GE Medical Systems
Kretz Ultrasound

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DICOM
Conformance Statement

KTD100141
Revision 4

VOLUSON® Voluson E8 7.x.x
CE 0123

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Contents

1 Introduction

1.1 Overview

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

Section 2 (Network Conformance Statement), which specifies the Voluson E8 equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (Ultrasound Information Object Implementation), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of an Ultrasound Medicine Information Object.

Section 4 (Ultrasound Multi-Frame Information Object Implementation), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of an Ultrasound Multi-Frame Information.

Section 5 (SC Information Object Implementation), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of a Secondary Capture Information Object.

Section 6 (SR Information Object Implementation), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of a Comprehensive Structured Reporting Information Object.

Section 7 (Modality Worklist Information Model), which specifies the Voluson E8 equipment compliance to DICOM requirements for the implementation of the Modality Worklist service.

Section 8 (Modality Performed Procedure Step SOP Class Definition), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of Modality Performed Procedure Step Service.

Section 9 (Storage Commitment Push Model SOP Class Definition), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of the Storage Commitment Push Model Service.

Section 10 (Basic Print Meta SOP Class Information Object Implementation), which specifies the Voluson E8 compliance to DICOM requirements for the implementation of Basic Print Meta SOP Classes (Gray and Color).

Section 11 (Study Root Query/Retrieve Information Model), which specifies the Voluson E8 compliance to DICOM requirements for the Study Root Query/Retrieve Information Model.

1.2 Overall DICOM Conformance Statement Document Structure

The Documentation Structure of the GE Healthcare Conformance Statements and their relationship with the DICOM Conformance Statements is shown below.

This document specifies the DICOM implementation. It is entitled:

Voluson E8 Version 7.x.x Conformance Statement Part Number KTD100141

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to inter-operate with the Voluson E8 network interface. Introductory information, which is applicable to all GE Healthcare Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement Direction: 2118780.

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GE Healthcare Conformance Statements.

The Voluson E8 Conformance Statement, contained in this document, also specifies the Lower Layer communications, which it supports (e.g. TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the standard may be addressed to:

DICOM Secretariat NEMA 1300 N. 17th Street, Suite 1847 Rosslyn, VA 22209 USA

1.3 Intended Audience

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standards and with the terminology and concepts, which are used in those Standards. If readers are unfamiliar with DICOM terminology they should first refer to the document listed below, then read the DICOM Standard itself, prior to reading this DICOM Conformance Statement document.

> Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement Direction: 2118780

1.4 Scope and Field of Application

It is the intent of this document, in conjunction with the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780, to provide an unambiguous specification for GE Healthcare implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GE Healthcare medical data exchanged using DICOM. The Voluson E8 Conformance Statements are available to the public.

Included in this DICOM Conformance Statement are the Module Definitions, which define all data elements, used by the Voluson E8 implementation. If the user encounters unspecified private data elements while parsing a Voluson E8 Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by the Voluson E8.

1.5 Important Remarks

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with the Voluson E8 equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

Integration - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non-GE systems is the user's responsibility and should not be underestimated. The user is strongly advised to ensure that such an integration analysis is correctly performed.

Validation - Testing the complete range of possible interactions between any GE device and non-GE devices, before the connection is declared operational, should not be overlooked. Therefore, the user should ensure that any non-GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non-GE device and the stability of the image data for the intended applications.

Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

Future Evolution - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GE Healthcare protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices, which have implemented DICOM. In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these DICOM Conformance Statements. The user should ensure that any non-GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

Interaction - It is the sole responsibility of the non-GE provider to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

2 Network Conformance Statement

2.1 Introduction

This section of the DICOM Conformance Statement specifies the compliance to DICOM conformance requirements for the relevant Networking features for the Voluson E8. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section. Voluson E8 is an Ultrasound scanner running on a commercial computer. It allows for the following DICOM functionality:

- Sending and receiving Echo messages to and from DICOM Verification SCP and client.
- Exporting DICOM images and SR documents to a DICOM SCP.
- Querying and retrieving DICOM Modality Worklist from a Worklist SCP.
- Sending start and end of examination to a DICOM Modality Performed Procedure Step SCP.
- Sending storage commitment requests to and receiving replies from a DICOM Storage Commitment SCP.
- Printing images to a DICOM Printer.

2.2 Implementation Model

2.2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in Figure 1.

There are six local real-world activities that occur in Voluson E8 - **Image Send, Verify, Query Worklist, Start/End Exam, Print Image and Query/Retrieve.**

- **Image Send** spools images or SR documents into a send queue. The queue manager then initiates a connection with the DICOM SCP and transmits the images and SR documents to the DICOM SCP. If Storage Commitment is configured, a commitment request will be sent for the images and SR documents.
- **Verify** initiates a connection with the DICOM SCP, posts a Verification request and closes the connection. It also responds to incoming Verification requests.
- **Query Worklist** initiates a connection with the DICOM SCP, performs a query and retrieves the matching entries to the product.
- **Start/End exam**: If Modality Performed Procedure Step is configured N-CREATE and N-SET messages will be sent for the exam.
- **Print Image** will send images to a DICOM Print SCP. It uses the same spooling mechanism as Image Send.
- **Query/Retrieve** will send queries to a DICOM Query/Retrieve SCP and retrieve them.
- **Receive Image**: The modality will accept requests for DICOM image storage and store the received images into a local database.

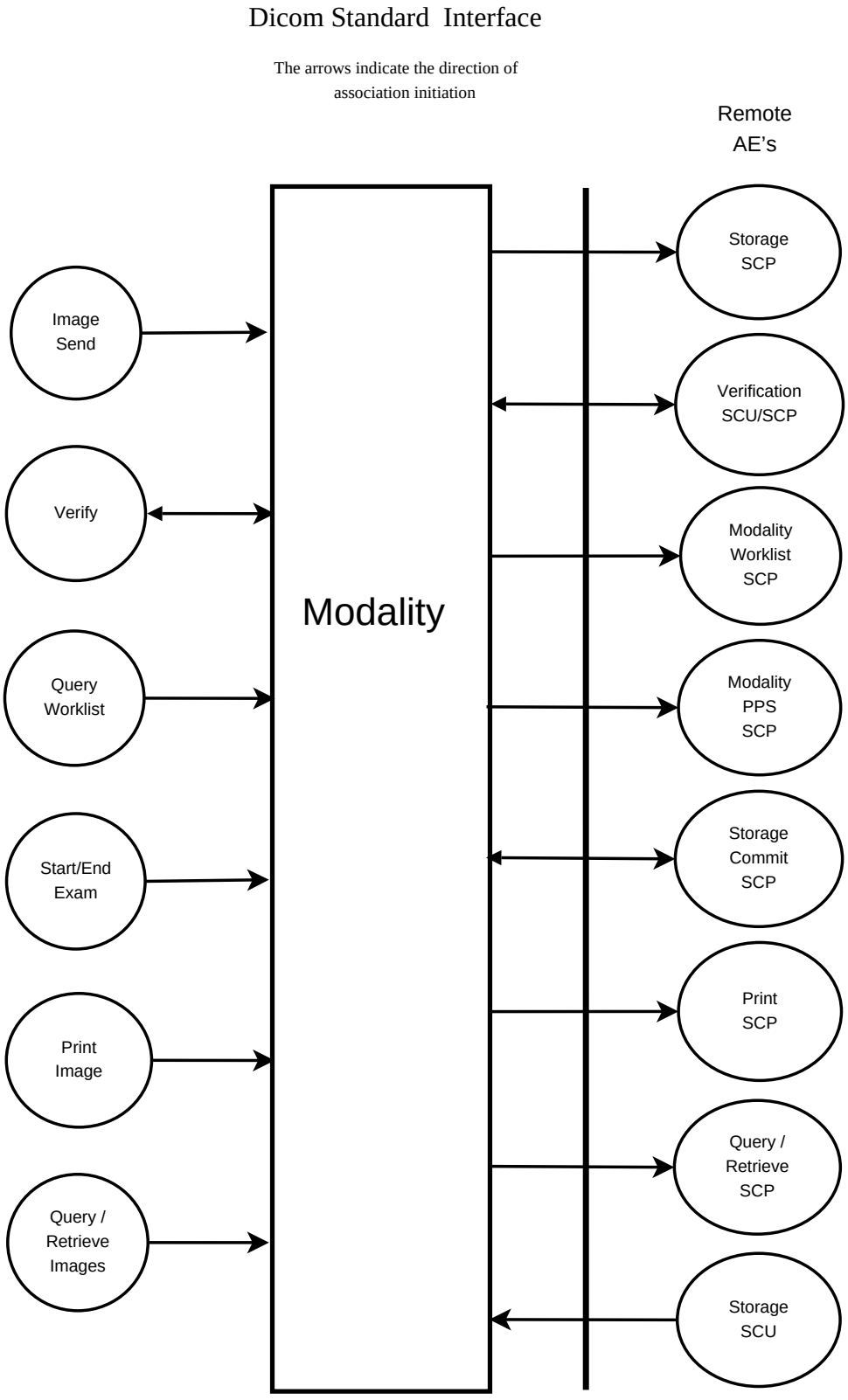

Figure 1: Application Data Flow Diagram

2.2.2 Functional Definition of AE's

Application Entity Voluson E8 supports the following functions:

- Initiates a DICOM association to send images and SR documents.
- Transmits DICOM images and SR documents to the DICOM Storage SCP.
- Initiates a DICOM verification to assist in network diagnostics.
- Responds to DICOM verification requests from other devices.
- Initiates a DICOM worklist query to receive worklist information.
- Initiates a DICOM association to notify start of examination.
- Initiates a DICOM association to notify end of examination.
- Initiates a DICOM association to request storage commitment of images and SR documents.
- Responds to replies from DICOM Storage SCPs, for storage commitment requests of images and SR documents sent by Voluson E8.
- Initiates a DICOM association to print images.
- Initiates a DICOM association to query for and retrieve images.

