



DICOM 3.0 Conformance Statement



SuperSonic® MACH 40 Ultrasound System V2.X software

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Conformance Statement Overview

SuperSonic Mach 40 implements the necessary DICOM services to:

- Support the Echo (Verification) service as both SCU/SCP;
- Support Modality Worklist Service as SCU;
- Support Modality Performed Procedure Step Service as SCU;
- Support Basic Printing Service as SCU;
- Support Query/Retrieve Service as SCU;
- Support Image Storage as SCU;
- Support Storage Commitment Service as SCU;
- Support Media Storage Service as FSC.

This document is intended to describe SuperSonic Mach 40's conformance to DICOM 3.0. Table 1.1 provides an overview of the network services supported by SuperSonic Mach 40 and Table 1.2 provides an overview of the Media Storage Application Profiles supported by SuperSonic Mach 40.

| SOP Classes | User of Service (SCU) | Provider of Service (SCP) |
|--|-----------------------|---------------------------|
| Transfer | | |
| Ultrasound Image Storage | Yes ¹ | Yes ² |
| Ultrasound Multi-Frame Image Storage | Yes ¹ | Yes ² |
| Ultrasound Image Storage (Retired) | No | Yes ² |
| Ultrasound Multi-Frame Image Storage (Retired) | No | Yes ² |

| | | |
|--|------------------|------------------|
| Secondary Capture Image Storage | No | Yes ² |
| Multi-Frame Single Bit Secondary Capture Image Storage | No | Yes ² |
| Multi-Frame Grayscale Byte Secondary Capture Image Storage | No | Yes ² |
| Multi-Frame Grayscale Word Secondary Capture Image Storage | No | Yes ² |
| Multi-Frame True Color Secondary Capture Image Storage | No | Yes ² |
| Encapsulated PDF Storage | Yes ¹ | No |
| CT Image Storage | No | Yes ² |
| Enhanced CT Image Storage | No | Yes ² |
| MR Image Storage | No | Yes ² |
| Enhanced MR Image Storage | No | Yes ² |
| Digital Mammography X-Ray Image Storage - For Presentation | No | Yes ² |
| Digital Mammography X-Ray Image Storage - For Processing | No | Yes ² |
| Nuclear Medecine Image Storage | No | Yes ² |
| RETIRED Nuclear Medecine Image Storage | No | Yes ² |
| Computed Radiography Image Storage | No | Yes ² |
| Digital XRay Image Storage - For Presentation | No | Yes ² |
| Digital XRay Image Storage - For Processing | No | Yes ² |
| XRay Angiographic Image Storage | No | Yes ² |
| Enhanced XA Image Storage | No | Yes ² |
| XRay Radiofluoroscopic Image Storage | No | Yes ² |
| Enhanced XRF Image Storage | No | Yes ² |
| VL Endoscopic Image Storage | No | Yes ² |
| VL Microscopic Image Storage | No | Yes ² |
| Positron Emission Tomography Image Storage | No | Yes ² |
| RT Structure Set Storage | No | Yes ² |
| Comprehensive SR Storage | Yes ³ | No |
| Query/Retrieve | | |
| Study Root Query/Retrieve Information Model - FIND | Yes ² | No |
| Study Root Query/Retrieve Information Model - MOVE | Yes ² | No |
| Workflow Management | | |
| Modality Worklist (C-FIND) | Yes ¹ | No |

| | | |
|-----------------------------------|------------------|----|
| Storage Commitment Push Model | Yes ¹ | No |
| Modality Performed Procedure Step | Yes ¹ | No |
| Print Management | | |
| Basic Grayscale Print Management | Yes ¹ | No |
| Basic Color Print Management | Yes ¹ | No |

Table 1.1: *Network Services*

| Media Storage Application Profile | Write Files (FSC or FSU) | Read Files (FSR) |
|--|-----------------------------|---------------------|
| Compact Disk - Recordable | | |
| General Purpose CD-R Profiles (STD-GEN-CD) | Yes ⁴ / No | Yes ⁴ |
| 120 mm DVD | | |
| General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG) | Yes ⁴ / No | Yes ⁴ |
| USB connected removable devices⁵ | | |
| General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG) | Yes ⁴ / No | Yes ⁴ |

⁴Purchasable option.

⁵The DICOMDIR file is not in the root directory of the medium.

Table 1.2: *Media Services*

¹Purchasable option. (Basic DICOM option)

²Purchasable option. (Q/R DICOM option)

³Purchasable option. (SR DICOM option)

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Introduction

2.1 Revision History

The revision history of this document is available on Table 2.1.

| Document Version | Date | Author | Description |
|------------------|---------------------|----------------------------|--|
| Version A | August 19, 2019 | Damien LERAT / Michel AMAT | Creation |
| Version A | September 3rd, 2019 | Damien LERAT | Implementation and Security Profiles updated |
| | | | |
| | | | |

Table 2.1: *Revision history*

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2.2 Audience

This document is written for the people that need to understand how SuperSonic Mach 40 will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

2.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between SuperSonic Mach 40 and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality. This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between SuperSonic Mach 40 and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.
- The DICOM standard will evolve to meet the users' future requirements. Hologic SuperSonic Imagine is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

SuperSonic Mach 40 has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement for SuperSonic Mach 40, together with the IHE Technical Framework, may facilitate the process of validation testing. SuperSonic Mach 40's Integration statement can be freely downloaded from the following URL: <http://www.supersonicimagine.com/ihe>.

2.4 Definitions, Terms and Abbreviations

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

2.4.1 Definitions

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax: the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE): an end point of a DICOM information exchange, including the DICOM network or media interface software; *i.e.*, the software that sends or receives DICOM information objects or messages. A single device may have multiple *Application Entities*.

Application Entity Title: the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context: The specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association: A network communication channel set up between *Application Entities*.

Attribute: a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Command: A request to operate on information across a network.

Command Element: An encoding of a parameter of a command which conveys this parameter's value.

Command Stream: The result of encoding a set of DICOM *Command Elements* using the DICOM encoding scheme.

Conformance Statement: A formal statement that describes a specific product implementation that uses the DICOM Standard. It specifies the *Service Classes*, *Information Objects*, and Communication Protocols supported by the implementation.

Context Group: A set of coded concepts defined by a Mapping Resource forming a set appropriate to use in a particular context. **Data Dictionary:** A registry of DICOM *Data Elements* which assigns a unique *tag*, a name, value characteristics, and semantics to each *Data Element*.

Data Element: A unit of information as defined by a single entry in the *Data Dictionary*.

Data Set: Exchanged information consisting of a structured set of *Attributes*. The value of each *Attribute* in a *Data Set* is expressed as a *Data Element*.

Data Stream: The result of encoding a *Data Set* using the DICOM encoding scheme (Data Element Numbers and representations as specified by the Data Dictionary).

Information Object: An abstraction of a real information entity (*e.g.*, CT Image, Structured Report, *etc.*) which is acted upon by one or more DICOM Commands.

Information Object Class: A formal description of an *Information Object* which includes a description of its purpose and the *Attributes* it possesses. It does not include values for these *Attributes*.

Information Object Definition (IOD): the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Information Object Instance: A representation of an occurrence of a real-world entity, which includes values for the *Attributes* of the *Information Object Class* to which the entity belongs.

Joint Photographic Experts Group (JPEG): A set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile: The specification of DICOM *Information Objects* and encoding exchanged on removable media (*e.g.* CDs).

Message: A data unit of the Message Exchange Protocol exchanged between two cooperating DICOM Applications. A *Message* is composed of a *Command Stream* followed by an optional *Data Stream*.

Module: A set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation: First phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context: The set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU): A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile: A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.

Service Class: A structured description of a service which is supported by cooperating DICOM Applications using specific DICOM Commands acting on a specific class of *Information Object*.

Service Class Provider (SCP): Role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality Worklist SCP).

Service Class User (SCU): Role of an *Application Entity* that uses a DICOM network service;

typically, a client. Examples: imaging modality (image storage SCU, and modality Worklist SCU), imaging workstation (image query/retrieve SCU).

Service/Object Pair (SOP) Class: The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance: An *Information Object*; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag: a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) *Data Element*. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [Private Data Element].

Transfer Syntax: The encoding used for exchange of DICOM *Information Objects* and *Messages*. Examples: JPEG compressed (images), little Endian explicit value representation.

Unified Code for Units of Measure (UCUM): a standard for all units of measurement.

Unique Identifier (UID): A globally unique “dotted decimal” string that identifies a specific object; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR): The format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

2.4.2 Basics of DICOM communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the *Conformance Statement* are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*). DICOM specifies a number of network services and types of *Information Objects*, each of which is called an *Abstract Syntax* for the *Negotiation*. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The *Negotiation* allows the initiating *Application Entity* to propose combinations of *Abstract Syntax* and *Transfer Syntax* to be used on the *Association*; these combinations are called *Presentation Contexts*. The receiving *Application Entity* accepts the *Presentation Contexts* it supports.

For each *Presentation Context*, the *Association Negotiation* also allows the devices to agree on

Roles – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, *i.e.*, the client system calls the server, but not always.

The *Association Negotiation* finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called *Extended Negotiation* information).

The *Application Entities*, having negotiated the *Association* parameters, may now commence exchanging data. Common data exchanges include queries for Worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated *Transfer Syntax*. There is a *Default Transfer Syntax* that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two *Application Entities* may also communicate with each other by exchanging media (such as a CD-R). Since there is no *Association Negotiation* possible, they both use a *Media Application Profile* that specifies “pre-negotiated” exchange media format, *Abstract Syntax*, and *Transfer Syntax*.

2.4.3 Abbreviations and terms

| | |
|---------------|--|
| ACR: | American College of Radiology |
| AE: | Application Entity |
| AET: | Application Entity Title |
| ASUM: | Australian Society of Ultrasound Medicine |
| CD-R: | Compact Disk Recordable |
| CFEF: | Collège Français d’Échographie Foetale |
| CR: | Computed Radiography |
| CT: | Computed Tomography |
| DHCP: | Dynamic Host Configuration Protocol |
| DICOM: | Digital Imaging and Communications in Medicine |
| DNS: | Domain Name System |
| DX: | Digital X-ray |
| FSC: | File-Set Creator |
| FSU: | File-Set Updater |
| FSR: | File-Set Reader |
| HIS: | Hospital Information System |
| HL7: | Health Level 7 Standard |
| IHE: | Integrating the Healthcare Enterprise |
| IOD: | Information Object Definition |

| | |
|----------------|---|
| IPv4: | Internet Protocol version 4 |
| IPv6: | Internet Protocol version 6 |
| ISO: | International Organization for Standards |
| JPEG: | Joint Photographic Experts Group |
| MG: | Mammography (X-ray) |
| LUT: | Look-up Table |
| MPEG: | Moving Picture Experts Group |
| MG: | Mammography (X-ray) |
| MPPS: | Modality Performed Procedure Step |
| MR: | Magnetic Resonance Imaging |
| MTU: | Maximum Transmission Unit (IP) |
| MWL: | Modality Worklist |
| NEMA: | National Electrical Manufacturers Association |
| NM: | Nuclear Medicine |
| NTP: | Network Time Protocol |
| O | Optional (Key Attribute) |
| OSI: | Open Systems Interconnection |
| PACS: | Picture Archiving and Communication System |
| PDE: | Patient Data Entry |
| PDU: | Protocol Data Unit |
| PET: | Positron Emission Tomography |
| R | Required (Key Attribute) |
| RF: | Radiofluoroscopy |
| RIS: | Radiology Information System |
| SPS: | Scheduled Procedure Step |
| SC: | Secondary Capture |
| SCP: | Service Class Provider |
| SCU: | Service Class User |
| SOP: | Service-Object Pair |
| SPS: | Scheduled Procedure Step |
| SR: | Structured Reporting |
| TCP/IP: | Protocol Transmission Control Protocol/Internet |
| U | Unique (Key Attribute) |
| UID: | Unique Identifier |
| UL : | Upper Layer |
| US: | Ultrasound |
| US MF: | Ultrasound Multi-Frame |
| VR: | Value Representation |
| XA: | X-ray Angiography |

2.5 References

NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://medical.nema.org/>

User's Guide SuperSonic Mach 40 V2.x User's Guide

3.1 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.

3.1.1 Application Data flow

SuperSonic Mach 40 is implemented in six Application entities. Figure 3.1.1 illustrates the SuperSonic Mach 40 *Application Entities* (AE), (in the boxes) and relationships between user invoked activities (in the circles at the left of the AE) and the DICOM services (depicted in the circles at the right of the AE). Exam data are sent to all selected Store and Print destinations simultaneously in accordance with system configuration of “Send After Acquisition” or at “End of Exam” or Manual. Worklist queries are executed either manually or automatically. Modality Performed Procedure Step (MPPS) messages are send at exam opening and closing. Query/Retrieve requests are executed either manually or automatically and selected instance are pushed to the local storage and added to the local database.

3.1.1.1 Storage

SuperSonic Mach 40 sends single and multi-frame ultrasound images, PDF reports, and Structured Reports to one or several remote AEs. Acquisition of images is associated with the local real-world activities “Save Clip” for multi-frame images and “Save Image” for single frame images. Sending or exporting of images depends on user configuration, either “Send After Acquisition” or “End of Exam” (when “End of Exam” button is pressed), or Manual. PDF reports creation are associated with the real world activities “Report”. Sending or exporting of

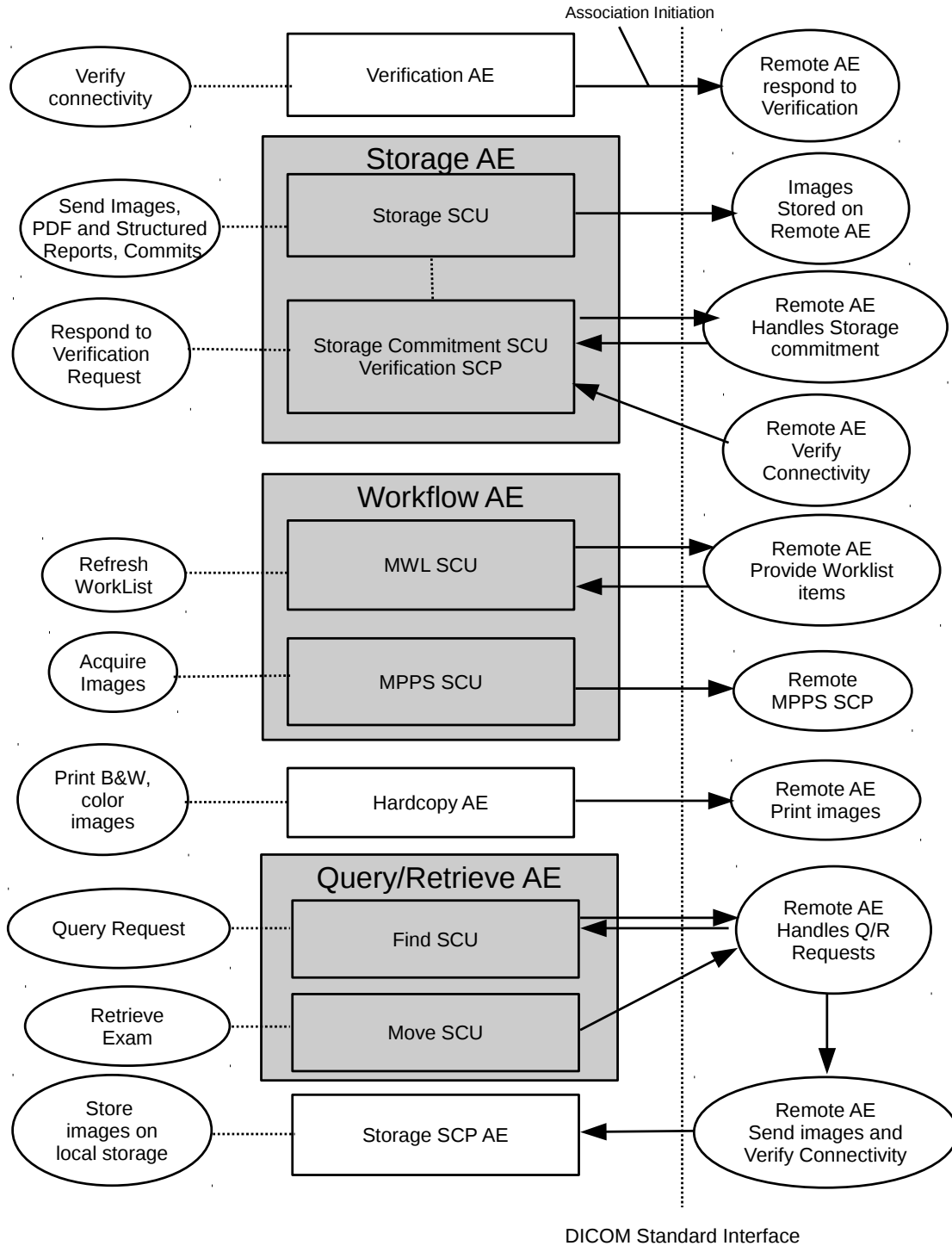


Figure 3.1.1: Application Data Flow

reports also depends on user configuration, either “End of Exam” (when “End of Exam” button is pressed), or Manual. SR are generated automatically at end of exam if at least one image is acquired with the OB/Gyn or Vascular preset. Sending or exporting of SR depends on user configuration.

For either “Send After Acquisition” or “End of Exam”, or manual mode, each remote AE can be individually configured to accept or reject single frame images, multi-frames images, PDF reports or Structured Reports.

Please refer to the user’s guide for configuration and use of DICOM Storage.

3.1.1.2 Worklist

SuperSonic Mach 40 queries Worklist information from remote AE. It is associated with the local real-world activities “Refresh” or automatic refresh (at a user configured refresh rate). When either the “Refresh” or automatic refresh are performed, SuperSonic Mach 40 queries a remote AE for Worklist items that provides the set of Worklist items matching the query request.

Automatic refresh can be configured to be executed at configurable intervals of time or a key moments (Smart Mode) like “End Of Exams”. SuperSonic Mach 40 supports both IHE’s worklist queries: the Patient Based Query and the Broad Query.

Please refer to the user’s guide for configuration and use of DICOM Worklist.

3.1.1.3 Modality Performed Procedure Step

SuperSonic Mach 40 sends Modality Performed Procedure Step message to remote AE. Messages are send automatically at exam opening and closing. Exam is said to be opened when patient information have been filled either automatically by selecting a patient in the Worklist or manually and a first image have been acquired or a first measurement has been performed. In this case, the message is send with the “In-Progress” Status.

Exam is closed with the status “completed” by either pressing the “End of Exam” button located on the control panel or by pressing “new patient” on the touch screen. A third way to close an exam is to press the “Cancel Exam” button on the touch screen. A “discontinued” message status is then sent. The discontinuation reason can be chosen by the Performing Physician/Sonographer.

Please refer to the user’s guide for configuration and use of DICOM Modality Performed Procedure Step.

3.1.1.4 Verification

SuperSonic Mach 40 initiates a connection with a remote AE, posts a Verification request and closes the connection. It also responds to incoming Verification requests (for service use).

3.1.1.5 Print Images

SuperSonic Mach 40 sends single images to one or several remote AEs (Printer or Print Server). Acquisition of images is associated with the local real-world activities “Save Image”. Printing of images depends on user configuration, either “Send After Acquisition” or “End of Exam” (when “End of Exam” button is pressed), or Manual.

For either “Send After Acquisition” or “End of Exam”, or manual mode, each remote AE can be individually configured to send fully rendered pages already containing the user’s selected formatting choices.

Please refer to the user’s guide for configuration and use of DICOM Printing.

3.1.1.6 Storage commitment

SuperSonic Mach 40 sends single and multi-frame images, PDF reports, and Structured Reports to one or several remote AEs. Acquisition of images is associated with the local real-world activities “Save Clip” for multi-frame images and “Save Image” for single frame images. Sending or exporting of images depends on user configuration, either “Send After Acquisition” or “End of Exam” (when “End of Exam” button is pressed), or Manual. PDF reports creation are associated with the real world activities “Report”. Sending or exporting of reports also depends on user configuration, either “End of Exam” (when “End of Exam” button is pressed), or Manual. SR are generated automatically at end of exam if at least one image is acquired with the OB/Gyn preset. Sending or exporting of SR depends on user configuration.

For either “Send After Acquisition”, “End of Exam”, or manual mode, each remote AE can be individually configured to accept or reject single frame images, multi-frame images, and PDF report.

The Storage AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database and then will freely manage its own internal resources according configuration (automatic deletion of exam upon commit reception). Commit requests may or may not be sent to the storage AE and depending on the configuration they may be send in the same or a separate association.

Please refer to the user’s guide for configuration and use of DICOM Storage Commitment.

3.1.1.7 Query/Retrieve

SuperSonic Mach 40 queries remote AE’s for lists of studies and series matching user’s request. If a selection of series is requested for retrieval, then an association is established to a remote query/retrieve AE and a move order is sent in destination to SuperSonic Mach 40’s local storage SCP.

Please refer to the user’s guide for configuration and use of DICOM Query/Retrieve.

3.1.1.8 Storage SCP

Storage SCP receives incoming images. This images may be unsolicited instances send by any remote Application Entities or may be instances requested thanks to the Query/Retrieve interface.

Please refer to the user's guide for configuration and use of DICOM Query/Retrieve.

3.1.2 Functional Definitions of SuperSonic Mach 40 Application Entities

As an acquisition modality, SuperSonic Mach 40 mainly act as a SCU and connects to other DICOM applications. However, if Query/Retrieve option is enabled, then SuperSonic Mach 40 accept incoming storage request as a store SCP. Moreover, conceptually the network services may be modeled as separate AEs, but in fact MWL SCU, MPPS SCU, image storage SCU, storage commitment SCU and print SCU share a single (configurable) AE Title.

3.1.2.1 Verification Service as both SCU and SCP

SuperSonic Mach 40 can initiate associations with Presentation Contexts for the Verification service SOP class. It will send a C-ECHO request to another DICOM application and wait for a response to complete the verification. Moreover SuperSonic Mach 40 will answer to any C-ECHO request coming from other DICOM application.

3.1.2.2 Basic Modality Worklist Management Service as SCU

SuperSonic Mach 40 uses the Basic Worklist Management service to get required information to build its DICOM datasets.

It establishes one association with the remote Worklist SCP, performs a Find request, waits for responses, and then releases the association. During receiving, the Worklist response items are counted and the query processing is canceled if the configurable limit of items is reached. The results will be displayed in a separate list, which will be cleared with the next successful Worklist update.

3.1.2.3 Modality Performed Procedure Step Management Service as SCU

SuperSonic Mach 40 establishes one association with the remote MPPS SCP, send a N-Set or N-Create message, waits for responses, and then releases the association.

3.1.2.4 Image Storage Service as SCU

The existence of a send-job queue entry with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state with an error message. SuperSonic Mach 40 will try

two other times to initiate another association with 20 seconds between each retry. If send-job is still failing, then the job is automatically paused and a notification icon is displayed in the notification panel.

The number of retry and the idle period between each retry are both configurable in the set up.

3.1.2.5 Storage Commitment Service as SCU

SuperSonic Mach 40 uses the Storage Commitment service to check that a commitment is taken by the server receiving the stored images. After a Storage operation, SuperSonic Mach 40 may establish one association or use an already opened one with the remote Storage Commitment SCP, performs a Store Commit request, and then releases the association. The answer is waited for another association started by the Storage Commitment SCP. An automatic deletion mechanism, triggered off upon reception of commitment message, can be activated.

3.1.2.6 Basic Print Service as SCU

The existence of a print-job in the print queue will activate the Hardcopy AE. An association is established with the printer. If the printer is operating normally, the film sheets described within the print-job will be printed. If the printer is not operating normally, SuperSonic Mach 40 will try to send again the print-job two other times to initiate another association with 20 seconds between each retry. If print-job is still failing then the job is automatically paused and a notification icon is displayed in the notification panel.

The number of retry and the idle period between each retry are both configurable in the set up.

3.1.2.7 Query/Retrieve Service as SCU

SuperSonic Mach 40 uses the Query/Retrieve service as a SCU to query a remote AE. Query/Retrieve service can be decomposed in two basic tasks:

- first FIND requests or queries are executed on a remote AE to perform a match of all the keys specified in the request against the information it possesses. All queries are performed recursively from the study through the series levels until all matching series have been listed. The query keys are patient's name, patient id, accession number, study date, modality. SuperSonic Mach 40 performs a Find request, waits for responses, and then releases the association. During receiving, the response items are counted and the query processing is canceled if the configurable limit of items is reached.
- then, eventually, a MOVE order is sent to the remote AE to move a list of series on SuperSonic Mach 40 local storage SCP.

There are two different ways to start Query requests. If the automatic query settings is activated then queries are automatically performed at exam creation. Queries can also be performed manually when the "Q/R" hard button on the control panel is pushed. If the automatic retrieve settings is activated or when a list of series is manually selected, a move request is sent.

3.1.2.8 Storage SCP

If Query/retrieve option is enabled, SuperSonic Mach 40 use the Storage Service Class to accept association from any SCU. Storage Service waits in the background for unsolicited or requested instances sent by remote AE. It will accept any associations with Presentation Contexts for SOP Classes of the Storage Service Class or Verification service class, and will store the received instances to the local database where they may subsequently be listed and viewed through the Query/Retrieve user interface.

3.1.3 Sequencing of Real-World Activities

On SuperSonic Mach 40, images can be pushed on a remote Print, Store, Store commit server in three ways : “after acquisition”, “on End of Exam”, and “manually”. It is possible to configure individually each server. Moreover, at any time, during an exam or not, it is possible to start a query or retrieve a list of series.

3.1.3.1 Sequencing of Real-World Activities - Send After Acquisition

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 3.1.2 apply:

1. Query Worklist
2. Receive Worklist
3. Start acquisition and create MPPS with “IN-PROGRESS” status
4. Acquire and Store image
5. Request a Storage Commitment (if any Store Commit is configured)
6. Print acquired images on film (if film sheet is full)
7. Send MPPS with “DISCONTINUED” status (if “Cancel Exam” is pressed)
8. or Send MPPS with “COMPLETED” status (if “End of Exam” is pressed)
9. Print remaining images on film
10. Store PDF and Structured Reports
11. Wait and accept commitment response(s)

Other workflow situations (*e.g.* unscheduled procedure) will have other sequencing constraints. Printing could be omitted completely if no printer is connected or hardcopies are not required. PDF reports and Structured Reports can be omitted.

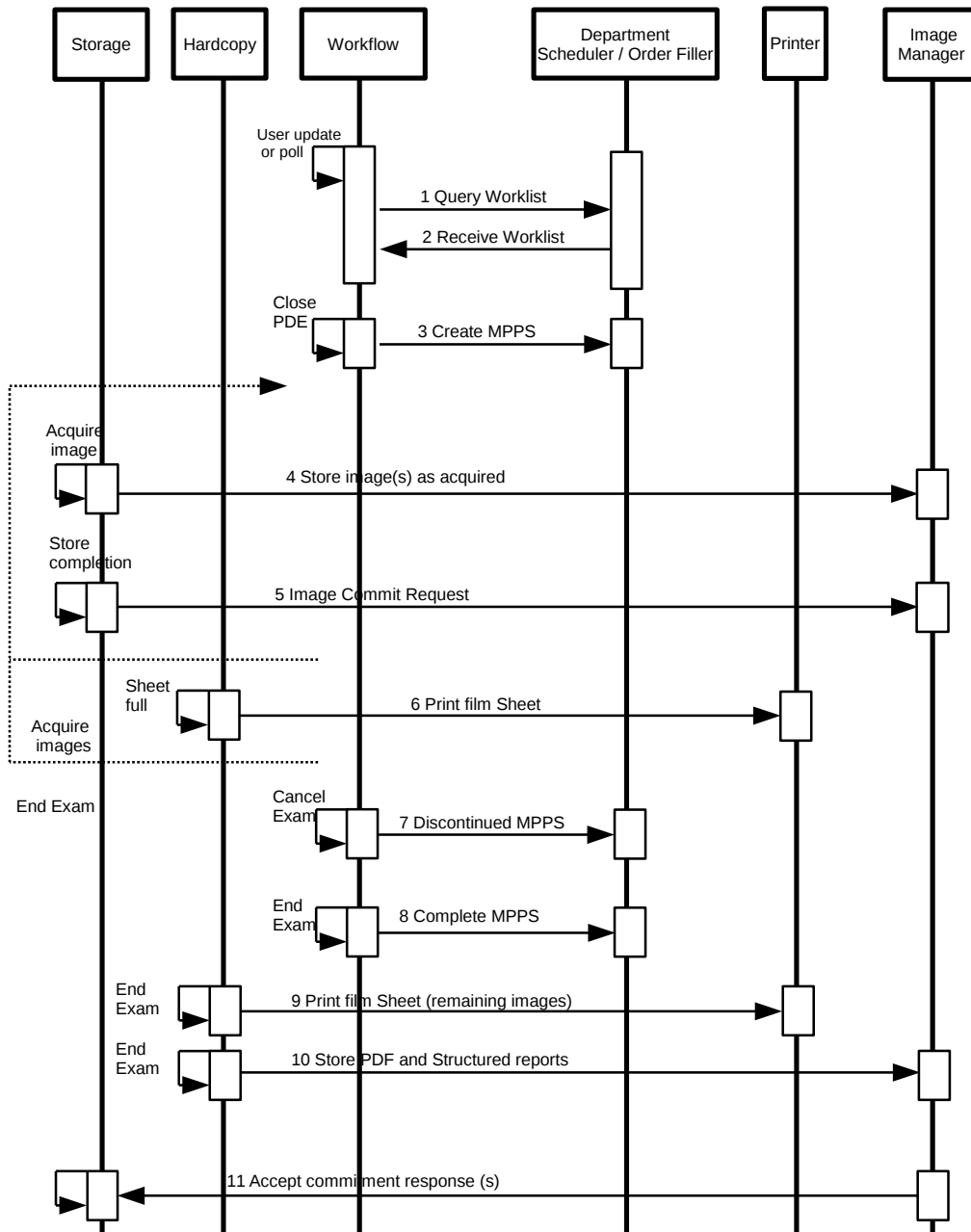


Figure 3.1.2: Sequencing Constraints - Send After Acquisition configuration

3.1.3.2 Sequencing of Real-World Activities - End of Exam

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 3.1.3 apply:

1. Query Worklist
2. Receive Worklist
3. Start acquisition and create MPPS with “IN-PROGRESS” status
4. Send MPPS with “DISCONTINUED” status (if “Cancel Exam” is pressed)
5. or Send MPPS with “COMPLETED” status (if “End of Exam” is pressed)
6. Store acquired images, PDF report, Structured Report
7. Print acquired images on film
8. Request a Storage Commitment (if any Store Commit is configured)
9. Wait and accept commitment response(s)

Other workflow situations (*e.g.* unscheduled procedure) will have other sequencing constraints. Printing could be omitted completely if no printer is connected or hardcopies are not required. PDF reports and Structured Reports can be omitted.

3.1.3.3 Sequencing of Real-World Activities - Query/Retrieve

If “Automatic Query” setting is activated, then SuperSonic Mach 40 will send automatically queries to a remote server. The keys for the query are Patient’s Name and/or Patient ID and/or Accession Number. The queries are send after the first image acquisition. If “automatic retrieve” setting is activated, SuperSonic Mach 40 will retrieve automatically the latest study. Otherwise, manual queries can be started at anytime, with or without any active exam.

3.2 Application Entity Specifications

3.2.1 Storage SCU Application Entity Specification

3.2.1.1 SOP Classes

The SuperSonic Mach 40’s Storage SCU AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.1.

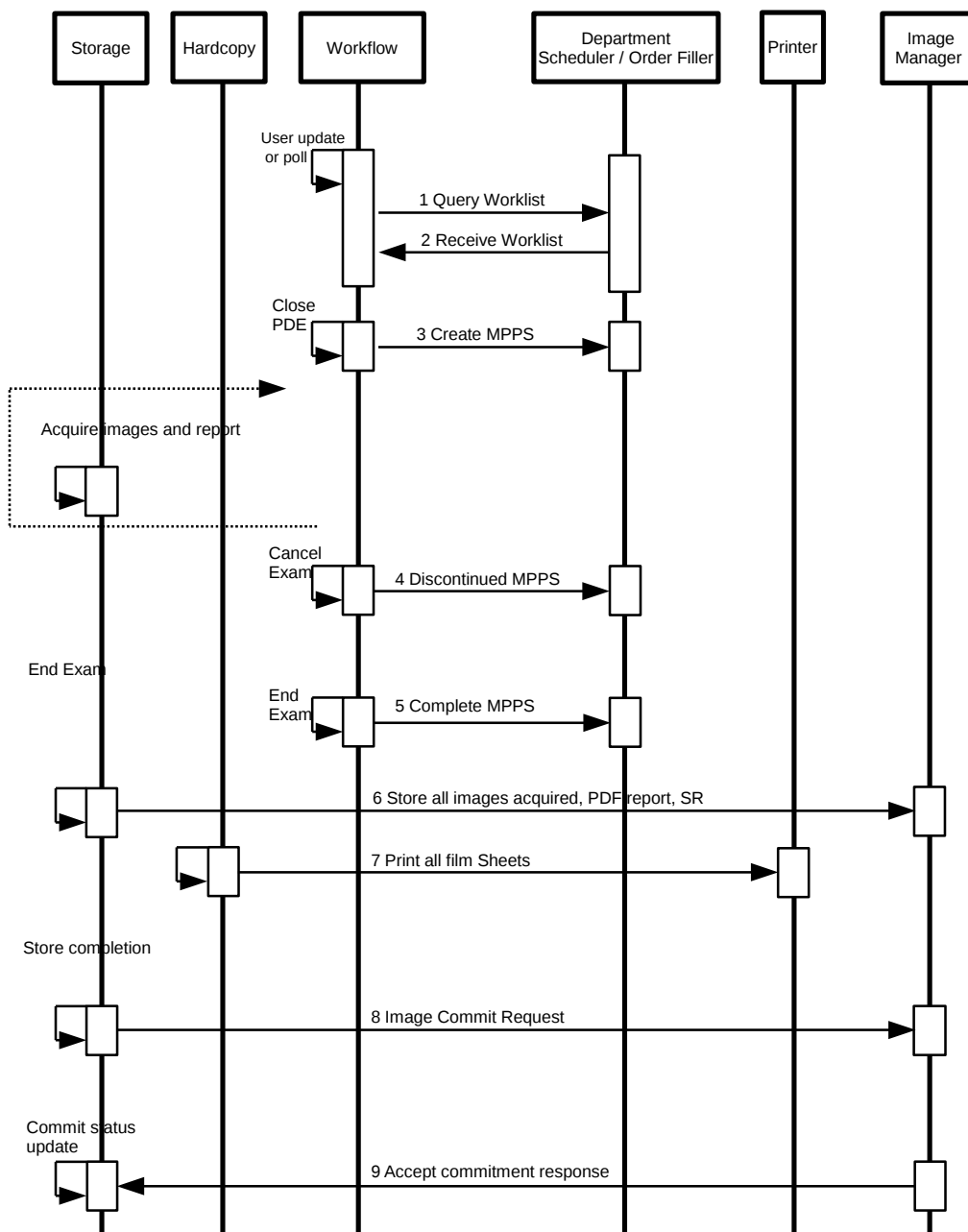


Figure 3.1.3: Sequencing Constraints - End of Exam configuration

| SOP Class Name | SOP Class UID | SCU | SCP |
|------------------------------|-------------------------------|-----|-----|
| US Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Yes | No |
| US Multi-Frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Yes | No |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Yes | No |
| Comprehensive SR Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Yes | No |

Table 3.1: *SOP Classes for Storage AE*

3.2.1.2 Association Policies

3.2.1.2.1 General

As illustrated in Table 3.2, the DICOM 3.0 standard Application context is always specified for each association.

