	0040,1010	PN		ANAP	MWL	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		VNAP	MWL	

>Referenced SOP Instance UID	0008,1155	UI		VNAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		VNAP	MWL	
>Coding Scheme Designator	0008,0102	SH		VNAP	MWL	
>Coding Scheme Version	0008,0103	SH		VNAP	MWL	
>Code Meaning	0008,0104	LO		VNAP	MWL	

Table 117: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnosis Description	0008,1080	LO		VNAP	MWL	
Patient Size	0010,1020	DS		VNAP	MWL, USER	
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	

Table 118: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Presentation IntentType	0008,0068	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI	CR	ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		VNAP	MWL/ USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	
Requesting Physician	0032,1032	PN		ANAP	MWL	
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Requested Procedure Description	0032,1060	LO		VNAP	MWL	
>Requested Contrast	0032,1070	LO		ANAP	MWL	

Agent						
>Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO , MWL	
>Requested Procedure Priority	0040,1003	SH		ANAP	MWL	
>Patient Transport Arrangements	0040,1004	LO		ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	AUTO , MWL	
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	MWL	
>Pre-Medication	0040,0012	LO		ANAP	MWL	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	USER , MWL	
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	MWL	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL	

Table 119: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	AUTO	
Institution Name	0008,0080	LO		VNAP	CONFIG	
Station Name	0008,1010	SH		VNAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	A string indicating the product, level, and clinical specialty. Example: EPIQ 7C
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	Decimal representation of system "Chip ID" found in PSC>System Management>

						System Information. Also used as component of system generated private UIDs
Software Versions	0018,1020	LO		ALWAYS	AUTO	A string indicating the model name and software build version. Example: EPIQ 7G_7.0.0.748

Table 120: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number*	0020,0013	IS		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Acquisition DateTime	0008,002A	DT		ALWAYS	AUTO	
Derivation Description	0008,2111	ST		ALWAYS	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	
> Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
> Referenced SOP Instance UID	0008,1155	UI		ANAP	AUTO	
> Purpose of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	
>> Coding Scheme Designator	0008,0102	SH		ANAP	AUTO	
>> Code Value	0008,0100	SH		ANAP	AUTO	
>> Code Meaning	0008,0104	LO		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Lossy Image Compression Method	0028,2114	CS		ANAP	AUTO	
Presentation LUT	2050,0010	SQ		ANAP	AUTO	

Sequence				Mutually exclusive with 2050,0020		
> LUT Description	0028,3002	US or SS		ANAP	AUTO	
> LUT Data	0028,3006	US or SS or OW		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

***** Instance Number will be mapped to View Number when studies with General Imaging Protocol Images are configured to export shuffled. Images that are not part of the protocol will have the instance number offset by 10,000.

Table 121 : Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	CONFIG	
Columns	0028,0011	US		ALWAYS	CONFIG	Image width in pixels: 1593 or 1920 for Secondary Capture Images 1593 for Multi-frame True Color SC Images
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel.
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixe
High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	0” pixels are Unsigned Integers
Pixel Data	7FE0,0010	OW / OB		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAP	AUTO	

Table 122 : SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	WSD=Workstation	ALWAYS	AUTO	
Modality	0008,0060	CS		ALWAYS	AUTO	Determined by the image

						modality being viewed at the time of acquisition.

Table 123 : SC Multi-Frame Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO	

Table 124 : SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Specific Character Set	0008,0005	CS		ANAP	AUTO	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	

8.1.2.4. Multi-Frame True Color Secondary Capture IOD

Table 125: IOD OF CREATED MULTI-FRAME TRUE COLOR SECONDARY CAPTURE SOP INSTANCES

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
	Patient Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
	SC Equipment	Always
Image	General Image	Always
	Image Pixel	All attributes are optional and are not present
	Cine	Always
	Multi-frame	Always
	SC Multi-frame Image	Always
	SC Multi-frame Vector	All attributes are conditional and are not present
	SOP Common	Always

Table 126: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment

Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	
Patient ID	0010,0020	LO		ALWAYS	MWL, AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO	F, M, O	VNAP	MWL, USER	
Ethnic Group	0010,2160	SH		VNAP	MWL, USER	
Patient Comments	0010,4000	LT		VNAP	MWL, USER	