2.2.3 Sequencing of Real-World Activities

Not applicable.

2.3 AE Specifications

2.3.1 Voluson E8 AE Specification

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an SCU:

Table 2.3–1: **SCU SOP Classes**

SOP Class Name	SOP Class UID
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Verification SOP Class	1.2.840.10008.1.1
Modality Worklist Ingormation Model - FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an SCP:

Table 2.3–2: **SCP SOP Classes**

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Table 2.3–3: **Application Context Name**

Name	UID
Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length PDU negotiation is included in all association establishment requests. The maximum length PDU for an association initiated by the equipment is:

Table 2.3–4: **PDU Size**

Name	**Length**
Maximum PDU Size Offered	28872 bytes

The SOP Class Extended Negotiation is not supported.

The user information Items sent by this product are:

- Maximum PDU Length
- Implementation UID Implementation
- Version Name

2.3.1.1.2 Number of Associations

The Voluson E8 AE will initiate multiple DICOM associations.

2.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

"1.2.276.0.26.20010718.240

The Implementation Version Name for this DICOM Implementation is:

"KRETZDICOM_240"

Note: The Implementation Version Name may change in the future without modification of this document.

2.3.1.2 Association Initiation Policy

The Voluson E8 AE attempts to establish a new association with a remote device due to the following Real-World Activities:

- Image Send initiated by the operator for images and SR documents and sending requests for Storage Commitment.

- Verification, which verifies application level communication between peer DICOM AE's for service purposes.
- Worklist initiated by the operator for receiving worklist information.
- Start/End Exam sending messages to Modality Performed Procedure Step.
- Print initiated by the operator for a specific image or group of images.
- Query/Retrieve initiated by the operator for querying and receiving images.

2.3.1.2.1 Real-World Activity A ('Image Send' Operation)

2.3.1.2.1.1 Associated Real-World Activity

Upon a request by the operator (manual or automatic), images or SR documents will be sent to a DICOM Storage SCP.

2.3.1.2.1.2 Proposed Presentation Context Tables

The Proposed Presentation Context Table depends on compression according to the following tables:

Table 2.3–5: **Presentaion Context Table - Proposed (No Compression)**

Abstract Syntax Name	**Abstract Syntax UID**	**Transfer Syntax Name**	**Transfer Syntax UID**	**Role**	**Ext. Neg.**
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

Table 2.3–6: **Presentaion Context Table - Proposed (JPEG Compression)**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCU	None.
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCU	None.
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCU	None.

Table 2.3–7: **Presentaion Context Table - Proposed**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Comprehensive Structured Report	1.2.840.10008.5.1.4.1.88.33	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.1.2.1 SOP Specific DICOM Conformance Statement for all Storage SOP Classes

The Voluson E8 also sends a Storage Commitment Request, with the following proposed presentation context. The result from the SCP is expected on another association for the Storage Commitment result.

Table 2.3–8: **Presentaion Context Table - Proposed - Storage Commitment**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

For this SOP class, all status codes with status Refused or Error are treated as failures and terminate the association and operation. On a failure, the request will be put in a holding queue for the user to manually retry the request. All status codes with status Warning or Success are treated as successes.

2.3.1.2.2 Real-World Activity B ('Verify' Operation)

2.3.1.2.2.1 Associated Real-World Activity

The user may initiate a DICOM Verification Request in the Config screen. Associations will be released upon the receipt of each C-ECHO confirmation. In the event that the SCP does not respond for some reason, the operation will time out and the Voluson E8 will close the association.

2.3.1.2.2.2 Proposed Presentation Context Table

Table 2.3–9: **Presentaion Context Table - Proposed**

Abstract Syntax Name	**Abstract Syntax UID**	**Transfer Syntax Name**	**Transfer Syntax UID**	**Role**	**Ext. Neg.**
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.3 Real-World Activity C ('Query Worklist' Operation)

2.3.1.2.3.1 Associated Real-World Activity

The user may initiate a DICOM Worklist Query in Search screen, which will send a C-FIND-RQ to the Worklist SCP.

Associations will be released upon the receipt of C-FIND-RSP confirmation.

2.3.1.2.3.2 Proposed Presentation Context Table

Table 2.3–10: **Presentaion Context Table - Proposed**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.3.2.1 SOP Specific DICOM Conformance Statement for Worklist SOP Classes

The Voluson E8 includes matching keys in the Modality Worklist queries as described in Section 7.5. All status codes with status Refused or Error are treated as failures and terminate the association and operation. On a failure, the user will be informed

2.3.1.2.4 Real-World Activity D ('Start/End Exam' Operation)

2.3.1.2.4.1 Associated Real-World Activity

The Modality Performed Procedure Step messages are sent when the exam is started by the user after a worklist entry has been selected or patient data have been entered on the patient data entry screen. At this time the N-CREATE message is sent.

The N-SET will be sent when 'End Exam' is being pressed. The status is set to COMPLETED by default, however the operator may chose to manually set the status to DISCONTINUED and select the discontinuation reason from a predefined list.

2.3.1.2.4.2 Proposed Presentation Context Table

Table 2.3–11: **Presentaion Context Table - Proposed**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.4.2.1 SOP Specific DICOM Conformance Statement for Modality Performed Procedure Step SOP Class

The Voluson E8 includes Attributes in the Modality Performed Procedure Step N-CREATE as described in Section 8.2.1.

The Voluson E8 includes Attributes in the Modality Performed Procedure Step N-SET as described in Section 8.2.1.

The mapping from Worklist attributes is described in Section 7.5.

Voluson E8 sends N-SET after the exam is ended. The N-SET will include all acquired images SOP Instance UIDs and the status of COMPLETED or DISCONTINUED.

For this SOP class, all status codes with status Refused or Error are treated as failures and terminate the association and operation. All status codes with status Warning or Success are treated as successes.

2.3.1.2.5 Real-World Activity E ('Image Print' Operation)

2.3.1.2.5.1 Associated Real-World Activity

Upon a request by the operator, print jobs will be sent to a DICOM Print SCP. The jobs are entered into a send queue and processed by the spool manager. If an error occurs during the transmission the operation may be retried manually. The number of automatic etries is configurable.

2.3.1.2.5.2 Proposed Presentation Context Table

Table 2.3–12: **Presentaion Context Table - Proposed**

Abstract Syntax Name	**Abstract Syntax UID**	**Transfer Syntax Name**	**Transfer Syntax UID**	**Role**	**Ext. Neg.**
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.5.2.1 SOP Specific DICOM Conformance Statement for Print Management SOP Classes

The Voluson E8 treats all status codes with status Refused or Error as failures and the spool manager retries the operation. After the configurable number of retries has been exceeded the spooler's job status is set to FAILED and the print job may be retried manually.

2.3.1.2.6 Real-World Activity F ('Query/Retrieve Images' Operation)

2.3.1.2.6.1 Associated Real-World Activity

The user may initiate a DICOM Query in Search screen, which will send a C-FIND-RQ to the Query/Retrieve SCP.

Associations will be released upon the receipt of C-FIND-RSP confirmation.

The user may then select an examination to be retrieved, using the C-MOVE-RQ command to the Query/Retrieve SCP. The result from the SCP is expected on another association for the retrieved examinations.

2.3.1.2.6.2 Proposed Presentation Context Table

Table 2.3–13: **Presentation Context Table - Proposed**

Abstract Syntax Name	**Abstract Syntax UID**	**Transfer Syntax Name**	**Transfer Syntax UID**	**Role**	**Ext. Neg.**
Study Root Query/ Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.
Study Root Query/ Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.2.6.2.1 SOP Specific DICOM Conformance Statement for Query/Retrieve SOP Class

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 (SERIES). The user then can select one "Exam" (Series) and retrieve it. Retrieving is being done at the SERIES level.

The Voluson E8 treats all status codes with status Refused or Error as failures and terminate the assicuation and operation. All status codes with status Warning or Success are treated as

success.

Table 2.3–14: **Study Root Request Identifier for Query**

Attribute Name	**Tag**	**Types of Matching**	**Filtering is supported**
STUDY Level			
Study Date	(0008,0020)	*,U,R	Yes
Study Time	(0008,0030)	S,*,U,R	Yes
Referring Physicians Name	(0008,1090)	S,*,U	
Accession Number	(0008,0050)	*,U	Yes
Patient Name	(0010,0010)	*,U	Yes
Patient ID	(0010,0020)	*,U	Yes
Patient Birth Date	(0010,0030)	S,*,U,R	Yes
Patient Sex	(0010,0040)	S,*U	Yes
Study Instance UID	(0020,000D)	UNIQUE	
Number of Patient Related Studies	(0020,1200)	S,*,U	
Number of Patient Reldated Series	(0020,1202)	S,*,U	
SERIES Level			
Modality	(0008,0060)	S	always "US"
Series Date	(0008,0021)	S,*,U,R	
Series Time	(0008,0031)	S,*,U,R	
Series Instance UID	(0020,000E)	UNIQUE	
Number of Series Related Instances	(0020,1209)	S,*,U	

Types of Matching:

- Single Value Matching (S)
- Universal Matching (U)
- Wildcard Matching (*)
- Date,Time Range Matching (R)

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

"Filtering is supported" means that matching strings can be controlled from the Search screen.