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

Table 3.2: *DICOM Application Context for Storage AE*

3.2.1.2.2 Number of Associations

The Storage AE may initiates one Association at a time (see Table 3.3) for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains :

- pending until the active job is completed or failed,
- paused until they are resumed.

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

Table 3.3: *Number of Associations as an Association Initiator for Storage AE*

The Storage AE may accept up to 15 associations (Table 3.4) to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class and C-ECHO requests for the Verification service SOP Class.

3.2.1.2.3 Asynchronous Nature

As illustrated in Table 3.5, The Storage AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

| | |
|---|-----------|
| Maximum number of simultaneous Associations | unlimited |
|---|-----------|

Table 3.4: *Number of Associations as an Association Acceptor for Storage AE*

| | |
|---|---|
| Maximum number of outstanding asynchronous transactions | 0 |
|---|---|

Table 3.5: *Asynchronous Nature as an Association Initiator for Storage AE*

3.2.1.2.4 Implementation Identifying Information

The implementation information for the Storage Application Entity is described in Table 3.6.

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation Version Name | SSI_DCMTK_364 |

Table 3.6: *DICOM Implementation Class and Version for Storage AE*

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Description and Sequencing of Activity Send Instances

As described in section 3.1.1.1, a user can manually select instances from Review Mode and request them to be sent to multiple destinations. Each request is forwarded to the “DICOM Store” job queue and processed individually if the “group exportation” option is active (default). Otherwise a job per instance will be created. When the “Send After Acquisition” or “Send on End of Exam” option are active, each acquired instances will be forwarded to the “DICOM Store” job queue for a pre-configured list of target destinations. It can be configured which type of instances (still images, clips, PDF reports, Structured Reports) will be accepted by each destination.

The Storage AE is invoked by the job list interface that is responsible for processing network archival tasks. The job consists of data describing the instances marked for storage and the destination. An internal daemon process triggered by a job for a specific Storage destination initiates a C-STORE request to store instances. If the process successfully establishes an Association to a remote Application Entity, it will transfer each instance one after another via the open Association. Status of the transfer is reported through the job list interface. Only one Storage job will be active at a time. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It will be restarted automatically later.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request. If the job contains multiple instances then multiple C-STORE requests will be issued over the

same Association. If the Remote AE is configured as an archive device, after all instances have been successfully sent, a Storage Commitment request is issued. This Storage Commitment request will be sent over a separate association. SuperSonic Mach 40 will open a separate association for this, send a N-ACTION request to the server and wait for the N-ACTION response on this association. SuperSonic Mach 40 then releases this association, without expecting any N-EVENT-REPORT message. SuperSonic Mach 40 expects N-EVENT-REPORTS messages to be sent over a separate association initiated by the Storage Commitment SCP server. A possible sequence of interactions between Storage AE and an Image Manager is illustrated in Figure 3.2.1 :

1. The Storage AE opens an association with the Image Manager,
2. Acquired image(s), PDF reports, SR are transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success),
3. The Storage AE closes the association with the Image Manager,
4. The Storage AE opens an association with the Image Manager,
5. A Store Commitment is requested,
6. The Storage AE closes the association with the Image Manager.

3.2.1.3.2 Proposed Presentation Contexts

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by SuperSonic Mach 40 for a C-Store service are defined in Table 3.7.

| Presentation Context Table | | | | | |
|----------------------------|-----------------------------|--|------------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Ultrasound 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 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCU | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCU | NONE |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 | SCU | NONE |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 | SCU | NONE |
| | | | | | |

| | | | | | |
|---|-------------------------------|--|------------------------|-----|------|
| Ultrasound Multi- Frame 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 |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCU | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCU | NONE |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 | SCU | NONE |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 | SCU | NONE |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |
| Comprehensive SR 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 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.7: Proposed Presentation Contexts for Activity Send instances

If a remote AE is configured as a Store Commit server, SuperSonic Mach 40 will propose Presentation Contexts as shown in Table 3.8. Depending on the configuration, this presentation context will be presented during the first association or in a separate association.

| Presentation Context Table | | | | | |
|-------------------------------|----------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| 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 | SCU | NONE |

Table 3.8: Proposed Presentation Contexts for AE and Storage Commitment SCU Activity

3.2.1.3.3 SOP Specific Conformance for Storage SOP Class

SuperSonic Mach 40 applies the following rules for its proposed presentation contexts:

- All uncompressed transfer syntaxes are proposed for Storage operations,

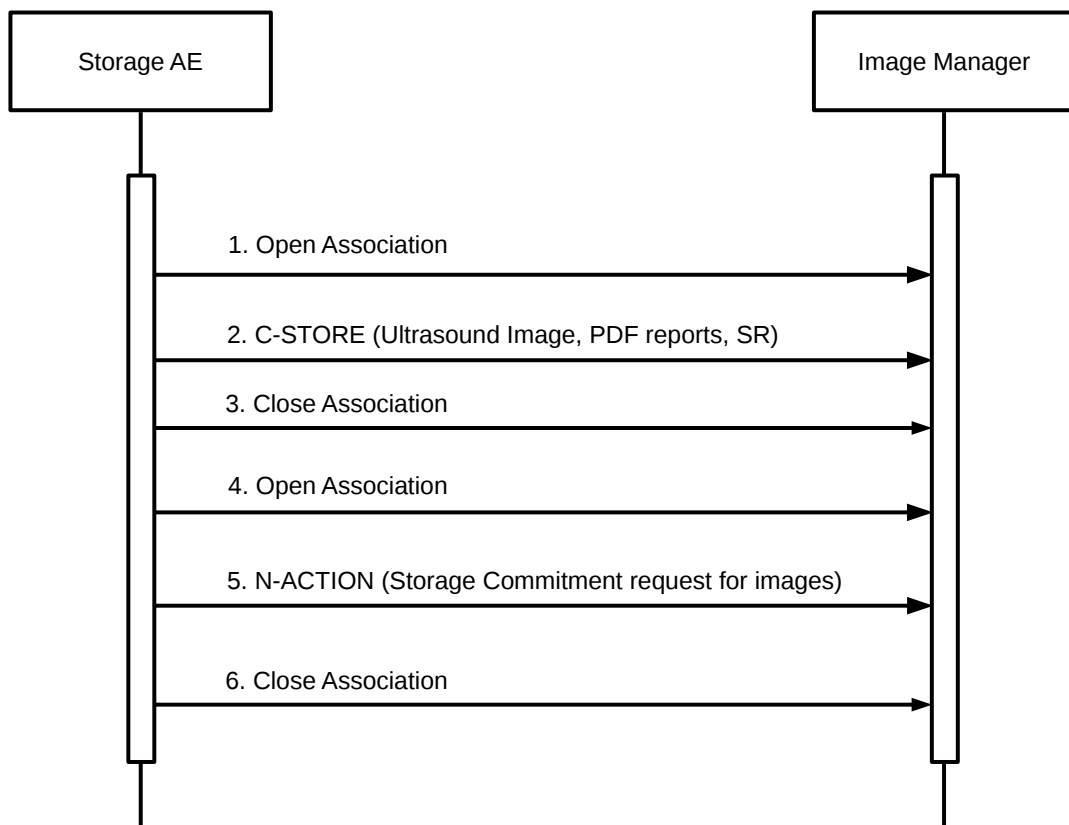


Figure 3.2.1: *Sequencing of Activity - Send Images*

- If an image is encoded, its corresponding native transfer syntax is also proposed, and will be preferred by the SCU if both compressed and uncompressed transfer syntaxes are accepted by the SCP,
- If the SCP does not accept encoded transfer syntaxes, SuperSonic Mach 40 will uncompress the related images on the fly.

The DICOM images created by SuperSonic Mach 40 conform to the DICOM IOD definitions (Standard extended IODs). They may contain some additional private elements (see Annex B). The DICOM Encapsulated PDF instances created by SuperSonic Mach 40 conform to the DICOM Encapsulated PDF IOD (Standard extended IODs). They may contain some additional private elements (see Annex B).

The Structured Report instances created by SuperSonic Mach 40 conform to the Comprehensive Structured Report IOD (Standard extended IODs). They may contain some additional private elements (see Annex B).

Structure of created instances is described in Annex A.1.

The behavior of Storage AE when encountering status codes in a C-STORE response is summarized in the Table 3.9. A failed Job will be automatically restarted. The delay between resending failed jobs and the number of retries is configurable. If a job keeps failing and reach the number of retries then it will be reschedule at the end of the queue.

The behavior of Storage AE during communication failure is summarized in the Table 3.10.

3.2.1.3.4 SOP Specific Conformance for Storage Commitment SOP Class

3.2.1.3.4.1 Storage Commitment Operations (N-ACTION)

The Storage AE will request storage commitment for encapsulated PDF, US single and multi-frame images and Structured Reports if the Remote AE is configured as an archive device with storage commitment facilities and a presentation context for the Storage Commitment Push Model has been accepted. The Storage AE will consider that encapsulated PDF, or US single and multi frame images or Structured Reports are not committed until a N-EVENT-REPORT is received for the Transaction UID. The number of committed files per exam is available in “Patient Directory”’s window. The Storage AE does not send the optional Storage Media FileSet ID & UID attributes or the Referenced Study Component Sequence Attribute in the N-ACTION. The behavior of Storage AE when encountering status codes in a N-ACTION response is summarized in Table 3.11.

The behavior of Storage AE during communication failure is summarized in Table 3.12.

3.2.1.3.4.2 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage AE is capable of receiving a N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push Model. However,

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|--|------------------------|---|
| Success | Success | 0000 | The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete. |
| Error | Refused: Out of Resource | A700-A7FF | The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure. |
| | Data Set does not match SOP Class | A900-A9FF | The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. |
| | Cannot Understand | C000-CFFF | The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. |
| Warning | Coercion of Data elements | B000 | Image transmission is considered successful but the status meaning is logged. |
| | Elements Data Set does not match SOP Class | B007 | Image transmission is considered successful but the status meaning is logged. |
| | Elements Discarded | B006 | Image transmission is considered successful but the status meaning is logged. |
| * | * | Any other status code. | The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application. |

Table 3.9: Storage C-STORE response Status Handling Behavior

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control interface. |
| Association aborted by the SCP or network layers | The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control interface. |

Table 3.10: *Storage Communication Failure Behavior*

| Service Status | Further Meaning | Error Code | Behavior |
|-----------------------|------------------------|------------------------|---|
| Success | Success | 0000 | The request for storage commitment is considered successfully sent. |
| * | * | Any other status code. | The Association is aborted using A-ABORT and the request for storage commitment is marked as failed. The status meaning is logged and reported to the user. |

Table 3.11: *Storage Commitment N-ACTION Response Status Handling Behavior*

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application. |
| Association aborted by the SCP or network layers | The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application. |

Table 3.12: *Storage Commitment Communication Failure Behavior*

such notifications are never expected on the same association as the one used to convey the N-ACTION request. The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 3.13.

| Event Type Name | Event Type ID | Behavior |
|--|----------------------|---|
| Storage Commitment Request Successful | 1 | The Referenced SOP Instances under Referenced SOP Sequence (0008,1199) are marked within the database and PDE window as “Committed” Successfully. Studies with all their instances marked as “Committed” are candidates for “Automatic Deletion after Commit” from the local database. Studies will not be deleted if they are marked with a lock flag. |
| Storage Commitment Request Complete-Failures Exist | 2 | The Referenced SOP Instances under Referenced SOP Sequence (0008,1199) are treated in the same way as in the success case (Event Type 1). The Referenced SOP Instances under Failed SOP Sequence (0008,1198) are marked within the database as “Not Committed”. The Failure Reasons are logged and the job failure is reported to the user via the job control application. A send job that failed storage commitment will not be automatically restarted but can be restarted by user interaction. |

Table 3.13: *Storage Commitment N-EVENT-REPORT behavior*

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table 3.14.

3.2.1.4 Association Acceptance Policy

3.2.1.4.1 Activity - Receive Storage Commitment Response

3.2.1.4.1.1 Description and Sequencing of Activities

When the Storage AE has sent its storage commitment N-ACTION messages to a server, it expects to be notified of responses by N-EVENT-REPORT messages on separate associations. A possible sequence of interactions between Storage AE and an Image Manager is illustrated in Figure 3.2.2.

1. The Image Manager opens an association with Storage AE,
2. The Image Manager send the Storage Commitment responses,

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

Table 3.14: *Storage Commitment N-EVENT-REPORT Response Status Reasons*

3. The Images manager closes the association with the Storage AE.

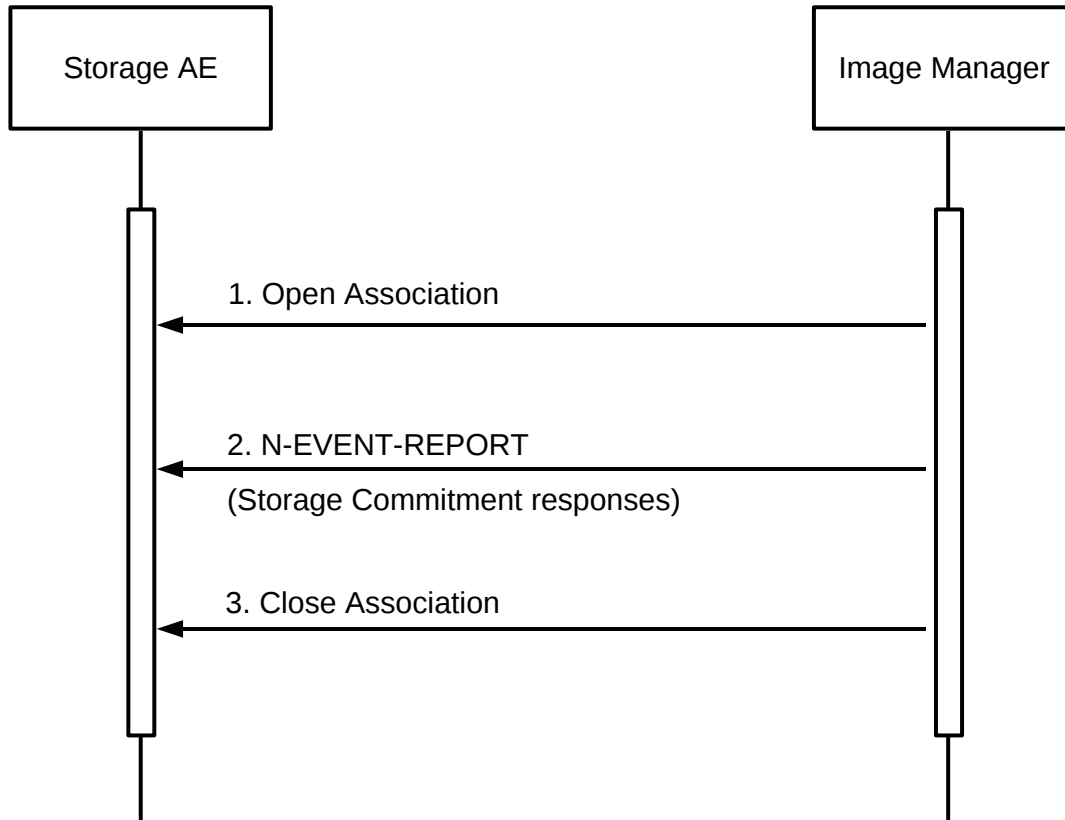


Figure 3.2.2: *Sequencing of Activity - Receive Storage Commitment Response*

The Storage AE may reject association attempts as shown in Table 3.15. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU (see PS 3.8, Section 9.3.4). The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are:

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

3.2.1.4.1.2 Accepted Presentation Contexts

The Storage AE will accept Presentation Contexts as shown in Table 3.16.

| Result | Source | Reason/Diag | Explanation |
|----------------------|--------|--|--|
| 2-rejected-transient | c | temporary congestion | No association can be accepted at this time because insufficient resources are available (e.g. memory, processes, threads). An association request with the same parameters may succeed at a later time. |
| 1-rejected-permanent | a | 2 - application-context-name-not-supported | The association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time. |
| 1-rejected-permanent | b | 1-no-reason-given | The association request could not be parsed. An association request with the same format will not succeed at a later time. |

Table 3.15: Association Rejection Reasons

| Presentation Context Table | | | | | |
|-------------------------------|----------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| 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 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |
| Verification SOP Class | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |

Table 3.16: Acceptable Presentation Contexts for Activity Receive Storage Commitment Response

3.2.1.4.1.3 SOP Specific Conformance for Storage Commitment SOP Class

3.2.1.4.1.3.1. Storage Commitment Notifications (N-EVENT-REPORT)

Upon receipt of a N-EVENT-REPORT the exam status in the Patient Directory associated with the Transaction UID will be updated.

The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 3.13.

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in Table 3.14.

3.2.1.4.1.3.2. SOP Specific Conformance for Verification SOP Class

The Storage AE provides standard conformance to the Verification SOP Class as a SCP. If the C-ECHO request was successfully received, a 0000 (Success) status code will be returned in the C-ECHO response. Otherwise, a C000 (Error-Cannot Understand) status code will be returned in the C-ECHO response.

3.2.2 Workflow Application Entity Specification

3.2.2.1 SOP Classes

The Workflow AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.17.

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

Table 3.17: *SOP Classes for AE Workflow*

3.2.2.2 Association Policies

3.2.2.2.1 General

As illustrated in Table 3.18, the DICOM 3.0 standard Application context is always specified for each association.

3.2.2.2.2 Number of Associations

The Workflow AE may initiate two Associations at a time (see Table 3.19) :

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

Table 3.18: DICOM Application Context for Workflow AE

- One Worklist request,
- One association at a time for a Performed Procedure Step transfer request.

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

Table 3.19: Number of Associations as an Association Initiator for Workflow AE

3.2.2.2.3 Asynchronous Nature

As illustrated in Table 3.20, the Workflow AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

| | |
|---|---|
| Maximum number of outstanding asynchronous transactions | 0 |
|---|---|

Table 3.20: Asynchronous Nature as an Association Initiator for Workflow AE

3.2.2.2.4 Implementation Identifying Information

The implementation information for the Workflow Application Entity is described in Table 3.21.

3.2.2.3 Association Initiation Policy

3.2.2.3.1 Activity - Refresh Worklist

3.2.2.3.1.1 Description and Sequencing of Activity

The request for a Worklist Update is initiated by user interaction, *i.e.* pressing the buttons “Update Worklist” or automatically at specific time intervals, configurable by the user. All Modality Worklist operations are performed synchronously and SuperSonic Mach 40 always requests all items. The Broad queries are performed using any combination (7) of the following attributes: Scheduled Station AE Title (actual AET used), Scheduled Procedure Step Start Date (any date or From: today, yesterday, last two days , last seven days To: today, tomorrow, next 2 days, next 7 days), Modality (US, MG, GR, MR, CT, MN, DX, XA, RF) are configurable by a

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation Version Name | SSI_DCMTK_364 |

Table 3.21: DICOM Implementation Class and Version for Workflow AE

Service Engineer.

The Patient Based query are performed using any combination (15) of the following attributes: Patient’s Name, Patient ID, Accession Number, Requested Procedure ID. Some optional attributes can also be specified: exam date, patient’s birth date, and gender.(Note that matching on those fields is not always supported by Work SCP).

To protect the system from overflow, SuperSonic Mach 40 can be configured to limit the number of processed Worklist responses to a configurable maximum.

For each basic query of a remote application entity for a Modality Worklist list of items, SuperSonic Mach 40 will initiate an association, send a C-FIND request command, wait in blocking mode for all C-FIND responses, and then release the association. A possible sequence of interactions between the Workflow AE and a Departmental Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as a SCP) is illustrated in Figure 3.2.3 :

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

3.2.2.3.1.2 Proposed Presentation Contexts

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by SuperSonic Mach 40 for a C-Find service are defined in Table 3.22.

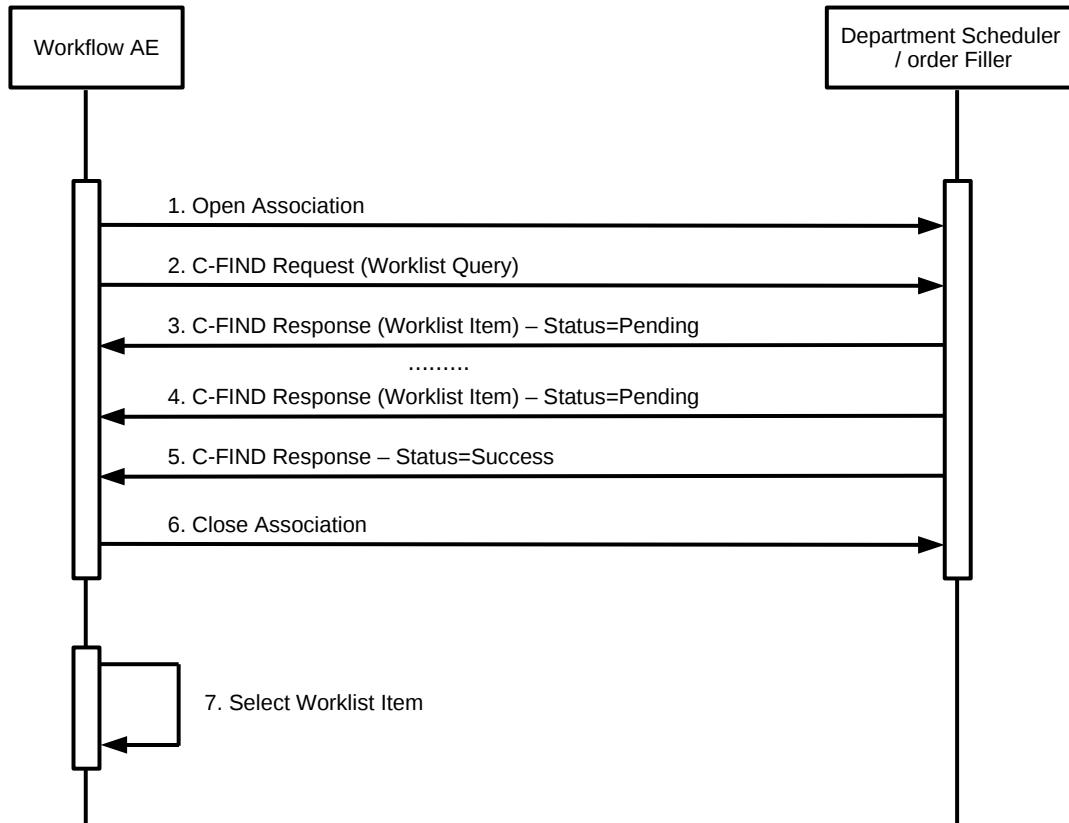


Figure 3.2.3: Sequencing of Activity - Worklist SCU

| Presentation Context Table | | | | | |
|-------------------------------------|------------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Modality Worklist Information Model | 1.2.840.10008.5.1.4.31 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.22: Proposed Presentation Contexts for Workflow AE and Worklist SCU Activity

3.2.2.3.1.3 Specific Conformance for Worklist Management SOP Class

The behavior of SuperSonic Mach 40 when encountering status codes in a Modality Worklist C-FIND response is summarized in Table 3.23. If any other SCP response status than “Success” or “Pending” is received by SuperSonic Mach 40, a notification will appear on the user interface.

The behavior of SuperSonic Mach 40 during communication failure is summarized in Table 3.24.

Acquired images will always¹ use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally. Table 3.25 below provides a description of SuperSonic Mach 40 Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored. Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored. No attempt is made to filter out possible duplicate entries.

| Module Name Attribute Name | Tag | VR | VM | M | R | Q | D | IOD |
|---|-------------|----|-----|---|---|---|---|-----|
| SOP Common | | | | | | | | |
| Specific Character Set | (0008,0005) | CS | 1-n | | x | | | |
| Scheduled Procedure Step | | | | | | | | |
| Scheduled Procedure Step Sequence | (0040,0100) | SQ | 1 | | x | | | |
| > Scheduled Station AET | (0040,0001) | AE | 1-n | S | | | x | |
| > Scheduled Procedure Step Start Date | (0040,0002) | DA | 1 | R | | | x | |
| > Scheduled Procedure Step Start Time | (0040,0003) | TM | 1 | | x | | x | |
| > Scheduled Procedure Step End Date | (0040,0004) | DA | 1 | | x | | x | |
| > Scheduled Procedure Step End Time | (0040,0005) | TM | 1 | | x | | x | |
| > Modality | (0008,0060) | CS | 1 | S | x | | x | x |
| > Scheduled Performing Physician's Name | (0040,0006) | PN | 1 | | x | | x | x |
| > Scheduled Procedure Step Description | (0040,0007) | LO | 1 | | x | | x | x |
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | 1-n | | x | | x | x |
| >> Code Value | (0008,0100) | SH | 1 | | x | | x | x |
| >> Coding Scheme Designator | (0008,0102) | SH | 1 | | x | | x | x |
| >> Coding Scheme Version | (0008,0103) | SH | 1 | | x | | x | x |
| >> Code Meaning | (0008,0104) | LO | 1 | | x | | x | x |
| > Pre-Medication | (0040,0012) | LO | 1 | | x | | x | |
| > Scheduled Procedure Step ID | (0040,0009) | SH | 1 | | x | | x | x |
| > Scheduled Station Name | (0040,0010) | SH | 1 | | x | | x | x |
| > Scheduled Procedure Step Location | (0040,0011) | SH | 1 | | x | | x | x |

¹Except if UID is not valid or DICOM administrator setting forced.

| | | | | | | | | |
|---|-------------|----|-----|--|---|--|---|---|
| > Requested Contrast Agent | (0032,1070) | LO | 1 | | x | | x | |
| > Scheduled Procedure Step status | (0040,0020) | CS | 1 | | x | | x | |
| > Comments on the Scheduled Procedure Step | (0040,0400) | LT | 1 | | x | | x | |
| Requested Procedure | | | | | | | | |
| Requested Procedure ID | (0040,1001) | SH | 1 | | x | | x | x |
| Requested Procedure Description | (0032,1060) | LO | 1 | | x | | x | x |
| Reason for the Requested Procedure | (0040,1002) | LO | 1 | | x | | x | |
| Requested Procedure Location | (0040,1005) | LO | 1 | | x | | x | x |
| Study Instance UID | (0020,000D) | UI | 1 | | x | | x | x |
| Study Date | (0008,0020) | DA | 1 | | x | | x | x |
| Study Time | (0008,0030) | TM | 1 | | x | | x | x |
| Referenced Study Sequence | (0008,1110) | SQ | 1 | | x | | x | x |
| > Referenced SOP Class UID | (0008,1150) | UI | 1 | | x | | x | x |
| > Referenced SOP Instance UID | (0008,1155) | UI | 1 | | x | | x | x |
| Requested Procedure Priority | (0040,1003) | SH | 1 | | x | | x | |
| Patient Transport Arrangements | (0040,1004) | LO | 1 | | x | | x | |
| Requested Procedure Code Sequence | (0032,1064) | SQ | 1 | | x | | x | x |
| > Code Value | (0008,0100) | SH | 1 | | x | | x | x |
| > Coding Scheme Designator | (0008,0102) | SH | 1 | | x | | x | x |
| > Coding Scheme Version | (0008,0103) | SH | 1 | | x | | x | x |
| > Code Meaning | (0008,0104) | LO | 1 | | x | | x | x |
| Names of Intended Recipients of Results | (0040,1010) | PN | 1-n | | x | | x | x |
| Requested Procedure Comments | (0040,1400) | LT | 1 | | x | | x | x |
| Imaging Service Request | | | | | | | | |
| Accession Number | (0008,0050) | SH | 1 | | x | | x | x |
| Issuer of Accession Number Sequence | (0008,0051) | SQ | 1 | | x | | | x |
| > Local Namespace Entity ID | (0040,0031) | UT | 1 | | x | | | x |
| > Universal Entity ID | (0040,0032) | UT | 1 | | x | | | x |
| > Universal Entity ID Type | (0040,0033) | CS | 1 | | x | | | x |
| Requesting Physician | (0032,1032) | PN | 1 | | x | | x | x |
| Referring Physician's Name | (0008,0090) | PN | 1 | | x | | x | x |
| Requesting Service | (0032,1033) | LO | 1 | | x | | x | |
| Imaging Service Request Comments | (0040,2400) | LT | 1 | | x | | x | |
| Placer Order Number/Imaging Service Request | (0040,2016) | LO | 1 | | x | | x | |
| Visit Identification | | | | | | | | |
| Admission ID | (0038,0010) | LO | 1 | | x | | x | |
| Visit Status | | | | | | | | |
| Current Patient Location | (0038,0300) | LO | 1 | | x | | x | |
| Visit Relationship | | | | | | | | |

| | | | | | | | | |
|--|-------------|----|-----|---|---|--|---|---|
| Referenced Patient Sequence | (0008,1120) | SQ | 1 | | x | | x | x |
| > Referenced SOP Class UID | (0008,1150) | UI | 1 | | x | | x | x |
| > Referenced SOP Instance UID | (0008,1155) | UI | 1 | | x | | x | x |
| Patient Identification | | | | | | | | |
| Patient Name | (0010,0010) | PN | 1 | * | x | | x | x |
| Patient ID | (0010,0020) | LO | 1 | | x | | x | x |
| Issuer of Patient ID | (0010,0021) | LO | 1 | | x | | x | x |
| Issuer of Patient ID Qualifiers Sequence | (0010,0024) | SQ | 1 | | x | | | x |
| > Universal Entity ID | (0040,0032) | UT | 1 | | x | | | x |
| > Universal Entity ID Type | (0040,0033) | CS | 1 | | x | | | x |
| Other Patient IDs Sequence | (0010,1000) | SQ | 1 | | x | | | x |
| > Patient ID | (0010,0020) | LO | 1 | | x | | x | x |
| > Issuer Of Patient ID | (0010,0021) | LO | 1 | | x | | | x |
| > Type Of Patient ID | (0010,0022) | CS | 1 | | x | | | x |
| Patient Demographic | | | | | | | | |
| Patient's Birth Date | (0010,0030) | DA | 1 | | x | | x | x |
| Patient's Birth time | (0010,0032) | TM | 1 | | x | | x | x |
| Patient's Sex | (0010,0040) | CS | 1 | | x | | x | x |
| Patient's Weight | (0010,1030) | DS | 1 | | x | | x | x |
| Patient's Size | (0010,1020) | DS | 1 | | x | | x | x |
| Confidentiality Constraint On patient Data Description | (0040,3001) | LO | 1 | | x | | x | |
| Patient comments | (0010,4000) | LT | 1 | | x | | x | x |
| Ethnic Group | (0010,2160) | SH | 1 | | x | | x | x |
| Patient Medical | | | | | | | | |
| Patient State | (0038,0500) | LO | 1 | | x | | x | |
| Pregnancy Status | (0010,21C0) | US | 1 | | x | | x | |
| Medical Alerts | (0010,2000) | LO | 1-n | | x | | x | |
| Allergies | (0010,2110) | LO | 1-n | | x | | x | |
| Special Needs | (0038,0050) | LO | 1 | | x | | x | |
| Additional patient History | (0010,21B0) | LT | 1 | | x | | x | |
| Last Menstrual Date | (0010,21D0) | DA | 1 | | x | | x | |

Table 3.25: Worklist Request Identifier

Table 3.25 should be read as follows:

- Module Name: The name of the associated module for supported worklist attributes.
 Attribute Name: Attributes supported to build an SuperSonic Mach 40 Worklist Request Identifier.
 Tag: DICOM tag for this attribute.
 VR: DICOM VR for this attribute.

| | |
|------|---|
| VM: | DICOM VM for this attribute. |
| M: | Matching keys for Worklist Update. A “S” will indicate that SuperSonic Mach 40 will supply an attribute value for Single Value Matching, a “R” will indicate Range Matching and a “*” will denote wildcard matching. |
| R: | Return keys. An “x” will indicate that SuperSonic Mach 40 will supply this attribute as Return Key with zero length for Universal Matching. The SuperSonic Mach 40 will support retired date format (yyyy.mm.dd) for “Patient’s Birth Date” and “Scheduled Procedure Step Start Date” in the response identifiers. For “Scheduled Procedure Step Start Time” also retired time format as well as unspecified time components are supported. |
| Q: | Interactive Query Key. |
| D: | Displayed keys. An “x” indicates that this Worklist attribute is displayed to the user during a patient registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination. |
| IOD: | An “x” indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step. |

The default Query Configuration is set to all Worklist items. Optionally, additional matching for the own AET, US modality², and a period of time is configurable.