Table 127: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study ID	0020,0010	SH		ALWAYS	MWL, AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Study Description	0008,1030	LO		VNAP	MWL, USER	
Physicians of Record	0008,1048	PN		ANAP	USER	
Names of Intended Recipients of Results	0040,1010	PN		ANAP	MWL	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		VNAP	MWL	
>Referenced SOP Instance UID	0008,1155	UI		VNAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		VNAP	MWL	
>Coding Scheme Designator	0008,0102	SH		VNAP	MWL	
>Coding Scheme Version	0008,0103	SH		VNAP	MWL	
>Code Meaning	0008,0104	LO		VNAP	MWL	

Table 128: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnosis Description	0008,1080	LO		VNAP	MWL	
Patient Size	0010,1020	DS		VNAP	MWL, USER	
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	

Table 129: General Series Module

Attribute Name	Tag	VR	Value	Presence of	Source	Comment

				Value		
Modality	0008,0060	CS		ALWAYS	AUTO	
Presentation IntentType	0008,0068	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI	CR	ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		VNAP	MWL/ USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	
Requesting Physician	0032,1032	PN		ANAP	MWL	
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Requested Procedure Description	0032,1060	LO		VNAP	MWL	
>Requested Contrast Agent	0032,1070	LO		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO , MWL	
>Requested Procedure Priority	0040,1003	SH		ANAP	MWL	
>Patient Transport Arrangements	0040,1004	LO		ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	AUTO , MWL	
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	MWL	
>Pre-Medication	0040,0012	LO		ANAP	MWL	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure	0040,0244	DA		ALWAYS	AUTO	

Step Start Date						
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	USER , MWL	
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	MWL	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL	

Table 130: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	AUTO	
Institution Name	0008,0080	LO		VNAP	CONFIG	
Station Name	0008,1010	SH		VNAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	A string indicating the product, level, and clinical specialty. Example: EPIQ 7C
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	Decimal representation of system "Chip ID" found in PSC>System Management> System Information. Also used as component of system generated private UIDs
Software Versions	0018,1020	LO		ALWAYS	AUTO	A string indicating the model name and software build version. Example: EPIQ 7G_7.0.0.748

Table 131: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment

Instance Number*	0020,0013	IS		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Acquisition Date Time	0008,002A	DT		ALWAYS	AUTO	
Derivation Description	0008,2111	ST		ALWAYS	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	
> Referenced SOP Class UID	0008,1150	UI		ANAP	AUTO	
> Referenced SOP Instance UID	0008,1155	UI		ANAP	AUTO	
> Purpose of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	
>> Coding Scheme Designator	0008,0102	SH		ANAP	AUTO	
>> Code Value	0008,0100	SH		ANAP	AUTO	
>> Code Meaning	0008,0104	LO		ANAP	AUTO	
Burned In Annotation	0028,0301	CS		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Lossy Image Compression Method	0028,2114	CS		ANAP	AUTO	
Presentation LUT Sequence	2050,0010	SQ		ANAP Mutually exclusive with 2050,0020	AUTO	
> LUT Description	0028,3002	US or SS		ANAP	AUTO	
> LUT Data	0028,3006	US or SS or OW		ANAP	AUTO	
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 132: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	

Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	CONFIG	
Columns	0028,0011	US		ALWAYS	CONFIG	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	8 Bits per pixel.
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	8 Bits per pixe
High Bit	0028,0102	US	7	ALWAYS	AUTO	High bit is 7
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	0” pixels are Unsigned Integers
Pixel Data	7FE0,0010	OW / OB		ALWAYS	AUTO	
Planar Configuration	0028,0006	US		ANAP	AUTO	

Table 133: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Time	0018,1063	DS		ANAP	AUTO	
Recommended Display Frame Rate	0008,2144	IS		ANAP	AUTO	
Cine Rate	0018,0040	IS		ANAP	AUTO	

Table 134: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ANAP	AUTO	
Frame Increment Pointer	0028,0009	AT		ANAP	AUTO	

Table 135: Sop Common

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Specific Character Set	0008,0005	CS		ANAP	AUTO	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	

8.1.2.5. Comprehensive Structured Report IOD

Table 136 : IOD OF CREATED COMPREHENSIVE STRUCTURED REPORT SOP INSTANCES

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always

	Patient Study Module	Always
Series	SR Document Series	Always
Equipment	General Equipment Module	Always
	SC Equipment	Always
Document	SR Document General	Always
	SR Document Content	Always
	SOP Common	Always

Table 137: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	
Patient ID	0010,0020	LO		ALWAYS	MWL, AUTO	
Patient's Birth Date	0010,0030	DA		VNAP	MWL, USER	
Patient's Sex	0010,0040	CS		VNAP	MWL, USER	
Other Patient IDs	0010,1000	LO	F, M, O	VNAP	MWL, USER	
Ethnic Group	0010,2160	SH		VNAP	MWL, USER	
Patient Comments	0010,4000	LT		VNAP	MWL, USER	