2.3.1.2.6.2.2 SOP Specific DICOM Conformance Statement for Study Root Query/Retrieve Information SOP Class

The Voluson E8 treats all status codes with status Refused or Error as failures. All status codes with status Warning or Success are treated as successes.

2.3.1.3 Association Acceptance Policy

The Voluson E8 AE accepts an association when it receives a Verification Request from another network device, an image storage request from an SCU or a Storage Commitment result from a Storage Commitment SCP.

2.3.1.3.1 Real-World Activity A('Echo' Operation)

2.3.1.3.1.1 Associated Real-World Activity

An incoming Verification Request will cause the AE to accept the association and respond with a Verification Response.

2.3.1.3.1.2 Accepted Presentation Context Table

Table 2.3–15: **Presentaion Context Table - Accepted**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.3.1.2.1 SOP Specific DICOM Conformance Statement for Verify SOP Class

The AE provides standard conformance to the Verification SOP Class as an SCP. The port number used is configured in Config screen, default is 104.

2.3.1.3.1.3 Presentation Context Acceptance Criterion

No criterion.

2.3.1.3.1.4 Transfer Syntax Selection Policies

The selected transfer syntax is based on the proposed transfer syntax list. The priority order is Explicit VR Little Endian, Explicit VR Big Endian and Implicit VR Little Endian.

2.3.1.3.2 Real-World Activity B('End Exam' Operation)

2.3.1.3.2.1 Associated Real-World Activity

Voluson E8 will only listen for an N-EVENT-REPORT (Storage Commitment Result) from a Storage Commitment SCP in a new association.

2.3.1.3.2.2 Accepted Presentation Context Table

Table 2.3–16: **Presentaion Context Table - Accepted - Storage Commitment**

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Ext. Neg.
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None.

2.3.1.3.2.2.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class SCU

The Voluson E8 will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class. The result from the SCP is expected on another association for the Storage Commitment result.

The Voluson E8 behavior after receiving an N-EVENT-REPORT (Storage Commitment Result) is described in Section 7.5.

For this SOP class, all status codes with status Refused or Error are treated as failures and terminate the association and operation. All status codes with status Warning or Success are treated as successes.

2.3.1.3.3 Real-World Activity C (Receive Image Operation)

2.3.1.3.3.1 Associated Real-World Activity

Voluson E8 will accept associations for C-STOR-RQs. The received images will be stored into a local database.

2.3.1.3.3.2 Accepted Presentation Context Table

Table 2.3–17: **Presentaion Context Table - Accepted**

Abstract Syntax Name	**Abstract Syntax UID**	**Transfer Syntax Name**	**Transfer Syntax UID**	**Role**	**Ext. Neg.**
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCP	None.
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2 1.2.840.10008.1.2.4.50 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	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian JPEG Baseline JPEG Lossless Non-Hier. (Process 14)	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCP	None.

2.3.1.3.3.2.1 SOP Specific DICOM Conformance Statement for the Storage SOP Classes

The AE provides standard conformance to the Storage SOP Classes as an SCP. The port number used is not configurable and is set to 104.

2.3.1.3.3.2.2 Presentation Context Acceptance Criterion

No criterion.

2.3.1.3.3.2.3 Transfer Syntax Selection Policies

The accepted transfer syntaxes are based on the proposed transfer syntax list. There is no defined priority order. All supported transfer syntaxes are accepted.

2.4 Communication Profiles

2.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

DICOM Upper Layer (PS 3.8) is supported using TCP/IP.

2.4.2 TCP/IP Stack

The TCP/IP stack is inherited from the product's operating system. Please refer to product documentation for more information.

2.4.2.1 API

Not applicable to this product.

2.5 Extensions / Specialisations / Privatizations

the product will send ultrasound raw volume data information in private data elements designated by the private tag 7FE1,00xx VR OB, VM 1.

2.6 Configuration

2.6.1 AE Title/Presentation Address Mapping

The Local AE title is configurable through the Config screen, see below.

2.6.2 Configurable Parameters

Network:

- Local IP address
- Local IP netmask
- Local routing table information

Local:

- Local AE Title

- Local TCP Port Number

Verification:

- The AE Title, IP Address and Port number of the SCP.

Modality Worklist:

- The AE Title, IP Address and Port number of the SCP.

Modality Performed Procedure Step:

- The AE Title, IP Address and Port number of the SCP.

Storage Commitment:

- The AE Title, IP Address and Port number of the SCP.
- Max retries, Retry interval.

Print:

- The AE Title, IP Address and Port number of the SCP.
- Max retries, Retry interval.
- Configuration for each print job in setup dialog.

2.7 Support of Extended Character Sets

Voluson E8 will support the ISO_IR 100 (ISO 8859-1:1987 Latin character set.

2.8 Codes and Controlled Terminology

The product uses the fixed (non-configurable, non-extensible) coded terminology in SR Document attributes, as described in Section 6 SR Information Object Implementation.

2.9 Security Profiles

The product does not conform to any defined DICOM Security Profiles. It is assumed that the product is used within a secured environment.

It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the product.
- Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
- Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network(VPN))

3 Ultrasound (US) Information Object Implementation

3.1 Introduction

This section specifies the use of the DICOM US Image IOD to represent the information included in US images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

- IOD Implementation
- IOD Module Table
- IOD Module Definitions

3.2 US IOD Implementation

This section defines the implementation of US image information object.

3.3 US Entity-Relationship Model

3.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the US Information Object.

3.3.2 Voluson E8 Mapping of DICOM Entities

Table 3.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
Patient	Patient
Study	Exam
Series	Exam
Image	Image
Curve	not used

3.4 IOD Module Table

Within an entity of the DICOM US IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets.

The table below identifies the defined modules within the entities, which comprise the DICOM US IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

Only the single frame US Image IOD is described here.

Table 3.4–1: **US Image IOD Modules**

Entity Name	Module Name	Reference
Patient	Patient	3.5.1.1
Study	General Study	3.5.2.1
Study	Patient Study	3.5.2.2
Series	General Series	3.5.3.1
Frame of Reference	Frame of Reference	Not used
Frame of Reference	US Frame of Reference	Not used
Equipment	General Equipment	3.5.4.1
Image	General Image	3.5.5.1
Image	Image Pixel	3.5.5.2
Image	Contrast / Bolus	Not used
Image	Palette Color Lookup Table	not used
Image	US Region Calibration	3.5.7.1
Image	US Image	3.5.7.2
Image	Overlay Plane	Not used
Image	VOI LUT	Not used
Image	SOP Common	3.5.6.1
Curve		Not used

3.5 Information Module Definitions

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the US Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

3.5.1 Common Patient Entity Modules

3.5.1.1 Patient Module

Table 3.5–1: **Patient Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Patient's Name	0010, 0010	2	Patient name with ^ delimiters
Patient ID	0010, 0020	2	64 char max
Birth Date	0010, 0030	2	Used
Patient Sex	0010, 0040	2	Used
Referenced Patient SQ		3	Not used
Patient's Birth Time		3	Not used
Other Patient ID		3	Not used
Other Patient Names		3	Not used
Ethnic Group		3	Not used
Patient Comments		3	Not used

3.5.2 Common Study Entity Modules

3.5.2.1 General Study Module

Table 3.5–2: **General Study Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	0020,000D	1	Uniquely generated by the equipment. Taken from worklist if it is there.
Study Date	0008,0020	2	Set to exam date.
Study Time	0008,0030	2	Set to exam time.
Referring Physicians Name	0008,0090	2	May be entered from user interface. Taken from the worklist if present.
Study ID	0020,0010	2	Taken for the worklist if present. (from Requested Procedure ID)
Accession Number	0008,0050	2	May be entered from user interface. Taken from the worklist if present.
Study Description	0008,1030	3	Taken for the worklist if present. (from Requested Procedure ID)
Name of Reading Physician(s)	0008,1060	3	May be entered from user interface.
Referenced Study Sequence	0008,1110	3	Taken from the worklist if present.
>Referenced SOP Class UID	0008,1150	3	Taken from the worklist if present.
>Referenced SOP Instance UID	0008,1155	3	Taken from the worklist if present.

3.5.2.2 Patient Study Module

No attributes from this module are used.

3.5.3 Common Series Entity Modules

3.5.3.1 General Series Module

Table 3.5–3: **General Series Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Modality	0008, 0060	1	Defined Term "US" used.
Series Instance UID	0020, 000E	1	Uniquely generated by the equipment.
Series Number	0020, 0011	2	Internal number which is incremented for each new series.
Laterality	0020, 0060	2C	Not used
Series Date	0008, 0021	3	Set to series date.
Series Time	0008, 0031	3	Set to series time.
Performing Physician's Name	0008, 1050	3	May be entered from user interface. Taken from worklist if present. (from Scheduled Performing Physician's Name)
Series Description	0008,103E	3	Not used
Operator's Name	0008, 1070	3	May be entered from user interface.
Referenced Performed Procedure Step Sequence	0008, 1111	3	Used if Modality Performed Procedure Step is enabled.