3.2.2.3.2 Activity - Acquire images

3.2.2.3.2.1 Description and Sequencing of Activities

After Patient registration, SuperSonic Mach 40 is awaiting the first image acquisition. The trigger to create a MPPS SOP Instance is derived from this event. An Association to the configured MPPS SCP system is established immediately and the related MPPS SOP Instance will be created. The final state of the MPPS is automatically set to:

- “COMPLETED” when user close the exam by either pressing the “End of Exam” button on the control panel or by pressing “new patient” on the touch screen.
- “DISCONTINUED” when user press the “Cancel Exam” button on the touch screen. In the “Discontinued” case, the discontinuation reason is automatically set to “Doctor cancel procedure”.

SuperSonic Mach 40 only supports a 0-to-1 relationship between Scheduled and Performed Procedure Steps. SuperSonic Mach 40 initiates an Association to issue both :

²Modality value can be adjusted by a DICOM administrator

| Service Status | Further Meaning | Error Code | Behavior |
|-----------------------|--|------------------------|--|
| Success | Success | 0000 | The SCP has completed the matches. Worklist items are available for display or further processing. |
| Failed | Refused: Out of Resource | A700 | The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response will be logged. |
| | Identifier does not match SOP Class | A900 | The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user. |
| | Unable to Process | CFFF | The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user. |
| Cancel | Matching terminated due to Cancel request | FE00 | If the query was canceled due to too many Worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged. |
| Pending | Matches are continuing | FF00 | The Worklist item contained in the Identifier is collected for later display. |
| | Matches are continuing – Warning that one or more Optional Keys were not supported | FF01 | The Worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation. |
| * | * | Any other status code. | The Association is aborted using A-ABORT and the Worklist is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response will be logged. |

Table 3.23: Modality Worklist C-FIND response status handling behavior

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and the Worklist query marked as failed. The reason is logged and reported to the user if an interactive query. |
| Association aborted by the SCP or network layers | The Worklist query is marked as failed. The reason is logged and reported to the user. |

Table 3.24: *Modality Worklist Communication Failure Behavior*

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

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 a SCP) is illustrated in Figure 3.2.4:

1. The Workflow AE opens an association with the Departmental Scheduler;
2. The Workflow AE sends a N-CREATE request to the Departmental Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Departmental Scheduler acknowledges the MPPS creation with a N-CREATE response (status success);
3. The Workflow AE closes the association with the Departmental Scheduler;
4. All images are acquired and stored in the local database;
5. The Workflow AE opens an association with the Departmental Scheduler;
6. The Workflow AE sends a N-SET request to the Departmental Scheduler to update the MPPS instance with status of “COMPLETED” and set all necessary attributes. The Departmental Scheduler acknowledges the MPPS update with a N-SET response (status success);
7. The Workflow AE closes the association with the Departmental Scheduler.

3.2.2.3.2.2 Proposed Presentation Contexts

The Workflow AE will propose Presentation Contexts as shown in Table 3.27.

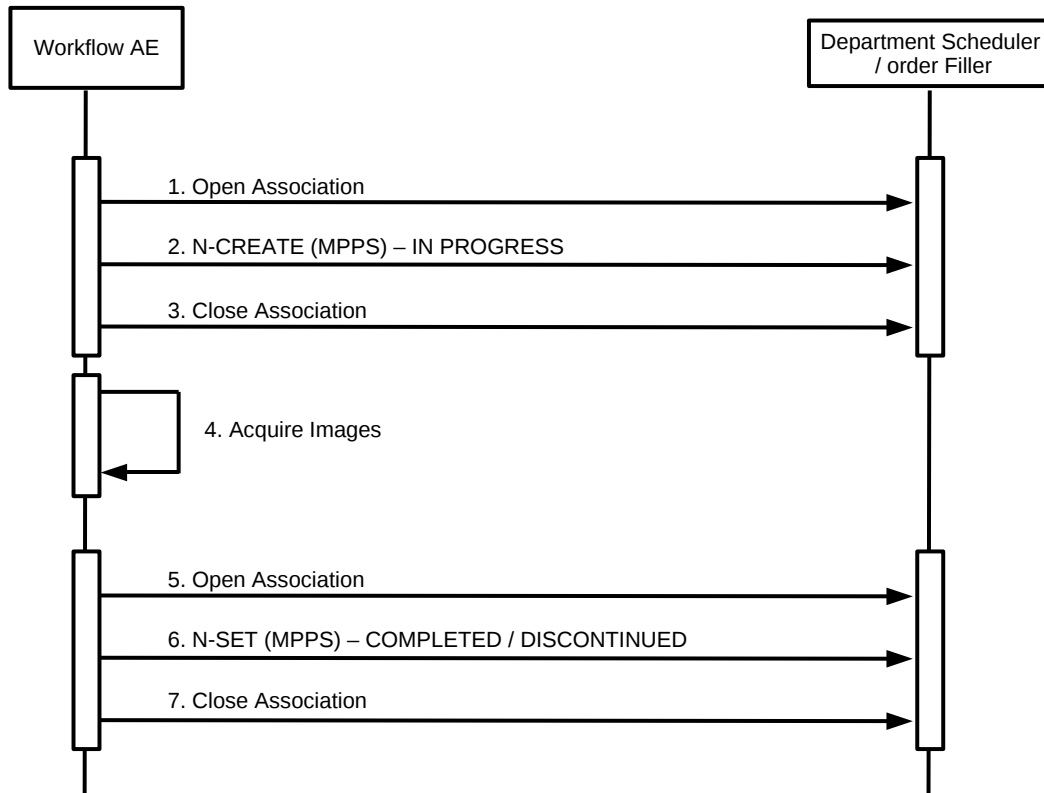


Figure 3.2.4: Sequencing of Activity - MPPS SCU

| Presentation Context Table | | | | | |
|----------------------------|-------------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Modality | 1.2.840.10008.3.1.2.3.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| Performed | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| Procedure Step | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.27: Proposed Presentation Contexts for Workflow AE and MPPS SCU Activity

3.2.2.3.2.3 Specific Conformance for MPPS SOP Class

The behavior of SuperSonic Mach 40 when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in Table 3.28. If any other SCP response status than “Success” or “Warning” is received by SuperSonic Mach 40, a notification will appear on the user interface.

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|---|------------------------|---|
| Success | Success | 0000 | The SCP has completed the operation successfully. |
| Failure | Processing Failure – Performed Procedure Step Object may no longer be updated | 0110 | The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. |
| Warning | Attribute Value Out of Range | 0116H | The MPPS operation is considered successful but the status meaning is logged. |
| * | * | Any other status code. | The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. |

Table 3.28: MPPS N-CREATE / N-SET Response Status Handling Behavior

The behavior of Workflow AE during communication failure is summarized in Table 3.29.

| Exception | Behavior |
|--|--|
| Timeout | The Association is aborted using A-ABORT and MPPS marked as failed. The reason is logged and reported to the user. |
| Association aborted by the SCP or network layers | The MPPS is marked as failed. The reason is logged and reported to the user. |

Table 3.29: MPPS Communication Failure Behavior

Table 3.30 provides a description of the MPPS N-CREATE and N-SET request identifiers sent by SuperSonic Mach 40. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

| Attribute Name | Tag | VR | N-CREATE | N-SET |
|---|-------------|----|--|---------------|
| Specific Character set | (0008,0005) | CS | see Table 5.1 | see Table 5.1 |
| Performed Procedure Step Relationship | | | | |
| Scheduled Step Attributes Sequence | (0040,0270) | SQ | Always present | |
| > Study Instance UID | (0020,000D) | UI | From Modality Worklist | |
| > Referenced Study Sequence | (0008,1110) | SQ | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| > > Referenced SOP Class UID | (0008,1150) | UI | From Modality Worklist | |
| > > Referenced SOP Instance UID | (0008,1155) | UI | From Modality Worklist | |
| > Accession Number | (0008,0050) | SH | From Modality Worklist or user input. The user can't modify values provided via Modality Worklist. | |
| > Issuer of Accession Number Sequence | (0008,0051) | SQ | From Modality Worklist or absent. The user can't modify values provided via Modality Worklist. | |
| >> Local Namespace Entity ID | (0040,0031) | UT | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| >> Universal Entity ID | (0040,0032) | UT | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| >> Universal Entity ID Type | (0040,0033) | CS | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| > Placer Order Number / Imaging Service Request | (0040,2016) | SH | From Modality Worklist or absent. The user can't modify values provided via Modality Worklist. | |
| > Requested Procedure ID | (0040,1001) | SH | From Modality Worklist | |

| | | | | |
|--|-------------|----|--|--|
| > Requested Procedure Code Sequence | (0032,1064) | SQ | From Modality Worklist | |
| > Requested Procedure Description | (0032,1060) | LO | From Modality Worklist | |
| > Scheduled Procedure Step ID | (0040,0009) | SH | From Modality Worklist | |
| > Scheduled Procedure Step Description | (0040,0007) | LO | From Modality Worklist | |
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | From Modality Worklist | |
| Patient's Name | (0010,0010) | PN | From Modality Worklist or user input. The user can't modify values provided via Modality Worklist. | |
| Patient ID | (0010,0020) | LO | From Modality Worklist or user input. The user can't modify values provided via Modality Worklist. | |
| Issuer Of Patient ID | (0010,0021) | LO | From Modality Worklist or empty. The user can't modify values provided via Modality Worklist. | |
| Issuer of Patient ID Qualifiers Sequence | (0010,0024) | SQ | From Modality Worklist or not send. The user can't modify values provided via Modality Worklist. | |
| > Universal Entity ID | (0040,0032) | UT | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| > Universal Entity ID Type | (0040,0033) | UT | From Modality Worklist. The user can't modify values provided via Modality Worklist. | |
| Patient's Birth Date | (0010,0030) | DA | From Modality Worklist or user input. The user can modify values provided via Modality Worklist. | |

| | | | | |
|---|-------------|----|---|---------------------------|
| Patient's Sex | (0010,0040) | CS | From Modality Worklist or user input. The user can modify values provided via Modality Worklist. | |
| Referenced Patient Sequence | (0008,1120) | SQ | From Modality Worklist or zero length. The user can modify values provided via Modality Worklist. | |
| Admission ID | (0038,0010) | LO | From Modality Worklist. | |
| Performed Procedure Step Information | | | | |
| Performed Procedure Step ID | (0040,0253) | SH | Automatically created but can be modified by the user. From Modality Worklist or user input. | |
| Performed Station AE Title | (0040,0241) | AE | SuperSonic Mach 40 AE Title | |
| Performed Station Name | (0040,0242) | SH | From configuration | |
| Performed Location | (0040,0243) | SH | From configuration | |
| Performed Procedure Step Start Date | (0040,0244) | DA | Actual start date | |
| Performed Procedure Step Start Time | (0040,0245) | TM | Actual start time | |
| Performed Procedure Step Description | (0040,0254) | LO | Use Study Description Value. | |
| Performed Procedure Type Description | (0040,0255) | LO | Zero length | |
| Procedure Code Sequence | (0008,1032) | SQ | Copy from Requested Code Sequence (0032,1064) | |
| 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 | DISCONTINUED or COMPLETED |
| Comments On The Performed Procedure Step | 0040,0280 | ST | Copy from Comments on the Scheduled Procedure Step (0040,0400) if provided by Modality Worklist. | |

| | | | | |
|---|-------------|----|--|--|
| Performed Procedure Step Discontinuation Reason Code Sequence | (0040,0281) | SQ | Zero length | If Performed Procedure Step Status (0040,0252) is “DISCONTINUED” then a single item will be present containing an entry drawn from Context Group 9300. |
| Image Acquisition Results | | | | |
| Modality | (0008,0060) | CS | US | |
| Study ID | (0020,0010) | SH | From Modality Worklist or From Modality Worklist or user input. The user can modify values provided via Modality Worklist. | |
| Performed Protocol Code Sequence | (0040,0260) | SQ | Zero length | |
| Performed Series Sequence | (0040,0340) | SQ | Zero length | Present |
| > Performing Physician’s Name | (0008,1050) | PN | | From Modality Worklist or user input. The user can’t modify values provided via Modality Worklist. |
| > Operator’s Name | (0008,1070) | PN | | From Modality Worklist or user input. The user can’t modify values provided via Modality Worklist. |
| > Protocol Name | (0018,1030) | LO | | “Free From” |
| > Series Instance UID | (0020,000E) | UI | | x |
| > Series Description | (0008,103E) | LO | | x |
| > Retrieve AE Title | (0008,0054) | AE | | From Configuration |
| > Archive Requested | (0040,A494) | CS | | x |
| > Referenced Image Sequence | (0008,1140) | SQ | | One or more items |
| > > Referenced SOP Class UID | (0008,1150) | UI | | x |
| > > Referenced SOP Instance UID | (0008,1155) | UI | | x |

| | | | | |
|--|-------------|----|--|------------------|
| > Referenced Non Image Composite SOP Instance Sequence | (0008,1140) | SQ | | Zero or One item |
| > > Referenced SOP Class UID | (0008,1150) | UI | | x |
| > > Referenced SOP Instance UID | (0008,1155) | UI | | x |

Table 3.30: *MPPS N-Create / N-Set Request Identifier*

3.2.2.4 Association Acceptance Policy

The Workflow AE does not accept Associations.

3.2.3 Hardcopy Application Entity Specification

3.2.3.1 SOP Classes

The Hardcopy AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.31.

3.2.3.2 Association Policies

3.2.3.2.1 General

As illustrated in Table 3.32, the DICOM 3.0 standard Application context is always specified for each association.

3.2.3.2.2 Number of Associations

Hardcopy AE may initiates 1 Association at a time (see Table 3.33).

3.2.3.2.3 Asynchronous Nature

As illusted in Table 3.34, Hardcopy AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

3.2.3.2.4 Implementation Identifying Information

The implementation information for the Hardcopy Application Entity is described in Table 3.35.

3.2.3.3 Association Initiation Policy

3.2.3.3.1 Activity - print images

| SOP Class Name | SOP Class UID | SCU | SCP |
|--|-------------------------|-----|-----|
| Supported Meta SOP Classes for Basic Print Service | | | |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 | Yes | No |
| Basic Color Print Management | 1.2.840.10008.5.1.1.18 | Yes | No |
| Supported SOP Classes for Basic Grayscale Print Service | | | |
| Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Yes | No |
| Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Yes | No |
| Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 | Yes | No |
| Printer SOP Class | 1.2.840.10008.5.1.1.16 | Yes | No |
| Supported SOP Classes for Basic Color Print Service | | | |
| Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Yes | No |
| Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Yes | No |
| Basic Color Image Box SOP Class | 1.2.840.10008.5.1.1.4.1 | Yes | No |
| Printer SOP Class | 1.2.840.10008.5.1.1.16 | Yes | No |

Table 3.31: SOP Classes for AE Hardcopy

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

Table 3.32: DICOM Application Context for Hardcopy AE

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

Table 3.33: Number of Associations as an Association Initiator for Hardcopy AE

| | |
|---|---|
| Maximum number of outstanding asynchronous transactions | 0 |
|---|---|

Table 3.34: Asynchronous Nature as an Association Initiator for Hardcopy AE

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation Version Name | SSI_DCMTK_364 |

Table 3.35: DICOM Implementation Class and Version for Hardcopy AE

3.2.3.3.1.1 Description and Sequencing of Activity

SuperSonic Mach 40 will initiate a separate association with a Print SCP for each print session. After an association has been accepted and is established, SuperSonic Mach 40 will send a print job to the Print Server. Each print job includes the following steps (see Figure 3.2.5):

- SuperSonic Mach 40 first performs a N-GET request to get Printer information;
- SuperSonic Mach 40 requests the server to a N-CREATE a film session SOP instance.

For each film to be printed:

- A N-CREATE request is performed to get a Film Box SOP instance;
- N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data;
- If no print collation is needed, a N-ACTION is requested for the Film Box instance;
- This causes the film to be printed;
- If print collation is requested, a N-ACTION is performed on the film session.

3.2.3.3.1.2 Proposed Presentation Contexts

SuperSonic Mach 40 will propose Presentation Contexts as shown in Table 3.36.

| Presentation Context Table | | | | | |
|--|------------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Basic Grayscale Print Management Meta SOP Class ¹ | 1.2.840.10008.5.1.1.9 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |
| Basic Color Print Management Meta SOP Class ¹ | 1.2.840.10008.5.1.1.18 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

¹Only one Abstract Syntax is proposed. Choice is achieved through configuration window.

Table 3.36: Proposed Presentation Contexts for Hardcopy AE and Print SCU Activity

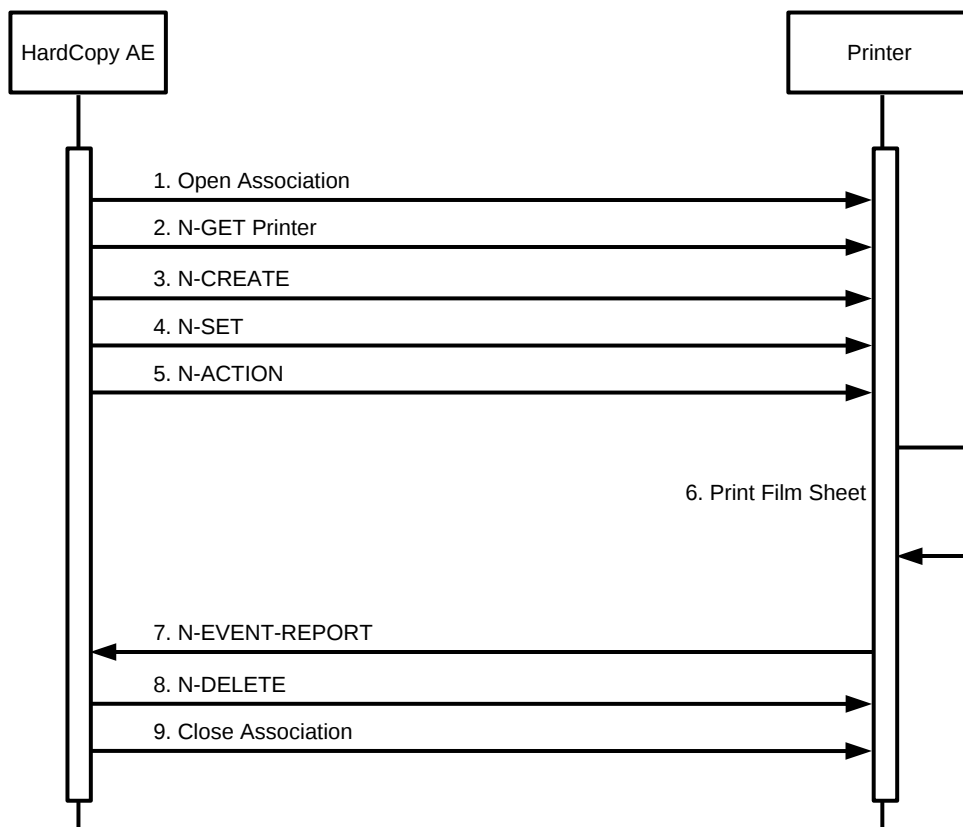


Figure 3.2.5: Sequencing of Activity - Print SCU

3.2.3.3.1.3 SOP Specific Conformance for Print SOP Class

If the DICOM Print software is unable to open an association with the selected destination AE, an error message displays in SuperSonic Mach 40. No message is displayed when successful printing operation responses are received. After an association has been accepted and is established, SuperSonic Mach 40 will send a print job to the Print Server. Each print job includes the following steps:

- SuperSonic Mach 40 first performs a N-GET request to get Printer information;
- SuperSonic Mach 40 requests the server to a N-CREATE a film session SOP instance;
- For each film to be printed:
 - A N-CREATE request is performed to get a Film Box SOP instance;
 - N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data;
 - If no print collation is needed, a N-ACTION is requested for the Film Box instance. This causes the film to be printed;
 - If print collation is requested, a N-ACTION is performed on the film session.

3.2.3.3.1.3.1. Basic Printer SOP Class

SuperSonic Mach 40 can send the following DIMSE commands to a Film Box: N-GET. N-GET is issued by SuperSonic Mach 40 to get Print information. However, this information is not used.

3.2.3.3.1.3.2. Basic Film Session SOP Class

SuperSonic Mach 40 can send the following DIMSE commands to a Film Session: N-CREATE, N-SET, N-ACTION, N-DELETE.

- N-CREATE is issued by SuperSonic Mach 40 to create a Film Session where film boxes will be created. (see Table 3.37):
- No N-SET is issued by SuperSonic Mach 40 to change Film Session attributes;
- N-ACTION is issued by SuperSonic Mach 40 to request printing of all Film Boxes in the Film Session;
- N-DELETE is issued by SuperSonic Mach 40 to request a Film Session deletion;

| Attribute Name | Tag ID | Value / Comment |
|--------------------|-------------|--|
| Number of Copies | (2000,0010) | Default is 1 |
| Print Priority | (2000,0020) | HIGH, MED, LOW. Default is MED |
| Medium Type | (2000,0030) | PAPER, BLUE FILM, CLEAR FILM or empty string. Default is paper |
| Film Destination | (2000,0040) | PROCESSOR or MAGAZINE. Default is MAGAZINE |
| Film Session Label | (2000,0050) | Configurable |

Table 3.37: *Basic Film Session SOP Class N-CREATE request attributes*

3.2.3.3.1.3.3. Basic Film Box SOP Class

SuperSonic Mach 40 can send the following DIMSE commands to a Film Box: N-CREATE, N-SET, N-ACTION, N-DELETE.

- N-CREATE is issued by SuperSonic Mach 40 to create a Film Box in a Film Session, where image boxes will be created (see Table 3.38);
- No N-SET is issued by SuperSonic Mach 40 to create/change Film Box attributes;
- N-ACTION is issued by SuperSonic Mach 40 to request printing of a Film Boxes;
- N-DELETE is issued by SuperSonic Mach 40 to request a Film Box deletion;

3.2.3.3.1.3.4. Basic Grayscale Image Box SOP Class

Basic Grayscale Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet. SuperSonic Mach 40 can send the following DIMSE commands to an Image Box: N-SET.

- N-SET is issued by SuperSonic Mach 40 to set change Image Box attributes. (see Table 3.39).

3.2.3.3.1.3.5. Basic Color Image Box SOP Class

Basic Color Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet. SuperSonic Mach 40 can send the following DIMSE commands to an Image Box: N-SET.

- N-SET is issued by SuperSonic Mach 40 to set change Image Box attributes. (see Table 3.40)

| Attribute Name | Tag ID | Value / Comment |
|----------------------------------|--------------|--|
| Image Display Format | (2010, 0010) | STANDARD |
| Film Orientation | (2010, 0030) | PORTRAIT or LANDSCAPE. Default is PORTRAIT. |
| Film Size ID | (2010, 0050) | 8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, A4 or A3. Not set if default. |
| Magnification Type | (2010, 0060) | NONE, REPLICATE, BILINEAR or CUBIC Not set if default. |
| Smoothing Type | (2010, 0080) | Not set if default. |
| Border Density | (2010, 0100) | BLACK, WHITE, Grayscale. Not set if default |
| Empty Image Density | (2010, 0110) | BLACK, WHITE, Grayscale. Not set if default |
| Min Density | (2010, 0120) | Not set |
| Max Density | (2010, 0130) | Not set |
| Trim | (2010, 0140) | Not set |
| Referenced Film Session Sequence | (2010, 0500) | |
| >Referenced SOP Class UID | (0008, 1150) | |
| >Referenced SOP Instance UID | (0008, 1155) | |

Table 3.38: Basic Film Box SOP Class N-CREATE attributes

| Attribute Name | Tag ID | Value / Comment |
|--------------------------------|--------------|---|
| Image Box Position | (2020, 0010) | 1 to <number of images in film box> |
| Polarity | (2020, 0020) | NORMAL or REVERSE. Not set if default |
| Basic Grayscale Image Sequence | (2020, 0110) | |
| >Samples Per Pixel | (0028, 0002) | 1 |
| >Photometric Interpretation | (0028, 0004) | MONOCHROME2 |
| >Rows | (0028, 0010) | at most 1080 (reduction may be applied) |
| >Columns | (0028, 0011) | at most 1440 (reduction may be applied) |
| >Pixel Aspect Ratio | (0028, 0034) | 1/1 |
| >Bits Allocated | (0028, 0100) | 8 |
| >Bits Stored | (0028, 0101) | 8 |
| >High Bit | (0028, 0102) | 7 |
| >Pixel Representation | (0028, 0103) | 0 |
| >Pixel Data | (7FE0, 0010) | |

Table 3.39: Basic Grayscale Image Box SOP Class Request attributes

| Attribute Name | Tag ID | Value / Comment |
|-----------------------------|--------------|---|
| Image Position | (2020, 0010) | 1 to <number of images in film box> |
| Polarity | (2020, 0020) | NORMAL or REVERSE. Not set if default. |
| Basic Color Image Sequence | (2020, 0110) | |
| >Samples Per Pixel | (0028, 0002) | 3 |
| >Photometric Interpretation | (0028, 0004) | RGB |
| >Planar Configuration | (0028, 0006) | 0 |
| >Rows | (0028, 0010) | at most 1080 (reduction may be applied) |
| >Columns | (0028, 0011) | at most 1440 (reduction may be applied) |
| >Pixel Aspect Ratio | (0028, 0034) | 1/1 |
| >Bits Allocated | (0028, 0100) | 8 |
| >Bits Stored | (0028, 0101) | 8 |
| >High Bit | (0028, 0102) | 7 |
| >Pixel Representation | (0028, 0103) | 0 |
| >Pixel Data | (7FE0, 0010) | |

Table 3.40: Basic Color Image Box SOP Class Request attributes

3.2.4 Verification Application Entity Specification

3.2.4.1 SOP Classes

The Verification AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.41.

| SOP Class Name | SOP Class UID | SCU | SCP |
|----------------|-------------------|-----|-----|
| Verification | 1.2.840.10008.1.1 | Yes | No |

Table 3.41: *SOP Classes for AE Verification*

3.2.4.2 Association Policies

3.2.4.2.1 General

As illustrated in Table 3.42, the DICOM 3.0 standard Application context is always specified for each association.

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

Table 3.42: *DICOM Application Context for Verification AE*

3.2.4.2.2 Number of Associations

Verification AE may initiates 1 Association at a time (see Table 3.43).

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

Table 3.43: *Number of Associations as an Association Initiator for Verification AE*

3.2.4.2.3 Asynchronous Nature

As illustrated in Table 3.44, Verification AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

3.2.4.2.4 Implementation Identifying Information

The implementation information for the Verification Application Entity is described in Table 3.45.

| | |
|---|---|
| Maximum number of outstanding asynchronous transactions | 0 |
|---|---|

Table 3.44: *Asynchronous Nature as an Association Initiator for Verification AE*

| Implementation Class UID | Implementation Version Name |
|------------------------------------|-----------------------------|
| 1.2.250.1.204.0.1.20120820.0.3.6.4 | SSI_DCMTK_364 |

Table 3.45: *DICOM Implementation Class and Version for Verification AE*

3.2.4.3 Association Initiation Policy

3.2.4.3.1 Activity - Verification SCU

3.2.4.3.1.1 Description and Sequencing of Activities

All verification SCU operations are performed synchronously, on user request. SuperSonic Mach 40 may initiate an association with a Verification SCP within its configuration panel to check remote SCP availability. A possible sequence of interactions between Verification SCU and a verification SCP is illustrated in Figure 3.2.6 :

1. Verification SCU opens an association with the Verification SCP;
2. Verification SCU sends a C-Echo Request;
3. Verification SCP sends a C-Echo Response;
4. Verification SCU closes the association.

3.2.4.3.1.2 Proposed Presentation Contexts

SuperSonic Mach 40 will propose Presentation contexts as shown in Table 3.46.

| Presentation Context Table | | | | | |
|----------------------------|-------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.46: *Presentation Context Table for Verification SCU*

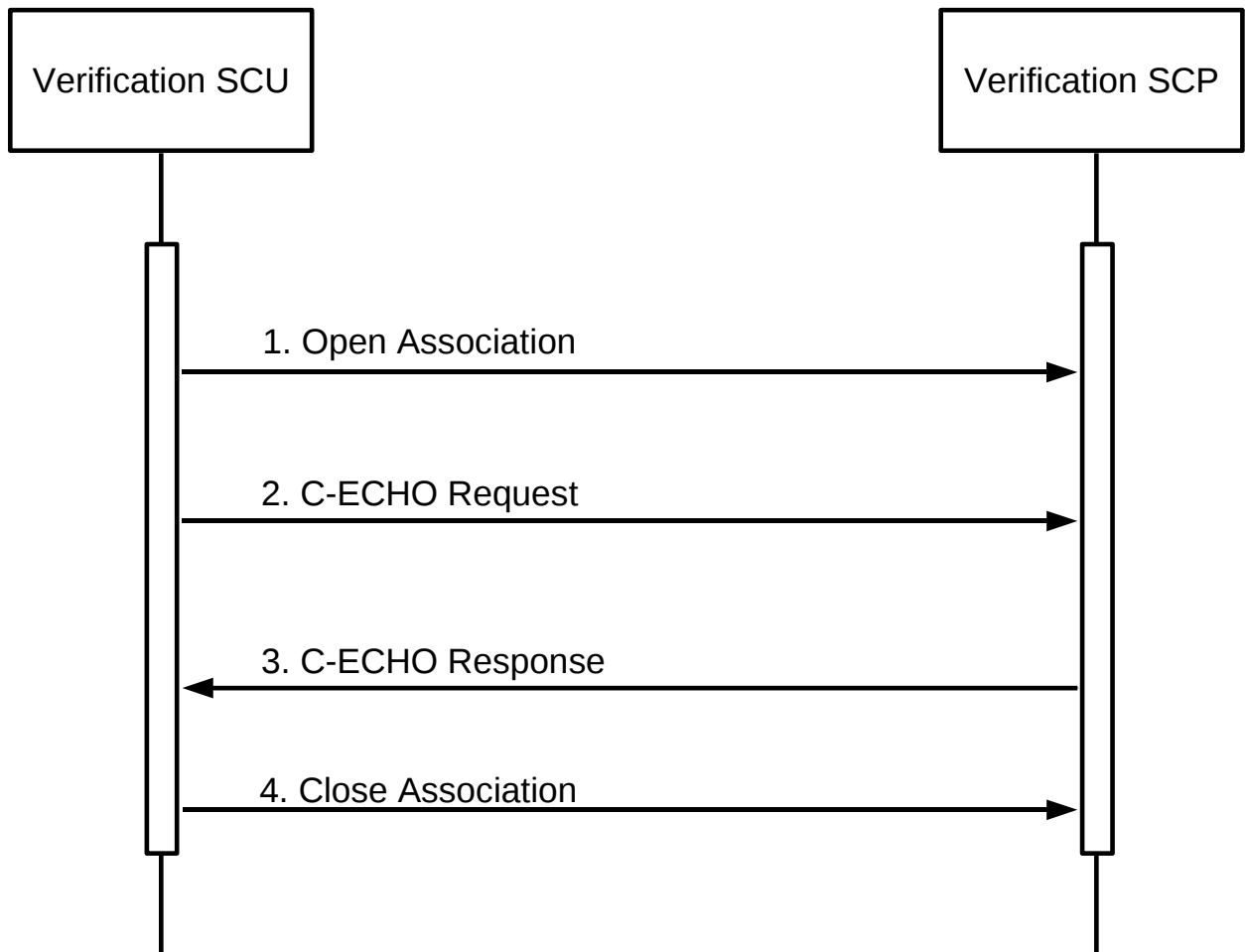


Figure 3.2.6: Sequencing of Activity - CEcho SCU

3.2.5 Storage SCP Application Entity Specification

3.2.5.1 SOP Classes

The SuperSonic Mach 40's Storage SCP AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.47.

3.2.5.2 Association Policies

3.2.5.2.1 General

The Storage SCP AE accepts but never initiates associations. The maximum PDU size accepted by Storage SCP AE is described in Table 3.48.

3.2.5.2.2 Number of Associations

As shown in Table 3.49, the Storage SCP AE may accept UP TO 15 of simultaneous associations.

3.2.5.2.3 Asynchronous Nature

The Storage SCP AE will only allow a single outstanding operation on an Association. Therefore, the Storage SCP AE will not perform asynchronous operations during negotiation.

3.2.5.2.4 Implementation Identifying Information

The implementation information for the Storage SCP Application Entity is described in Table 3.50.

3.2.5.3 Association Initiation Policy

The Storage SCP AE does not initiate associations.

3.2.5.4 Association Acceptance Policy

When Storage SCP accepts an association, it will respond to storage requests. Connections from any host are accepted.