Table 138: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study Date	0008,0020	DA		ALWAYS	AUTO	
Study Time	0008,0030	TM		ALWAYS	AUTO	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study ID	0020,0010	SH		ALWAYS	MWL, AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Study Description	0008,1030	LO		VNAP	MWL, USER	
Physicians of Record	0008,1048	PN		ANAP	USER	
Names of Intended Recipients of Results	0040,1010	PN		ANAP	MWL	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		VNAP	MWL	
>Referenced SOP Instance UID	0008,1155	UI		VNAP	MWL	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>Code Value	0008,0100	SH		VNAP	MWL	
>Coding Scheme Designator	0008,0102	SH		VNAP	MWL	

>Coding Scheme Version	0008,0103	SH		VNAP	MWL	
>Code Meaning	0008,0104	LO		VNAP	MWL	

Table 139: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnosis Description	0008,1080	LO		VNAP	MWL	
Patient Size	0010,1020	DS		VNAP	MWL, USER	
Patient's Weight	0010,1030	DS		VNAP	MWL, USER	

Table 140: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Presentation IntentType	0008,0068	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI	CR	ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		VNAP	MWL/ USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	
Requesting Physician	0032,1032	PN		ANAP	MWL	
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Requested Procedure Description	0032,1060	LO		VNAP	MWL	
>Requested Contrast Agent	0032,1070	LO		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO , MWL	
>Requested Procedure Priority	0040,1003	SH		ANAP	MWL	
>Patient Transport Arrangements	0040,1004	LO		ANAP	MWL	

>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	AUTO , MWL	
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		VNAP	MWL	
>Pre-Medication	0040,0012	LO		ANAP	MWL	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	USER , MWL	
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	MWL	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL	

Table 141: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	AUTO	
Institution Name	0008,0080	LO		VNAP	CONFIG	
Station Name	0008,1010	SH		VNAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	A string indicating the product, level, and clinical specialty. Example: EPIQ 7C
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	Decimal representation of system "Chip ID" found in PSC>System Management> System Information. Also used as component of system generated private UIDs
Software Versions	0018,1020	LO		ALWAYS	AUTO	A string

						indicating the model name and software build version. Example: EPIQ 7G_7.0.0.748

Table 142: SR Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	MPPS	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MPPS	
> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	

Table 143: SR Document General Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Completion Flag	0040,A491	CS		ALWAYS	AUTO	
Verification Flag	0040,A493	CS		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Predecessor Documents Sequence	0040,A360	SQ		ANAP	AUTO	
>Study Instance UID	0020,000D	UI		ANAP	AUTO	
>Referenced Series Sequence	0008,1115	SQ		ALWAYS	AUTO	
>>Referenced SOP Sequence	0008,1199	SQ		ALWAYS	AUTO	
>>> Referenced SOP Class	0008,1150	UI		ALWAYS	AUTO	

>>> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
Referenced Request Sequence	0040,A370	SQ		ANAP	AUTO	
>Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
>Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>>Referenced SOP Class UID	0008,1150	UI		ANAP	MWL	
>>Referenced SOP Instance UID	0008,1155	UI		ANAP	MWL	
>Accession Number	0008,0050	SH		VNAP	MWL, USER	
>Placer Order Number/Imaging Service Request	0040,2016	LO		VNAP	MWL	
>Filler Order Number/Imaging Service Request	0040,2017	LO		VNAP	MWL	
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	
>Requested Procedure Description	0032,1060	LO		ANAP	MWL	
>Requested Procedure Code Sequence	0032,1064	SQ		VNAP	MWL	
Performed Procedure Code Sequence	0040,A372	SQ		VNAP	AUTO/ MWL	

Table 144: SR Document Content Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Template Sequence	0040,A504	SQ		ALWAYS	AUTO	
>Template Identifier	0040,DB00	CS		ALWAYS	AUTO	
>Mapping Resource	0008,0105	CS		ALWAYS	AUTO	
Content Sequence	0040,A730	SQ		ALWAYS	AUTO	
>Relationship Type	0040,A010	CS		ALWAYS	AUTO	
Document Relationship Macro				ANAP	AUTO	
Document Content				ALWAYS	AUTO	