Table 3.5–3: **General Series Module Attributes (continued)**

Attribute Name	Tag	Type	Attribute Description
>Referenced SOP Class UID	0008, 1150	3	Used if Modality Performed Procedure Step is enabled.
>Referenced SOP Instance UID	0008, 1155	3	Used if Modality Performed Procedure Step is enabled.
Body Part Examined	0018, 0015	3	Not used
Patient Position	0018, 5100	2C	Not used
Smallest Pixel Value in Series	0028, 0108	3	Not used
Largest Pixel Value in Series	0028, 0109	3	Not used
Request Attribute Sequence	0040, 0275	3	Used if Modality Worklist and/or Modality Performed Procedure Step is enabled.
>Requested Procedure ID	0028, 1001	1C	Taken from worklist if present.
>Scheduled Procedure Step ID	0040, 0009	1C	Taken from worklist if present.
>Scheduled Procedure Step Description	0040, 0007	3	Taken from worklist if present.
>Scheduled Protocol Code SQ	0040, 0008	3	Taken from worklist if present.
>Include "Code SQ Macro"			
Performed Procedure Step ID	0040, 0253	3	Used if Modality Performed Procedure Step is enabled.
Performed Procedure Step Start Date	0040, 0244	3	Used if Modality Performed Procedure Step is enabled.
Performed Procedure Step Time	0040, 0245	3	Used if Modality Performed Procedure Step is enabled.
Performed Procedure Step Description	0040, 0254	3	Used if Modality Performed Procedure Step is enabled.
Performed Protocol Code SQ	0040, 0260	3	Taken from worklist if present. (from Scheduled Protocol Code Sequence)
>Include "Code SQ Macro"			

3.5.4 Common Equipment Entity Modules

3.5.4.1 General Equipment Module

Table 3.5–4: **General Equipment Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Manufacturer	0008, 0070	2	"GE Medical Systems Kretztechnik GmbH & Co OHG"
Institution Name	0008,0080	3	Used
Institution Address	0008,0081	3	Not used
Station Name	0008,1010	3	Used
Institutional Department Name	0008,1040	3	Not used
Manufacturer's Model Name	0008, 1090	3	"V830"
Device Serial Number	0018,1000	3	"0"
Software Version	0018,1020	3	Used
Spatial Resolution	0018,1050	3	Not used
Date of Last Calibration	0018,1200	3	Not used

Table 3.5–4: **General Equipment Module Attributes (continued)**

Attribute Name	Tag	Type	Attribute Description
Time of Last Calibration	0018,1201	3	Not used
Pixel Padding Value	0028,0120	3	Not used

3.5.5 Common Image Entity Modules

3.5.5.1 General Image Module

Table 3.5–5: **General Image Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Image Number	0020,0013	2	Image number in exam
Patient Orientation	0020,0020	2C	Zero length
Acquisition Date	0008,0022	3	Not used
Acquisition Time	0008.0032	3	Not used
Image Type	0008,0008	3	Used
Acquisition Number		3	Not used
Content Date	0008,0023	2C	Used
Content Time	0008,0033	2C	Used
Referenced Image Sequence		3	Not used
Derivation Description	0028,2111	3	Not used
Source Image Sequence		3	Not used
Images in Acquisition		3	Not used
Image Comments	0020,4000	3	Used
Lossy Image Compression	0028,2110	3	for lossy compressed image

3.5.5.2 Image Pixel Module

Table 3.5–6: **Image Pixel Module Elements**

Attribute Name	Tag	Type	Attribute Description
Samples Per Pixel	0028, 0002	1	RGB: 3 YBR_FULL_422: 3 MONOCHROME2: 1
Photometric Interpretation	0028, 0004	1	Defined Values used: "MONOCHROME2", "RGB", "YBR_FULL_422"
Rows	0028, 0010	1	Expert Models: configurable perDICOM destination (800x600 or 640x480) Pro Models: SC Images: configurable perDICOM destination,US Images: always 640x480

Table 3.5–6: **Image Pixel Module Elements (continued)**

Attribute Name	Tag	Type	Attribute Description
Columns	0028, 0011	1	Expert Models: configurable perDICOM destination (800x600 or 640x480) Pro Models :SC Images: configurable perDICOM destination,US Images: always 640x480
Bits Allocated	0028, 0100	1	Always 0008H
Bits Stored	0028, 0101	1	Always 0008H
High Bit	0028, 0102	1	Always 0007H
Pixel Representation	0028, 0103	1	Defined Value "0" (Unsigned int)
Pixel Data	7FE0, 0010	1	Pixel Data of Image
Planar Configuration	0028, 0006	1C	Used unless MONOCHROME2
Aspect Ratio	0028, 0034	1C	"1" if MONOCHROME2, else "0"
Smallest Image Pixel Value	0028, 0106	3	Not used
Largest Image Pixel Value	0028, 0107	3	Not used

3.5.5.3 Contrast/Bolus Module

This module is not being used.

3.5.5.4 Palette Color Lookup Module

This module is not being used.

3.5.5.5 VOI LUT Module

Table 3.5–7: **VOI LUT Module Attributes**

Attribute Name	Tag	Type	Attribute Description
VOI LUT Sequence	0028,3010	3	Not used
>LUT Descriptor	0028,3002	3	Not used
> LUT Explanation	0028,3003	3	Not used
>LUT Data	0028,3006	3	Not used
Window Center	0028,1050	3	Set to 127 if MONOCHROME2
Window Width	0028,1051	3	Set to 256 if MONOCHROME2
Device Serial Number	0018,1000	3	"0"
Window Center and Width Explanation	0028,1055	3	Not used

3.5.6 General Modules

The SOP Common Module is mandatory for all DICOM IODs.

3.5.6.1 SOP Common Module

Table 3.5–8: **SOP Common Module Attributes**

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	0008, 0016	1	Set to: "1.2.840.10008.5.1.4.1.1.3.1", "1.2.840.10008.5.1.4.1.1.6.1" or "1.2.840.10008.5.1.4.1.1.7"
SOP Instance UID	0008, 0018	1	Uniquely generated by the equipment
Specific Character Set	0008,0005	1C	Set to "ISO_IR 100"
Instance Creation Date	0008,0012	3	Not used
Instance Creation Time	0008,0013	3	Not used
Instance Creator ID	0008,0014	3	Not used
Instance Number	0020,0013	3	Not used

3.5.7 General Modules

This Section describes US Series, Equipment, and Image Modules. These Modules contain attributes that are specific to US Image IOD.

3.5.7.1 US Region Calibration Module

The US Region Calibration Module is used to describe multiple regions.

Table 3.5–9: **US Region Calibration Module elements**

Attribute Name	Tag	Type	Attribute Description
Sequence of Ultrasound Regions	0018,6011	1	Used
>Region Spatial Format	0018,6012	1	1,2,3
>Region Data Type	0018,6014	1	1
>Region Flags	0018,6016	1	0
>Region Location MinX0	0018,6018	1	0..959
>Region Location MinY0	0018,601a	1	0..661
>Region Location Max X1	0018,601c	1	0..959
>Region Location Max Y1	0018,601e	1	0..661
>Reference Pixel X0	0018,6020	3	0
>Reference Pixel Y0	0018,6022	3	0..xxx
>Physical Units X Direction	0018,6024	1	3,4
>Physical Units Y Direction	0018,6026	1	3,4
>Reference Pixel Physical Value X	0018,6028	3	0
>Reference Pixel Physical Value Y	0018,602a	3	0
>Physical Delta X	0018,602c	1	Used
>Physical Delta Y	0018,602e	1	Used

3.5.7.2 US Image Module

This section specifies the attributes that describe ultrasound images.

Table 3.5–10: **US Image Module Elements**

Attribute Name	Tag	Type	Attribute Description
Samples Per Pixel	0028,0002	1	Value set to: "MONOCHROME2", "YBR_FULL_422" or "RGB"
Photometric Interpretation	0028, 0004	1	RGB: 3 YBR_FULL_422: 3 MONOCHROME2: 1"
Bits Allocated	0028,0100	1	Always 0008H
Bits Stored	0028,0101	1	Always 0008H
High Bit	0028,0102	1	Always 0007H
Planar Configuration	0028, 0006	1C	Used unless MONOCHROME2
Pixel Representation	0028, 0103	1	Unsigned int
Frame Increment Pointer	0028,0009	1C	Not used
Image Type	0008,0008	2	Used
Lossy Image Compression	0028, 2110	1C	for lossy compressed image
Ultrasound color data present	0028,0014	3	Not used
Referenced Overlay Sequence	0008,1130	3	Not used
>Referenced SOP Class UID	0008,1150	1C	Not used
>Referenced SOP Instance UID	0008,1150	1C	Not used
Referenced Curve Sequence	0008,1155	3	Not used
>Referenced SOP Class UID	0008,1150	1C	Not used
>Referenced SOP Instance UID	0008,1150	1C	Not used
Number of Event Timers	0008,2129	3	Not used
Event Elapsed Times	0008,2130	3	Not used
Event Timer Name	0008,2132	3	Not used
Anatomic Region Sequence	0008,2218	3	Not used
>Include 'Code Sequence Macro'			
>Anatomic Region Modifier Sequence	0008,2220	3	Not used
>>Include 'Code Sequence Macro'			
Primary Anatomic Structure Sequence	0008,2228	3	Not used
>Include 'Code Sequence Macro'			
>>Include 'Code Sequence Macro'			
>Primary Anatomic Structure Modifier Sequence	0008,2230	3	Not used
Transducer Position Sequence	0008,2240	3	Not used
>Include 'Code Sequence Macro'			
>Transducer Position ModifierSequence	0008,2242	3	Not used
>>Include 'Code Sequence Macro'			
Transducer Orientation Sequence	0008,2244	3	Not used
>Include 'Code Sequence Macro'			
>Transducer Orientation Sequence	0008,2246	3	Not used
>>Include 'Code Sequence Macro'			
Trigger Time	0018,1060	3	Not used

Table 3.5–10: **US Image Module Elements (continued)**

Attribute Name	Tag	Type	Attribute Description
Nominal Interval	0018,1062	3	Not used
Beat Rejection Flag	0018,1080	3	Not used
Low R-R Value	0018,1081	3	Not used
High R-R Value	0018,1082	3	Not used
Heart Rate	0018,1088	3	Not used
Output Power	0018,5000	3	Not used
Transducer Data	0018,5010	3	Not used
Transducer Type	0018,6031	3	Not used
Focus Depth	0018,5012	3	Not used
Preprocessing Function	0018,5020	3	Not used
Mechanical Index	0018,5022	3	Not used
Bone Thermal Index	0018,5024	3	Not used
Cranial Thermal Index	0018,5026	3	Not used
Soft Tissue Thermal Index	0018,5027	3	Not used
Soft Tissue-focus Thermal Index	0018,5028	3	Not used
Soft Tissue-surface Thermal Index	0018,5029	3	Not used
Depth of Scan Field	0018,5050	3	Not used
Image Transformation Matrix	0018,5210	3	Not used
Image Translation Vector	0018,5212	3	Not used
Overlay Subtype	60xx,0045	3	Not used

4 Ultrasound Multi-Frame (US-MF) Information Object Implementation

4.1 Introduction

This section specifies the use of the DICOM US Multi-frame Image IOD to represent the information included in US images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

- IOD Implementation
- IOD Module Table
- IOD Module Definitions

4.2 US MF IOD Implementation

This section defines the implementation of US Multi-Frame image information object.