3.2.5.4.1 Activity – Store instances on local storage

3.2.5.4.1.1 Description and Sequencing of Activities

As instances are received, they are copied to the local file system and a record inserted into the local database. If the received instance is a duplicate of a previously received instance, the old file and database record will be overwritten with the new one. SuperSonic Mach 40's storage area is limited, thus oldest instances will be automatically deleted.

| SOP Class Name | SOP Class UID | SCU | SCP |
|--|--------------------------------|-----|-----|
| US Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | No | Yes |
| US Multi-Frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | No | Yes |
| (Retired) US Image Storage | 1.2.840.10008.5.1.4.1.1.6 | No | Yes |
| (Retired) US Multi-Frame Image Storage | 1.2.840.10008.5.1.4.1.1.3 | No | Yes |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | No | Yes |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 | No | Yes |
| Enhanced CT Image Storage | 1.2.840.10008.5.1.4.1.1.2.1 | No | Yes |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 | No | Yes |
| Enhanced MR Image Storage | 1.2.840.10008.5.1.4.1.1.4.1 | No | Yes |
| Digital Mammography X-Ray Image Storage - For Presentation | 1.2.840.10008.5.1.4.1.1.1.2 | No | Yes |
| Digital Mammography X-Ray Image Storage - For Processing | 1.2.840.10008.5.1.4.1.1.1.2.1 | No | Yes |
| Nuclear Medecine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | No | Yes |
| Nuclear Medecine Image Storage (Retired) | 1.2.840.10008.5.1.4.1.1.5 | No | Yes |
| Multiframe Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | No | Yes |
| Multiframe Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | No | Yes |
| Multiframe Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | No | Yes |
| Multiframe True Color Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.4 | No | Yes |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | No | Yes |
| Digital X-Ray Image Storage - For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | No | Yes |
| Digital X-Ray Image Storage - For Processing | 1.2.840.10008.5.1.4.1.1.1.1.1 | No | Yes |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | No | Yes |
| Enhanced XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1.1 | No | Yes |
| X-Ray Radiofluoroscopic Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | No | Yes |
| Enhanced XRF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2.1 | No | Yes |
| VL Endoscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.1 | No | Yes |
| VL Microscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.2 | No | Yes |
| Positron Emission Tomography Image Storage | 1.2.840.10008.5.1.4.1.1.128 | No | Yes |
| RT Structure Set Storage | 1.2.840.10008.5.1.4.1.1.481.3 | No | Yes |

Table 3.47: SOP Classes for Storage SCP AE

| | |
|---------------------------|-------|
| Maximum pdu size received | 16384 |
|---------------------------|-------|

Table 3.48: Maximum PDU size received as a SCP for Storage SCP

| | |
|---|----|
| Maximum number of simultaneous Associations | 15 |
|---|----|

Table 3.49: Number of Associations as a SCP for Storage SCP AE

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation Version Name | SSI_DCMTK_364 |

Table 3.50: DICOM Implementation Class and Version for Storage SCP AE

A possible sequence of interactions between Storage SCP AE and a Remote Storage SCU AE is illustrated in Figure 3.2.7:

1. A Remote Storage SCU AE opens an association with the SuperSonic Mach 40's Storage SCP AE,
2. Acquired image(s) is transmitted to the Storage SCP AE using a C-STORE request and the Storage SCP AE replies with a C-STORE response (status success),
3. Remote Storage SCU AE closes the association with the SuperSonic Mach 40's Storage SCP AE.

3.2.5.4.1.2 Accepted Presentation Contexts

Each time an association is initiated, both SCU and SCP proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts accepted by Store SCP AE:

- for a C-Store service are defined in Table 3.51.
- for a C-Echo service are defined in Table 3.52.

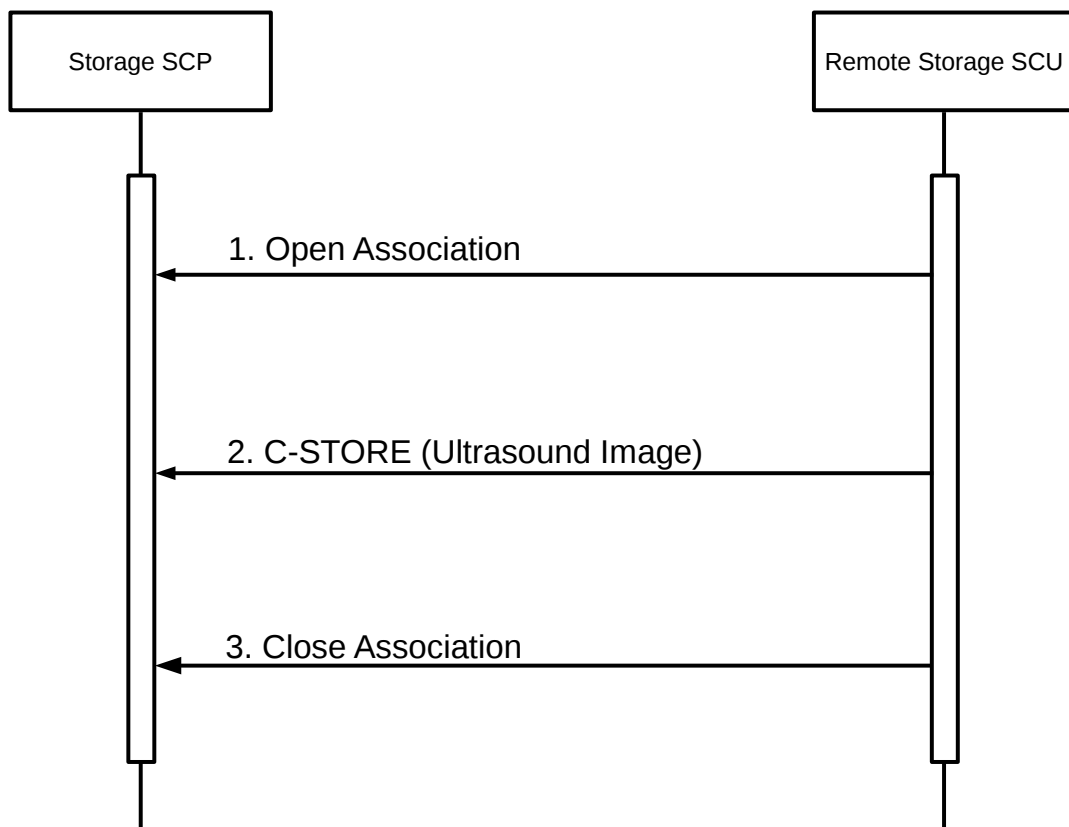


Figure 3.2.7: *Sequencing of Activity - Send Images*

| Presentation Context Table | | | | | |
|--|-----------------------------|--|------------------------|-------------|-----------------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Ultrasound 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Ultrasound Multi-Frame 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| (Retired) Ultrasound Image Storage | 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| (Retired) Ultrasound Multi-Frame Image Storage | 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |

| | | | | | |
|---------------------------|-----------------------------|--|------------------------|-----|------|
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

| | | | | | |
|--|-------------------------------|--|------------------------|-----|------|
| Digital Mam- mography X-Ray 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Digital Mam- mography X-Ray 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 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Nuclear Medecine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

| | | | | | |
|--|-----------------------------|--|------------------------|-----|------|
| Multiframe Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Digital XRay Image Storage - For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

| | | | | | |
|--|--------------------------------|--|------------------------|-----|------|
| Digital XRay Image Storage - For Processing | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| RETIRED Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.5 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| XRay 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Enhanced XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

| | | | | | |
|---|--------------------------------|--|------------------------|-----|------|
| XRay Radiofluoro- scopic Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Enhanced XRF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| VL Endoscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| VL Microscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| RT Structure Set Storage | 1.2.840.10008.5.1.4.1.1.481.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |

Table 3.51: Acceptable Presentation Contexts for Storage SCP and receive storage request

| Presentation Context Table | | | | | |
|----------------------------|-------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |

Table 3.52: *Acceptable Presentation Contexts for Storage SCP and receive Echo request*

3.2.5.4.1.2.1. Extended Negotiation

No extended negotiation is performed, though Storage SCP:

- is a Level 2 Storage SCP (Full – does not discard any data elements);
- does not support digital signatures;
- does not coerce any received data elements.

3.2.5.4.1.3 SOP Specific Conformance

3.2.5.4.1.3.1. SOP Specific Conformance to Storage SCP SOP Classes

Storage SCP provides standard conformance to the Storage Service Class.

3.2.5.4.1.3.2. SOP Specific Conformance to Storage SCP SOP Classes

Storage SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

3.2.5.4.1.3.3. Transfer Syntax Selection Policies

The default behavior of the Storage SCP is to prefer transfer syntaxes having an explicit encoding over the default implicit transfer syntax and since Storage SCP is running on little-endian hardware it will prefer Little Endian Explicit to Big Endian Explicit transfer syntax.

3.2.5.4.1.3.4. Response Status

Storage SCP will behave as described in Table 3.53 when generating the C-STORE response command message.

| Service Status | Further Meaning | Error Code | Reasons |
|----------------|-----------------------------------|------------|---|
| Refused | Out of Resources | A7xx | Never sent |
| Error | Data Set does not match SOP Class | A9xx | Never sent – data set is not checked prior to storage |
| | Cannot understand | Cxxx | Never sent |
| Warning | Coercion of Data Elements | B000 | Never sent - no coercion is ever performed |
| | Data Set does not match SOP Class | B007 | Never sent - data set is not checked prior to storage |
| | Elements Discarded | B006 | Never sent – all elements are always stored |
| Success | Success | 0000 | |

Table 3.53: *Response Status for Storage SCP and Receive Storage Request*

3.2.6 Query/Retrieve Application Entity Specification

3.2.6.1 SOP Classes

The Query/Retrieve AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.54.

| SOP Class Name | SOP Class UID | SCU | SCP |
|--|-----------------------------|-----|-----|
| Study Root Query/Retrieve Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Yes | No |
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | No |

Table 3.54: *SOP Classes for AE Query/Retrieve*

3.2.6.2 Association Policies

3.2.6.2.1 General

As illustrated in Table 3.55, the DICOM 3.0 standard Application context is always specified for each association.

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

Table 3.55: DICOM Application Context for Query/Retrieve AE

3.2.6.2.2 Number of Associations

The Query/Retrieve AE may initiates Two Association at a time (see Table 3.56) :

- One C-Find request;
- One C-Move request.

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

Table 3.56: Number of Associations as an Association Initiator for Query/Retrieve AE

3.2.6.2.3 Asynchronous Nature

As illustrated in Table 3.57, the Query/Retrieve AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

| | |
|---|---|
| Maximum number of outstanding asynchronous transactions | 0 |
|---|---|

Table 3.57: Asynchronous Nature as an Association Initiator for Query/Retrieve AE

3.2.6.2.4 Implementation Identifying Information

The implementation information for the Query/Retrieve Application Entity is described in Table 3.58.

3.2.6.3 Association Initiation Policy

3.2.6.3.1 Activity - Query Request

3.2.6.3.1.1 Description and Sequencing of Activity

The Find SCU attempts to initiate a new association when the user performs the query action from the user interface. If this involves recursive queries for lower query levels in the hierarchy, these will be performed on other associations. A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation Version Name | SSI_DCMTK_364 |

Table 3.58: DICOM Implementation Class and Version for Query/Retrieve AE

3.2.6.3.1.2 Proposed presentation Context

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by SuperSonic Mach 40 for a C-Find service are defined in Table 3.59.

| Presentation Context Table | | | | | |
|----------------------------|-----------------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| FIND Study Root | 1.2.840.10008.5.1.4.1.2.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| Query/Retrieve | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| Information Model | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.59: Proposed Presentation Contexts for Activity Query Request

3.2.6.3.1.2.1. Extended Negotiation

No extended negotiation is performed.
 In particular, relational queries are not supported.

3.2.6.3.1.3 SOP Specific Conformance

3.2.6.3.1.3.1. SOP Specific Conformance to C-FIND SOP Classes

FIND-SCU provides standard conformance to the supported C-FIND SOP Classes. Only a single information model, Study Root, is supported. All queries are initiated at the highest level of the information model (the STUDY level), and then for each response received, recursively repeated at the next lower level (the SERIES level), in order to elucidate the “tree” of series available on the remote AE (from which the user may subsequently request a retrieval at Series level).

A CANCEL request will be sent if the number of series receive is greater than a configurable limit.

Table 3.60 show the requested identifier at the Study and Series Information level of the Study Root Query/Retrieve Information Model. The types of Matching supported by the Find SCU is the following :

- “S” indicates the identifier attribute uses Single Value Matching,
- “R” indicates Range Matching,
- “*” indicates wildcard matching,
- “U” indicates Universal Matching,
- “L” indicates that UID lists are sent,
- “NONE” indicates that no matching is supported, but that values for this Element are requested to be returned (*i.e.* universal matching),
- “UNIQUE” indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

3.2.6.3.1.3.2. Presentation Context Acceptance Criterion

The Find SCU does not accept associations.

3.2.6.3.1.3.3. Transfer Syntax Selection Policies

The Find SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in the accepted Presentation Contexts, it will choose the Little-Endian Explicit Transfer Syntax.

3.2.6.3.1.3.4. Response Status

The Find SCU will behave as described in Table 3.61 in response to the status returned in the C-FIND response command message(s).

3.2.6.3.2 Activity - Retrieve Exam

3.2.6.3.2.1 Description and Sequencing of Activity

For series selected from the user interface to be retrieved, a single attempt will be made to retrieve them from the selected remote AE. If the retrieve fails, for whatever reason, no retry will be performed.

3.2.6.3.2.2 Proposed presentation Context

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by SuperSonic Mach 40 for a C-Move service are defined in Table 3.62.

| Description | Tag | Type |
|-------------------------------------|-------------|------------|
| Study Level | | |
| Study Date | (0008,0020) | S, *, U, R |
| Study Time | (0008,0030) | U |
| Accession Number | (0008,0050) | S, *, U |
| Patient's Name | (0010,0010) | S, *, U |
| Patient ID | (0010,0020) | S, *, U |
| Study ID | (0020,0010) | U |
| Study Instance UID | (0020,000D) | UNIQUE |
| Modalities in Study | (0008,0061) | U |
| SOP Classes in Study | (0008,0062) | U |
| Referring Physician's Name | (0008,0090) | U |
| Study Description | (0008,1030) | U |
| Name of Physician(s) Reading Study | (0008,1060) | U |
| Patient's Birth Date | (0010,0030) | U |
| Patient's Birth Time | (0010,0032) | U |
| Patient's Sex | (0010,0040) | U |
| Number of Study Related Series | (0020,1206) | NONE |
| Retrieve AE Title | (0008,0054) | U |
| Series Level | | |
| Series Number | (0020,0011) | U |
| Modality | (0008,0060) | S,U |
| Series Instance UID | (0020,000E) | UNIQUE |
| Number of Series Related Instances | (0020,1208) | U |
| Series Date | (0008,0021) | U |
| Series Time | (0008,0031) | U |
| Performed Procedure Step Start Date | (0040,0244) | U |
| Performed Procedure Step Start Time | (0040,0245) | U |

Table 3.60: Study Root request identifier for Find SCU

| Service Status | Further Meaning | Error Code | Behavior |
|----------------|--|------------|--|
| Refused | Out of Resources | A700 | Current query is terminated, remaining queries continue. |
| Error | Identifier does not match SOP Class | A900 | Current query is terminated, remaining queries continue |
| | Unable to process | Cxxx | Current query is terminated, remaining queries continue |
| Cancel | Matching terminated due to Cancel request | FE00 | A CANCEL request will be sent if the number of series receive is greated than a configurable limit |
| Success | Matching is complete - No final Identifier is supplied | 0000 | Current query is terminated, remaining queries continue |
| Pending | Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys | FF00 | Identifier used to populate browser and trigger recursive lower level queries |
| | Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier | FF01 | Identifier used to populate browser and trigger recursive lower level queries |

Table 3.61: *Response Status for Find SCU and Query Remote AE Request*

| Presentation Context Table | | | | | |
|----------------------------|-----------------------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| MOVE Study Root | 1.2.840.10008.5.1.4.1.2.2.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | NONE |
| Query Retrieve | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | NONE |
| Information Model | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | NONE |

Table 3.62: *Proposed Presentation Contexts for Activity Retrieve Exam Request*

3.2.6.3.2.2.1. Extended Negotiation

No extended negotiation is performed.
 In particular, relational retrievals are not supported.

3.2.6.3.2.3 SOP Specific Conformance

3.2.6.3.2.3.1. SOP Specific Conformance to C-FIND SOP Classes

The Move SCU provides standard conformance to the supported C-MOVE SOP Classes. Only a single information model, Study Root, is supported. A retrieval will be performed at the SERIES level.

No CANCEL requests are ever issued.

The retrieval is performed from the AE that was specified in the Retrieve AE attribute returned from the query performed by FIND-SCU. The instances are retrieved to the current application's local database by specifying the destination as the AE Title of the STORE-SCP AE of the local application.

3.2.6.3.2.3.2. Presentation Context Acceptance Criterion

The Move SCU does not accept associations.

3.2.6.3.2.3.3. Transfer Syntax Selection Policies

The Move SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in the accepted Presentation Contexts, it will choose the Little-Endian Explicit Transfer Syntax.

3.2.6.3.2.3.4. Response Status

The Move SCU will behave as described in Table 3.63 in response to the status returned in the C-MOVE response command message(s).

3.2.6.3.2.3.5. Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

The Move SCU completely ignores whatever activities are taking place in relation to the Storage SCP AE that is receiving the retrieved instances. Once the C-MOVE has been initiated it runs to completion (or failure) as described in the C-MOVE response command message(s). There is no attempt by Move SCU to confirm that instances have actually been successfully received or locally stored. Whether or not completely or partially successfully retrievals are made available in the local database to the user is purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by Move SCU.

Whether or not the remote AE attempts to retry any failed C-STORE sub-operations is beyond the control of Move SCU.

If the association on which the C-MOVE was issued is aborted for any reason, whether or not the C-STORE sub-operations continue is dependent on the remote AE; the local Storage SCP will continue to accept associations and storage operations regardless.

3.2.6.4 Association Acceptance Policy

The Query/Retrieve AE does not accept Associations.

3.3 Network Interfaces

3.3.1 Physical Network Interface

SuperSonic Mach 40 supports a single network interface. The following physical network interfaces are supported:

- Ethernet 10baseT;
- Ethernet 100baseT;
- Ethernet 1000baseT.

| Service Status | Further Meaning | Status Code | Related Fields | Behavior |
|-----------------------|---|--------------------|--|--|
| Failed | Refused: Out of Resources - Unable to calculate number of matches | A701 | (0000,0902) | Retrieval is terminated |
| | Refused: Out of Resources - Unable to perform sub-operations | A702 | (0000,1020) (0000,1021) (0000,1022) (0000,1023) | Retrieval is terminated |
| | Move Destination unknown | A801 | (0000,0902) | Retrieval is terminated |
| | Identifier does not match SOP Class | A900 | (0000,0901) (0000,0902) (0000,0901) | Retrieval is terminated |
| | Unable to process | Cxxx | (0000,0902) | Retrieval is terminated |
| Cancel | Sub-operations terminated due to Cancel Indication | FE00 | (0000,1020) (0000,1021) (0000,1022) (0000,1023) | Retrieval is terminated (should never occur, since cancels never issued) |
| Warning | Sub-operations Complete - One or more Failures | B000 | (0000,1020) (0000,1022) (0000,1023) | Retrieval is terminated |
| Success | Sub-operations Complete - No Failures | 0000 | (0000,1020) (0000,1021) (0000,1022) (0000,1023) | Retrieval is terminated |
| Pending | Sub-operations are continuing | FF00 | (0000,1020) (0000,1021) (0000,1022) (0000,1023) | Retrieval continues |

Table 3.63: Response Status for Move SCU and retrieve from Remote AE Request

3.3.2 Additional Protocols

SuperSonic Mach 40 conforms to the System Management Profiles listed in the Table below. All requested transactions for the listed profiles and actors are supported. Support for optional transactions is listed in the Table 3.64:

| Profile Name | Actor | Protocols Used | Optional Transaction |
|----------------------------|-------------|----------------|----------------------|
| Network Address Management | DHCP Client | DHCP | N/A |
| | DNS Client | DNS | N/A |
| Time Synchronization | NTP Client | NTP | N/A |
| | DHCP Client | DHCP | N/A |

Table 3.64: *Supported System Management profiles*

3.3.2.1 DHCP

DHCP can be used to obtain TCP/IP network configuration information. The network parameters obtainable via DHCP are shown in Table 3.65. The Default Value column of the table shows the default used if the DHCP server does not provide a value. Support for DHCP can be configured via the “Network Configuration” Window. If DHCP is not in use, TCP/IP network configuration information can be manually configured via the “Network Configuration” Window. If the DHCP server refuses to renew a lease on the assigned IP address all active DICOM

| DHCP Parameter | Default Value |
|----------------|----------------------------|
| IP Address | None |
| Subnet mask | Derived from IP Address |
| Time offset | Site configurable |
| MTU | Network Hardware Dependent |

Table 3.65: *Supported DHCP Parameters*

Associations will be aborted.

3.3.2.2 DNS

DNS can be used for address resolution. If DHCP is not in use or the DHCP server does not return any DNS server addresses, the identity of a DNS server can be configured via the “Network Configuration” window.

3.3.2.3 NTP

The NTP client will issue an NTP broadcast to identify any local NTP servers. If no local servers can be found via NTP broadcast, the NTP Servers identified by DHCP will be used as time references. Additionally, one NTP Server can be configured via the via the “Regional” window. If no NTP Servers are identified then the local clock will be used as a time reference and a warning written to the system log files.

3.3.2.4 LDAP

LDAP is not supported.

3.3.3 IPv4 and IPv6 Support

This product only supports IPv4 connections.

3.4 Configuration

3.4.1 AE Title/Presentation Address Mapping

All local applications use the AE Titles and TCP/IP Ports configured via the “System Configuration” → “Administration” → “Devices” tab of SuperSonic Mach 40. The Field Service Engineer can configure SuperSonic Mach 40’s own DICOM parameter via the “System DICOM Options” Window. The AE Title must be configured during installation. This AE Title is shared between all local applications.

Please refer to the user’s guide for configuration and use of DICOM Storage.

3.4.2 Parameters

SuperSonic Mach 40 configurable parameters are accessible through the “System Configuration” → “Devices Settings” → “System DICOM Options” tab of SuperSonic Mach 40.

- Default AE Title is SuperSonic Mach 40. It can be changed to any value compliant with the AE VR.
- Default port is 11112. It can be changed to any value greater than 1024. SuperSonic Mach 40 follows the recommendation written in chapter 9.1.1 in PS3.8. If the operating system does not permit access to privileged ports it is recommended to use the "registered" port number 11112. See "<http://www.iana.org/assignments/port-numbers>".
- Default Station location is echo1
- Default Number of tries before error logging default is 3

- Default Retry delay between 2 tries is 1000 ms
- Default Connection Timeout is 15s

There is no limitation on the configuration of any remote AE. Any valid AE Title, port-number, and host-names can be configured. An unlimited number of remote Storage SCP, remote Storage Commitment SCP, and Print SCP can be configured, enabling one or more of them.

An unlimited number of remote MWL SCPs and MPPS SCPs, and Query/Retrieve SCPs can be configured, enabling only one of them at a given time.

Please refer to the user's guide for configuration and use of DICOM Storage.

Media Interchange

4.1 Implementation Model

4.1.1 Application Data flow

The Offline-Media Application Entity exports images, PDF and Structured reports to a CD-R, DVD, USB Storage medium. It is associated with the local real-world activities “Export to CD-R, DVD”, “Export to USB”. These real-world activities are performed upon user request for selected patients, studies or instances (images, clips, PDF reports, Structured reports).

The Offline-Media Application Entity can be used to import object from a CD-R, DVD, USB Storage medium. It is associated with the local real-world activities “Import to CD-R, DVD”, “Import to USB”. These real-world activities are performed upon user request using the import button from the Query and Retrieve interface.

The application data flow diagram for media storage is illustrated on figure [4.1.1](#).

4.1.2 Functional Definitions of Application Entities

4.1.2.1 Functional Definition of Media Creation Application Entity

Activation of the “Export to CD-R, DVD”, “Export to USB” buttons will pass the currently selected patients, studies or instances to the media creation service. The SOP Instances associated with the selection will be collected into one job. The contents of each export job will be written to a single CD-R or DVD media.

4.1.2.2 Functional Definition of Media Importation Application Entity

Activation of the “Import to CD-R, DVD”, “Import to USB” buttons will pass the currently selected DICOMDIR, files or folder located in a removable media to the media importation

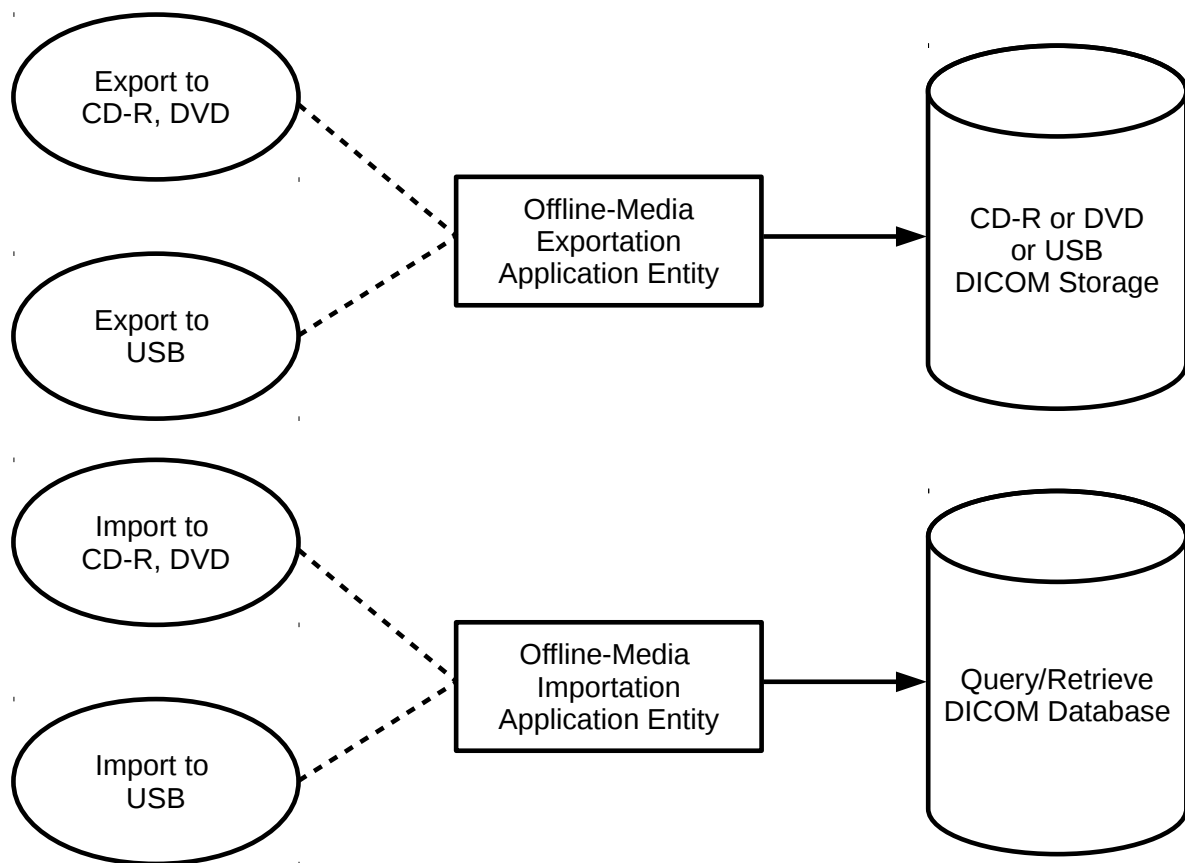


Figure 4.1.1: *Application Data Flow for Media Storage*

service. The SOP Instances associated with the selection will be copied to SuperSonic Mach 40's local disk and added to the local database.

4.1.3 Sequencing of Real-Word Activities

4.1.3.1 Sequencing of Real-Word Activities - Exportation

At least one image must exist and be selected before the media creation service can be invoked. The operator can insert a new media at any time before or after invocation of the service. It will wait indefinitely for a media to be inserted before starting to write to the media device. If no media is available the media creation job can be canceled from the job queue.

4.1.3.2 Sequencing of Real-Word Activities - Importation

Upon pressing the import button from the Query/Retrieve interface, user can select a DICOM removable media and browse it. DICOMDIR, folder and files can be selected for importation. If no DICOMDIR is selected, the import service will scan recursively all files and folders and copy the DICOM files to SuperSonic Mach 40's local disk. The imported exam are then displayed in the Query/Retrieve interface and flagged as "imported".

4.1.4 File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is described in Table 4.1.

| | |
|-----------------------------|------------------------------------|
| Implementation Class UID | 1.2.250.1.204.0.1.20120820.0.3.6.4 |
| Implementation version name | SSI_DCMTK_364 |

Table 4.1: DICOM Implementation Class and Version for DICOMDIR creation

4.2 Application Entity Specifications

4.2.1 Offline-Media Application Entity Specification

The Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed in Table 4.2.

| Application Profile supported | Real World Activity | Role |
|--|---------------------|------|
| Compact Disk - Recordable | | |
| General Purpose CD-R Profiles (STD-GEN-CD) | Export to CD-R | FSC |
| 120 mm DVD | | |
| General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG) | Export to DVD | FSC |
| USB connected removable devices¹ | | |
| General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG) | Export to USB | FSC |

¹The DICOMDIR file is not in the root directory of the medium

Table 4.2: Application Profiles, activities, and roles for Offline Media

4.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is the same AE Title than the one configured for DICOM Option.

4.2.1.2 Real-World Activities

4.2.1.2.1 Activity – Export to CD-R DVD

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to a CD-R or DVD medium. The medium characteristics are automatically detected by the system and shown to user. After user selection of patients, studies and images from the review list window, an exportation job is created by pressing the “CD-R /DVD” button. The contents of the export job will be written together with a corresponding DICOMDIR to a single-session CDR/DVD. Writing in multi-session mode is not supported. The user can cancel an export job in the job queue.

Please refer to the user’s guide for configuration and use of DICOM Storage.

4.2.1.2.1.1 Media Storage Application Profiles

The Offline-Media Application Entity support the Application Profile described in Table 4.3.

| Application Profile supported |
|-------------------------------|
| STD-GEN-CD |
| STD-GEN-DVD-JPEG |

Table 4.3: Media Storage Application Profiles for CDR/DVD

4.2.1.2.1.1.1. Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.4. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.4. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won't be referenced in the DICOMDIR.

| Information Object Definition | SOP Class UID | Transfer Syntax UID | Transfer Syntax |
|--------------------------------------|-------------------------------|--|------------------------|
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 |
| Ultrasound Multi-Frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Comprehensive SR Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

Table 4.4: IODs, SOP Classes and Transfer Syntaxes for the CDR/DVD media

4.2.1.2.2 Activity – Export to USB

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to USB medium. The medium characteristics are automatically detected by the system and shown to user. After user selection of patients, studies and images from the review list window, an exportation job is created by pressing the “USB” button. The contents

of the export job will be written together with a corresponding DICOMDIR to the following filesystem hierarchy: at the root of the medium a folder named “SuperSonic Mach 40” is created, in this folder will be created for each job a second folder whose name depends on date and time exportation job was created. Please note that this implementation does not follow the DICOM standard but allow user to create several DICOM media on one USB medium without mixing the contents of two different jobs.

Please refer to the user’s guide for configuration and use of DICOM Storage.

4.2.1.2.2.1 Media Storage Application Profiles

The Offline-Media Application Entity support the STD-GEN-USB-JPEG Application Profile.

4.2.1.2.2.2 Media Storage Application Profiles

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.5. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.5. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won’t be referenced in the DICOMDIR.

4.2.2 Offline-Media Importation Application Entity Specification

The Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed in Table 4.6.

4.2.2.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is the same AE Title than the one configured for DICOM Option.

4.2.2.2 Real-World Activities

4.2.2.2.1 Activity – Import to CD-R, DVD, USB

The Offline-Media Application Entity acts as an FSR when requested to import DICOM objects from a CD-R or DVD medium to the local database. The medium arborescence is shown to user and can be browsed. After user selection of DICOMDIR, folder and files from the importation window. The imported DICOM files can later be displayed to user.

Please refer to the user’s guide for configuration and use of DICOM Storage.

| Information Object Definition | SOP Class UID | Transfer Syntax UID | Transfer Syntax |
|--------------------------------------|-------------------------------|--|------------------------|
| Ultrasound Image Storage | 1.2.840.10008.5.1.4.1.1.6.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 |
| Ultrasound Multi-Frame Image Storage | 1.2.840.10008.5.1.4.1.1.3.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 |
| | | JPEG-LS Lossless Image Compression | 1.2.840.10008.1.2.4.80 |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 |
| Encapsulated PDF Storage | 1.2.840.10008.5.1.4.1.1.104.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |
| Comprehensive SR Storage | 1.2.840.10008.5.1.4.1.1.88.33 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 |

Table 4.5: IODs, SOP Classes and Transfer Syntaxes for USB media

| Application Profile supported | Real World Activity | Role |
|--|---------------------|------|
| Compact Disk - Recordable | | |
| General Purpose CD-R Profiles (STD-GEN-CD) | Import CD-R | FSR |
| 120 mm DVD | | |
| General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG) | Import DVD | FSR |
| USB connected removable devices¹ | | |
| General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG) | Import to USB | FSR |

¹The DICOMDIR file is not in the root directory of the medium

Table 4.6: Application Profiles, activities, and roles for Offline Media Importation

4.2.2.2.2 Activity – Import to USB

The Offline-Media Application Entity acts as an FSR when requested to import DICOM objects from a USB medium to the local database. The medium arborescence is shown to user and can be browsed. After user selection of DICOMDIR, folder and files from the importation window. The imported DICOM files can later be displayed to user.

Please refer to the user’s guide for configuration and use of DICOM Storage.