Macro						
Value Type	0040,A040	CS		ALWAYS	AUTO	
Concept Name Code Sequence	0040,A043	SQ		ALWAYS	AUTO	
>Code Value	0008,0100	SH		ALWAYS	AUTO	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	
Continuity of Content	0040,A050	CS		ALWAYS	AUTO	
Spatial Coordinates Macro				ANAP	AUTO	
Graphic Data	0070,0022			ANAP	AUTO	
Graphic Type	0070,0023			ALWAYS	AUTO	
Numeric Measurement Macro				ALWAYS	AUTO	
Code Macro				ALWAYS	AUTO	

Table 145: SOP COMMON MODULE

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Specific Character Set	0008,0005	CS		ALWAYS	CONFIG	

8.1.3. Attribute Mapping

Below Table summarizes the relationships between attributes received via MWL, stored in acquired images and communicated via MPPS. The format and conventions used in Below Table relate to the corresponding table in IHE Technical Framework, Rev. 11.0 07-24-2012, vol. II: Transactions.

Table 146: 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 > Series Description > Performed Procedure Step Description	>Scheduled Procedure Step Description > Performed 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
----	>Referenced SOP Class UID	SOP Class UID
----	>Referenced SOP Instance UID	SOP Instance UID
----	Protocol Name	Protocol Name

8.1.4. Coerced/Modified fields

The 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.

Data Dictionary of Private Attributes
Not applicable

Coded Terminology and Templates
This application supports the following Coded Terminology and templates as described in the sub-sections.

8.1.5. Context Groups

Not applicable

8.1.6. Template Specifications

8.1.6.1. Comprehensive SR IOD Templates

This section describes the content of all the templates used in the Comprehensive SR IOD Template.

Table 147: Used Templates for Comprehensive SR Reporting

Template Name	Template ID
OB-GYN Ultrasound Procedure Report	TID 5000
Vascular Ultrasound Report	TID 5100
Echocardiography Procedure Report	TID 5200
Paediatric Fetal & Congenital Cardiac Ultrasound Report (UWS supports Paediatric only)	TID 5220

8.1.6.1.1 TID 5000

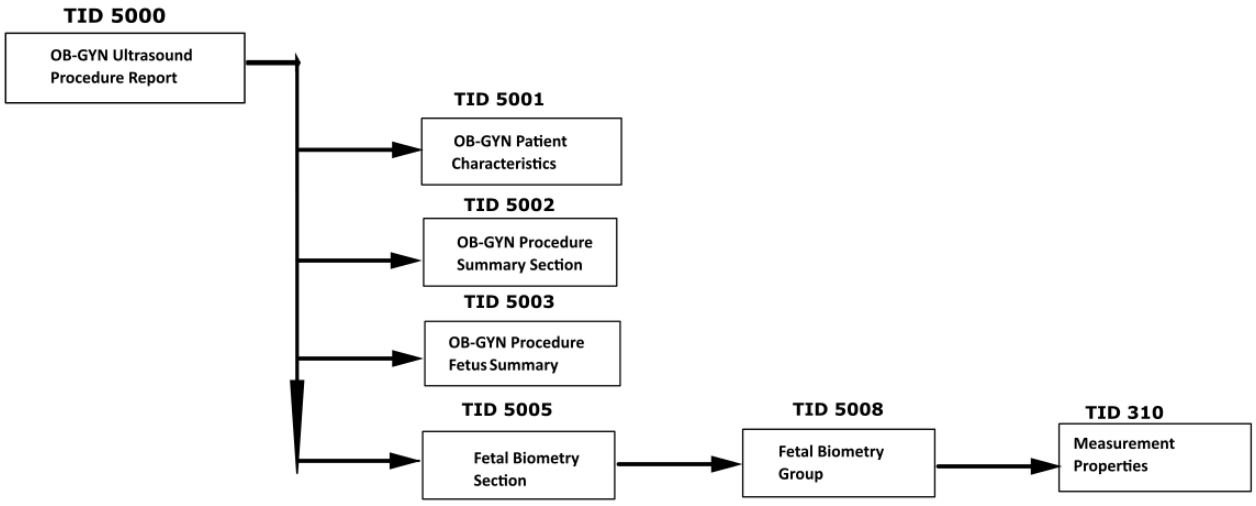

Figure 22: TID 5000 - OB-GYN Ultrasound Procedure Report SR IOD Template Structure

Table 148: 5000 OB-GYN Ultrasound Procedure Report

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (125000, DCM, "OB-GYN Ultrasound Procedure Report")	CONTAINER	1	ALWAYS	Root node
>	CONTAINS	DTID 5001 “OB-GYN Patient Characteristics”	INCLUDE	1	USER DEFINED	
>	CONTAINS	DTID 5002 “OB-GYN Procedure Summary Section”	INCLUDE	1	USER DEFINED	
>	CONTAINS	DTID 5005 “Fetal Biometry Section”	INCLUDE	1	USER DEFINED	