4.3 US Entity-Relationship Model

4.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the US Multi-Frame Information Object.

4.3.2 Voluson E8 Mapping of DICOM Entities

Table 4.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
Patient	Patient
Study	Exam
Series	Exam
Image	Image
Curve	not used

4.4 IOD Module Table

Within an entity of the DICOM US Multi-Frame IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets.

The table below identifies the defined modules within the entities, which comprise the DICOM US Multi-Frame IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

Table 4.4–1: **US Multi-Frame Image IOD Modules**

Entity Name	Module Name	Reference
Patient	Patient	3.5.1.1
Study	General Study	3.5.2.1
Study	Patient Study	3.5.2.2
Series	General Series	3.5.3.1
Frame of Reference	Frame of Reference	Not used
Frame of Reference	US Frame of Reference	Not used
Equipment	General Equipment	3.5.4.1
Image	General Image	3.5.5.1
Image	Image Pixel	3.5.5.2
Image	Contrast / Bolus	Not used
Image	Cine	4.5.1.1
Image	Multi-Frame	4.5.1.2
Image	Palette Color Lookup Table	not used
Image	US Region Calibration	3.5.7.1
Image	US Image	3.5.7.2
Image	Overlay Plane	Not used
Image	VOI LUT	Not used
Image	SOP Common	3.5.6.1
Curve		Not used

4.5 Information Module Definitions

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the US Multi-Frame Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

4.5.1 Common Image Modules

4.5.1.1 Cine Module

Table 4.5–1: **Cine Module Elements**

Attribute Name	Tag	Type	Attribute Description
Frame Time	0018,1063	1C	Set to interframe time
Frame Time Vector	0018,1065	1C	Not Used
Start Trim	0008,2142	3	Not used
Stop Trim	0008,2143	3	Not used
Recommended Display Frame Rate	0008,2144	3	Not used
Cine Rate	0018,0040	3	Not used
Frame Delay	0018,1066	3	Not used

Table 4.5–1: **Cine Module Elements (continued)**

Attribute Name	Tag	Type	Attribute Description
Effective Duration	0018,1072	3	Not used
Actual Frame Duration	0018,1242	3	Not used
Preferred Playback Sequencing	0018,1244	3	Not used

4.5.1.2 Multi-Frame Module

Table 4.5–2: **Multi Frame Module Elements**

Attribute Name	Tag	Type	Attribute Description
Number of Frames	0028,0008	1	Set to number of frames in image.
Frame Increment Pointer	0028,0009	1	Set o Frame Time (0018,0063)

5 SC Information Object Implementation

5.1 Introduction

This section specifies the use of the DICOM SC Image IOD to represent the information included in SC images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

- IOD Implementation
- IOD Module Table
- IOD Module Definitions

5.2 SC IOD Implementation

This section defines the implementation of SC image information object.

5.3 SC Entity-Relationship Model

5.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the SC Information Object.

5.3.2 Voluson E8 Mapping of DICOM Entities

Table 5.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
Patient	Patient
Study	Exam
Series	Exam
Image	Image
Curve	not used

5.4 IOD Module Table

Within an entity of the DICOM SC IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets.

The table below identifies the defined modules within the entities, which comprise the DICOM SC IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

Table 5.4–1: **SC Image IOD Modules**

Entity Name	Module Name	Reference
Patient	Patient	3.5.1.1
Study	General Study	3.5.2.1
Study	Patient Study	3.5.2.2
Series	General Series	3.5.3.1
Equipment	General Equipment	3.5.4.1
Equipment	SC Equipment	5.5.1.1
Image	General Image	3.5.5.1
Image	Image Pixel	3.5.5.2
Image	SC Image	5.5.1.2
Image	Overlay Plane	Not used
Image	Modality LUT	Not used
Image	VOI LUT	3.5.5.5
Image	SOP Common	3.5.6.1

5.5 Information Module Definitions

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the SC Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

5.5.1 SC Modules

5.5.1.1 SC Equipment Module

This Module describes equipment used to convert images into a DICOM format.

Table 5.5–1: **Secondary Capture Equipment Module Elements**

Attribute Name	Tag	Type	Attribute Description
Conversion Type	0008,0064	1	Set to: WSD
Modality	0008,0060	3	Defined Term "US" used
Secondary Capture Device ID	0018,1010	3	Not used
Secondary Capture Device Manufacturer	0008,1016	3	Not used
Secondary Capture Device Manufacturer's Model Name	0008, 1018	3	Not used
Secondary Capture Device Software Version	0018,1019	3	Not used
Video Image Format Acquired	0018,1022	3	Not used
Digital Image Format Acquired	0018,1023	3	Not used

5.5.1.2 SC Image Module

The table in this Section contains IOD attributes that describe SC images.

Table 5.5–2: **Secondary Capture Image Module Elements**

Attribute Name	Tag	Type	Attribute Description
Date of Secondary Capture	0018, 1012	3	Not used
Time of Secondary Capture	0018, 1014	3	Not used

6 SR Information Object Implementation

6.1 Introduction

This section specifies the use of the DICOM Comprehensive SR IOD to represent the information included in SC images produced by this implementation. Corresponding attributes are conveyed using the module construct. The contents of this section are:

- IOD Implementation
- IOD Module Table
- IOD Module Definitions

6.2 Comprehensive SR IOD Implementation

This section defines the implementation of Comprehensive SR information object.

6.3 Comprehensive SR Entity-Relationship Model

6.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the Comprehensive SR Information Object.

6.3.2 Voluson E8 Mapping of DICOM Entities

Table 6.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
Patient	Patient
Study	Exam
Series	Exam
SR Document	Results

6.4 IOD Module Table

Within an entity of the DICOM Comprehensive SR IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets.

The table below identifies the defined modules within the entities, which comprise the DICOM Comprehensive SR IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

Table 6.4–1: **SR IOD Modules**

Entity Name	Module Name	Reference
Patient	Patient	3.5.1.1
Patient	Specimen Identification	Not used
Study	General Study	3.5.2.1
Study	Patient Study	3.5.2.2
Series	SR Document Series	6.5.1
Equipment	General Equipment	3.5.4.1
Document	SR Document General	6.5.2
Document	SR Document Content	6.5.3
Document	SOP Common	3.5.6.1

6.5 Information Module Definitions

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the Comprehensive SR Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions).

6.5.1 SR Document Series Module

Table 6.5–1: **SR Document Series Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Modality	0008, 0060	1	Defined Term "SR" used.
Series Instance UID	0020, 000E	1	Uniquely generated by the equipment.
Series Number	0020, 0011	2	Internal number which is incremented for each new series.
Referenced Performed Procedure Step Sequence	0008, 1111	3	Used if Modality Performed Procedure Step is enabled.
>Referenced SOP Class UID	0008, 1150	3	Used if Modality Performed Procedure Step is enabled.
>Referenced SOP Instance UID	0008, 1155	3	Used if Modality Performed Procedure Step is enabled.

6.5.2 SR Document General Module

Table 6.5–2: **SR Document General Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Instance Number	0020,0013	1	Internal number which is incremented for each new SR document

Table 6.5–2: **SR Document General Module Attributes (continued)**

Attribute Name	Tag	Type	Attribute Description
Completion Flag	0040,A491	1	Define Term "PARTIAL" used
Completion Flag Description	0040,A492	3	Not used
Verification Flag	0040,A493	1	Define Term "UNVERIFIED" used
Content Date	0008,0023	1	Used
Content Time	0008.0032	1	Used
Verifying Observer Sequence	0040,A073	1C	Not used
>Verifying Observer Name	0040,A075	1	
>Verifying Observer Identification Code Sequence	0040,A088	2	
>>Include 'Code Sequence Maco'			
>Verifying Organization	0040,A027	1	
>Verifying DateTime	0040,A030	1	
Predecessor Documents Sequence	0040,A360	1C	Not used
>Include 'SOP Instance Reference Macro'			
Identical Documents Sequence	0040,A525	1C	Not used
>Include 'SOP Instance Reference Macro'			
Referenced Request Sequence	0040,A370	1C	Filled if the exam is based on a Worklist entry
>Study Instance UID	0020,000D	1	Taken from Study Instance UID in General Study Module
>Referenced Study Sequence	0008,1110	2	Taken from Worklist if MPPS is being used
>>Referenced SOP Class UID	0008,1150	1	Not used
>>Referenced SOP Instance UID	0008,1155	1	Not used
>Accession Number	0008,0050	2	Taken from Study Instance UID in General Study Module
>Placer Order Number/Imaging Service Request	0040,2016	2	Not used
>Filler Order Number/Imaging Service Reques2	0040,2017		Not used
>Requested Procdure ID	0040,1001	2	Taken from Worklist if present
>Requested Procdure Description	0032,1060	2	Taken from Worklist if present
>Requested Procdure Code Sequence	0032,1064	2	Taken from Worklist if present
>Include 'Code Sequence Macro'			
Current Requested Procedure Evidence Sequence	0040,A375	1C	Not used
>Study Instance UID	0020,000D	1	
>Referenced Series Sequenece	0008,1115	1	
>>Series Instance UID	0020,000E	1	
>>Retrieve AE Titls	0008,0054	3	
>>Storage Media File-Set ID	0088,0130	3	
>>Storage Media File-Set UID	0088,0140	3	
>>Referenced SOP Sequence	0008,1199	1	
>>>References SOP Class UID	0008,1150	1	
>>>References SOP Instance UID	0008,1155	1	
Pertinent Other Evidence Sequence	0040,A385	1C	