4.2.2.2.2.1 Media Storage Application Profiles

The Offline-Media Application Entity support the Application Profile described in Table 4.7.

| Application Profile supported |
|-------------------------------|
| STD-GEN-CD |
| STD-GEN-DVD-JPEG |

Table 4.7: *Media Storage Application Profiles for CDR/DVD Importation*

4.2.2.2.2.1.1. Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.8. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.8. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won’t be referenced in the DICOMDIR.

| Presentation Context Table | | | | | |
|--|-----------------------------|--|------------------------|-------------|-----------------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| Ultrasound 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Ultrasound Multi-Frame 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| (Retired) Ultrasound Image Storage | 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| (Retired) Ultrasound Multi-Frame Image Storage | 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |

| | | | | | |
|---------------------------|-----------------------------|--|------------------------|-----|------|
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

| | | | | | |
|--|-------------------------------|--|------------------------|-----|------|
| Digital Mam- mography X-Ray 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Digital Mam- mography X-Ray 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 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Nuclear Medecine Image Storage | 1.2.840.10008.5.1.4.1.1.20 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe Single Bit Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Trans- fer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

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|--|-----------------------------|--|------------------------|-----|------|
| Multiframe Grayscale Byte Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe Grayscale Word Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Multiframe 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Digital XRay Image Storage - For Presentation | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

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|--|--------------------------------|--|------------------------|-----|------|
| Digital XRay Image Storage - For Processing | 1.2.840.10008.5.1.4.1.1.1.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| RETIRED Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.5 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| XRay 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Enhanced XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| | | | | | |

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|---|--------------------------------|--|------------------------|-----|------|
| XRay Radiofluoro- scopic Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| Enhanced XRF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| VL Endoscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| VL Microscopic Image Storage | 1.2.840.10008.5.1.4.1.1.77.1.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| 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 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |
| | | JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression | 1.2.840.10008.1.2.4.50 | SCP | NONE |
| | | JPEG Lossless Compressed | 1.2.840.10008.1.2.4.70 | SCP | NONE |
| RT Structure Set Storage | 1.2.840.10008.5.1.4.1.1.481.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | NONE |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | NONE |
| | | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | NONE |

Table 4.8: IODs, SOP Classes and Transfer Syntaxes for the CDR/DVD media Importation

4.3 Augmented and Private Application Profiles

SuperSonic Mach 40 does not support any augmented for private application profiles.

4.4 Media Configuration

The local applications use the AE Titles configured via the “System Configuration” → “Administration” → “Devices” tab of SuperSonic Mach 40.

Please refer to the user’s guide for configuration and use of DICOM Storage.

Support of Extended Character Sets

All SuperSonic Mach 40 DICOM applications support the following character set:

| DICOM | Character Set | Coverage |
|----------------|-------------------|---|
| ISO_IR 6 | ASCII | |
| ISO_IR 100 | Latin alphabet #1 | Afrikaans, Albanian, Breton, Catalan, Danish, English (UK and US), Faroese, Galician, German, Icelandic, Irish (new orthography), Italian, Kurdish (The Kurdish Unified Alphabet), Latin (basic classical orthography), Leonese, Luxembourgish (basic classical orthography), Norwegian (Bokmål and Nynorsk), Occitan, Portuguese (Portuguese and Brazilian), Rhaeto-Romanic, Scottish Gaelic, Spanish, Swahili, Swedish, Walloon, Basque |
| ISO_IR 101 | Latin alphabet #2 | Bosnian, Croatian, Czech, German, Hungarian, Polish, Romanian, Serbian (when in the Latin script), Slovak, Slovene, Upper Sorbian, and Lower Sorbian |
| ISO_IR 109 | Latin alphabet #3 | Turkish, Maltese and Esperanto |
| ISO_IR 110 | Latin alphabet #4 | Estonian, Latvian, Lithuanian, Greenlandic, and Sami |
| ISO_IR 144 | Cyrillic | Bulgarian, Russian, Rusyn, Bosnian, Serbian, Macedonian, Ukrainian, Moldovan, Kazakh, Uzbek, Kyrgyz, Tajik, Tuvan, Mongolian |
| ISO_IR 127 | Arabic | |
| ISO_IR 126 | Greek | |
| ISO_IR 138 | Hebrew | |
| ISO_IR 148 | Latin alphabet #5 | Turkish |
| ISO 2022 IR 87 | Japanese | |
| GB18030 | Chinese | |
| ISO_IR 192 | Unicode | |

Table 5.1: *Supported Character Set*

The character set has to be configured for each remote DICOM server. Finally, the Worklist accepts the following additional encodings:

- ISO 2022 IR 6
- ISO 2022 IR 100
- ISO 2022 IR 101
- ISO 2022 IR 109
- ISO 2022 IR 110
- ISO 2022 IR 144
- ISO 2022 IR 127
- ISO 2022 IR 126
- ISO 2022 IR 138
- ISO 2022 IR 148
- ISO 2022 IR 13
- ISO 2022 IR 166
- ISO 2022 IR 87
- ISO 2022 IR 159
- ISO 2022 IR 149
- GBK
- ISO IR 13

Security Profiles

Please note that it is assumed that SuperSonic Mach 40 and Mach20 are used within a secured environment. It is assumed that a secured environment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to SuperSonic Mach 40 and Mach20.
2. Firewall or router protections to ensure that SuperSonic Mach 40 and Mach20 only have network access to approved external hosts and services.
3. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (*e.g.* such as a Virtual Private Network (VPN)).

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

6.1 Secure Use Profiles

SuperSonic Mach 40 and Mach20 implement the Audit Trail Message Format Profile. The following audit events are recorded in the device's logs:

- Application Activity: Event Recorded Application Start, Application Stop;
- Begin Transferring DICOM Instances;
- DICOM Instances Accessed;
- DICOM Study Deleted;

- Data Export;
- Data Import; and
- Security Alert.

Note: Please note that the logs are not pushed on a centralized log server. They are kept on the device.

6.2 Secure Transport Connection Profiles

SuperSonic Mach 40 and Mach20 support the BCP 195 and AES TLS Secure Transport Connection Profiles. The ciphersuites supported by BCP195 Profile are:

- TLS_DHE_RSA_WITH_AES_128_GCM_SHA256;
- TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256;
- TLS_DHE_RSA_WITH_AES_256_GCM_SHA384;
- TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384;
- TLS_RSA_WITH_AES_128_CBC_SHA; and
- TLS_RSA_WITH_3DES_EDE_CBC_SHA.

The ciphersuites supported for AES Profiles are:

- TLS_RSA_WITH_AES_128_CBC_SHA; and
- TLS_RSA_WITH_3DES_EDE_CBC_SHA.

6.3 Attribute Confidentiality Profiles

SuperSonic Mach 40 and Mach20 support the Basic Attribute Confidentiality Profile. The way Attribute's values are anonymized is described in Chapter [A.5](#) Attribute anonymization and in Table [A.33](#).

Appendix



IOD contents

A.1 Created SOP instances

Examples of Ultrasound images, Encapsulated PDF Reports and Structured reports created by SuperSonic Mach 40 can be downloaded from: <http://www.supersonicimagine.com/images>

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

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

The abbreviations used in the “Source” column:

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

Note: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the “System Configuration” → “System Display” → “Regional” tab.

A.1.1 US Image IOD Modules

See Table A.1.

| IE | Module | Reference | Presence of Module |
|---------------------|-----------------------|------------|--------------------|
| Patient | Patient | Table A.5 | ALWAYS |
| Study | General Study | Table A.6 | ALWAYS |
| | Patient Study | Table A.7 | ALWAYS |
| Series | General Series | Table A.8 | ALWAYS |
| Equipment | General Equipment | Table A.11 | ALWAYS |
| Image | General Image | Table A.14 | ALWAYS |
| | Image Pixel | Table A.15 | ALWAYS |
| | Contrast/bolus | Table A.16 | ANAP |
| | Device | Table A.13 | ANAP |
| | US Region Calibration | Table A.19 | ALWAYS |
| | US Image | Table A.20 | ALWAYS |
| | VOI LUT | Table A.21 | ANAP |
| Extended Attributes | SOP Common | Table A.23 | ALWAYS |
| | Private Application | Table B.1 | ANAP |
| | Extra Module | Table A.29 | ALWAYS |

Table A.1: *US Image IOD Modules*

A.1.2 US Multi-Frame Image IOD Module

See table A.2.

A.1.3 Encapsulated PDF IOD Module

See table A.3.

| IE | Module | Reference | Presence of Module |
|---------------------|-----------------------|------------|--------------------|
| Patient | Patient | Table A.5 | ALWAYS |
| Study | General Study | Table A.6 | ALWAYS |
| | Patient Study | Table A.7 | ALWAYS |
| Series | General Series | Table A.8 | ALWAYS |
| Equipment | General Equipment | Table A.11 | ALWAYS |
| Image | General Image | Table A.14 | ALWAYS |
| | Image Pixel | Table A.15 | ALWAYS |
| | Contrast/bolus | Table A.16 | ANAP |
| | Cine | Table A.17 | ALWAYS |
| | Multi-Frame | Table A.18 | ALWAYS |
| | Device | Table A.13 | ANAP |
| | US Region Calibration | Table A.19 | ALWAYS |
| | US Image | Table A.20 | ALWAYS |
| | VOI LUT | Table A.21 | ANAP |
| | SOP Common | Table A.23 | ALWAYS |
| Extended Attributes | Extra Module | Table A.29 | ALWAYS |

Table A.2: *US Multi-Frame Image IOD Module*

| IE | Module | Reference | Presence of Module |
|-----------------------|------------------------------|------------|--------------------|
| Patient | Patient | Table A.5 | ALWAYS |
| Study | General Study | Table A.6 | ALWAYS |
| | Patient Study | Table A.7 | ALWAYS |
| Series | Encapsulated Document Series | Table A.9 | ALWAYS |
| Equipment | General Equipment | Table A.11 | ALWAYS |
| | SC Equipment | Table A.22 | ALWAYS |
| Encapsulated Document | Encapsulated Document | Table A.24 | ALWAYS |
| | SOP Common | Table A.23 | ALWAYS |
| Extended Attributes | Extra Module | Table A.30 | ALWAYS |

Table A.3: *Encapsulated PDF IOD Module*

A.1.4 Comprehensive SR IOD Module

See table [A.4](#).

| IE | Module | Reference | Presence of Module |
|---------------------|---------------------|----------------------------|--------------------|
| Patient | Patient | Table A.5 | ALWAYS |
| Study | General Study | Table A.6 | ALWAYS |
| | Patient Study | Table A.7 | ALWAYS |
| Series | SR Document Series | Table A.10 | ALWAYS |
| Equipment | General Equipment | Table A.11 | ALWAYS |
| Document | SR Document General | Table A.25 | ALWAYS |
| | SR Document Content | Table A.26 | ALWAYS |
| | SOP Common | Table A.23 | ALWAYS |
| Extended Attributes | Extra Module | Table A.30 | ALWAYS |

Table A.4: *Comprehensive SR IOD Module*

A.1.5 Common Modules

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|--|-------------------|--------------|
| Patient's Name | (0010,0010) | PN | From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received. | VNAP | MWL/ USER |
| Patient ID | (0010,0020) | LO | From Modality Worklist or user input | VNAP | MWL/ USER |
| Issuer of Patient ID | (0010,0021) | LO | From Modality Worklist or empty | VNAP | MWL |
| Issuer of Patient ID Qualifiers Sequence | (0010,0024) | SQ | From Modality Worklist or absent | VNAP | MWL |
| > Universal Entity ID | (0040,0032) | UT | From Modality Worklist | VNAP | MWL |
| > Universal Entity ID Type | (0040,0033) | CS | From Modality Worklist | VNAP | MWL |
| Patient's Birth Date | (0010,0030) | DA | From Modality Worklist or user input | VNAP | MWL/ USER |
| Patient's Sex | (0010,0040) | CS | From Modality Worklist or user input | VNAP | MWL/ USER |
| Other Patient IDs Sequence | (0010,1000) | SQ | From Modality Worklist | VNAP | MWL |
| > Patient ID | (0010,0020) | LO | From Modality Worklist | VNAP | MWL |
| > Issuer Of Patient ID | (0010,0021) | LO | From Modality Worklist | VNAP | MWL |
| > Type Of Patient ID | (0010,0022) | CS | From Modality Worklist | VNAP | MWL |
| Referenced Patient Sequence | (0008,1120) | SQ | From Modality Worklist | VNAP | MWL |
| >Referenced SOP Class UID | (0008,1150) | UI | From Modality Worklist | ALWAYS | AUTO |
| >Referenced SOP Instance UID | (0008,1155) | UI | From Modality Worklist | ALWAYS | AUTO |
| Patient's Birth Time | (0010,0032) | TM | From Modality Worklist | VNAP | MWL |
| Patient Comments | (0010,4000) | LT | From Modality Worklist or user input | VNAP | USER |
| Patient Identity Removed | (0012,0062) | CS | de-identification selected by user | VNAP | USER |
| De-identification Method | (0012,0063) | LO | de-identification selected by user | VNAP | USER |
| Ethnic Group | (0010,2160) | SH | From Modality Worklist | VNAP | MWL |

Table A.5: Patient Module Attributes of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------------|-------------|----|--|-------------------|--------------|
| Study Instance UID | (0020,000D) | UI | From Modality Worklist or generated by the device. | ALWAYS | MWL/ USER |
| Study Date | (0008,0020) | DA | From Modality Worklist or generated by the device. | ALWAYS | AUTO |
| Study Time | (0008,0030) | TM | From Modality Worklist or generated by the device. | ALWAYS | AUTO |
| Referring Physician's Name | (0008,0090) | PN | From Modality Worklist or user input | VNAP | MWL/ USER |
| Study ID | (0020,0010) | SH | Generated by the device | ALWAYS | MWL/ AUTO |
| Accession Number | (0008,0050) | SH | From Modality Worklist or user input. | VNAP | AUTO |
| Issuer of Accession Number Sequence | (0008,0051) | SQ | From Modality Worklist | VNAP | AUTO |
| > Local Namespace Entity ID | (0040,0031) | UT | From Modality Worklist | VNAP | AUTO |
| > Universal Entity ID | (0040,0032) | UT | From Modality Worklist | VNAP | AUTO |
| > Universal Entity ID Type | (0040,0033) | CS | From Modality Worklist | VNAP | AUTO |
| Study Description | (0008,1030) | LO | user input | VNAP | USER |
| Referenced Study Sequence | (0008,1110) | SQ | From Modality Worklist | VNAP | AUTO |
| >Referenced SOP Class UID | (0008,1150) | UI | From Modality Worklist | ALWAYS | AUTO |
| >Referenced SOP Instance UID | (0008,1155) | UI | From Modality Worklist | ALWAYS | AUTO |
| Procedure Code Sequence | (0008,1032) | SQ | From Modality Worklist | VNAP | AUTO |
| >Code Value | (0008,0100) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Coding Scheme Designator | (0008,0102) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Coding Scheme Version | (0008,0103) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Code Meaning | (0008,0104) | LO | From Modality Worklist | ALWAYS | AUTO |
| Physician(s) of Record | (0008,1048) | PN | From Modality Worklist | VNAP | AUTO |

Table A.6: General Study Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------------|-------------|----|--------------------------------------|-------------------|----------|
| Patient's Age | (0010,1010) | AS | Generated from Patient's Birth Date | VNAP | AUTO |
| Patient's Size | (0010,1020) | DS | user input or from Modality Worklist | VNAP | USER/MWL |
| Patient's Weight | (0010,1030) | DS | user input or from Modality Worklist | VNAP | USER/MWL |
| Additional Patient's History | (0010,21B0) | LT | From Modality Worklist | VNAP | MWL |
| Admission ID | (0038,0010) | LO | From Modality Worklist | VNAP | USER |

Table A.7: *Patient Study Module of created SOP Instances*

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|---|-------------------|--------|
| Modality | (0008,0060) | CS | US | ALWAYS | AUTO |
| Series Instance UID | (0020,000E) | UI | Generated by device | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | Generated by device | ALWAYS | AUTO |
| Laterality | (0020,0060) | CS | Empty | ALWAYS | AUTO |
| Series Date | (0008,0021) | DA | <yyyymmdd> | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | <hhmm> | ALWAYS | AUTO |
| Series Description | (0008,103E) | LO | User input | VNAP | USER |
| Performing Physician's Name | (0008,1050) | PN | User input | VNAP | USER |
| Protocol Name | (0018,1030) | LO | Free Form | ALWAYS | AUTO |
| Operators' Name | (0008,1070) | PN | Copy from Performing Physician's Name (0008,1050) | VNAP | USER |
| Referenced Performed Procedure Step Sequence | (0008,1111) | SQ | | ALWAYS | MPPS |
| >Referenced SOP Class UID | (0008,1150) | UI | | ALWAYS | AUTO |
| >Referenced SOP Instance UID | (0008,1155) | UI | | ALWAYS | MPPS |
| Patient Position | (0018,5100) | CS | Empty | ALWAYS | AUTO |
| Request Attributes Sequence | (0040,0275) | SQ | | ALWAYS | AUTO |
| >Requested Procedure ID | (0040,1001) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Accession Number | (0008,0050) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Scheduled Procedure Step ID | (0040,0009) | SH | From Modality Worklist | ALWAYS | AUTO |
| >Scheduled Procedure Step Description | (0040,0007) | LO | From Modality Worklist | ALWAYS | AUTO |
| >Scheduled Protocol Code Sequence | (0040,0008) | SQ | From Modality Worklist | ALWAYS | AUTO |
| >>Code Value | (0008,0100) | SH | From Configuration | ALWAYS | AUTO |
| >>Coding Scheme Designator | (0008,0102) | SH | From Configuration | ALWAYS | AUTO |
| >>Coding Scheme Version | (0008,0103) | SH | From Configuration | ALWAYS | AUTO |
| >>Code Meaning | (0008,0104) | LO | From Configuration | ALWAYS | AUTO |

Table A.8: General Series Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-----------------------------|-------------|----|--------------------------------------|-------------------|--------------|
| Modality | (0008,0060) | CS | set to US | ALWAYS | AUTO |
| Series Instance UID | (0020,000E) | UI | Generated by device | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | Generated by device | ALWAYS | AUTO |
| Laterality | (0020,0060) | CS | Empty | ALWAYS | AUTO |
| Series Date | (0008,0021) | DA | Generated by device | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | Generated by device | ALWAYS | AUTO |
| Performing Physicians' Name | (0008,1050) | PN | From Modality Worklist or User input | ANAP | MWL/ USER |
| Series Description | (0008,103E) | LO | User input | VNAP | AUTO |
| Protocol Name | (0018,1030) | LO | set to Free Form | ALWAYS | AUTO |
| Operators' Name | (0008,1050) | PN | From Modality Worklist or User input | ANAP | MWL/ USER |
| Patient Position | (0018,5100) | CS | empty | ALWAYS | AUTO |

Table A.9: Encapsulated Document Series Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|---------------------|-------------------|--------|
| Modality | (0008,0060) | CS | set to SR | ALWAYS | AUTO |
| Series Instance UID | (0020,000E) | UI | Generated by device | ALWAYS | AUTO |
| Series Number | (0020,0011) | IS | Generated by device | ALWAYS | AUTO |
| Series Date | (0008,0021) | DA | Generated by device | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | Generated by device | ALWAYS | AUTO |
| Series Description | (0008,103E) | LO | User input | VNAP | 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 A.10: SR Document Series Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------|-------------|----|----------------------------------|-------------------|--------|
| Manufacturer | (0008,0070) | LO | Hologic SuperSonic Imagine SA | ALWAYS | AUTO |
| Institution Name | (0008,0080) | LO | Configuration | ALWAYS | AUTO |
| Institution Address | (0008,0081) | ST | Configuration | ALWAYS | AUTO |
| Station Name | (0008,1010) | SH | Configuration | ALWAYS | AUTO |
| Manufacturer's Model Name | (0008,1090) | LO | SuperSonicMach40 | ALWAYS | AUTO |
| Device Serial Number | (0018,1000) | LO | Device Serial Number | ALWAYS | AUTO |
| Software Versions | (0018,1020) | LO | Software Versions | ALWAYS | AUTO |

Table A.11: General Equipment Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------|-------------|----|----------------------------------|-------------------|--------|
| Manufacturer | (0008,0070) | LO | Hologic SuperSonic Imagine SA | ALWAYS | AUTO |
| Manufacturer's Model Name | (0008,1090) | LO | SuperSonicMach40 | ALWAYS | AUTO |
| Device Serial Number | (0018,1000) | LO | Device Serial Number | ALWAYS | AUTO |
| Software Versions | (0018,1020) | LO | Software Versions | ALWAYS | AUTO |

Table A.12: Enhanced General Equipment Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|---------------------------|-------------|----|----------------------------------|-------------------|--------|
| Manufacturer | (0008,0070) | LO | Hologic SuperSonic Imagine SA | ALWAYS | AUTO |
| Manufacturer's Model Name | (0008,1090) | LO | SuperSonicMach40 | ALWAYS | AUTO |
| Device Serial Number | (0018,1000) | LO | Generated by device. | ALWAYS | AUTO |

Table A.13: Device Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--------------------------------|-------------|----|----------------------------|-------------------|--------|
| Instance Number | (0020,0013) | IS | Generated by the device | ALWAYS | AUTO |
| Patient Orientation | (0020,0020) | CS | Always empty. | EMPTY | AUTO |
| Content Date | (0008,0023) | DA | Generated by device | ALWAYS | AUTO |
| Content Time | (0008,0033) | TM | Generated by device | ALWAYS | AUTO |
| Image Type | (0008,0008) | CS | ORIGINAL, DERIVED, PRIMARY | ALWAYS | AUTO |
| Acquisition Number | (0020,0012) | IS | Generated by device | ALWAYS | AUTO |
| Acquisition Date | (0008,0022) | DA | Generated by device | ALWAYS | AUTO |
| Acquisition Time | (0008,0032) | TM | Generated by device | ALWAYS | AUTO |
| Acquisition DateTime | (0008,002A) | DT | Generated by device | ALWAYS | AUTO |
| Burned In Annotation | (0028,0301) | CS | Generated by device | ALWAYS | AUTO |
| Lossy Image Compression | (0028,2110) | CS | Generated by device | ANAP | AUTO |
| Lossy Image Compression Method | (0028,2114) | CS | Generated by device | ANAP | AUTO |
| Lossy Image Compression Ratio | (0028,2112) | CS | Generated by device | ANAP | AUTO |

Table A.14: General Image Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------|-------------|----|--------------------------------|-------------------|--------|
| Samples per Pixel | (0028,0002) | US | 3 | ALWAYS | AUTO |
| Photometric Interpretation | (0028,0004) | CS | RGB, YBR_FULL_422, MONOCHROME2 | ALWAYS | AUTO |
| Rows | (0028,0010) | US | Configuration (max 1050) | ALWAYS | AUTO |
| Columns | (0028,0011) | US | Configuration (max 1400) | ALWAYS | AUTO |
| Pixel Aspect Ratio | (0028,0034) | US | 1:1 | ALWAYS | AUTO |
| Bits Allocated | (0028,0100) | US | 8 | ALWAYS | AUTO |
| Bits Stored | (0028,0101) | US | 8 | ALWAYS | AUTO |
| High Bit | (0028,0102) | US | 7 | ALWAYS | AUTO |
| Pixel Representation | (0028,0103) | US | 0000H | ALWAYS | AUTO |
| Pixel Data | (7FE0,0010) | OW | | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | 0 | ALWAYS | AUTO |

Table A.15: Image Pixel Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------|-------------|----|-------------------------|-------------------|----------------------|
| Contrast/Bolus Agent | (0018,0010) | LO | Selected contrast agent | ANAP | AUTO |
| Contrast/Bolus Agent Sequence | (0018,0012) | SQ | Selected contrast agent | ANAP | AUTO (see Table C.2) |

Table A.16: Contrast/Bolus Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|----------------------|-------------------|--------|
| Frame Time | (0018,1063) | DS | Only for US-MF image | ANAP | AUTO |

Table A.17: Cine Module of created US Multi-frame SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------|-------------|----|----------------------|-------------------|--------|
| Number of Frames | (0028,0008) | IS | Only for US-MF image | ANAP | AUTO |
| Frame Increment Pointer | (0028,0009) | AT | Only for US-MF image | ANAP | AUTO |

Table A.18: Multi-Frame Module of created US Multi-frame SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--------------------------------|-------------|----|-------|-------------------|--------|
| Sequence of Ultrasound Regions | (0018,6011) | SQ | | ANAP | AUTO |
| >Region Location Min x0 | (0018,6018) | UL | | ANAP | AUTO |
| >Region Location Min y0 | (0018,601A) | UL | | ANAP | AUTO |
| >Region Location Max x1 | (0018,601C) | UL | | ANAP | AUTO |
| >Region Location Max y1 | (0018,601E) | UL | | ANAP | AUTO |
| >Physical Units X Direction | (0018,6024) | US | | ANAP | AUTO |
| >Physical Units Y Direction | (0018,6026) | US | | ANAP | AUTO |
| >Physical Delta X | (0018,602C) | FD | | ANAP | AUTO |
| >Physical Delta Y | (0018,602E) | FD | | ANAP | AUTO |
| >Region Spatial Format | (0018,6012) | US | | ANAP | AUTO |
| >Region Data Type | (0018,6014) | US | | ANAP | AUTO |
| >Region Flags | (0018,6016) | UL | | ANAP | AUTO |

Table A.19: US Region Calibration Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------|-------------|----|----------------------------|-------------------|--------|
| Samples per Pixel | (0028,0002) | US | 3 | ALWAYS | AUTO |
| Photometric Interpretation | (0028,0004) | CS | RGB or YBR_FULL_422 | ALWAYS | AUTO |
| Planar Configuration | (0028,0006) | US | 0 | ALWAYS | AUTO |
| Bits Allocated | (0028,0100) | US | 8 | ALWAYS | AUTO |
| Bits Stored | (0028,0101) | US | 8 | ALWAYS | AUTO |
| High Bit | (0028,0102) | US | 7 | ALWAYS | AUTO |
| Pixel Representation | (0028,0103) | US | 0000H | ALWAYS | AUTO |
| Image Type | (0008,0008) | CS | ORIGINAL, DERIVED, PRIMARY | ALWAYS | AUTO |
| Lossy Image Compression | (0028,2110) | CS | Generated by device | ANAP | AUTO |
| Ultrasound Color Data Present | (0028,0014) | CS | Generated by device | ANAP | AUTO |
| Acquisition DateTime | (0008,002A) | DT | | ALWAYS | AUTO |

Table A.20: US Image Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------|-------------|----|------------|-------------------|--------|
| Window Center | (0028,1050) | DS | Set to 127 | ANAP | CONFIG |
| Window Width | (0028,1051) | DS | Set to 254 | ANAP | CONFIG |

Table A.21: VOI LUT Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|-------------------------------|-------------------|--------|
| Conversion Type | (0008,0064) | CS | SD | ALWAYS | AUTO |
| Modality | (0008,0060) | CS | US | ALWAYS | AUTO |
| Secondary Capture Device ID | (0018,1010) | LO | Device serial number | ALWAYS | AUTO |
| Secondary Capture Device Manufacturer | (0018,1016) | LO | Hologic SuperSonic Imagine SA | ALWAYS | AUTO |
| Secondary Capture Device Manufacturer's Model Name | (0018,1018) | LO | SuperSonicMach40 | ALWAYS | AUTO |
| Secondary Capture Device Software Versions | (0018,1018) | LO | | ALWAYS | AUTO |

Table A.22: SC Equipment Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------|-------------|----|---|-------------------|--------|
| Specific Character Set | (0008,0005) | CS | See table 5.1 | ALWAYS | AUTO |
| SOP Class UID | (0008,0016) | UI | Configuration (US-SF, US-MF,encapsulated PDF) | ALWAYS | AUTO |
| SOP Instance UID | (0008,0018) | UI | | ALWAYS | AUTO |
| Instance Creator Date | (0008,0012) | DA | | ALWAYS | AUTO |
| Instance Creator Time | (0008,0013) | TM | | ALWAYS | AUTO |
| Instance Creator UID | (0008,0014) | UI | | ALWAYS | AUTO |
| Instance Number | (0020,0013) | IS | | ALWAYS | AUTO |

Table A.23: SOP Common Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------|-------------|----|-------|-------------------|--------|
| 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 |
| Burned In Annotation | (0028,0301) | CS | | ALWAYS | AUTO |

Table A.24: Encapsulated Document Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--------------------------------------|-------------|----|---|-------------------|--------|
| Instance Number | (0020,0013) | IS | | ALWAYS | AUTO |
| Preliminary Flag | (0040,A496) | CS | PRELIMINARY | ALWAYS | AUTO |
| Completion Flag | (0040,A491) | CS | PARTIAL | ALWAYS | AUTO |
| Completion Flag Description | (0040,A492) | LO | "This report precedes the final report" | ALWAYS | AUTO |
| Verification Flag | (0040,A493) | CS | UNVERIFIED | ALWAYS | AUTO |
| Content Date | (0008,0023) | DA | | ALWAYS | AUTO |
| Content Time | (0008,0033) | TM | | ALWAYS | AUTO |
| Author Observer Sequence | (0040,A078) | SQ | From Configuration | ALWAYS | AUTO |
| >Observer Type | (0040,A084) | CS | PSN | ALWAYS | AUTO |
| >Person Name | (0040,A123) | PN | From Configuration | ALWAYS | AUTO |
| >Person Identification Code Sequence | (0040,1101) | SQ | | ALWAYS | AUTO |
| >>Code Value | (0008,0100) | SH | From Configuration | ALWAYS | AUTO |
| >>Coding Scheme Designator | (0008,0102) | SH | From Configuration | ALWAYS | AUTO |
| >>Coding Scheme Version | (0008,0103) | SH | From Configuration | ALWAYS | AUTO |
| >>Code Meaning | (0008,0104) | LO | From Configuration | ALWAYS | AUTO |
| Participant Sequence | (0040,A07A) | SQ | | ALWAYS | AUTO |
| >Participation Type | (0040,A080) | CS | SOURCE | ALWAYS | AUTO |
| >Participation DateTime | (0040,A082) | DT | | ALWAYS | AUTO |
| >>Observer Type | (0040,A084) | CS | DEV | ALWAYS | AUTO |
| >>Station Name | (0008,1010) | SH | From Configuration | ALWAYS | AUTO |
| >>Device UID | (0018,1002) | UI | | ALWAYS | AUTO |
| >>Manufacturer | (0008,0070) | LO | Hologic SuperSonic Imagine SA | ALWAYS | AUTO |
| >>Manufacturer's Model Name | (0008,1090) | LO | SuperSonicMach40 | ALWAYS | AUTO |
| >>Institution Name | (0008,0080) | LO | From Configuration | ALWAYS | AUTO |
| Predecessor Documents Sequence | (0040,A360) | SQ | | ANAP | AUTO |
| >Study Instance UID | (0020,000D) | UI | | ALWAYS | AUTO |
| >Referenced Series Sequence | (0008,1115) | SQ | | ALWAYS | AUTO |
| >>Series Instance UID | (0020,000E) | UI | | ALWAYS | AUTO |

| | | | | | |
|---|-------------|----|-------------------------|--------|------|
| > >Referenced SOP Sequence | (0008,1199) | SQ | | ALWAYS | AUTO |
| > > >Referenced SOP Class UID | (0008,1150) | UI | | ALWAYS | AUTO |
| > > >Referenced SOP Instance UID | (0008,1155) | UI | | ALWAYS | AUTO |
| Referenced Request Sequence | (0040,A370) | SQ | From Modality Work-list | ALWAYS | MWL |
| >Study Instance UID | (0020,000D) | UI | | ALWAYS | AUTO |
| >Referenced Study Sequence | (0008,1110) | UI | From Modality Work-list | ALWAYS | MWL |
| >Requested Procedure Description | (0032,1060) | LO | From Modality Work-list | ALWAYS | MWL |
| >Requested Procedure Code Sequence | (0032,1064) | SQ | From Modality Work-list | ALWAYS | MWL |
| Performed Procedure Code Sequence | (0040,A372) | SQ | From Modality Work-list | ALWAYS | MWL |
| Current Requested Procedure Evidence Sequence | (0040,A375) | SQ | From Modality Work-list | ALWAYS | MWL |
| >Study Instance UID | (0020,000D) | UI | | ALWAYS | AUTO |
| >Referenced Series Sequence | (0008,1115) | SQ | | ALWAYS | AUTO |
| > >Series Instance UID | (0020,000E) | UI | | ALWAYS | AUTO |
| > >Referenced SOP Sequence | (0008,1199) | SQ | | ALWAYS | AUTO |
| > > >Referenced SOP Class UID | (0008,1150) | UI | | ALWAYS | AUTO |
| > > >Referenced SOP Instance UID | (0008,1155) | UI | | ALWAYS | AUTO |

Table A.25: SR Document General Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|------------------------------------|-----|----|-------|-------------------|--------|
| Include Table A.27 | | | | | |
| Include Table A.28 | | | | | |

Table A.26: SR Document Content Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|----------------------------------|-------------|----|-------|-------------------|--------|
| 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 |
| >Coding Scheme Version | (0008,0103) | SH | | ALWAYS | AUTO |
| >Code Meaning | (0008,0104) | LO | | ALWAYS | AUTO |
| Text Value | (0040,A160) | UT | | ANAP | AUTO |
| DateTime | (0040,A120) | DT | | ANAP | AUTO |
| Date | (0040,A121) | DA | | ANAP | AUTO |
| Time | (0040,A122) | TM | | ANAP | AUTO |
| Person Name | (0040,A123) | PN | | ANAP | AUTO |
| UID | (0040,A124) | UI | | ANAP | AUTO |
| Measured Value Sequence | (0040,A300) | SQ | | ANAP | AUTO |
| >Numeric Value | (0040,A30A) | DS | | ALWAYS | AUTO |
| >Measurement Units Code Sequence | (0040,08EA) | SQ | | ALWAYS | AUTO |
| >>Code Value | (0008,0100) | SH | | ALWAYS | AUTO |
| >>Coding Scheme Designator | (0008,0102) | SH | | ALWAYS | AUTO |
| >>Coding Scheme Version | (0008,0103) | SH | | ALWAYS | AUTO |
| >>Code Meaning | (0008,0104) | LO | | ALWAYS | AUTO |
| Concept Code Sequence | (0040,A168) | SQ | | ANAP | AUTO |
| >>Code Value | (0008,0100) | SH | | ALWAYS | AUTO |
| >>Coding Scheme Designator | (0008,0102) | SH | | ALWAYS | AUTO |
| >>Coding Scheme Version | (0008,0103) | SH | | ALWAYS | AUTO |
| >>Code Meaning | (0008,0104) | LO | | ALWAYS | AUTO |
| Continuity of Content | (0040,A050) | CS | | ANAP | AUTO |
| Content Template Sequence | (0040,A504) | SQ | | ANAP | AUTO |
| >Mapping Resource | (0008,0105) | CS | | ALWAYS | AUTO |
| >Template Identifier | (0040,DB00) | CS | | ALWAYS | AUTO |

Table A.27: Document Content Macro

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|-------------------------------------|-------------|----|-------|-------------------|--------|
| Observation Date-Time | (0040,A032) | DT | | ANAP | AUTO |
| Content Sequence | (0040,A730) | SQ | | ANAP | AUTO |
| >Relationship Type | (0040,A010) | CS | | ANAP | AUTO |
| >Include Table A.28 | | | | | |
| >Include Table A.27 | | | | | |

Table A.28: *Document Relationship Macro*

A.1.6 Extra Modules

These attributes extend the standard US Image and US Multiframe Image IODs

These attributes extend the standard Encapsulated PDF IOD.