Table 149: 5001 OB-GYN Patient Characteristics

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV(121118, DCM, "Patient Characteristics	CONTAINER	1	ALWAYS	

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	CONTAINS	(121029, DCM, "Subject Name")	TEXT	1	ALWAYS	
>	CONTAINS	(121030, DCM, "Subject ID")	TEXT	1	ALWAYS	
>	CONTAINS	(T9910-09, 99PMSBLUS, "Exam date")	DATE	1	ALWAYS	
>	CONTAINS	(T9910-105, 99PMSBLUS, "Study date")	DATE	1	ALWAYS	

Table 150: 5002 OB-GYN Procedure Summary Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV(121111, DCM, "Summary")	CONTAINER	1		
>	CONTAINS	(11781-2, LN, "EDD from average ultrasound age")	DATE	1		
>	CONTAINS	(11878-6, LN, "Number of Fetuses)	NUM	1		$Measurement = BCID 12018 “OB-GYN Summary”
>	CONTAINS	BTID 5003 “OB-GYN Fetus Summary	INCLUDE	1-n	USER CONDITIONAL	

Table 151: 5003 OB-GYN Procedure Fetus Summary

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
	CONTAINS	EV(121111, DCM, "Summary")]	CONTAINER	1	ALWAYS	
	>HAS OBS CONTEXT	EV(11951-1, LN, "Fetus ID")	TEXT	1	MANDATORY CONDITIONAL	
	>CONTAINS	DTID 300 “Measurement”	INCLUDE	1	USER DEFINED	$Measurement = DCID 12019 “OB-GYN Fetus Summary”

Table 152: 5005 Fetal Biometry Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
	CONTAINS	(125002, DCM, "Fetal Biometry")]	CONTAINER	1	ALWAYS	
	>HAS OBS CONTEXT	EV(11951-1, LN, "Fetus ID")	TEXT	1	MANDATORY CONDITIONAL	
	>CONTAINS	DTID 5008 “Fetal Biometry Group”	INCLUDE	1	ALWAYS	

Table 153: 5008 Fetal Biometry Group

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
	CONTAINS	(125005, DCM, "Biometry Group")	CONTAINER	1	ALWAYS	
	>HAS OBS CONTEXT	(11820-8, LN, "Biparietal Diameter)	TEXT	1	MANDATORY CONDITIONAL	$Measurement = $BiometryType
	>>HAS PROPERTIES	DTID 310 “Measurement Properties”	INCLUDE	1	USER DEFINED	
	>CONTAINS	(18185-9, LN, "Gestational Age")	NUM	1	MANDATORY CONDITIONAL	
	>INFERRED FROM	(121420, DCM, "Equation")	CODE	1	USER DEFINED	

Table 154: 300 Measurement Properties

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121404, DCM, "Selection Status")	CODE	1	USER DEFINED	

8.1.6.1.2 TID 5100

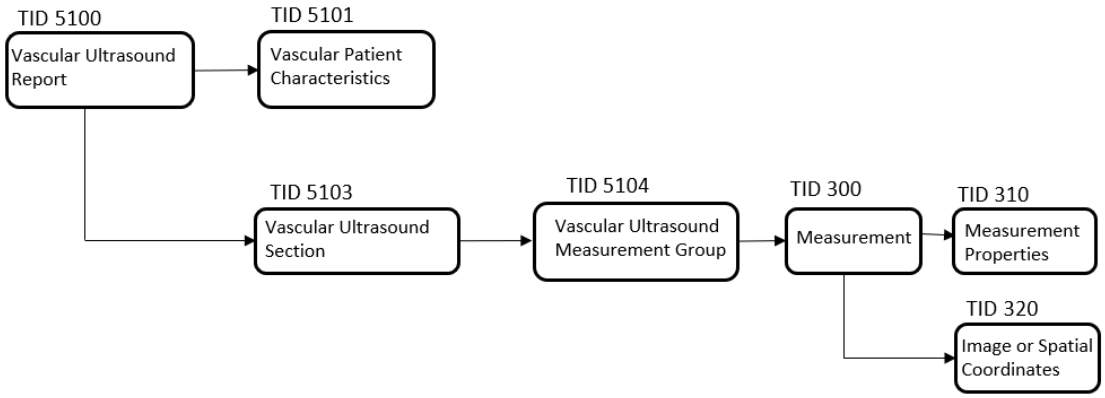

Figure 23: TID 5100 - Vascular Ultrasound Report SR IOD Template Structure

Table 155: TID 5100 Vascular Ultrasound Report

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		BCID 12100 “Vascular Ultrasound Report Document Title”	CONTAINER	1	ALWAYS	
>	CONTAINS	DTID 5101 “Vascular Patient Characteristics”	INCLUDE	1	USER DEFINED	
>	CONTAINS	DTID 5103 “Vascular Ultrasound Section”	INCLUDE	1	USER DEFINED	