Table 6.5–2: **SR Document General Module Attributes (continued)**

Attribute Name	Tag	Type	Attribute Description
>Include 'SOP Instance Reference Macro'			

6.5.3 SR Document Content Module

Table 6.5–3: **SR Document Content Module Attributes**

Attribute Name	Tag	Type	Attribute Description
Observation DateTime	0040,A032	1C	Not used
Content Template Sequence	0040,A504	1C	Not used
>Include "Template Identification Macro'			
Value Type	0040,A040	1	CONTAINER
Continuity of Content	0040,A050	1C	SEPARATE
Concept Name Code Sequence	0040,A043	1C	
>Include "Code SequenceMacro'			
Concept Value Attribute(s)			Not used for CONTAINER
Content Sequence	0040,A730	1C	See Template "OB–GYN Ultrasound Procedure Report" (TID 5000)
>Relationship Type	0040,A010	1	See Template "OB–GYN Ultrasound Procedure Report" (TID 5000)
>Referenced Content Item Identifier	0040,DB73	1C	Not used
>SR Document Content Module			See Template "OB–GYN Ultrasound Procedure Report" (TID 5000)

6.5.3.1 SR Document Content Descriptions

6.5.3.1.1 Content Template

The equipment supports the following root Templates for SR SOP Instances created, processed, or displayed by the equipment.

Table 6.5–4: **SR Root Templates**

SOP Class	Template ID	Template Name	Use
Comprehensive SR	5000	"OB–GYN Ultrasound Procedure Report"	Create

6.6 Standard Extended and Private Context Groups

All needed context items which are not defined in the DICOM Standard are privately defined and listed in Appendix A.

6.7 Standard Extended and Private Templates

All needed Templates which are not defined in the DICOM Standard are privately defined and listed in Appendix B.

7 Modality Worklist Information Model Definition

7.1 Introduction

This section specifies the use of the DICOM Modality Worklist Information Model used to organize data and against which a Modality Worklist Query will be performed. The contents of this section are:

- Information Model Description
- Information Model Entity-Relationship Model
- Information Model Module Table
- Information Model Keys

7.2 Modality Worklist Information Model Description

This section defines the implementation of the Modality Worklist Information Model.

7.3 Modality Worklist Information Model Entity-Relationship Model

7.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the Modality Worklist Information Model .

7.3.1.1 Scheduled Procedure Step

Schedule Procedure Step is implemented in a basic form to allow the user to retrieve a subset of attributes.

7.3.1.2 Requested Procedure Entity Description

Requested Procedure is implemented in a basic form to allow the user to retrieve a subset of attributes.

7.3.1.3 Imaging Servie Request Entity Description

Imaging Servie Request is implemented in a basic form to allow the user to retrieve a subset of attributes.

7.3.1.4 Visit Entity Description

Visit Entity is implemented in a basic form to allow the user to retrieve a subset of attributes.

7.3.1.5 Patient Entity Description

Patient Entity is implemented in a basic form to allow the user to retrieve a subset of attributes.

7.3.2 Voluson E8 Mapping of DICOM Entities

Table 7.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
Scheduled Procedure Step	Not Applicable
Requested Procedure	Exam
Imaging Service Request	Exam
Visit	Not Applicable
Patient	Patient

7.4 Information Model Module Table

Within an entity of the DICOM Comprehensive SR IOD, attributes are grouped into related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into data sets.

The table below identifies the defined modules within the entities, which comprise the DICOM Comprehensive SR IOD. Modules are identified by Module Name.

See DICOM Part 3 for a complete definition of the entities, modules, and attributes.

Table 7.4–1: **Modality Worklist Information Model Modules**

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	7.5.2.1
Scheduled Procedure Step	Scheduled Procedure Step	7.5.2.2
Requested Procedure	Requested Procedure	7.5.3.1
Imaging Service Request	Imaging Service Request	7.5.4.1
Visit	Visit Identification	7.5.5.1
Visit	Visit Status	7.5.5.2
Visit	Visit Relationship	7.5.5.3
Visit	Visit Admission	Not used
Patient	Patient Relationship	Not used
Patient	Patient Identification	7.5.6.1
Patient	Patient Demographic	7.5.6.2
Patient	Patient Medical	7.5.6.3

7.5 Information Model Keys

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) and PS 3.4 (Service Class Specifications) for a descripti on of each of the Entities contained within the Modality Worklist Information Model.

The following Module descriptions are included to specify what data elements are supported and what type of matching can be applied. It should be noted that they are the same ones as defined in the DICOM Standard PS 3.4 (Service Class Specifications).

The term Instance is used for Images and Reports in examinations, that are based on Worklist entries.

7.5.1 Supported Matching

Following are the types of matching that can be requested by the implementation:

- Single Value Matching.
- Wild Card Matching.
- Range of date.

Fields with "Filtering is supported" in the Matching column can be controlled from the Search screen. All non-required matching fields can be configured in the Configuration screen to be either enabled, enabled with a constant value or disabled. The constant value will be used as entered by the user. Returned values, particularly those not mapped into the images or MPPSs, are viewable by the user by using the "DICOM Properties" button in the user interface.

7.5.2 Scheduled Procedure Step Entity

7.5.2.1 SOP Common Module

Table 7.5–1: **SOP Common Module Attributes**

Attribute Name	**Tag**	**Expected Matching Key Type**	**Expected Returned Key Type**	**Mapped into Instance/ MPPS**	**Matching**
Specific Character Set	0008,0005	O	1C	Yes/Yes	not supported

7.5.2.2 Scheduled Procedure Step Module

Table 7.5–2: **Scheduled Procedure Step Module Attributes**

Attribute Name	**Tag**	**Expected Matching Key Type**	**Expected Returned Key Type**	**Mapped into Instance/ MPPS**	**Matching**
Scheduled Procedure Step Sequence	0040,0100	R	1	No/No	Matching supported
>Scheduled Staion AE Title	0040,0001	R	1	No/No	Matching supported
>Scheduled Procedure Step Start Date	0040,0002	R	1	No/No	Matching supported Filtering supported
>Scheduled Procedure Step Start Time	0040,0003	R	1	No/No	Matching supported
>Modality	0008,0060	R	1	Yes/Yes (but always "US")	Matching supported Filtering supported
>Scheduled Performing Physician's Name	0040,0006	R	2	Yes/Yes	Matching supported
>Scheduled Procedure Step Description	0040,0007	O	1C	Yes/Yes	Matching supported
>Scheduled Station Name	0040,0010	O	2	No/No	Matching supported
>Scheduled Procedure Step Location	0040,0010	O	2	No/No	Matching supported
>Scheduled Procedure Step ID	0040,0009	O	1	Yes/Yes	Matching supported
>Scheduled Protocol Code Sequence	0040,0008	O	1C	Yes/Yes	Matching supported

7.5.3 Requested Procedure Entity

7.5.3.1 Requested Procedure Module

Table 7.5–3: **Requested Procedure Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Requested Procedure ID	0040,1001	O	1	Yes/Yes	Matching supported
Requested Procedure Description	0032,1060	O	1C	Yes/Yes	Matching supported
Requested Procedure Code Sequence	0032,1064	O	1C	No/Yes	Matching supported
Requested Procedure Comments	0040,1400	I	3	No/No	Matching supported
Study Instance UID	0020,000D	O	1	Yes/Yes	Matching supported
Referenced Study Sequence	0008,1110	O	1C	Yes/Yes	Matching supported
>Referenced SOP Class UID	0008,1150	O	1C	Yes/Yes	Matching supported
>Referenced SOP Instance UID	0008,1155	O	1C	Yes/Yes	Matching supported
>Names of Intended Recipients of Results	0040,1010	O	3	No/No	Matching supported

7.5.4 Imaging Service Request Entity

7.5.4.1 Imaging Service Request Module

Table 7.5–4: **Imaging Service Request Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Accession Number	0008,1050	O	2	Yes/Yes	Matching supported Filtering supported

Table 7.5–4: **Imaging Service Request Module Attributes (continued)**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Referring Physician's Name	0008,0090	O	2	Yes/No	Matching supported
Requesting Physician	0032,1032	O	2	No/No	Matching supported
Requesting Service	0032,1033	O	3	No/No	Matching supported
Imaging Service Request Comments	0040,2400	O	3	No/No	Matching supported

7.5.5 Visit Entity

7.5.5.1 Visit Identification

Table 7.5–5: **Visit Identification Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Admission ID	0038,0010	O	2	No/No	Matching supported

7.5.5.2 Visit Status

Table 7.5–6: **Visit Status Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Current Patient Location	0038,0300	O	2	No/No	Matching supported