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|------------------------|-------------------|-------------|
| Requesting Physician | (0032,1032) | PN | From Modality Worklist | VNAP | MWL |
| Medical Alerts | (0010,2000) | LO | From Modality Worklist | VNAP | MWL |
| Allergies | (0010,2110) | LO | From Modality Worklist | VNAP | MWL |
| Pregnancy Status | (0010,21C0) | CS | From Modality Worklist | VNAP | MWL |
| Presentation Intent Type | (0008,0068) | CS | | ALWAYS | AUTO |
| Last Menstrual Date | (0010,21d0) | DA | From Modality Worklist | VNAP | MWL |
| Requesting Service | (0032,1033) | LO | From Modality Worklist | VNAP | MWL |
| Special Needs | (0038,0050) | LO | From Modality Worklist | VNAP | MWL |
| Patient State | (0038,0500) | LO | From Modality Worklist | VNAP | MWL |
| Performed Location | (0040,0243) | SH | From Configuration | ALWAYS | AUTO |
| Acquisition Context Description | (0040,0556) | ST | | ALWAYS | AUTO |
| Names Of Intended Recipients Of Results | (0040,1010) | PN | From Modality Worklist | VNAP | MWL |
| Reason For The Imaging Service Request | (0040,2001) | LO | From Modality Worklist | VNAP | MWL |
| Imaging Service Request Comments | (0040,2400) | LT | From Modality Worklist | VNAP | MWL |
| Confidentiality Constraint On Patient Data Description | (0040,3001) | LO | From Modality Worklist | VNAP | MWL |
| Placer Order number/imaging service request | (0040,2016) | LO | From Modality Worklist | VNAP | MWL |
| Concatenation Frame Offset Number | (0020,9228) | UL | | VNAP | AUTO CONFIG |
| Concatenation UID | (0020,9161) | UI | | VNAP | AUTO CONFIG |
| SOP Instance UID Of Concatenation Source | (0020,0242) | UI | | VNAP | AUTO CONFIG |
| In-Concatenation Number | (0020,9162) | US | | VNAP | AUTO CONFIG |
| In-Concatenation Total Number | (0020,9163) | US | | VNAP | AUTO CONFIG |

Table A.29: Extra Module of created SOP Instances

| Attribute Name | Tag | VR | Value | Presence of Value | Source |
|--|-------------|----|------------------------|-------------------|--------|
| Requesting Physician | (0032,1032) | PN | From Modality Worklist | VNAP | MWL |
| Medical Alerts | (0010,2000) | LO | From Modality Worklist | VNAP | MWL |
| Allergies | (0010,2110) | LO | From Modality Worklist | VNAP | MWL |
| Pregnancy Status | (0010,21C0) | CS | From Modality Worklist | VNAP | MWL |
| Presentation Intent Type | (0008,0068) | CS | | ALWAYS | AUTO |
| Last Menstrual Date | (0010,21d0) | DA | From Modality Worklist | VNAP | MWL |
| Requesting Service | (0032,1033) | LO | From Modality Worklist | VNAP | MWL |
| Special Needs | (0038,0050) | LO | From Modality Worklist | VNAP | MWL |
| Patient State | (0038,0500) | LO | From Modality Worklist | VNAP | MWL |
| Performed Location | (0040,0243) | SH | From Configuration | ALWAYS | AUTO |
| Acquisition Context Description | (0040,0556) | ST | | ALWAYS | AUTO |
| Names Of Intended Recipients Of Results | (0040,1010) | PN | From Modality Worklist | VNAP | MWL |
| Reason For The Imaging Service Request | (0040,2001) | LO | From Modality Worklist | VNAP | MWL |
| Imaging Service Request Comments | (0040,2400) | LT | From Modality Worklist | VNAP | MWL |
| Confidentiality Constraint On Patient Data Description | (0040,3001) | LT | From Modality Worklist | VNAP | MWL |
| Placer Order number/imaging service request | (0040,2016) | LO | From Modality Worklist | VNAP | MWL |
| Series Date | (0008,0021) | DA | From Configuration | ALWAYS | AUTO |
| Acquisition Date | (0008,0022) | DA | From Configuration | ALWAYS | AUTO |
| Series Time | (0008,0031) | TM | From Configuration | ALWAYS | AUTO |
| Acquisition Time | (0008,0032) | TM | From Configuration | ALWAYS | AUTO |
| Performing Physician's Name | (0008,1050) | PN | User input | VNAP | AUTO |
| Operators' Name | (0008,1070) | PN | User input | VNAP | AUTO |

Table A.30: Extra Module of created SOP Instances for Encapsulated PDF IOD

A.2 Used Fields in received IOD

No SOP Class specific fields are required.

The local database, remote query and directory browsers make use of the conventional identification attributes to distinguish patients, studies, series and instances. In particular, if two patients have the same value for Patient ID, they will be treated as the same in the browser and the local database. The usage of attributes received by Modality Worklist is described in section [3.2.2.3.1.3](#).

A.3 Attribute Mapping

A.3.1 Worklist-Instances-MPPS IOD mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in Table [A.31](#). The format and conventions used are the same as the corresponding table in DICOM Part 4, Annex M.6 [DICOM].

| Modality Worklist | Image IOD | MPPS IOD |
|---|--|---|
| Patient Name | Patient Name | Patient Name |
| Patient ID | Patient ID | Patient ID |
| Issuer Of Patient ID | Issuer Of Patient ID | Issuer Of Patient ID |
| Issuer of Patient ID Qualifiers Sequence | Issuer of Patient ID Qualifiers Sequence | Issuer of Patient ID Qualifiers Sequence |
| Other Patient IDs Sequence | Other Patient IDs Sequence | — |
| Patient's Birth Date | Patient's Birth Date | Patient's Birth Date |
| Patient's Sex | Patient's Sex | Patient's Sex |
| Accession Number | Accession Number | Accession Number |
| Issuer of Accession Number Sequence | Issuer of Accession Number Sequence | Issuer of Accession Number Sequence |
| Referenced Patient Sequence | — | Referenced Patient Sequence |
| Admission ID | Admission ID | Admission ID |
| 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 |
| Placer Order Number / Imaging Service Request | — | > Placer Order Number / Imaging Service Request |

| | | |
|--|--|--|
| — | Request Attributes Sequence | — |
| Requested Procedure ID | >Requested Procedure ID | >Requested Procedure ID |
| Requested Procedure Description | Requested Procedure Description | >Requested Procedure Description |
| Scheduled Procedure Step ID | >Scheduled Procedure Step ID | >Scheduled Procedure Step ID |
| Scheduled Procedure Step Description | >Scheduled Procedure Step Description | >Scheduled Procedure Step Description |
| Scheduled Protocol Code Sequence | >Scheduled Protocol Code Sequence | >Scheduled Protocol Code Sequence |
| — | Performed Protocol Code Sequence | Performed Protocol Code Sequence |
| — | Study ID | Study ID |
| — | Performed Procedure Step ID | Performed Procedure Step ID |
| Study Date | Study Date | Performed Procedure Step Start Date |
| Study Time | Study Time | Performed Procedure Step Start Time |
| — | Study Description | Performed Procedure Step Description |
| Comments on the Scheduled Procedure Step | Comments on the Performed Procedure Step | Comments on the Performed Procedure Step |
| — | — | Performed Series Sequence |
| Scheduled Performing Physician's Name | Performing Physician's Name | >Performing Physician's Name |
| Requested Procedure Code Sequence | Procedure Code Sequence | Procedure Code Sequence, Requested Procedure Code Sequence |
| — | Referenced Study Component Sequence | — |
| — | >Referenced SOP Class UID | SOP Class UID |
| — | >Referenced SOP Instance UID | SOP Instance UID |
| — | Protocol Name | Protocol Name |

Table A.31: Attribute Mapping between Modality Worklist, Images and MPPS

A.3.2 Worklist attribute mapping in SuperSonic Mach 40’s user interface

The relationships between attributes received via Modality Worklist, fields displayed in Worklist and Patient Data window are summarized in Table A.32.

| Module Name Attribute Name | Tag | VR | VM | PDE | Worklist |
|---|-------------|----|-----|-----------------------------------|----------------------------|
| SOP Common Specific Character Set | (0008,0005) | CS | 1-n | | |
| Scheduled Procedure Step Scheduled Procedure Step Sequence | (0040,0100) | SQ | 1 | Scheduled procedure Tab | |
| > Scheduled Station AET | (0040,0001) | AE | 1-n | Station AET | |
| > Scheduled Procedure Step Start Date | (0040,0002) | DA | 1 | Step Start Date | Date |
| > Scheduled Procedure Step Start Time | (0040,0003) | TM | 1 | Step Start Time | Date |
| > Scheduled Procedure Step End Date | (0040,0004) | DA | 1 | Step End Date | |
| > Scheduled Procedure Step End Time | (0040,0005) | TM | 1 | Step End Time | |
| > Modality | (0008,0060) | CS | 1 | | |
| > Scheduled Performing Physician’s Name | (0040,0006) | PN | 1 | Sonographer | Performing Physician |
| > Scheduled Procedure Step Description | (0040,0007) | LO | 1 | Step Description | |
| > Scheduled Station Name | (0040,0010) | SH | 1-n | Station Name | Scheduled Station Name |
| > Scheduled Procedure Step Location | (0040,0011) | SH | 1 | Location | Scheduled Station Location |
| > Scheduled Protocol Code Sequence | (0040,0008) | SQ | 1 | Scheduled Protocol Code Sequence | |
| > Pre-Medication | (0040,0012) | LO | 1 | Pre-Medication | |
| > Scheduled Procedure Step ID | (0040,0009) | SH | 1 | Step ID | |
| > Requested Contrast Agent | (0032,1070) | LO | 1 | Contrast Agent | |
| > Scheduled Procedure Step status | (0040,0020) | CS | 1 | Step status | |
| > Comments on the Scheduled Procedure Step | (0040,0400) | LT | 1 | Comments | |
| Requested Procedure Requested Procedure ID | (0040,1001) | SH | 1 | Requested ID | Exam |
| Requested Procedure Description | (0032,1060) | LO | 1 | Procedure Description | |
| Reason for the Requested Procedure | (0040,1002) | LO | 1 | Reason for Procedure | |
| Study Instance UID | (0020,000D) | UI | 1 | Study Instance UID | |
| Referenced Study Sequence | (0008,1110) | SQ | 1 | Referenced Study Sequence | |
| > Referenced SOP Class UID | (0008,1150) | UI | 1 | SOP Class UID | |
| > Referenced SOP Instance UID | (0008,1155) | UI | 1 | SOP Instance UID | |
| Requested Procedure Priority | (0040,1003) | SH | 1 | | |
| Patient Transport Arrangements | (0040,1004) | LO | 1 | | |
| Requested Procedure Code Sequence | (0032,1064) | SQ | 1 | Requested Procedure Code Sequence | |
| Names of intended recipients of results | (0040,1010) | PN | 1-n | Recipients | |
| Requested Procedure Comments | (0040,1400) | LT | 1 | Comments | |
| Imaging Service Request Accession Number | (0008,0050) | SH | 1 | Accession # | Accession Number |
| Requesting Physician | (0032,1032) | PN | 1 | Requesting MD | |
| Referring Physician’s Name | (0008,0090) | PN | 1 | Referring MD | |
| Requesting Service | (0032,1033) | LO | 1 | Requesting Service | |
| Reason for the Imaging Service Request (RET) | (0040,2001) | LO | 1 | Reason | |
| Imaging service request comments | (0040,2400) | LT | 1 | comments | |
| Placer Order number/imaging service request | (0040,2016) | LO | 1 | | |
| Visit Identification Admission ID | (0038,0010) | LO | 1 | Admission ID | |
| Visit Status Current Patient Location | (0038,0300) | LO | 1 | Patient Location | |
| Visit Relationship Referenced Patient Sequence | (0008,1120) | SQ | 1 | Referenced Patient Sequence | |

| | | | | | |
|--|-------------|----|-----|-------------------------------|------------|
| > Referenced SOP Class UID | (0008,1150) | UI | 1 | SOP Class UID | |
| > Referenced SOP Instance UID | (0008,1155) | UI | 1 | SOP Instance UID | |
| Patient Identification | | | | | |
| Patient Name | (0010,0010) | PN | 1 | Last Name, First Name, MI | Name |
| Patient ID | (0010,0020) | LO | 1 | Patient ID | Patient ID |
| Issuer of Patient ID | (0010,0021) | LO | 1 | | |
| Other Patient IDs | (0010,1000) | LO | 1-n | Other ID | |
| Patient Demographic | | | | | |
| Patient's Birth Date | (0010,0030) | DA | 1 | Date of Birth | |
| Patient's Birth time | (0010,0032) | TM | 1 | | |
| Patient's Sex | (0010,0040) | CS | 1 | Gender | Gender |
| Patient's Weight | (0010,1030) | DS | 1 | Weight | |
| Patient's Size | (0010,1020) | DS | 1 | Height | |
| Confidentiality constraint on patient data | (0040,3001) | LO | 1 | | |
| Patient comments | (0010,4000) | LT | 1 | Comments | |
| Ethnic Group | (0010,2160) | SH | 1 | | |
| Patient Medical | | | | | |
| Patient State | (0038,0500) | LO | 1 | Patient State | |
| Pregnancy Status | (0010,21C0) | US | 1 | Pregnancy Status & Pregnant | |
| Medical Alerts | (0010,2000) | LO | 1-n | Medical Alerts | |
| Allergies | (0010,2110) | LO | 1-n | Allergies | |
| Special Needs | (0038,0050) | LO | 1 | Special Needs | |
| Additional patient History | (0010,21B0) | LT | 1 | | |
| Last Menstrual Date | (0010,21D0) | DA | 1 | Last Menstrual Date& LMP& LMP | |

Table A.32: Attribute Mapping between Modality Worklist, Worklist and Patient Data windows

A.4 Coerced/Modified Fields

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

When the "Image De-Identification" option is enabled the attributes described in Table A.33 will be altered.

A.5 Attribute anonymization

In order to meet United States Health Insurance Portability and Accountability Act of 1996 (HIPAA) Safe-Harbor De-Identification Guidelines and European's GDPR regulations, SuperSonic Mach 40 supports basic anonymization. Anonymization is achieved by the following means:

- Attributes to be protected are either removed from the dataset, or have their values replaced by a different "replacement value" that does not allow identification of the patient;
- Attribute specified to be retained are retained;

- The attribute Patient Identity Removed (0012,0062) is added to the dataset with a value of "YES", De-identification Method (0012,0063) is added with the value "Limited Data Set" and De-identification Method Code Sequence (0012,0064) is added with the value "Basic Application Confidentiality Profile" from CID 7050. De-identification Method.
- If the Dataset being de-identified is being stored within a DICOM File, then the File Meta Information are also anonymized

The option to de-identify is available at the time of export for the manual send to media (USB and CD/DVD) and for manual send to DICOM Store . Please note that anonymization of "image pixel data" is ultimately the responsibility of the anonymization site even if SuperSonic Mach 40 is used to anonymize the data. Anonymization of data burned into the image itself (ie, image pixel data) is notoriously difficult. Review of all such images for accurate anonymization is strongly recommended.

Table A.33 list the attributes altered during anonymization and the method used. This table is derived from DICOM 2018b PS3.15 Annex E, Table E.1-1.

| Attribute Name | Tag | De-Identification Method |
|--|-------------|--------------------------|
| Accession Number | (0008,0050) | De-Identified value |
| Acquisition Date | (0008,0022) | De-Identified value |
| Acquisition DateTime | (0008,002A) | De-Identified value |
| Acquisition Time | (0008,0032) | De-Identified value |
| Additional Patient's History | (0010,21B0) | Removed |
| Admission ID | (0038,0010) | Removed |
| Allergies | (0010,2110) | Removed |
| Author Observer Sequence | (0040,A078) | Removed |
| Comments on the Performed Procedure Step | (0040,0280) | Removed |
| Confidentiality Constraint on Patient Data Description | (0040,3001) | Removed |
| Content Date | (0008,0023) | De-Identified value |
| Content Time | (0008,0033) | De-Identified value |
| Content Sequence | (0040,0512) | Removed |
| Contrast Bolus Agent | (0018,0010) | Empty Value |
| Ethnic Group | (0010,2160) | Removed |
| Filler Order Number/Imaging ServiceRequest | (0040,2017) | Empty Value |
| Imaging Service Request Comments | (0040,2400) | Removed |
| Instance Creator UID | (0008,0014) | De-Identified value |
| Institution Address | (0008,0081) | Removed |
| Institution Code Sequence | (0008,0082) | Removed |
| Institution Name | (0008,0080) | Removed |
| Institutional Department Name | (0008,1040) | Removed |
| Issuer of Admission ID | (0038,0011) | Removed |
| Issuer of Patient ID | (0010,0021) | Removed |
| Last Menstrual Date | (0010,21D0) | Removed |
| Media Storage SOP Instance UID | (0002,0003) | De-Identified value |
| Medical Alerts | (0010,2000) | Removed |
| Name of Physician(s) Reading Study | (0008,1060) | Removed |
| Names of Intended Recipient of Results | (0040,1010) | Removed |
| Operators' Name | (0008,1070) | Removed |
| Other Patient IDs | (0010,1000) | Removed |
| Other Patient IDs Sequence | (0010,1002) | Removed |
| Other Patient Names | (0010,1001) | Removed |
| Patient Comments | (0010,4000) | Removed |

| | | |
|--|-------------|---|
| Patient State | (0038,0500) | Removed |
| Patient ID | (0010,0020) | De-Identified value |
| Patient's Age | (0010,1010) | Value Kept |
| Patient's Birth Date | (0010,0030) | Empty Value |
| Patient's Birth Time | (0010,0032) | Removed |
| Patient's Name | (0010,0010) | De-Identified value "Anonymous Anonymous" |
| Patient's Sex | (0010,0040) | Empty Value |
| Patient's Size | (0010,1020) | Removed |
| Patient's Weight | (0010,1030) | Removed |
| Performed Location | (0040,0243) | Removed |
| Performed Procedure Step Description | (0040,0254) | Removed |
| Performed Procedure Step End Date | (0040,0250) | Removed |
| Performed Procedure Step End DateTime | (0040,4051) | Removed |
| Performed Procedure Step End Time | (0040,0251) | Removed |
| Performed Procedure Step ID | (0040,0253) | Removed |
| Performed Procedure Step Start Date | (0040,0244) | Removed |
| Performed Procedure Step Start DateTime | (0040,4050) | Removed |
| Performed Procedure Step Start Time | (0040,0245) | Removed |
| Performed Station AE Title | (0040,0241) | Removed |
| Performed Station Name | (0040,0242) | Removed |
| Performing Physicians' Name | (0008,1050) | Removed |
| Physician(s) Reading Study Identification Sequence | (0008,1062) | Removed |
| Physician(s) of Record | (0008,1048) | Removed |
| Placer Order Number / Imaging Service Request | (0040,2016) | Removed |
| Pregnancy Status | (0010,21C0) | Removed |
| Private attributes | (gggg,eeee) | (where gggg) is odd Value Kept |
| Protocol Name | (0018,1030) | Removed |
| Referenced Performed Procedure Step Sequence | (0008,1111) | Removed |
| Referenced SOP Instance UID | (0008,1155) | De-Identified value |
| Referenced Study Sequence | (0008,1110) | Removed |
| Referring Physician's Name | (0008,0090) | Empty Value |
| Request Attributes Sequence | (0040,0275) | Removed |
| Requested Procedure Comments | (0040,1400) | Removed |
| Requested Procedure Description | (0032,1060) | Removed |
| Requested Procedure ID | (0040,1001) | Removed |
| Requesting Physician | (0032,1032) | Removed |
| Requesting Service | (0032,1033) | Removed |
| Scheduled Procedure Step Description | (0040,0007) | Removed |
| Series Date | (0008,0021) | De-Identified value |
| Series Description | (0008,103E) | Removed |
| Series Instance UID | (0020,000E) | De-Identified value |
| Series Time | (0008,0031) | De-Identified value |
| SOP Instance UID | (0008,0018) | De-Identified value |
| Station Name | (0008,1010) | Removed |
| Study Comments | (0032,4000) | Removed |
| Study Date | (0008,0020) | De-Identified value |
| Study Description | (0008,1030) | Removed |
| Study ID | (0020,0010) | Empty Value |
| Study Instance UID | (0020,000D) | De-Identified value |
| Study Time | (0008,0030) | De-Identified value |

Table A.33: *De-Identified attributes*



Data Dictionary of Private Attributes

If appropriate options are set the SuperSonic Mach 40 may include private attributes in the US Image IODs. The Private Attributes added to created SOP Instances are listed in the Table [B.1](#). SuperSonic Mach 40 reserves blocks of private attributes in groups 2FF1 and 8FF1. Further details on usage of these private attributes are contained in Section [A](#).

| Name | Description | Tag | VR | VM | Value |
|---|--|-------------|----|-----|-------------------------------|
| Contrast Quantification Private Creator | Private creator data element | (2FF1,0060) | LO | 1 | SSI Contrast Quantification |
| Contrast Quantification Version | Private Creator Data Version | (2FF1,6001) | LO | 1 | 1.0 |
| Region Location Min X2 | Location of the Contrast image (pixel coordinates) | (2FF1,6018) | IS | 1 | |
| Region Location Min Y2 | Location of the Contrast image (pixel coordinates) | (2FF1,601A) | IS | 1 | |
| Region Location Min X3 | Location of the Contrast image (pixel coordinates) | (2FF1,601C) | IS | 1 | |
| Region Location Min Y3 | Location of the Contrast image (pixel coordinates) | (2FF1,601E) | IS | 1 | |
| Region Location Min X4 | Location of the Contrast image (pixel coordinates) | (2FF1,6019) | IS | 1 | |
| Region Location Min Y4 | Location of the Contrast image (pixel coordinates) | (2FF1,601B) | IS | 1 | |
| Region Location Min X5 | Location of the B-Mode image (pixel coordinates) | (2FF1,601D) | IS | 1 | |
| Region Location Min Y5 | Location of the B-Mode image (pixel coordinates) | (2FF1,601F) | IS | 1 | |
| Log-Compression Method | Method used for the Log-compression | (2FF1,6031) | IS | 1 | |
| Anti-Log Law Vector / Coefficient Table | Inverse log-compression law for data linearization | (2FF1,6032) | FL | 256 | |
| TGC Contrast Gain Vector | Unit: dB | (2FF1,6032) | DS | 256 | |
| Palette Name | | (2FF1,6035) | LO | 1 | |
| Contrast Red Palette Data | Contrast palette RGB values | (2FF1,6036) | IS | 256 | |
| Contrast Green Palette Data | Contrast palette RGB values | (2FF1,6037) | IS | 256 | |
| Contrast Blue Palette Data | Contrast palette RGB values | (2FF1,6038) | IS | 256 | |
| Transducer name | | (2FF1,6040) | LO | 1 | |
| SSI Q Private Creator | Private creator data element for header | (8FF1,0013) | LO | 1 | SSI Rich Quantification Group |
| SSI Q Blob | Binary data | (8FF1,1301) | OB | 1 | |
| SSI Image enhancement Private Creator | Private creator data element for header | (8FF1,0013) | LO | 1 | SSI Image enhancement Group |
| Gamma Value | Gamma Value | (8FF1,1401) | DS | 1 | |
| SSI Image enhancement Group Version | Private Creator Data Version | (8FF1,1410) | LO | 1 | 2.0 |
| RGB LUT | RGB LUT | (8FF1,1420) | IS | 256 | LUT values |
| LUT Description | LUT Description | (8FF1,1424) | LO | 1 | |

Table B.1: Data Dictionary of Private Attributes



Coded Terminology and Templates

C.1 Context Groups

The Workflow AE is capable of supporting arbitrary coding schemes for Procedure and Protocol Codes. The contents of Requested Procedure Code Sequence (0032,1064) and Scheduled Protocol Code Sequence (0040,0008) supplied in Worklist Items will be mapped to Image IOD and MPPS attributes as described in Table A.32.

As shown in Table C.1, the contents of Performed Procedure Step Discontinuation Reason Code Sequence (0040,0281) for a discontinued MPPS will be filled with a code selected by the user from a fixed list corresponding to Context Group 9300. The Ultrasound Contrast/Bolus Agents codes used by SuperSonic Mach 40 are described in Table C.2. Besides, since SuperSonic Mach 40 has the ability to export structured report, a subset of the context groups described in TID 5000 OB-GYN Ultrasound Procedure Report and/or TID 5200 Vascular Ultrasound Procedure Report may also be used.

| Context Group | Default Value Set | Configurable | Use |
|---|--|--------------|---|
| Procedure Discontinuation Reasons | Subset of CID 9300 (CID 9302 not included) | No | Mapped from popup window "Cancel Exam". Used in Performed Procedure Step Discontinuation Reason Code Sequence (0040,0281). User can select one item from the list. Default value is "Doctor cancelled procedure".(see Table C.3 |
| Ultrasound Contrast/Bolus Agents | CID 12030. | No | Ultrasound IOD(see Table C.2) |
| OB-GYN Dates | CID 12003 | No | OB-GYN Ultrasound Procedure Report (see Table D.1) |
| Fetal Biometry Ratios | CID 12004 | No | OB-GYN Ultrasound Procedure Report (see Table D.2) |
| Fetal Biometry Measurements | CID 12005 | No | OB-GYN Ultrasound Procedure Report (see Table D.3) |
| Fetal Long Bones Biometry Measurements | CID 12006 | No | OB-GYN Ultrasound Procedure Report (see Table D.4) |
| Fetal Cranium | CID 12007 | No | OB-GYN Ultrasound Procedure Report (see Table D.5) |
| OB-GYN Amniotic Sac | CID 12008 | No | OB-GYN Ultrasound Procedure Report (see Table D.6) |
| Early Gestation Biometry Measurements | CID 12009 | No | OB-GYN Ultrasound Procedure Report (see Table D.7) |
| Ultrasound Pelvis and Uterus | CID 12011 | No | OB-GYN Ultrasound Procedure Report (see Table D.8) |
| OB Equations and Tables | CID 12012 | No | OB-GYN Ultrasound Procedure Report (see Table D.17) |
| Gestational Age Equations and Tables | CID 12013 | No | OB-GYN Ultrasound Procedure Report (see Table D.17) |
| OB Fetal Body Weight Equations and Tables | CID 12014 | No | OB-GYN Ultrasound Procedure Report (see Table D.17) |

| | | | |
|--|-----------|----|---|
| Fetal Growth Equations and Tables | CID 12015 | No | OB-GYN Ultrasound Procedure Report (see Table D.17) |
| Estimated Fetal Weight Percentile Equations and Tables | CID 12016 | No | OB-GYN Ultrasound Procedure Report (see Table D.17) |
| OB-GYN Summary | CID 12018 | No | OB-GYN Ultrasound Procedure Report (see Table D.9) |
| OB-GYN Fetus Summary | CID 12019 | No | OB-GYN Ultrasound Procedure Report (see Table D.10) |
| Measurement Orientation | CID 12118 | No | OB-GYN Ultrasound Procedure Report (see Table D.11) |
| Vascular Ultrasound Property | CID 12119 | No | OB-GYN Ultrasound Procedure Report (see Table ??) |
| Blood Velocity Measurements by Ultrasound | CID 12120 | No | OB-GYN Ultrasound Procedure Report (see Table E.16) |
| Vascular Indices and Ratios | CID 12121 | No | OB-GYN Ultrasound Procedure Report (see Table E.17) |
| Other Vascular Properties | CID 12122 | No | OB-GYN Ultrasound Procedure Report (see Table E.18) |
| Pelvic Vasculature Anatomical Location | CID 12140 | No | OB-GYN Ultrasound Procedure Report (see Table D.12) |
| Fetal Vasculature Anatomical Location | CID 12141 | No | OB-GYN Ultrasound Procedure Report (see Table D.13) |
| Measurement Type | CID 3627 | No | OB-GYN Ultrasound Procedure Report (see Table E.21) |
| Equation or Table | CID 228 | No | OB-GYN Ultrasound Procedure Report (see Table D.15) |
| Laterality | CID 244 | No | OB-GYN Ultrasound Procedure Report (see Table E.23) |
| Extracranial Arteries | CID 12104 | No | Vascular Ultrasound Procedure Report (see Table E.1) |
| Intracranial Cerebral Vessels | CID 12105 | No | Vascular Ultrasound Procedure Report (see Table E.2) |
| Intracranial Cerebral Vessels (unilateral) | CID 12106 | No | Vascular Ultrasound Procedure Report (see Table E.3) |
| Upper Extremity Arteries | CID 12107 | No | Vascular Ultrasound Procedure Report (see Table E.4) |
| Upper Extremity Veins | CID 12108 | No | Vascular Ultrasound Procedure Report (see Table E.5) |
| Lower Extremity Arteries | CID 12109 | No | Vascular Ultrasound Procedure Report (see Table E.6) |
| Lower Extremity Veins | CID 12110 | No | Vascular Ultrasound Procedure Report (see Table E.7) |
| Abdominopelvic Arteries (lateral) | CID 12111 | No | Vascular Ultrasound Procedure Report (see Table E.8) |
| Abdominopelvic Arteries (unilateral) | CID 12112 | No | Vascular Ultrasound Procedure Report (see Table E.9) |
| Abdominopelvic Veins (lateral) | CID 12113 | No | Vascular Ultrasound Procedure Report (see Table E.10) |
| Abdominopelvic Veins (unilateral) | CID 12114 | No | Vascular Ultrasound Procedure Report (see Table E.11) |
| Renal Vessels | CID 12115 | No | Vascular Ultrasound Procedure Report (see Table E.12) |
| Vessel Segment Modifiers | CID 12116 | No | Vascular Ultrasound Procedure Report (see Table E.13) |
| Vessel Branch Modifiers | CID 12117 | No | Vascular Ultrasound Procedure Report (see Table E.14) |
| Carotid Ratios | CID 12123 | No | Vascular Ultrasound Procedure Report (see Table E.19) |
| Renal Ratios | CID 12124 | No | Vascular Ultrasound Procedure Report (see Table E.20) |
| Measurement Type | CID 3627 | No | Vascular Ultrasound Procedure Report (see Table E.21) |
| Equation or Table | CID 228 | No | Vascular Ultrasound Procedure Report (see Table E.22) |

Table C.1: Context Groups

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|----------|------------|--------------------------|--------------|--------------|
| Sonazoid | 125905 | DCM | 20090409 | Sonazoid |
| SonoVue | 125906 | DCM | 20090409 | SonoVue |

Table C.2: CID 12030 Ultrasound Contrast/Bolus Agents

C.2 Template Specifications

SuperSonic Mach 40 supports the root Templates described in Table C.4.