Table 156: TID 5101 Vascular Patient Characteristics

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121118, DCM, "Patient Characteristics")	CONTAINER	1	ALWAYS	

Table 157: TID 5103. Vascular Ultrasound Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		DT (121070, DCM,"Findings")	CONTAINER	1	ALWAYS	
>	HAS CONCEPT MOD	EV (G-C0E3, SRT , "Finding Site")	CODE	1	ALWAYS	
>	HAS CONCEPT MOD	EV (G-C171, SRT, "Laterality")	CODE	1	ALWAYS	
>	CONTAINS	DTID 5104 "Vascular Ultrasound Measurement Group"	INCLUDE	1-n	ALWAYS	

Table 158: TID 5104. Vascular Ultrasound Measurement Group

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		T-45100, SRT, "Common Carotid Artery	CONTAINER	1	ALWAYS	
>	HAS CONCEPT MOD	EV (G-A1F8, SRT, "Topographical Modifier")	CODE	1	USER DEFINED	
>	CONTAINS	DTID 300 "Measurement	INCLUDE	1	ALWAYS	

Table 159: TID 300 Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		(C12011-01, 99PMSBLUS, "Bladder Length")]	NUM	1	ALWAYS	
>	HAS PROPERTIES	DTID 310 "Measurement Properties	INCLUDE	1	USER DEFINED	
>		DTID 320 "Image or Spatial Coordinates"	INCLUDE	1-n	USER DEFINED	

Table 160: TID 310 Measurement Properties

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	HAS PROPERTIES	EV (121404, DCM, "Selection Status")	CODE	1	USER DEFINED	

Table 161: TID 320 Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
	INFERRED FROM		SCOORD	1	CONDITIONAL	
>	SELECTED FROM		IMAGE	1	CONDITIONAL	

8.1.6.1.3 TID 5200

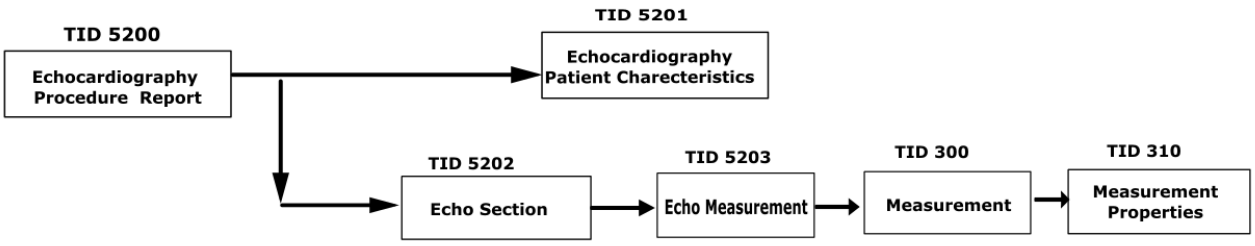

Figure 24: TID 5200- Echocardiography Procedure Report SR IOD Template Structure

Table 162: TID 5200 Echocardiography Procedure Report

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (125200, DCM, "Adult Echocardiography Procedure Report")	CONTAINER	1	ALWAYS	Root node
>	CONTAINS	DTID 5201 “Echocardiography Patient Characteristics”	INCLUDE	1	USER DEFINED	
>	CONTAINS	DTID 5202 “Echo Section”	INCLUDE	1	USER DEFINED	

Table 163: TID 5201 Echocardiography Patient Characteristics

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121118, DCM, "PatientCharacteristics")	CONTAINER	1	ALWAYS	
>	CONTAINS	EV (8277-6, LN, "Body Surface Area")	NUM	1	ALWAYS	
>	CONTAINS	EV (121033, DCM, "Subject Age")	NUM	1	USER DEFINED	

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>	CONTAINS	EV (121032, DCM, "Subject Sex")	CODE	1	USER DEFINED	