7.5.5.3 Visit Relationship

Table 7.5–7: **Visit Relationship Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Referenced Patient Sequence	0008,1120	O	2	Yes/Yes	Matching supported
>Referenced SOP Class UID	0008,1150	O	2	Yes/Yes	Matching supported
>Referenced SOP Instance UID	0008,1155	O	2	Yes/Yes	Matching supported

7.5.6 Patient Entity

7.5.6.1 Patient Identification

Table 7.5–8: **Patient Identification Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Patient's Name	0010,0010	R	1	Yes/Yes	Matching supported Filtering supported
Patient ID	0010,0020	R	1	Yes/Yes	Matching supported Filtering supported
Other Patient Ids	0010,1000	O	3	No/No	Not supported

7.5.6.2 Patient Demograaphic

Table 7.5–9: **Patient Demographic Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Patient's Birth Date	0010,0030	O	2	No/No	Matching supported
Patient's Birth Time	0010,0032	O	2	No/No	Not supported
Patient's Sex	0010,0040	O	2	Yes/Yes	Matching supported
Patient's Size	0010,1020	O	3	No/No	Not supported

Table 7.5–9: **Patient Demographic Module Attributes (continued)**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Patient's Weight	0010,1030	O	2	Yes/Yes	Matching supported
Ethnic Group	0010,2160	O	3	No/No	Not supported
Patient Comments	0010,4000	O	3	No/No	Not supported

7.5.6.3 Patient Medical

Table 7.5–10: **Patient Medical Module Attributes**

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance/ MPPS	Matching
Additional Patient History	0010,21B0	O	3	No/No	Not supported
Contrast Allergies	0010,2210	O	2	No/No	Not supported
Medical Alerts	0010,2000	O	2	No/No	Not supported
Pregnancy Status	0010,21C0	O	2	No/No	Not supported

8 Modality Performed Procedure Step SOP Class Definition

8.1 Introduction

This section of the DICOM Conformance Statement specifies the Modality Performed Procedure Step SOP Class, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior.

8.2 Modality Performed Procedure Step SOP Class Definition

In this section, supported means that tag is sent with value if entered by user or from worklist.

8.2.1 IOD Description

This is the description of the DICOM tags to be sent for Modality Performed Procedure Step SOP class.

The following tables describe the Modality Performed Procedure Step Sop Class N-CREATE, N-SET and Final State Attributes

Table 8.2–1: **PerformedProcedure Step Relationship**

Attribute Name	**Tag**	**Req.Type N-CREATE**	**Req, Type N-SET**
Scheduled Step Attribute Sequence	0040,0270	1	Not allowed
>Study Instance UID	0020,000D	1	Not allowed
>Referenced Study Sequence	0008,1110	2, supported	Not allowed
>>Referenced SOP Class UID	0008,1150	1C, supported	Not allowed
>>Referenced SOP Instance UID	0008,1155	1C,supported	Not allowed
>Accession Number	0008,0050	2, supported	Not allowed
>Placer Order Number/ Imaging Service Request	0040,2016	3, not supported	Not allowed
>Filler Order Number/ Imaging Service Request	0040,2017	3, not supported	Not allowed
>Requested Procedure ID	0040,1001	2, supported	Not allowed
>Requested Procedure Description	0032,1060	2, supported	Not allowed
>Scheduled Procedure Step ID	0040,0009	2, supported	Not allowed
>Scheduled Procedure Step Description	0040,0007	2, supported	
Scheduled Protocol Code Sequence	0040,0008	2, supported	
>>Include 'Code Sequence Macro'			
Patient's Name	0010,0010	2, supported	Not allowed
Patient ID	0010,0020	2, supported	Not allowed
Patient's Birth Date	0010,0032	2, supported	Not allowed
Patient's Sex	0010,0040	2, supported	Not allowed
>Referenced Patient Sequence	0008,1120	2, supported	Not allowed
>>Referenced SOP Class UID	0008,1150	1C, supported	Not allowed
>>Referenced SOP Instance UID	0008,1155	1C, supported	Not allowed

Table 8.2–2: **PerformedProcedure Step Information**

Attribute Name	**Tag**	**Req.Type N-CREATE**	**Req, Type N-SET**
Performed Procedure Step ID	0040,0253	1	Not allowed
Performed Station AE Title	0040,0241	1	Not allowed
Performed Station Name	0040,0242	2, supported	Not allowed
Performed Location	0040,0243	2, supported	Not allowed
Performed Procedure Step Start Date	0040,0244	1	Not allowed
Performed Procedure Step Start Time	0040,0245	1	Not allowed
Performed Procedure Status	0040,0252	1	3, supported
Performed Procedure Step Description	0040,0254	2, supported	3, supported
Performed Procedure Type Description	0040,0254	2, always empty	3, always empty
Procedure Code Sequence	0008,1032	2, supported	3, supported
>Include 'Code Sequence Macro'			
Performed Procedure Step End Date	0040,0250	2, always empty	3, supported
Performed Procedure Step End Time	0040,0251	2, always empty	3, supported

Table 8.2–3: **Image Acquisition Results**

Attribute Name	**Tag**	**Req.Type N-CREATE**	**Req, Type N-SET**
Modality	0008,0060	1	Not allowed
Study ID	0020,0010	2, supported	Not allowed
Performed Protocol Code Sequence	0040,0260	2, supported	3, supported
>Include 'Code Sequence Macro'			
Performed Series Sequence	0040,0340	2, always empty	3, supported
>Performing Physician's Name	0008,1050	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Protocol Name	0018,1030	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Operator's Name	0008,1070	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Series Instance UID	0020,000E	2C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Series Description	0008,103E	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Retrieving AE Title	0008,0054	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Referenced Image Sequence	0008,1140	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>>Referenced SOP Class UID	0008,1150	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>>Referenced SOP Instance UID	0008,1155	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)

Table 8.2–3: **Image Acquisition Results (continued)**

Attribute Name	Tag	Req.Type N-CREATE	Req, Type N-SET
>Referenced Non-Image Composite SOP Sequence	0040,0220	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>>Referenced SOP Class UID	0008,1150	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>>Referenced SOP Instance UID	0008,1155	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Referenced Frame Number	0008,1150	3, not supported	3, not supported

8.2.2 Operations

8.2.2.1 Action Information

Covered under IOD Description in Section 8.2.1.

8.2.2.2 Service Class User Behavior

The equipment sends N-CREATE when the exam is being started by pressing "Start Exam".

The equipment sends N-SET after the exam is ended. The N-SET will include all acquired images' UIDs and the status of COMPLETED or DISCONTINUED.

8.2.2.3 Status Codes

No Service Class specific status values are defined for the N-ACTION Service. See PS 3.7 for general response status codes.

9 Storage Commitment Push Model SOP Class Definition

9.1 Introduction

This section of the DICOM Conformance Statement specifies the Storage Commitment Push Model SOP Class, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code behavior.

9.2 Storage Commitment Push Model SOP Class Definition

9.2.1 IOD Description

9.2.1.1 Storage Commitment Module

Table 9.2–1: **Image Acquisition Results**

Attribute Name	**Tag**	**Req.Type N-CREATE**	**Req, Type N-SET**
Modality	0008,0060	1	Not allowed
Study ID	0020,0010	2, supported	Not allowed
Performed Protocol Code Sequence	0040,0260	2, supported	3, supported
>Include 'Code Sequence Macro'			
Performed Series Sequence	0040,0340	2, always empty	3, supported
>Performing Physician's Name	0008,1050	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Protocol Name	0018,1030	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Operator's Name	0008,1070	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Series Instance UID	0020,000E	2C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Series Description	0008,103E	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Retrieving AE Title	0008,0054	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>Referenced Image Sequence	0008,1140	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>>Referenced SOP Class UID	0008,1150	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>>Referenced SOP Instance UID	0008,1155	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Referenced Non-Image Composite SOP Sequence	0040,0220	2C (Required if SQ Item is present)	2C (Required if SQ Item is present)
>>Referenced SOP Class UID	0008,1150	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>>Referenced SOP Instance UID	0008,1155	1C (Required if SQ Item is present)	1C (Required if SQ Item is present)
>Referenced Frame Number	0008,1150	3, not supported	3, not supported

9.2.2 DIMSE Service Group

Table 9.2–2: **DIMSE Service Group**

DIMSE Service Element	Usage SCU/SCP
N-EVENT-REPOR	M/M
N-ACTION	M/M

9.2.3 Operations

9.2.3.1 Action Information

Covered under IOD Description in Table 9.2.1.

9.2.3.2 Service Class User Behavior

The equipment sends the N-ACTION primitive (Storage Commitment Request) after successful exam save to a DICOM Storage SCP.

The equipment may request Storage Commitment for the following SOP Class UIDs:

Table 9.2–3: **SOP Class Table**

Name	UID
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33

The association for the N-ACTION is disconnected after processing the response. Thus, the N-EVENT-REPORT must be sent on a separate association.

The Referenced Study Component Sequence Attribute is not supported.

The Transaction UID is valid until the request is confirmed, manually retried or manually deleted.

The optional Storage Media File-Set ID and UID Attributes in the N-ACTION are not supported.

On receipt of an unsuccessful N-ACTION Response Status Code from the SCP, the request will remain in the queue for the user to manually retry the request.

9.2.3.3 Status Codes

No Service Class specific status values are defined for the N-ACTION Service. See PS 3.7 for general response status codes.

9.2.4 Notifications

The equipment will only listen for an N-EVENT-REPORT from the SCP in a new association on the listen port for Verification and Storage Commitment.