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--|------------|--------------------------|--------------|--|
| Doctor canceled procedure | 110500 | DCM | 20140419 | Doctor canceled procedure |
| Equipment failure | 110501 | DCM | 20140419 | Equipment failure |
| Incorrect procedure ordered | 110502 | DCM | 20140419 | Incorrect procedure ordered |
| Patient allergic to media/contrast | 110503 | DCM | 20140419 | Patient allergic to media/contrast |
| Patient died | 110504 | DCM | 20140419 | Patient died |
| Patient refused to continue procedure | 110505 | DCM | 20140419 | Patient refused to continue procedure |
| Patient taken for treatment or surgery | 110506 | DCM | 20140419 | Patient taken for treatment or surgery |
| Patient did not arrive | 110507 | DCM | 20140419 | Patient did not arrive |
| Patient pregnant | 110508 | DCM | 20140419 | Patient pregnant |
| Change of procedure for correct charging | 110509 | DCM | 20140419 | Change of procedure for correct charging |
| Duplicate order | 110510 | DCM | 20140419 | Duplicate order |
| Nursing unit cancel | 110511 | DCM | 20140419 | Nursing unit cancel |
| Incorrect side ordered | 110512 | DCM | 20140419 | Incorrect side ordered |
| Discontinued for unspecified reason | 110513 | DCM | 20140419 | Discontinued for unspecified reason |
| Incorrect worklist entry selected | 110514 | DCM | 20140419 | Incorrect worklist entry selected |
| Patient condition prevented continuing | 110515 | DCM | 20140419 | Patient condition prevented continuing |
| Equipment change | 110516 | DCM | 20140419 | Equipment change |

Table C.3: CID 9300 Procedure Discontinuation Reasons

| SOP Class | Template ID | Template Name | Use |
|------------------|-------------|--|--------|
| Comprehensive SR | 5000 | "OB-GYN Ultrasound Procedure Report" (see annex D) | Create |
| Comprehensive SR | 5100 | "Vascular Ultrasound Report" (see annex E) | Create |

Table C.4: Structured Report Root Templates

C.3 Private Code definitions

The private codes used in OB-GYN Structured report by SuperSonic Mach 40 are described in Table C.5. The private codes used in Vascular Structured report by SuperSonic Mach 40 are described in Table C.6.

| Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|--------------------------|--------------|------------------------------|
| SSI-666-2 | SMS | 20030130 | AC by GA, CFEF 2000 |
| SSI-666-5 | SMS | 20030130 | FL by GA, CFEF 2000 |
| SSI-666-7 | SMS | 20061024 | GA by AC, CFEF 2000 |
| SSI-666-9 | SMS | 20061024 | GA by BPD, CFEF 2000 |
| SSI-666-11 | SMS | 20061024 | GA by FL, CFEF 2000 |
| SSI-666-13 | SMS | 20061024 | GA by HC, CFEF 2000 |
| SSI-666-15 | SMS | 20061024 | GA by TAD, CFEF 2000 |
| SSI-666-17 | SMS | 20030130 | HC by GA, CFEF 2000 |
| SSI-666-19 | SMS | 20030130 | TAD by GA, CFEF 2000 |
| SSI-666-21 | SMS | 20061024 | GA by FL, ASUM 2000 |
| SSI-666-37 | SMS | 20030130 | CRL by GA, Hansmann 1986 |
| SSI-666-38 | SMS | 20030130 | EFW by AC, BPD, Merz 1991 |
| SSI-666-45 | SMS | 20030130 | EFW by GA, Hadlock 1991 |
| SSI-666-46 | SMS | 20030130 | EFW by GA, Doubilet 1997 |
| SSI-666-47 | SMS | 20030130 | EFW by GA, Oken Male 2003 |
| SSI-666-48 | SMS | 20030130 | EFW by GA, Oken Female 2003 |
| SSI-666-49 | SMS | 20030130 | EFW by GA, Oken All 2003 |
| SSI-666-50 | SMS | 20160830 | EWP by GA, CFEF Massoud 2015 |
| SSI-666-51 | SMS | 20160830 | BPD by GA, CFEF 2006 |

| | | | |
|------------|-----|----------|------------------------------------|
| SSI-666-52 | SMS | 20160830 | BPDoi by GA, ISUOG Leung 2008 |
| SSI-666-53 | SMS | 20160830 | BPDoo by GA, ISUOG Leung 2008 |
| SSI-666-54 | SMS | 20160830 | FL by GA, ISUOG Leung 2008 |
| SSI-666-55 | SMS | 20160830 | GA by BPDoi, ISUOG Leung 2008 |
| SSI-666-56 | SMS | 20160830 | GA by BPDoo, ISUOG Leung 2008 |
| SSI-666-57 | SMS | 20160830 | GA by FL, ISUOG Leung 2008 |
| SSI-666-58 | SMS | 20160830 | GA by HC, ISUOG Leung 2008 |
| SSI-666-59 | SMS | 20160830 | HC by GA, ISUOG Leung 2008 |
| SSI-666-60 | SMS | 20160830 | GA by CRL, ISUOG Sahota 2009 |
| SSI-666-61 | SMS | 20160830 | HL by GA, Jeanty 1982 |
| SSI-666-62 | SMS | 20160830 | TIB by GA, Jeanty 1982 |
| SSI-666-64 | SMS | 20160830 | GA by CRL, McLeannan Schluter 2008 |
| SSI-666-65 | SMS | 20160830 | GA by CRL, Robinson Fleming 1975 |
| SSI-666-66 | SMS | 20160830 | GA by CRL, Verburg 2008 |
| SSI-666-67 | SMS | 20160830 | CRL by GA, Hadlock 1992 |

Table C.5: *OB-Gyn Private code*

| Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|--------------------------|--------------|--------------------------|
| SSI-666-74 | SMS | 20160830 | Post Void Bladder Volume |
| SSI-666-39 | SMS | 20030130 | MCA/Dist ICA |

Table C.6: *Vascular Private code*



OB-GYN Ultrasound Procedure Report

OB-GYN Ultrasound Procedure Reports are always created when images are acquired with the following preset:

- GYN;
- Early OB;
- Gen OB.

They are pushed to any DICOM Store in accordance with the "Enable export of SR OB-GYN" option.

D.1 OB-Gyn measurements

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--------------------|-------------------------|--------------------------|--------------|---------------------------------|
| EDD | 11778-8 | LN | 20030130 | EDD |
| EDD from LMP | 11779-6 | LN | 20030130 | EDD from LMP |
| EDD from AUA | 11781-2 | LN | 20030130 | EDD from average ultrasound age |
| EDD from ovulation | 11780-4 | LN | 20030130 | EDD from ovulation date |
| LMP | 11955-2 | LN | 20030130 | LMP |
| Ovulation date | 11976-8 | LN | 20030130 | Ovulation date |
| DOC | 33067-0 | LN | 20030130 | Conception Date |

Table D.1: *CID 12003 OB-GYN Dates*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|----------------|------------|--------------------------|--------------|----------------|
| HC/AC Ratio | 11947-9 | LN | 20030130 | HC/AC |
| FL/AC Ratio | 11871-1 | LN | 20030130 | FL/AC |
| FL/BPD Ratio | 11872-9 | LN | 20030130 | FL/BPD |
| Cephalic Index | 11823-2 | LN | 20030130 | Cephalic Index |
| FL/HC Ratio | 11873-7 | LN | 20030130 | FL/HC |

Table D.2: CID 12004 Fetal Biometry Ratios

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|---------------------------------------|------------|--------------------------|--------------|---------------------------------------|
| Abdominal Circumference | 11979-2 | LN | 20030130 | Abdominal Circumference |
| Anterior-Posterior Abdominal Diameter | 11818-2 | LN | 20030130 | Anterior-Posterior Abdominal Diameter |
| Anterior-Posterior Trunk Diameter | 11819-0 | LN | 20030130 | Anterior-Posterior Trunk Diameter |
| Biparietal Diameter | 11820-8 | LN | 20030130 | Biparietal Diameter |
| Biparietal Diameter Area Corrected | 11824-0 | LN | 20030130 | BPD area corrected |
| Cisterna Magna Length | 11860-4 | LN | 20030130 | Cisterna Magna |
| Femur Length | 11963-6 | LN | 20030130 | Femur Length |
| Foot Length | 11965-1 | LN | 20030130 | Foot length |
| Head Circumference | 11984-2 | LN | 20030130 | Head Circumference |
| Occipital Frontal Diameter | 11851-3 | LN | 20030130 | Occipital-Frontal Diameter |
| Thoracic Circumference | 11988-3 | LN | 20030130 | Thoracic Circumference |
| Thoracic Area | 33068-8 | LN | 20030130 | Thoracic Area |
| Transverse Abdominal Diameter | 11862-0 | LN | 20030130 | Tranverse Abdominal Diameter |
| Trans Cerebellar Diameter | 11863-8 | LN | 20030130 | Trans Cerebellar Diameter |
| Transverse Thoracic Diameter | 11864-6 | LN | 20030130 | Transverse Thoracic Diameter |
| Left Kidney Height | 11853-9 | LN | 20030130 | Left Kidney thickness |
| Left Kidney length | 11834-9 | LN | 20030130 | Left Kidney length |
| Left Kidney width | 11825-7 | LN | 20030130 | Left Kidney width |
| Right Kidney Height | 11855-4 | LN | 20030130 | Right Kidney thickness |
| Right Kidney length | 11836-4 | LN | 20030130 | Right Kidney length |
| Right Kidney width | 11827-3 | LN | 20030130 | Right Kidney width |
| APADxTAD | 33191-8 | LN | 20030130 | APAD * TAD |
| Fetal Ear - left Maximum length | 53684-7 | LN | 20030130 | Fetal Ear - left Maximum length |
| Fetal Ear - right Maximum length | 53668-0 | LN | 20030130 | Fetal Ear - right Maximum length |

Table D.3: CID 12005 Fetal Biometry Measurements

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------|------------|--------------------------|--------------|-----------------|
| Humerus Length | 11966-9 | LN | 20030130 | Humerus length |
| Radius Length | 11967-7 | LN | 20030130 | Radius length |
| Ulna Length | 11969-3 | LN | 20030130 | Ulna length |
| Tibia Length | 11968-5 | LN | 20030130 | Tibia length |
| Fibula Length | 11964-4 | LN | 20030130 | Fibula length |
| Clavicle Length | 11962-8 | LN | 20030130 | Clavicle length |
| Femur Length | 11963-6 | LN | 20030130 | Femur Length |

Table D.4: CID 12006 Fetal Long Bones Biometry Measurements

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--|------------|--------------------------|--------------|--|
| Lateral Ventricular width | 12171-5 | LN | 20030130 | Lateral Ventricle width |
| Cisterna Magna length | 11860-4 | LN | 20030130 | Cisterna Magna length |
| Nuchal Fold thickness | 12146-7 | LN | 20030130 | Nuchal Fold thickness |
| Inner Orbital Diameter | 33070-4 | LN | 20030130 | Inner Orbital Diameter |
| Outer Orbital Diameter | 11629-3 | LN | 20030130 | Outer Orbital Diameter |
| Trans Cerebellar Diameter | 11863-8 | LN | 20030130 | Trans Cerebellar Diameter |
| Nuchal Translucency | 33069-6 | LN | 20030130 | Nuchal Translucency |
| Anterior Horn Lateral Ventricular Width | 33197-5 | LN | 20030130 | Anterior Horn Lateral ventricular width |
| Posterior Horn Lateral Ventricular Width | 33196-7 | LN | 20030130 | Posterior Horn Lateral ventricular width |
| Hemisphere Width | 12170-7 | LN | 20030130 | Width of Hemisphere |

Table D.5: *CID 12007 Fetal Cranium*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------------------|------------|--------------------------|--------------|--------------------------|
| Amniotic Fluid Quadrant 1 Diameter | 11624-4 | LN | 20030130 | First Quadrant Diameter |
| Amniotic Fluid Quadrant 2 Diameter | 11626-9 | LN | 20030130 | Second Quadrant Diameter |
| Amniotic Fluid Quadrant 3 Diameter | 11625-1 | LN | 20030130 | Third Quadrant Diameter |
| Amniotic Fluid Quadrant 4 Diameter | 11623-6 | LN | 20030130 | Fourth Quadrant Diameter |

Table D.6: *CID 12008 OB-GYN Amniotic Sac*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--------------------------|------------|--------------------------|--------------|--------------------------|
| Crown Rump Length | 11957-8 | LN | 20030130 | Crown Rump Length |
| Gestational Sac Diameter | 11850-5 | LN | 20030130 | Gestational Sac Diameter |
| Spine Length | 33071-2 | LN | 20030130 | Spine Length |
| Yolk Sac Diameter | 11816-6 | LN | 20030130 | Yolk Sac length |
| Nuchal Translucency | 33069-6 | LN | 20030130 | Nuchal Translucency |

Table D.7: *CID 12009 Early Gestation Biometry Measurements*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------------|------------|--------------------------|--------------|-----------------------|
| Cervix Length | 11961-0 | LN | 20030130 | Cervix Length |
| Endometrium Thickness | 12145-9 | LN | 20030130 | Endometrium Thickness |

Table D.8: *CID 12011 Ultrasound Pelvis and Uterus*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------------------------|------------|--------------------------|--------------|-----------------------------------|
| Number of Fetuses by US | 11878-6 | LN | 20030130 | Number of Fetuses by US |
| GA by ovulation date | 11886-9 | LN | 20030130 | Gestational Age by ovulation date |

Table D.9: *CID 12018 OB-GYN Summary*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------|------------|--------------------------|--------------|--------------------------|
| GA | 11815-9 | LN | 20030130 | Gestational Age |
| Average Ultrasound Age | 11888-5 | LN | 20030130 | Composite Ultrasound Age |
| GA by LMP | 11885-1 | LN | 20030130 | Gestational Age by LMP |
| Estimated Fetal Weight | 11727-5 | LN | 20030130 | Estimated Weight |
| Fetal Heart rate | 11948-7 | LN | 20030130 | Fetal Heart Rate |

Table D.10: CID 12019 OB-GYN Fetus Summary

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--------------------|------------|--------------------------|--------------|--------------------|
| Anterior-Posterior | 122675 | DCM | 20110125 | Anterior-Posterior |

Table D.11: CID 12118 Measurement Orientation

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------------|------------|--------------------------|--------------|------------------------------|
| Umbilical Artery | T-F1810 | SRT | 20040322 | Umbilical Artery |
| Umbilical Vein | T-F1820 | SRT | 20040322 | Umbilical Vein |
| Ovarian Artery | T-46980 | SRT | 20040322 | Ovarian Artery |
| Ovarian Vein | T-48780 | SRT | 20040322 | Ovarian Vein |
| Uterine Artery | T-46820 | SRT | 20040322 | Uterine Artery |
| Uterine Vein | T-49010 | SRT | 20040322 | Uterine Vein |
| Vitelline Artery of Placenta | T-F1412 | SRT | 20040322 | Vitelline Artery of Placenta |
| Vitelline Vein of Placenta | T-F1413 | SRT | 20040322 | Vitelline Vein of Placenta |
| Common Iliac Artery | T-46710 | SRT | 20040322 | Common Iliac Artery |

Table D.12: CID 12140 Pelvic Vasculature Anatomical Location

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------|------------|--------------------------|--------------|------------------------|
| Fetal Aorta | T-42000 | SRT | 20040322 | Aorta |
| Middle Cerebral Artery | T-45600 | SRT | 20040322 | Middle Cerebral Artery |

Table D.13: CID 12141 Fetal Vasculature Anatomical Location

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|------------|--------------------------|--------------|--------------|
| Best value | R-002E1 | SRT | 20060613 | Best value |
| Average | R-00317 | SRT | 20060613 | Mean |
| Estimated | R-10260 | SRT | 20060613 | Estimated |
| Measured | R-41D41 | SRT | 20060613 | Measured |

Table D.14: CID 3627 Measurement Type

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------|------------|--------------------------|--------------|-----------------|
| Equation | 121420 | DCM | 20030327 | Equation |
| Table of Values | 121424 | DCM | 20030327 | Table of Values |

Table D.15: CID 228 Equation or Table

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------|------------|--------------------------|--------------|--------------|
| Right | G-A100 | SRT | 20030108 | Right |
| Left | G-A101 | SRT | 20030108 | Left |

Table D.16: *CID 244 Laterality*

D.2 OB-Gyn Equation and Table

Equations and tables used in the ultrasound procedure report are described in Table D.17.

| Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|--------------------------|--------------|--------------------------------------|
| 33072-0 | LN | 20061024 | GA by AC, ASUM 2000 |
| 33145-4 | LN | 20030130 | AC by GA, ASUM 2000 |
| 33075-3 | LN | 20061024 | GA by AC, Merz 1988 |
| 33081-1 | LN | 20061024 | GA by BPD, Merz 1988 |
| SSI-666-2 | SMS | 20030130 | AC by GA, CFEF 2000 |
| 33146-2 | LN | 20030130 | AC by GA, Hadlock 1984 |
| 33148-8 | LN | 20030130 | AC by GA, Merz 1988 |
| 11892-7 | LN | 20061024 | GA by AC, Hadlock 1984 |
| 33106-6 | LN | 20061024 | GA by GS, Hansmann 1985 |
| 33151-2 | LN | 20030130 | BPD by GA, ASUM 2000 |
| 33198-3 | LN | 20030130 | BPD by GA, Hadlock 1984 |
| 33154-6 | LN | 20030130 | BPD by GA, Merz 1988 |
| 11902-4 | LN | 20061024 | GA by BPD, Hadlock 1984 |
| 33538-0 | LN | 20061024 | GA by BPD, Hansmann 1986 |
| 33081-1 | LN | 20061024 | GA by BPD, Merz 1988 |
| 33079-5 | LN | 20061024 | GA by BPD, ASUM 2000 |
| 33090-2 | LN | 20061024 | GA by CRL, ASUM 2000 |
| 33540-6 | LN | 20061024 | GA by CRL, Hansmann 1986 |
| 11910-7 | LN | 20061024 | GA by CRL, Hadlock 1992 |
| 11735-8 | LN | 20030130 | EFW by AC, BPD, FL, Hadlock 1985 |
| 11732-5 | LN | 20030130 | EFW by AC, BPD, FL, HC, Hadlock 1985 |
| 11738-2 | LN | 20030130 | EFW by AC, BPD, Hadlock 1984 |
| 11751-5 | LN | 20030130 | EFW by AC, FL, Hadlock 1985 |
| 11746-5 | LN | 20030130 | EFW by AC, FL, HC, Hadlock 1985 |
| 11754-9 | LN | 20030130 | EFW by AC, HC Hadlock 1984 |
| 33139-7 | LN | 20030130 | EFW by BPD, TTD, Hansmann 1986 |
| 33165-2 | LN | 20030130 | FL by GA, ASUM 2000 |
| SSI-666-5 | SMS | 20030130 | FL by GA, CFEF 2000 |
| 33166-0 | LN | 20030130 | FL by GA, Hadlock 1984 |
| 33168-6 | LN | 20030130 | FL by GA, Jeanty 1982 |
| 33169-4 | LN | 20030130 | FL by GA, Merz 1988 |
| 33098-5 | LN | 20061024 | GA by FL, Chitty 1997 |
| 11920-6 | LN | 20061024 | GA by FL, Hadlock 1984 |
| 33541-4 | LN | 20061024 | GA by FL, Hansmann 1986 |
| 11923-0 | LN | 20061024 | GA by FL, Jeanty 1984 |
| 33542-2 | LN | 20061024 | GA by FL, Merz 1988 |
| 33104-1 | LN | 20061024 | GA by GS, Daya 1991 |
| SSI-666-7 | SMS | 20061024 | GA by AC, CFEF 2000 |
| SSI-666-9 | SMS | 20061024 | GA by BPD, CFEF 2000 |
| SSI-666-21 | SMS | 20061024 | GA by FL, ASUM 2000 |
| SSI-666-11 | SMS | 20061024 | GA by FL, CFEF 2000 |
| SSI-666-13 | SMS | 20061024 | GA by HC, CFEF 2000 |
| SSI-666-15 | SMS | 20061024 | GA by TAD, CFEF 2000 |
| 33109-0 | LN | 20061024 | GA by HC, ASUM 2000 |
| 33172-8 | LN | 20030130 | HC by GA, ASUM 2000 |
| SSI-666-17 | SMS | 20030130 | HC by GA, CFEF 2000 |
| 33173-6 | LN | 20030130 | HC by GA, Hadlock 1984 |
| 33176-9 | LN | 20030130 | HC by GA, Merz 1988 |
| 11932-1 | LN | 20061024 | GA by HC, Hadlock 1984 |
| 33543-0 | LN | 20061024 | GA by HC, Hansmann 1986 |
| 33110-8 | LN | 20061024 | GA by HC measured, Chitty 1997 |
| 33115-7 | LN | 20061024 | GA by HC, Merz 1988 |
| 11936-2 | LN | 20061024 | GA by Humerus length, Jeanty 1984 |

| | | | |
|------------|-----|----------|---|
| 33116-5 | LN | 20061024 | GA by Humerus Length, ASUM 2000 |
| 33177-7 | LN | 20030130 | Humerus Length by GA, ASUM 2000 |
| 33119-9 | LN | 20061024 | GA by OFD, ASUM 2000 |
| 33178-5 | LN | 20030130 | OFD by GA, ASUM 2000 |
| 33120-7 | LN | 20061024 | GA by OFD, Hansmann 1986 |
| SSI-666-19 | SMS | 20030130 | TAD by GA, CFEF 2000 |
| 11941-2 | LN | 20061024 | GA by Tibia, Jeanty 1984 |
| 11944-6 | LN | 20061024 | GA by Ulna, Jeanty 1984 |
| 33136-3 | LN | 20061024 | GA by Transverse Thoracic Diameter, Hansmann 1985 |
| 33082-9 | LN | 20061024 | GA by BPD, Osaka 1989 |
| 33117-3 | LN | 20061024 | GA by HL, Osaka 1989 |
| 33093-6 | LN | 20061024 | GA by CRL, Osaka 1989 |
| 11944-6 | LN | 20061024 | GA by ULNA, Jeanty 1984 |
| SSI-666-37 | SMS | 20030130 | CRL by GA, Hansmann 1986 |
| SSI-666-38 | SMS | 20030130 | EFW by AC, BPD, Merz 1991 |
| SSI-666-45 | SMS | 20030130 | EFW by GA, Hadlock 1991 |
| SSI-666-46 | SMS | 20030130 | EFW by GA, Doubilet 1997 |
| SSI-666-47 | SMS | 20030130 | EFW by GA, Oken Male 2003 |
| SSI-666-48 | SMS | 20030130 | EFW by GA, Oken Female 2003 |
| SSI-666-49 | SMS | 20030130 | EFW by GA, Oken All 2003 |
| SSI-666-50 | SMS | 20160830 | EWP by GA, CFEF Massoud 2015 |
| SSI-666-51 | SMS | 20160830 | BPD by GA, CFEF 2006 |
| SSI-666-52 | SMS | 20160830 | BPDoi by GA, ISUOG Leung 2008 |
| SSI-666-53 | SMS | 20160830 | BPDoo by GA, ISUOG Leung 2008 |
| SSI-666-54 | SMS | 20160830 | FL by GA, ISUOG Leung 2008 |
| SSI-666-55 | SMS | 20160830 | GA by BPDoi, ISUOG Leung 2008 |
| SSI-666-56 | SMS | 20160830 | GA by BPDoo, ISUOG Leung 2008 |
| SSI-666-57 | SMS | 20160830 | GA by FL, ISUOG Leung 2008 |
| SSI-666-58 | SMS | 20160830 | GA by HC, ISUOG Leung 2008 |
| SSI-666-59 | SMS | 20160830 | HC by GA, ISUOG Leung 2008 |
| SSI-666-60 | SMS | 20160830 | GA by CRL, ISUOG Sahota 2009 |
| SSI-666-61 | SMS | 20160830 | HL by GA, Jeanty 1982 |
| SSI-666-62 | SMS | 20160830 | TIB by GA, Jeanty 1982 |
| SSI-666-64 | SMS | 20160830 | GA by CRL, McLeannan Schluter2008 |
| SSI-666-65 | SMS | 20160830 | GA by CRL, Robinson Fleming 1975 |
| SSI-666-66 | SMS | 20160830 | GA by CRL, Verburg 2008 |
| SSI-666-67 | SMS | 20160830 | CRL by GA, Hadlock 1992 |
| 11928-9 | LN | 20061024 | GA by GS, Hellman 1969 |
| SSI-666-68 | SMS | 20061024 | GS by GA, Hellman 1969 |
| 33134-8 | LN | 20061024 | GA by TCD, Hill 1990 |
| SSI-666-69 | SMS | 20061024 | TCD by GA, Hill 1990 |
| 11929-7 | LN | 20061024 | GA by GS, Rempen 1991 |
| 33171-0 | LN | 20061024 | GS by GA, Rempen 1991 |

Table D.17: Tables and equations

D.3 OB-Gyn Template

OB-GYN Ultrasound Procedure Report template is described in table [D.18](#)

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|----|-----------|----------------------|
| 1 | | | CONTAINER | EV (125000, DCM, "OB-GYN Ultrasound Procedure Report") | 1 | | |

| | | | | | | | |
|----|----|-----------------|-----------|---|-----|--|--|
| 2 | > | CONTAINS | INCLUDE | DTID (5001) Patient Characteristics (See D.19) | 1 | | |
| 3 | > | CONTAINS | CONTAINER | DT (111028, DCM, "Image Library") | 1 | | |
| 4 | >> | CONTAINS | IMAGE | No purpose of reference | 1-n | | |
| 5 | > | CONTAINS | INCLUDE | DTID (5002) OB-GYN Procedure Summary Section (See D.20) | 1 | | |
| 6 | > | CONTAINS | INCLUDE | DTID (5004) Fetal Biometry Ratio Section (See Table D.22) | 1-n | | |
| 7 | > | CONTAINS | INCLUDE | DTID (5005) Fetal Biometry Section (See Table D.23) | 1-n | | |
| 8 | > | CONTAINS | INCLUDE | DTID (5006) Long Bones Section (See Table D.24) | 1-n | | |
| 9 | > | CONTAINS | INCLUDE | DTID (5007) Fetal Cranium Section (See Table D.25) | 1-n | | |
| 10 | > | CONTAINS | INCLUDE | DTID (5009) Fetal Biophysical Profile Section (See Table D.27) | 1-n | | |
| 11 | > | CONTAINS | INCLUDE | DTID (5011) Early Gestation Section (See Table D.29) | 1-n | | |
| 12 | > | CONTAINS | INCLUDE | DTID (5010) Amniotic Sac Section (See Table D.28) | 1 | | |
| 13 | > | CONTAINS | INCLUDE | DTID (5015) Pelvis and Uterus Section (See Table D.33) | 1 | | |
| 14 | > | CONTAINS | INCLUDE | DTID (5012) Ovaries Section (See Table D.30) | 1 | | |
| 15 | > | CONTAINS | INCLUDE | DTID (5013) Follicles Section (See Table D.31) | 1 | | \$Laterality = EV (G-A101, SRT, "Left") \$Number = EV (11879-4, LN, "Number of follicles in left ovary") |
| 16 | > | CONTAINS | INCLUDE | DTID (5013) Follicles Section (See Table D.31) | 1 | | \$Laterality = EV (G-A100, SRT, "Right") \$Number = EV (11880-2, LN, "Number of follicles in right ovary") |
| 17 | > | CONTAINS | CONTAINER | EV (59776-5, LN, "Findings") | 1-n | | |
| 18 | >> | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | | EV (T-F6800, SRT, "Embryonic Vascular Structure") |
| 19 | >> | CONTAINS | INCLUDE | DTID (5025) OB-GYN Fetal Vascular Measurement Group (See Table D.35) | 1 | | \$AnatomyGroup = DCID (12141) Fetal Vasculature |
| 20 | > | CONTAINS | CONTAINER | EV (59776-5, LN, "Findings") | 1 | | |
| 21 | >> | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | | EV (T-D6007, SRT, "Pelvic Vascular Structure") |

| | | | | | | | |
|----|----|----------|---------|---|---|--|--|
| 22 | >> | CONTAINS | INCLUDE | DTID (5026) OB-GYN Pelvic Vascular Measurement Group (See Table D.36) | 1 | | \$AnatomyGroup = DCID (12140) Pelvic Vasculature Anatomical Location |
|----|----|----------|---------|---|---|--|--|

Table D.18: TID 5000 OB-GYN Ultrasound Procedure Report

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|----|-----------|----------------------|
| 1 | | | CONTAINER | EV (121118 , DCM, "Patient Characteristics") | 1 | | |
| 2 | > | CONTAINS | TEXT | EV (121106 , DCM, "Comment") | 1 | | |
| 3 | > | CONTAINS | NUM | EV (8302-2, LN , "Patient Height") | 1 | | |
| 4 | > | CONTAINS | NUM | EV (29463-7, LN , "Patient Weight") | 1 | | |
| 5 | > | CONTAINS | NUM | EV (11996-6, LN , "Gravida") | 1 | | |
| 6 | > | CONTAINS | NUM | EV (11977-6, LN , "Para") | 1 | | |
| 7 | > | CONTAINS | NUM | EV (11612-9, LN , "Aborta") | 1 | | |
| 8 | > | CONTAINS | NUM | EV (33065-4, LN , "Ectopic Pregnancies") | 1 | | |

Table D.19: TID 5001 OB-GYN Patient Characteristics

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|-----|------------------------------------|---|
| 1 | | | CONTAINER | DT (55112-7, LN, "Summary") | 1 | | |
| 2 | > | CONTAINS | DATE | DCID (12003) OB-GYN Dates | 1-n | | |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | | \$Measurement = BCID (12018) OB-GYN Summary |
| 4 | > | CONTAINS | INCLUDE | BTID (5003) OB-GYN Fetus Summary (See Table D.21) | 1-n | No more than 1 inclusion per fetus | |

Table D.20: TID 5002 OB-GYN Procedure Summary Section

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|--|---|
| 1 | | | CONTAINER | DT (125008, DCM, "Fetus Summary") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | | \$Measurement = DCID (12019) OB-GYN Fetus Summary \$Equation = DCID (12012) OB Equations and Tables |

Table D.21: TID 5003 OB-GYN Fetus Summary

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|-----|--|----------------------|
| 1 | | | CONTAINER | DT (125001, DCM, "Fetal Biometry Ratios") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | NUM | DCID (12004) Fetal Biometry Ratios ¹ | 1-n | | |

Table D.22: TID 5004 Fetal Biometry Ratio Section

¹Numeric ratio related to fetal growth.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|--|---|
| 1 | | | CONTAINER | DT (125002, DCM, "Fetal Biometry") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | INCLUDE | DTID (5008) Fetal Biometry Group ¹ (See Table D.26) | 1-n | | \$BiometryType = Member Of {DCID (12005) Fetal Biometry Measurements} |

Table D.23: TID 5005 Fetal Biometry Section

¹The group of measurements. Only one group per biometry type.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|--|--|
| 1 | | | CONTAINER | DT (125003, DCM, "Fetal Long Bones") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | INCLUDE | DTID (5008) Fetal Biometry Group ¹ (See Table D.26) | 1-n | | \$BiometryType = Member Of {DCID (12006) Fetal Long Bones Biometry Measurements} |

Table D.24: TID 5006 Fetal Long Bones Section

¹The group of measurements. Only one group per biometry type.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|--|---|
| 1 | | | CONTAINER | DT (125004, DCM, "Fetal Cranium") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | INCLUDE | DTID (5008) Fetal Biometry Group (See Table D.26) ¹ | 1-n | | \$BiometryType = Member Of {DCID (12007) Fetal Cranium} |

Table D.25: TID 5007 Fetal Cranium Section

¹The group of measurements. Only one group per biometry type.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|--|--|
| 1 | | | CONTAINER | DT (125005, DCM, "Biometry Group") ¹ | 1 | | |
| 2 | > | CONTAINS | INCLUDE | DTID (300) Measurement ² (See Table D.37) | 1-n | At least one of row 2 and 3 shall be present | \$Measurement = \$BiometryType \$Derivation = DCID (3627) Measurement Type |
| 3 | > | CONTAINS | NUM | EV (18185-9, LN, "Gestational Age") | 1 | At least one of row 2 and 3 shall be present | Units= EV (d, UCUM, days) |
| 4 | >> | INFERRED FROM | INCLUDE | DCID (228) Equation or Table ³ | 1 | | DCID (12013) Gestational Age Equations and Tables |

Table D.26: TID 5008 Fetal Biometry Group

¹Container to segregate biometry data by measurement type.

²The discrete measurements of the biometry type including derived measurements such as mean. One of the measurements may be flagged as selected for derived measurements.