Table 164: 5202 Echo Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		DT (59776-5, LN,"Findings")	CONTAINER	1	ALWAYS	
>	HAS CONCEPT MOD	EV (363698007, SCT, "Finding Site")	CODE	1	ALWAYS	
>	HAS CONCEPT MOD	EV (272741003, SCT, "Laterality")	CODE	1	ALWAYS	
>	CONTAINS	DTID 5203 "Echo Measurement Group"	INCLUDE	1-n	ALWAYS	

Table 165: 5203 Echo Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		DTID 300 "Measurement"	INCLUDE	1	ALWAYS	

Table 166: 300 Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		$Measurement	NUM	1	ALWAYS	
	>HAS PROPERTIES	DTID 310"Measurement Properties"	INCLUDE	1	USER DEFINED	

Table 167: 310 Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121404, DCM, "Selection Status")	CODE	1	ALWAYS	

Note :

- Concept name DTID 1001 "Observation Context" is not present in the template ID 5200. Echocardiography Procedure Report.

8.1.6.1.4 TID 5220

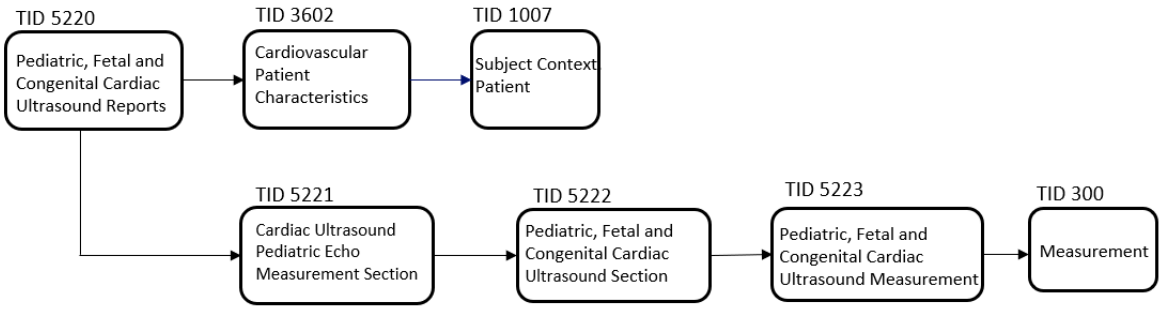

Figure 25: TID 5220 - Pediatric Fetal & Congenital Cardiac Ultrasound Report SR IOD Template Structure

Table 168: 5220 Pediatric Fetal & Congenital Cardiac Ultrasound Report (UWS supports Pediatric only)

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		(125195, DCM, "Pediatric Cardiac Ultrasound Report")	CONTAINER	1	ALWAYS	
>	CONTAINS	DTID 3602 "Cardiovascular Patient Characteristics"	INCLUDE	1	USER DEFINED	
>		DTID 5221 "Cardiac Ultrasound Pediatric Echo Measurement Section	CONTAINS	1	USER DEFINED	

Table 169: TID 3602. Cardiovascular Patient Characteristics

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121118, DCM, "Patient Characteristics"	CONTAINER	1	ALWAYS	
>	CONTAINS	EV (121033, DCM, "Subject Age")	NUM	1	ALWAYS	
>	CONTAINS	EV (121032, DCM, "Subject Sex")	CODE	1	ALWAYS	
>	CONTAINS	EV (8302-2, LN, "Patient Height")	NUM	1	ALWAYS	
>	CONTAINS	EV (29463-7, LN, "Patient Weight")	NUM	1	ALWAYS	

Table 170: TID 1007 Subject Context, Patient

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV (121029, DCM, "Subject Name")	PNAME	1	CONDITIONAL	Defaults to Value of Patient's Name (0010,0010) of the Patient Module
		EV (121030, DCM, "Subject ID")	PNAME	1	CONDITIONAL	Defaults to Value of Patient ID (0010,0020) of the Patient Module
		EV (121032, DCM, "Subject Sex")	CODE	1	USER DEFINED	Defaults to value equivalent to Patient's Sex (0010,0040) in Patient Module
		EV (121031, DCM, Subject Birth Date")	DATE	1	USER DEFINED	Defaults to value of Patient's Birth Date (0010,0030) in Patient Module

Table 171: TID 5221. Cardiac Ultrasound Pediatric Echo Measurement Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
>		DTID 5222 “Pediatric, Fetal and Congenital Cardiac Ultrasound Section”	INCLUDE	1-n	USER DEFINED	$SectionSubject = DCID 12287 “Cardiac Ultrasound Ventricle Finding Site” $MeasType = DCID 12259 “Cardiac Ultrasound Ventricles Measurement”

Table 172: TID 5222. Pediatric, Fetal and Congenital Cardiac Ultrasound Section

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		EV(121070, DCM, "Findings"	CONTAINER	1	ALWAYS	
>	HAS CONCEPT MOD	EV (363698007, SCT, $SectionSubject "Finding Site")	CODE	1	ALWAYS	$SectionSubject
>	CONTAINS	EV(125007, DCM, "Measurement Group)	CONTAINER	1-n	ALWAYS	
>	CONTAINS	DTID 5223 “Pediatric, Fetal and Congenital Cardiac Ultrasound Measurement”	INCLUDE	1-n	ALWAYS	

Table 173: TID 5223. Pediatric, Fetal and Congenital Cardiac Ultrasound Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
		DTID 300 “Measurement”	INCLUDE	1	ALWAYS	

Table 174: TID 300 Measurement

NL	Relation with Parent	Concept Name	VT	VM	Presence of Value	Value
	CONTAINS	(M-02550, SRT, "Diameter")	NUM	1	ALWAYS	
>	HAS CONCEPT MOD	(R-4089A, SRT, "Cardiac Cycle Point")	CODE	1	USER DEFINED	
>	HAS CONCEPT MOD	(G-0373, SRT, "Image Mode")	CODE	1	USER DEFINED	

Note :

- Concept Name with "DTID 1204 “Language of Content Item and Descendants are not present in the system created TID 5220 - Pediatric Fetal & Congenital Cardiac Ultrasound Report.

Grayscale Image consistency

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

Standard Extended/Specialized/Private SOPs

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

Table 175 : Ultrasound Image Extended Attributes

Tag	Attribute Name	Added to
0028,0030	Pixel Spacing	Images with a single 2D region or dual 2D with same depth
0008,0068	Presentation Intent Type	Indicates that Pixel Data 7FE0,0010 contains 3D volume data
0008,2112	Source Image Sequence	Extended to use codes from CID 7205. See Table 9.31.
0032,1032	Requesting Physician	Added to image IODs for consistency with Structured Reports.

Pixel Spacing 0028,0030 is added to the exported DICOM file when the user has configured this attribute to be included and the image contains only one 2D calibration region and no Doppler or M-Mode calibration regions. This attribute is system generated, if used:

Contain the Pixel Spacing attribute: 2D still, 2D loop, 2D color still, 2D color loop, Mode Preview Still, PW Preview Still, CW Preview still, and Dual with same calibration on both images.

Do NOT contain the Pixel Spacing attribute: Mode live trace, Mode frozen trace, PW live trace, PW Frozen trace, CW live trace, CW frozen trace, Reports and dual images with different calibration on each image.

Ultrasound Multi frame Image instances may be used to store 3D and 4D ultrasound volume information. The presence of the Presentation Intent Type 0008,0068 value “FOR PRESENTATION” indicates that Pixel Data 7FE0,0010 contains spatially related frames of a 3D volume rather than the normal temporally related frames. 3D Temporal a.k.a. 4D volume information is stored using private attributes within a normal Ultrasound Multi frame Image object.
The private attributes that are sent via network or media are dependent on settings for the specific destination, as found in “Print/Network>Device Selection and either the “Media” tab or “Archive” tab and the “Advanced” button for the highlighted archive device.

Table 176: Source Image Sequence Item Extended Attributes

Attribute Name	Tag	Type	VR	Description	Value	Attribute Name
Source Image Sequence	0008,2112	3	SQ		Source Image Sequence	
>Purpose of Reference Code Sequence	0040,A170	3	SQ			>Purpose of Reference Code Sequence
>> Code Value	0008,0100	1	SH		121324	>> Code Value
>>Code Meaning	0008,0104	1	LO		Source Image	>>Code Meaning

8.1.7. 3D Presentation State Private SOP Class

EPIQ Elite, Elite Advanced, 7, CVx CVi and some EPIQ 5 configurations may create instances of the following Private SOP Class:

Table 177: Private Sop Class For 3d Presentation State

SOP Class Name	SOP Class UID	SCU	SCP
Private 3D Presentation State	1.3.46.670589.2.5.1.1	Yes	No

Private Transfer Syntaxes

There are no Private Transfer Syntaxes.

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9. Document Revision History

The table below shows the approved versions of this document only

Version	Release Date	Author	Description of changes	CR / Reason
2.0	Available in DMS	Available in DMS	Updated the section 8 for the Structure report template details as per the product behaviour.	Partner-Request

10. Approval

Name	Role / Function	Date & Signature	Repository
Available in DMS	Available in DMS	Available in DMS	TFS DHP.Vault / IOCC Compliance Certification Claims