³The reference that defines the equation or table of GA derivation.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|----|--|---------------------------------------|
| 1 | | | CONTAINER | DT (125006, DCM, "Biophysical Profile") | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | NUM | EV (11631-9, LN, "Gross Body Movement") ¹ | 1 | At least one of row 3-7 shall be present | Units = DT ("0:2", UCUM, "range 0:2") |
| 4 | > | CONTAINS | NUM | EV (11632-7, LN, "Fetal Breathing") ¹ | 1 | At least one of row 3-7 shall be present | Units = DT ("0:2", UCUM, "range 0:2") |
| 5 | > | CONTAINS | NUM | EV (11635-0, LN, "Fetal Tone") ¹ | 1 | At least one of row 3-7 shall be present | Units = DT ("0:2", UCUM, "range 0:2") |
| 6 | > | CONTAINS | NUM | EV (11635-5, LN, "Fetal Heart Reactivity") ¹ | 1 | At least one of row 3-7 shall be present | Units = DT ("0:2", UCUM, "range 0:2") |
| 7 | > | CONTAINS | NUM | EV (11630-1, LN, "Amniotic Fluid Volume") ¹ | 1 | At least one of row 3-7 shall be present | Units = DT ("0:2", UCUM, "range 0:2") |
| 8 | > | CONTAINS | NUM | DT (11634-3, LN, "Biophysical Profile Sum Score") ² | 1 | | |

Table D.27: TID 5009 Fetal Biophysical Profile Section

¹The numeric profile score of range 0-2

²The sum of rows 3-7. The range is from 0 to the maximum possible score according to the items scored in rows 3-7.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|----|-----------|--|
| 1 | | | CONTAINER | DT (59776-5, LN, "Findings") | 1 | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | | DT (T-F1300, SRT, "Amniotic Sac") |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement ¹ (See Table D.37) | 1 | | \$Measurement = DT (11627-7, LN, "Amniotic Fluid Index") |
| 4 | > | CONTAINS | INCLUDE | DTID (300) Measurement ² (See Table D.37) | 4 | | \$Measurement = DCID (12008) OB-GYN Amniotic Sac |

Table D.28: TID 5010 Amniotic Sac Section

¹The sum of the 4 quadrant diameters

²The four amniotic sac quadrant diameters

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|-------------------------------------|----|-----------|----------------------|
| 1 | | | CONTAINER | DT (125009, DCM, "Early Gestation") | 1 | | |

| | | | | | | | |
|---|---|-----------------|---------|---|-----|--|--|
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |
| 3 | > | CONTAINS | INCLUDE | DTID (5008) Fetal Biometry Group (See Table D.26) | 1-n | | \$BiometryType= Member of {DCID (12009) Early Gestation Biometry Measurements} |

Table D.29: TID 5011 Early Gestation Section

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|----|-----------|--|
| 1 | | | CONTAINER | DT (59776-5, LN, "Findings") | 1 | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | | DT (T-87000, SRT, "Ovary") |
| 3 | > | CONTAINS | INCLUDE | DTID (5016) LWH Volume Group (See Table D.34) | 1 | | \$GroupName = EV (T-87000, SRT, "Ovary") \$Width = EV (11829-9, LN, "Left Ovary Width") \$Length = EV (11840-6, LN, "Left Ovary Length") \$Height = EV (11857-0, LN, "Left Ovary Height") \$Volume = EV (12164-0, LN, "Left Ovary Volume") |
| 4 | > | CONTAINS | INCLUDE | DTID (5016) LWH Volume Group (See Table D.34) | 1 | | \$GroupName = EV (T-87000, SRT, "Ovary") \$Width = EV (11830-7, LN, "Right Ovary Width") \$Length = EV (11841-4, LN, "Right Ovary Length") \$Height = EV (11858-8, LN, "Right Ovary Height") \$Volume = EV (12165-7, LN, "Right Ovary Volume") |

Table D.30: TID 5012 Ovaries Section

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|-----|-----------|---------------------------------------|
| 1 | | | CONTAINER | DT (59776-5, LN, "Findings") | 1 | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | | DT (T-87600, SRT, "Ovarian Follicle") |
| 3 | > | HAS CONCEPT MOD | CODE | EV (G-C171, SRT, "Laterality") | 1 | | \$Laterality |
| 4 | > | CONTAINS | NUM | \$Number | 1 | | |
| 5 | > | CONTAINS | INCLUDE | DTID (5014) Follicle Measurement Group (See Table D.32) | 1-n | | |

Table D.31: TID 5013 Follicles Section

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---------------------------------------|----|-----------|----------------------|
| 1 | | | CONTAINER | EV (125007, DCM, "Measurement Group") | 1 | | |

| | | | | | | | |
|---|---|-----------------|---------|---|-----|--|---|
| 2 | > | HAS OBS CONTEXT | TEXT | EV (125010, DCM, "Identifier") | 1 | | Unique among all groups of same laterality |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1 | | \$Measurement = EV (G-D705, SRT, "Volume") |
| 4 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | | \$Measurement = EV (11793-7, LN, "Follicle Diameter") \$Derivation = DCID (3627) Measurement Type |

Table D.32: TID 5014 Follicle Measurement Group

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|-----|-----------|--|
| 1 | | | CONTAINER | DT (125011, DCM, "Pelvis and Uterus") | 1 | | |
| 2 | > | CONTAINS | INCLUDE | DTID (5016) LWH Volume Group (See Table D.34) | 1 | | \$GroupName = EV (T-83000, SRT, "Uterus") \$Width = EV (11865-3, LN, "Uterus Width") \$Length = EV (11842-2, LN, "Uterus Length") \$Height = EV (11859-6, LN, "Uterus Height") \$Volume = EV (33192-6, LN, "Uterus Volume") |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | | \$Measurement = DCID (12011) Ultrasound Pelvis and Uterus \$Derivation = DCID (3627) Measurement Type |

Table D.33: TID 5015 Pelvis and Uterus Section

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|-----|--|--|
| 1 | | | CONTAINER | \$GroupName | 1 | | |
| 2 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1 | At least one of row 2,3,4,5 shall be present | \$Measurement = \$Volume |
| 3 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | At least one of row 2,3,4,5 shall be present | \$Measurement = \$Length \$Derivation = DCID (3627) Measurement Type |
| 4 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | At least one of row 2,3,4,5 shall be present | \$Measurement = \$Width \$Derivation = DCID (3627) Measurement Type |
| 5 | > | CONTAINS | INCLUDE | DTID (300) Measurement (See Table D.37) | 1-n | At least one of row 2,3,4,5 shall be present | \$Measurement = \$Height \$Derivation = DCID (3627) Measurement Type |

Table D.34: TID 5016 LWH Volume Group

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|----|--|----------------------|
| 1 | | | CONTAINER | \$AnatomyGroup | 1 | | |
| 2 | > | HAS OBS CONTEXT | INCLUDE | DTID (1008) Subject Context, Fetus (See Table D.39) | 1 | IF this template is invoked more than once to describe more than one fetus | |

| | | | | | | | |
|---|---|-------------------------|---------|--|-----|-------------------------------|---|
| 3 | > | HAS OBS CON- TEXT | CODE | EV (G-C171, SRT "Laterality") | 1-n | IFF anatomy has laterality | DCID (244) Laterality |
| 4 | > | CONTAINS | INCLUDE | DTID (300) Measure- ment (See Table D.37) | 1-n | | \$MeasType = DCID (12119) Vascular Ultrasound Property \$Derivation = DCID (3627) Measurement Type |

Table D.35: TID 5025 OB-GYN Fetal Vascular Ultrasound Measurement Group

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------------|-----------|--|-----|-------------------------------|---|
| 1 | | | CONTAINER | \$AnatomyGroup ¹ | 1 | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-C171, SRT, "Laterality") | 1 | IFF anatomy has laterality | DCID (244) Laterality |
| 3 | > | HAS CONCEPT MOD | TEXT | EV (112050, DCM, "Anatomic Identifi- fier") ² | 1-n | | |
| 4 | > | CONTAINS | INCLUDE | DTID (300) Measure- ment (See Table D.37) | 1-n | | \$MeasType = DCID (12119) Vascular Ultrasound Property \$Derivation = DCID (3627) Measurement Type |
| 5 | >> | HAS CONCEPT MOD | CODE | EV (125105, DCM, "Measurement Orien- tation") | 1 | | DCID (12118) Measurement Orientation |
| 6 | >> | HAS CONCEPT MOD | NUM | EV (125106, DCM, "Doppler Angle") | 1 | | UNIT = EV (deg, UCUM , "de- grees") |
| 7 | >> | HAS CONCEPT MOD | NUME | EV (125107, DCM, "Sample Volume Depth") | 1-n | | UNIT = EV (cm, UCUM , "cm") |

Table D.36: TID 5026 OB-GYN Pelvic Vascular Ultrasound Measurement Group

¹Specifies the anatomical context of the observations in the group.

²Differentiates between multiple structures such as the two umbilical arteries.

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------------|---------|---|-----|----------------------------|----------------------|
| 1 | | | NUM | \$Measurement | 1 | Units = \$Units | |
| 2 | > | HAS CONCEPT MOD | CODE | \$ModType ¹ | 1-n | \$ModValue | |
| 3 | > | HAS CONCEPT MOD | CODE | EV (G-C036, SRT, "Measurement Method") | 1 | \$Method | |
| 4 | > | HAS CONCEPT MOD | CODE | EV (121401, DCM, "Derivation") | 1 | \$Derivation | |
| 5 | > | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | \$TargetSite | |
| 6 | >> | HAS CONCEPT MOD | CODE | EV (G-C171, SRT, "Laterality") | 1 | DCID (244) Laterality | |
| 7 | >> | HAS CONCEPT MOD | CODE | DT (G-A1F8, SRT, "Topographical modifier") | 1 | \$TargetSiteMod | |
| 8 | | INFERRED FROM | INCLUDE | DTID (315) Equation or Table (See Table D.38) | 1 | \$Equation = \$Equation | |

Table D.37: TID 300 Measurement

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|--------------------------|------|---------------------------------------|-----|-----------|----------------------|
| 1 | | | CODE | EV (121036, DCM, "Mother of fetus") | 1 | | \$Equation |
| 2 | > | HAS PROPER- TIES | NUM | EV (11951-1, LN, "Fetus ID") | 1-n | | |
| 3 | > | R-HAS PROPER- TIES | NUM | EV (11878-6, LN, "Number of Fetuses") | 1-n | | |

Table D.38: TID 315 Equation or Table

| | NL | Rel with Parent | VT | Concept Name | VM | Condition | Value Set Constraint |
|---|----|-----------------|-------|---------------------------------------|----|-----------|---|
| 1 | | | PNAME | EV (121036, DCM, "Mother of fetus") | 1 | | Defaults to an observation subject that is a patient prior to replacing the Observation Subject Class with Fetus. |
| 2 | | | TEXT | EV (11951-1, LN, "Fetus ID") | 1 | | For separation of multiple fetuses during this procedure e.g. fetus "1" of "2" ... not for longitudinal comparisons.; ie. the "m" of fetus "m" of "n" |
| 3 | | | NUME | EV (11878-6, LN, "Number of Fetuses") | 1 | | i.e. the "n" of fetus "m" of "n" Units EV (1,UCUM,"no units") |

Table D.39: TID 1008 Subject Context, Fetus



Vascular Ultrasound Procedure Report

Vascular Ultrasound Procedure Reports are always created when images are acquired with the following applications:

- Vascular;
- Abdominal;

They are pushed to any DICOM Store in accordance with the "Enable export of SR Vascular" option.

E.1 Vascular measurements

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------------------------|------------|--------------------------|--------------|-------------------------|
| Carotid Bifurcation | T-45160 | SRT | 20030327 | Carotid Bifurcation |
| Bulb | T-45170 | SRT | 20030327 | Carotid Bulb |
| Common Carotid Artery | T-45100 | SRT | 20030327 | Common Carotid Artery |
| External Carotid Artery | T-45200 | SRT | 20030327 | External Carotid Artery |
| Internal Carotid Artery | T-45300 | SRT | 20030327 | Internal Carotid Artery |
| Subclavian Artery | T-46100 | SRT | 20030327 | Subclavian Artery |
| Vertebral Artery | T-45700 | SRT | 20030327 | Vertebral Artery |

Table E.1: *CID 12104 Extracranial Arteries*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--|------------|--------------------------|--------------|--|
| Anterior Cerebral Artery | T-45540 | SRT | 20160314 | Anterior Cerebral Artery |
| Anterior Communicating Artery | T-45530 | SRT | 20160314 | Anterior Communicating Artery |
| Anterior-Middle Cerebral Artery Bifurcation | G-0368 | SRT | 20160314 | Anterior-Middle Cerebral Artery Bifurcation |
| Anterior-Posterior Cerebral Artery Bifurcation | G-0369 | SRT | 20160314 | Anterior-Posterior Cerebral Artery Bifurcation |
| Carotid Siphon | T-45308 | SRT | 20160314 | Carotid Siphon |
| Central Retinal Artery | T-45430 | SRT | 20160314 | Central Retinal Artery |
| Central Retinal Vein | T-48286 | SRT | 20160314 | Central Retinal Vein |
| Internal Carotid Artery | T-45300 | SRT | 20160314 | Internal Carotid Artery |
| Terminal internal carotid artery | R-102BD | SRT | 20160314 | Terminal internal carotid artery |
| Middle Cerebral Artery | T-45600 | SRT | 20160314 | Middle Cerebral Artery |
| Middle Cerebral Artery M1 Segment | R-1024F | SRT | 20160314 | Middle Cerebral Artery M1 Segment |
| Middle Cerebral Artery M2 Segment | R-10251 | SRT | 20160314 | Middle Cerebral Artery M2 Segment |
| Ophthalmic Artery | T-45400 | SRT | 20160314 | Ophthalmic Artery |
| Posterior Cerebral Artery | T-45900 | SRT | 20160314 | Posterior Cerebral Artery |
| Posterior Cerebral Artery P1 Segment | R-10253 | SRT | 20160314 | Posterior Cerebral Artery P1 Segment |
| Posterior Cerebral Artery P2 Segment | R-10255 | SRT | 20160314 | Posterior Cerebral Artery P2 Segment |
| Posterior Communicating Artery | T-45320 | SRT | 20160314 | Posterior Communicating Artery |
| MCA/Dist ICA | SSI-666-39 | SMS | 20160314 | MCA/Dist ICA |

Table E.2: CID 12105 Intracranial Cerebral Vessels

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|----------------|------------|--------------------------|--------------|----------------|
| Basilar Artery | T-45800 | SRT | 20030327 | Basilar Artery |

Table E.3: CID 12106 Intracranial Cerebral Vessels (unilateral)

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------------------------|------------|--------------------------|--------------|-----------------------------------|
| Axillary Artery | T-47100 | SRT | 20050110 | Axillary Artery |
| Brachial Artery | T-47160 | SRT | 20050110 | Brachial Artery |
| Deep Palmar Arch of Radial Artery | T-47340 | SRT | 20050110 | Deep Palmar Arch of Radial Artery |
| Innominate Artery | T-46010 | SRT | 20050110 | Innominate Artery |
| Radial Artery | T-47300 | SRT | 20050110 | Radial Artery |
| Subclavian Artery | T-46100 | SRT | 20050110 | Subclavian Artery |
| Superficial Palmar Arch | T-47240 | SRT | 20050110 | Superficial Palmar Arch |
| Ulnar Artery | T-47200 | SRT | 20050110 | Ulnar Artery |
| Digital artery of hand | T-47260 | SRT | 20050110 | Digital artery of hand |

Table E.4: CID 12107 Upper Extremity Arteries

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------------------------|------------|--------------------------|--------------|-------------------------|
| Axillary vein | T-49110 | SRT | 20160314 | Axillary vein |
| Basilic vein | T-49230 | SRT | 20160314 | Basilic vein |
| Brachial vein | T-49350 | SRT | 20160314 | Brachial vein |
| Cephalic vein | T-49240 | SRT | 20160314 | Cephalic vein |
| Innominate vein | T-48620 | SRT | 20160314 | Innominate vein |
| Median Cubital vein | T-49250 | SRT | 20160314 | Median Cubital vein |
| Radial vein | T-49340 | SRT | 20160314 | Radial vein |
| Subclavian vein | T-48330 | SRT | 20160314 | Subclavian vein |
| Ulnar vein | T-49330 | SRT | 20160314 | Ulnar vein |
| Superior Vena Cava | T-48610 | SRT | 20160314 | Superior Vena Cava |
| Deep Palmar Venous Arch | T-49218 | SRT | 20160314 | Deep Palmar Venous Arch |

Table E.5: CID 12108 Upper Extremity Veins

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|---------------------------------|------------|--------------------------|--------------|---------------------------------|
| Common Iliac Artery | T-46710 | SRT | 20170914 | Common Iliac Artery |
| Common Iliac Artery Bifurcation | R-10258 | SRT | 20170914 | Common Iliac Artery Bifurcation |
| Anterior Tibial Artery | T-47700 | SRT | 20170914 | Anterior Tibial Artery |
| Common Femoral Artery | T-47402 | SRT | 20170914 | Common Femoral Artery |
| Dorsalis Pedis Artery | T-47740 | SRT | 20170914 | Dorsalis Pedis Artery |
| External Iliac Artery | T-46910 | SRT | 20170914 | External Iliac Artery |
| Internal Iliac Artery | T-46740 | SRT | 20170914 | Internal Iliac Artery |
| Peroneal Artery | T-47630 | SRT | 20170914 | Peroneal Artery |
| Plantar Arterial Arch | T-47630 | SRT | 20170914 | Plantar Arterial Arch |
| Popliteal Artery | T-47500 | SRT | 20170914 | Popliteal Artery |
| Posterior Tibial Artery | T-47600 | SRT | 20170914 | Posterior Tibial Artery |
| Profunda Femoris Artery | T-47440 | SRT | 20170914 | Profunda Femoris Artery |
| Superficial Femoral Artery | T-47403 | SRT | 20170914 | Superficial Femoral Artery |

Table E.6: CID 12109 Lower Extremity Arteries

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|----------------------------|------------|--------------------------|--------------|----------------------------|
| Anterior Tibial Vein | T-49630 | SRT | 20160314 | Anterior Tibial Vein |
| Lateral calf perforator | T-F6724 | SRT | 20160314 | Lateral calf perforator |
| Common Femoral Vein | G-035B | SRT | 20160314 | Common Femoral Vein |
| Common Iliac Vein | T-48920 | SRT | 20160314 | Common Iliac Vein |
| External Iliac Vein | T-48930 | SRT | 20160314 | External Iliac Vein |
| Great Saphenous Vein | T-49530 | SRT | 20160314 | Great Saphenous Vein |
| Lesser Saphenous Vein | T-49550 | SRT | 20160314 | Lesser Saphenous Vein |
| Peroneal Vein | T-49640 | SRT | 20160314 | Peroneal Vein |
| Popliteal Vein | T-49650 | SRT | 20160314 | Popliteal Vein |
| Posterior Tibial vein | T-49620 | SRT | 20160314 | Posterior Tibial Vein |
| Saphenofemoral Junction | T-D930A | SRT | 20160314 | Saphenofemoral Junction |
| Soleal vein | G-036B | SRT | 20160314 | Soleal vein |
| Superficial Femoral Vein | G-035A | SRT | 20160314 | Superficial Femoral Vein |
| Internal Iliac vein | T-48940 | SRT | 20160314 | Internal Iliac vein |
| Saphenopopliteal junction | T-4941A | SRT | 20160314 | Saphenopopliteal junction |
| Hunterian perforating vein | T-4942A | SRT | 20160314 | Hunterian perforating vein |

Table E.7: CID 12110 Lower Extremity Veins

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------|------------|--------------------------|--------------|------------------------|
| Accessory Renal Artery | T-46640 | SRT | 20050110 | Accessory Renal Artery |
| Gastric Artery | T-46410 | SRT | 20050110 | Gastric Artery |
| Lumbar Artery | T-46960 | SRT | 20050110 | Lumbar Artery |
| Ovarian Artery | T-46980 | SRT | 20050110 | Ovarian Artery |
| Testicular Artery | T-46970 | SRT | 20050110 | Testicular Artery |
| Common Iliac Artery | T-46710 | SRT | 20200310 | Common Iliac Artery |
| Umbilical Artery | T-F1810 | SRT | 20050110 | Umbilical Artery |
| Uterine Artery | T-46820 | SRT | 20050110 | Uterine Artery |
| Left Kidney thickness | 11853-9 | LN | 20030130 | Left Kidney thickness |
| Left Kidney length | 11834-9 | LN | 20030130 | Left Kidney length |
| Left Kidney width | 11825-7 | LN | 20030130 | Left Kidney width |
| Kidney | T-71000 | SRT | | Kidney |
| Right Kidney thickness | 11855-4 | LN | 20030130 | Right Kidney thickness |
| Right Kidney length | 11836-4 | LN | 20030130 | Right Kidney length |
| Right Kidney width | 11827-3 | LN | 20030130 | Right Kidney width |

Table E.8: CID 12111 Abdominopelvic Arteries (lateral)

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--------------------------------|------------|--------------------------|--------------|--------------------------------|
| Abdominal Aorta | T-42500 | SRT | 20200310 | Abdominal Aorta |
| Infra-renal Aorta | T-42520 | SRT | 20050110 | Infra-renal Aorta |
| Supra-renal Aorta | T-42510 | SRT | 20050110 | Supra-renal Aorta |
| Celiac Axis | T-46400 | SRT | 20050110 | Celiac Axis |
| Common Hepatic Artery | T-46421 | SRT | 20050110 | Common Hepatic Artery |
| Gastroduodenal Artery | T-46440 | SRT | 20050110 | Gastroduodenal Artery |
| Inferior Mesenteric Artery | T-46520 | SRT | 20050110 | Inferior Mesenteric Artery |
| Proper Hepatic Artery | T-46422 | SRT | 20050110 | Proper Hepatic Artery |
| Right Branch of Hepatic Artery | T-46423 | SRT | 20050110 | Right Branch of Hepatic Artery |
| Left Branch of Hepatic Artery | T-46427 | SRT | 20050110 | Left Branch of Hepatic Artery |
| Splenic Artery | T-46460 | SRT | 20050110 | Splenic Artery |
| Superior Mesenteric Artery | T-46510 | SRT | 20050110 | Superior Mesenteric Artery |
| Liver | T-62000 | SRT | | Liver |
| Gall Bladder | T-63000 | SRT | | Gall Bladder |
| Bile Duct | T-60610 | SRT | | Bile Duct |
| Pancreatic duct | T-65010 | SRT | | Pancreatic duct |
| Spleen | T-C3000 | SRT | | Spleen |
| Abdominal Aortic Aneurysm | SSI-666-73 | SMS | | Abdominal Aortic Aneurysm |

Table E.9: CID 12112 Abdominopelvic Arteries (unilateral)

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------------------|------------|--------------------------|--------------|-------------------|
| Common iliac vein | T-48920 | SRT | 20030327 | Common iliac vein |
| Gastric vein | T-48820 | SRT | 20030327 | Gastric vein |
| Ileal vein | G-0370 | SRT | 20030327 | Ileal vein |
| Ovarian vein | T-48780 | SRT | 20030327 | Ovarian vein |
| Testicular Vein | T-48770 | SRT | 20030327 | Testicular Vein |

Table E.10: CID 12113 Abdominopelvic Veins (lateral)

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|---|------------|--------------------------|--------------|---|
| Hepatic Vein | T-48720 | SRT | 20170914 | Hepatic Vein |
| Inferior Right Hepatic Vein | G-036D | SRT | 20170914 | Inferior Right Hepatic Vein |
| Left Hepatic Vein | T-48727 | SRT | 20170914 | Left Hepatic Vein |
| Right Hepatic Vein | T-48725 | SRT | 20170914 | Right Hepatic Vein |
| Portal Vein | T-48810 | SRT | 20170914 | Portal Vein |
| Left Main Branch of Portal Vein | T-48814 | SRT | 20170914 | Left Main Branch of Portal Vein |
| Right Main Branch of Portal Vein | T-48813 | SRT | 20170914 | Right Main Branch of Portal Vein |
| Inferior Mesenteric Vein | T-48910 | SRT | 20170914 | Inferior Mesenteric Vein |
| Inferior Vena Cava | 18006-7 | SRT | 20170914 | Inferior Vena Cava |
| Splenic Vein | T-48890 | SRT | 20170914 | Splenic Vein |
| Superior Mesenteric Vein | T-48840 | SRT | 20170914 | Superior Mesenteric Vein |
| Transjugular Intrahepatic Portosystemic Shunt | G-036C | SRT | 20170914 | Transjugular Intrahepatic Portosystemic Shunt |
| Portal Vein Congestion Index | SSI-666-71 | SMS | | Portal Vein Congestion Index |
| Inferior Vena Cava Diameter | T-48710 | LN | | Inferior Vena Cava |

Table E.11: CID 12114 Abdominopelvic Veins (unilateral)

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------------|------------|--------------------------|--------------|------------------------------|
| Renal Artery | T-46600 | SRT | 20030327 | Renal Artery |
| Segmental Artery | T-46659 | SRT | 20030327 | Segmental Artery |
| Arcuate Artery of the Kidney | T-4668A | SRT | 20030327 | Arcuate Artery of the Kidney |
| Interlobar Artery of Kidney | T-4667D | SRT | 20030327 | Interlobar Artery of Kidney |
| Accessory Renal Artery | T-46640 | SRT | 20030327 | Accessory Renal Artery |
| Renal Vein | T-48740 | SRT | 20030327 | Renal Vein |
| Left Kidney thickness | 11853-9 | LN | 20030130 | Left Kidney thickness |
| Left Kidney length | 11834-9 | LN | 20030130 | Left Kidney length |
| Left Kidney width | 11825-7 | LN | 20030130 | Left Kidney width |
| Right Kidney thickness | 11855-4 | LN | 20030130 | Right Kidney thickness |
| Right Kidney length | 11836-4 | LN | 20030130 | Right Kidney length |
| Right Kidney width | 11827-3 | LN | 20030130 | Right Kidney width |
| Bladder | T-74000 | SRT | | Bladder |
| Post Void Bladder | SSI-666-74 | SMS | | Post Void Bladder |
| Kidney | T-71000 | SRT | | Kidney |

Table E.12: CID 12115 Renal Vessels

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------|------------|--------------------------|--------------|------------------|
| Dist | G-A119 | SRT | 20050110 | Distal |
| Mid | G-A188 | SRT | 20050110 | Mid-longitudinal |
| Prox | G-A118 | SRT | 20050110 | Proximal |

Table E.13: CID 12116 Vessel Segment Modifiers

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-------|------------|--------------------------|--------------|--------------|
| Inf | G-A115 | SRT | 20160314 | Inferior |
| Mid | R-404D5 | SRT | 20160314 | Medial |
| Sup | R-42191 | SRT | 20160314 | Superior |

Table E.14: CID 12117 Vessel Branch Modifiers

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|---------------|------------|--------------------------|---------------------|--------------------------------------|
| EDV | 11653-3 | LN | 20030327 | End Diastolic Velocity |
| MDV | 11665-7 | LN | 20030327 | Minimum Diastolic Velocity |
| PSV or vel | 11726-7 | LN | 20030327 | Peak Systolic Velocity |
| TAMV | 20352-1 | LN | 20030327 | Time averaged mean velocity |
| TAPV | 11692-1 | LN | 20030327 | Time averaged peak velocity |
| PI | 12008-9 | LN | 20030327 | Pulsatility Index |
| RI | 12023-8 | LN | 20030327 | Resistivity Index |
| SD | 12144-2 | LN | 20030327 | Systolic to Diastolic Velocity Ratio |
| PG | 20247-3 | LN | Peak Gradient | |
| Doppler Angle | 125106 | DCM | Doppler Angle | |
| SV Depth | 125107 | DCM | Sample Volume Depth | |

Table E.15: CID 12119 Vascular Ultrasound Property

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------------------|------------|--------------------------|--------------|-----------------------------|
| End Diastolic Velocity | 11653-3 | LN | 20030327 | End Diastolic Velocity |
| Minimum Diastolic Velocity | 11665-7 | LN | 20030327 | Minimum Diastolic Velocity |
| Peak Systolic Velocity | 11726-7 | LN | 20030327 | Peak Systolic Velocity |
| Time averaged mean velocity | 20352-1 | LN | 20030327 | Time averaged mean velocity |
| Time averaged peak velocity | 11692-1 | LN | 20030327 | Time averaged peak velocity |

Table E.16: CID 12120 Blood Velocity Measurements by Ultrasound

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|--------------------------------------|------------|--------------------------|--------------|--------------------------------------|
| Pulsatility Index | 12008-9 | LN | 20050110 | Pulsatility Index |
| Resistivity Index | 12023-8 | LN | 20050110 | Resistivity Index |
| Systolic to Diastolic Velocity Ratio | 12144-2 | LN | 20050110 | Systolic to Diastolic Velocity Ratio |

Table E.17: CID 12121 Vascular Indices and Ratios

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|---------------|------------|--------------------------|--------------|---------------|
| Peak Gradient | 20247-3 | LN | 20050110 | Peak Gradient |

Table E.18: CID 12122 Other Vascular Properties

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------------------|------------|--------------------------|--------------|------------------------|
| ICA/CCA velocity ratio | 33868-1 | LN | 20030327 | ICA/CCA velocity ratio |

Table E.19: CID 12123 Carotid Ratios

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------------------------|------------|--------------------------|--------------|-----------------------------------|
| Renal Artery/Aorta velocity ratio | 33869-9 | LN | 20030327 | Renal Artery/Aorta velocity ratio |

Table E.20: CID 12124 Renal Ratios

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|------------|--------------------------|--------------|--------------|
| Best value | R-002E1 | SRT | 20060613 | Best value |
| Average | R-00317 | SRT | 20060613 | Mean |
| Measured | R-41D41 | SRT | 20060613 | Measured |

Table E.21: *CID 3627 Measurement Type*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|-----------------|------------|--------------------------|--------------|-----------------|
| Equation | 121420 | DCM | 20030327 | Equation |
| Table of Values | 121424 | DCM | 20030327 | Table of Values |

Table E.22: *CID 228 Equation or Table*

| Label | Code Value | Coding Scheme Designator | Code Version | Code Meaning |
|------------|------------|--------------------------|--------------|--------------|
| Right | G-A100 | SRT | 20030108 | Right |
| Left | G-A101 | SRT | 20030108 | Left |
| Unilateral | G-A103 | SRT | 20030108 | Unilateral |

Table E.23: *CID 244 Laterality*

E.2 Vascular Template

Vascular Ultrasound Procedure Report template is described in table E.24

| | NL | Rel with Parent | VT | Concept Name | VM | Req Type | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|----|----------|-----------|--|
| 1 | | | CONTAINER | EV (39445-2, DCM, "US Doppler Vessels Report") | 1 | M | | |
| 2 | > | CONTAINS | INCLUDE | DTID 5101 "Vascular Patient Characteristics" (See Table E.25) | 1 | U | | |
| 3 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12105 "Intracranial Cerebral Vessels" |
| 4 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12105 "Intracranial Cerebral Vessels" |
| 5 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") \$SectionLaterality = EV (G-A103, SRT, "Unilateral") \$Anatomy = DCID 12106 "Intracranial Cerebral Vessels (unilateral)" |
| 6 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-45005, SRT, "Artery of neck") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12104 "Extracranial Arteries" (See Table E.1) \$AnatomyRatio = DCID 12123 "Carotid Ratios" |
| 7 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-45005, SRT, "Artery of neck") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12104 "Extracranial Arteries" (See Table E.1) \$AnatomyRatio = DCID 12123 "Carotid Ratios" |
| 8 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-47040, SRT, "Artery of Lower Extremity") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12109 "Lower Extremity Arteries" |
| 9 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-47040, SRT, "Artery of Lower Extremity") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12109 "Lower Extremity Arteries" |

| | | | | | | | | |
|----|---|----------|---------|--|---|---|--|--|
| 10 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-49403, SRT, "Vein of Lower Extremity") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12110 "Lower Extremity Veins" |
| 11 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-49403, SRT, "Vein of Lower Extremity") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12110 "Lower Extremity Veins" |
| 12 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-47020, SRT, "Artery Of Upper Extremity") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12107 "Upper Extremity Arteries" |
| 13 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-47020, SRT, "Artery Of Upper Extremity") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12107 "Upper Extremity Arteries" |
| 14 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-49103, SRT, "Vein Of Upper Extremity") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12108 "Upper Extremity Veins" |
| 15 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-49103, SRT, "Vein Of Upper Extremity") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12108 "Upper Extremity Veins" |
| 16 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-71019, SRT, "Vascular Structure Of Kidney") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12115 "Renal Vessels" \$AnatomyRatio = DCID 12124 "Renal Ratios" |
| 17 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-71019, SRT, "Vascular Structure Of Kidney") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12115 "Renal Vessels" \$AnatomyRatio = DCID 12124 "Renal Ratios" |
| 18 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12111 "Abdominopelvic Arteries (lateral)" |

| | | | | | | | | |
|----|---|----------|---------|--|---|---|--|--|
| 19 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12111 "Abdominopelvic Arteries (lateral)" |
| 20 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") \$SectionLaterality = EV (G-A103, SRT, "Unilateral") \$Anatomy = DCID 12112 "Abdominopelvic Arteries (unilateral)" |
| 21 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") \$SectionLaterality = EV (G-A101, SRT, "Left") \$Anatomy = DCID 12113 "Abdominopelvic Veins (lateral)" |
| 22 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") \$SectionLaterality = EV (G-A100, SRT, "Right") \$Anatomy = DCID 12113 "Abdominopelvic Veins (lateral)" |
| 23 | > | CONTAINS | INCLUDE | DTID 5103 "Vascular Ultrasound Section" (See Table E.26) | 1 | U | | \$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") \$SectionLaterality = EV (G-A103, SRT, "Unilateral") \$Anatomy = DCID 12114 "Abdominopelvic Veins (unilateral)" |

Table E.24: TID 5100 Vascular Ultrasound Procedure Report

| | NL | Rel with Parent | VT | Concept Name | VM | Req Type | Condition | Value Set Constraint |
|---|----|-----------------|-----------|---|----|----------|-----------|--|
| 1 | | | CONTAINER | EV (121118, DCM, "Patient Characteristics") | 1 | M | | |
| 2 | > | CONTAINS | NUM | EV (121033, DCM, "Subject Age") | 1 | U | | UNITS = DCID 7456 "Units of Measure for Age" |
| 3 | > | CONTAINS | CODE | EV (121032, DCM, "Subject Sex") | 1 | U | | DCID 7455 "Sex" |

Table E.25: TID 5101 Vascular Patient Characteristics

| | NL | Rel with Parent | VT | Concept Name | VM | Req Type | Condition | Value Set Constraint |
|---|----|-----------------|-----------|----------------------------------|----|----------|-----------|----------------------|
| 1 | | | CONTAINER | DT (59776-5, LN, "Findings") | 1 | M | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-C0E3, SRT, "Finding Site") | 1 | M | | \$SectionScope |
| 3 | > | HAS CONCEPT MOD | CODE | EV (G-C171, SRT, "Laterality") | 1 | M | | \$SectionLaterality |

| | | | | | | | | |
|---|---|----------|---------|--|-----|---|--|--------------------------------|
| 4 | > | CONTAINS | INCLUDE | DTID 5104 "Vascular Ultrasound Measurement Group" (See Table E.27) | 1-n | M | | \$AnatomyGroup = \$Anatomy |
| 5 | > | CONTAINS | INCLUDE | DTID 300 "Measurement" (See Table D.37) | 1-n | U | | \$Measurement = \$AnatomyRatio |

Table E.26: TID 5103 Vascular Ultrasound Section

| | NL | Rel with Parent | VT | Concept Name | VM | Req Type | Condition | Value Set Constraint |
|---|----|-----------------|-----------|--|-----|----------|-----------|---|
| 1 | | | CONTAINER | \$AnatomyGroup | 1 | M | | |
| 2 | > | HAS CONCEPT MOD | CODE | EV (G-A1F8, SRT, "Topographical Modifier") | 1 | U | | DCID 12116 "Vessel Segment Modifiers" |
| 3 | > | HAS CONCEPT MOD | CODE | EV (125101, DCM, "Vessel Branch") | 1-n | U | | DCID 12117 "Vessel Branch Modifiers" |
| 4 | > | CONTAINS | INCLUDE | DTID 300 "Measurement" (See Table D.37) | 1-n | M | | \$Measurement = DCID 12119 "Vascular Ultrasound Property" \$Derivation = DCID 3627 "Measurement Type" |
| 5 | » | HAS PROPERTIES | NUM | EV (125106, DCM, "Doppler Angle") | 1 | U | | UNIT = EV (deg, UCUM, "degrees") |
| 6 | » | HAS PROPERTIES | NUM | EV (125107, DCM, "Sample Volume Depth") | 1 | U | | UNIT = EV (cm, UCUM, "cm") |

Table E.27: TID 5104 Vascular Ultrasound Measurement Group



Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.