9.2.4.1 Event Information

Table 9.2–4: **Storage Commitment Result - Event Infomation**

Event Type Name	Event Type ID	Attribute	Tag	Requirement Type SCU/SCP
Storage Commitment Request Successful	1	Transaction UID	0008,1195	-/1
		Retrieve AE Titls	0008,0054	Not used
		Storage Media File-Set ID	0008,0130	Not used
		Storage Media File-Set UID	0008,0140	Not used
		Referenced SOP Sequence	0008,1199	-/1
		>Referenced SOP Class UID	0008,1150	-/1
		>Referenced SOP Instance UID	0008,1155	-/1
		>Retrieve AE Title	0008,0054	Not used
		>Storage Media File-Set ID	0008,0130	Not used
		>Storage Media File-Set UID	0008,0140	Not used
Storage Commitment Request Complete - Failures Exist	2	Transaction UID	0008,1195	-/1
		Retrieve AE Titls	0008,0054	Not used
		Storage Media File-Set ID	0008,0130	Not used
		Storage Media File-Set UID	0008,0140	Not used
		Referenced SOP Sequence	0008,1199	-/1C
		>Referenced SOP Class UID	0008,1150	-/1
		>Referenced SOP Instance UID	0008,1155	-/1
		>Retrieve AE Title	0008,0054	Not used
		>Storage Media File-Set ID	0008,0130	Not used
		>Storage Media File-Set UID	0008,0140	Not used
		Failed SOP Sequence	0008,1198	-/1
		>Referenced SOP Class UID	0008,1150	-/1
		>Referenced SOP Instance UID	0008,1155	-/1
		>Failure Reason	0008,1197	-/1

9.2.4.2 Service Class User Behavior

If a successful answer is received, the request will be removed without warning.

If a non-successful answer is received, the request will be left in the queue.

If no answer is received, the request will remain in the queue for manual retry or manual deletion.

9.2.4.3 Status Codes

No Service Class specific status values are defined for the N-EVENT-REPORT Service. See PS 3.7 for general response status code.

10 Print Management SOP Class Definition

10.1 Introduction

This section of the DICOM Conformance Statement specifies the supported Print Management SOP and Meta SOP Classes, the optional a ttributes and service elements supported, the valid range of values for mandatory and optional attributes, and the status code be havior.

- 10.2 - Basic Print Management Meta SOP Classes
- 10.3 - Print Management SOP Class Definitions
- 10.4 - Print Management IODs
- 10.5.1 - IOD Module Definition

10.2 Basic Print Management Meta SOP Classes

The Basic Print Management Meta SOP Classes correspond with the minimum functionality that an implementation of the Print Management Service Class shall support. The equipment supports the Basic Grayscale Print Management Meta SOP Class and the Basic Color Print Management Meta SOP Class. These are defined in Table 10.2–1 and 10.2–2.

10.2.1 Basic Grayscale Print Management Meta SOP Classes

The Basic Grayscale Print Management Meta SOP Class is defined by the following set of supported SOP Classes.

Table 10.2–1: **Basic Grayscale Print Management Meta SOP Class**

SOP Class Name	Usage SCU	Reference
Basic Film Session SOP Class	M	see 10.3.1
Basic Film Box SOP Class	M	see 10.3.2
Basic Graysacle Image Box SOP Class	M	see 10.3.3.1
Printer SOP Class	M	see 10.3.4

10.2.2 Basic Color Print Management Meta SOP Classes

The Basic Color Print Management Meta SOP Class is defined by the following set of supported SOP Classes.

Table 10.2–2: **Basic Color Print Management Meta SOP Class**

SOP Class Name	Usage SCU	Reference
Basic Film Session SOP Class	M	see 10.3.1
Basic Film Box SOP Class	M	see 10.3.2
Basic Color Image Box SOP Class	M	see 10.3.3.2
Printer SOP Class	M	see 10.3.4

10.3 Print Management SOP Class Definitions

10.3.1 Basic Film Session SOP Class

The Basic Color Print Management Meta SOP Class is defined by the following set of supported SOP Classes

Table 10.3–1: **DIMSE Service Group**

DIMSE Service Element	Usage SCU	Reference
N-Create	M	see 10.3.1.1.1
N-Set	U	see 10.3.1.1.2
N-Delete	U	see 10.3.1.1.3
N-Action	U	see 10.3.1.1.4

10.3.1.1 DIMSE Service Group

10.3.1.1.1 N-CREATE

The N-CREATE DIMSE Service is used by equipment to request that the SCP create a Film Session SOP Instance.

10.3.1.1.2 N-SET

Not used in this implementation.

10.3.1.1.3 N-DELETE

Not used in this implementation.

10.3.1.1.4 N-ACTION

Not used in this implementation.

10.3.2 Basic Film Box SOP Class

The Basic Film Box IOD is an abstraction of the presentation of one film of the film session. The DIMSE services that are applicable to the IOD are shown in the following Table.

Table 10.3–2: **DIMSE Service Group**

DIMSE Service Element	Usage SCU	Reference
N-Create	M	see 10.3.2.1.1
N-Action	M	see 10.3.2.1.1.1
N-Set	U	see 10.3.2.1.2
N-Delete	U	see 10.3.2.1.3

10.3.2.1 DIMSE Service Group

10.3.2.1.1 N-CREATE

The N-CREATE DIMSE Service is used by equipment to request that the SCP create a Film Box SOP Instance. Table 10.4–2 defines the Basic Film Box Presentation Module attributes used in this request.

10.3.2.1.1.1 N-ACTION

The N-ACTION DIMSE Service is used by the equipment to request the SCP (printer) to print the number of copies configured by the user to a film of the film session.

10.3.2.1.2 N-SET

Not used in this implementation.

10.3.2.1.3 N-DELETE

The N-DELETE DIMSE Service is used by the equipment to request the SCP (printer) to delete the complete Film Box. The root Film Box Instance UID is sent to the SCP to accomplish this.

10.3.3 Image Box SOP Class

10.3.3.1 Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box IOD is an abstraction of the presentation of an image and image related data in the image area of a film. The DIMSE services that are applicable to the IOD are shown in Table 10.3–3.

Table 10.3–3: **DIMSE Service Group**

DIMSE Service Element	Usage SCU	Reference
N-Set	M	see 10.3.3.1.1

10.3.3.1.1 DIMSE Service Group (N-SET)

The N-SET DIMSE Service is used by the equipment to update the Basic Grayscale Image Box SOP Instance. Table 10.5.1.2.5 defines the Basic Image Box Presentation Module attributes used.

10.3.3.2 Basic Color Image Box SOP Class

The Basic Color Image Box IOD is an abstraction of the presentation of an image and image related data in the image area of a film. The DIMSE services that are applicable to the IOD are shown in Table 10.3–4.

Table 10.3–4: **DIMSE Service Group**

DIMSE Service Element	Usage SCU	Reference
N-SET	M	see 10.3.3.2.1

10.3.3.2.1 DIMSE Service Group (N-SET)

The N-SET DIMSE Service is used by the equipment to update the Basic Color Image Box SOP Instance. Table 10.5.1.2.5 defines the Basic Image Box Presentation Module attributes used.

10.3.4 Printer SOP Class

The Printer IOD is an abstraction of the hard copy printer and is the basic Information Entity to monitor the status of the printer. The DIMSE services that are applicable to the IOD are shown in Table 10.3–5.

10.3.4.1 DIMSE Service Group

Table 10.3–5: **DIMSE Service Group**

DIMSE Service Element	Usage SCU	Reference
N-Event-Report	M	see 10.3.4.1.1
N-Get	U	see 10.3.4.1.2

10.3.4.1.1 N-EVENT_REPORT

The equipment ignores any N-EVENT_REPOR initiated by the SCP (Printer).

10.3.4.1.2 N-GET

Used by the equipment to request the SCP to get a Printer SOP Instance. Table 10.5–7 defines the Printer Module attributes.

10.4 Print Management IODs

10.4.1 Print Management IODs

Within an entity of a DICOM Print Management, attributes are grouped into a related set of attributes. A set of related attributes is termed a module. A module facilitates the understanding of the semantics concerning the attributes and how the attributes are related with each other. A module grouping does not infer any encoding of information into datasets.

Table 10.4–1, Table 10.4–2, Table 10.4–3 and Table 10.4–4 identify the defined modules within the entities which comprise the DICOM Print Management Service IODs. Modules are identified by Module Name. See DICOM for a complete definition of the entities, modules and attributes.

10.4.1.1 Film Session IOD Module

Table 10.4–1: **Film Session IOD Modules**

Module Name	Reference	Module Description
SOP Common Module	see 10.5.1.1.1	Contains SOP Common information
Basic Film Session Presentation Module	see 10.5–2	Contains Film Session presentation information
Basic Film Session Relationship Module	see 10.5.1.2.2	References to related SOPs

10.4.1.2 Basic Film Box IOD Module Table

Table 10.4–2: **Basic Film Box IOD Modules**

Module Name	Reference
SOP Common Module	see 10.5.1.1.1
Basic Film Box Presentation Module	see 10.5.1.2.3
Basic Film Box Relationship Module	see 10.5.1.2.4

10.4.1.3 Basic Image Box IOD Module Table

Table 10.4–3: **Basic Image Box IOD Modules**

Module Name	Reference
SOP Common Module	see 10.5.1.1.1
Image Box Pixel Presentation Module	see 10.5.1.2.5

10.4.1.4 Printer IOD Module Table

Table 10.4–4: **Printer IOD Modules**

Module Name	Reference
SOP Common Module	see 10.5.1.1.1
Printer Module	see 10.5.1.2.6

10.5 Information Module Definitions

10.5.1 Information Module Definitions

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules that comprise the Print Management. The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported.

10.5.1.1 General Modules

10.5.1.1.1 SOP Common Module

This section defines the attributes that are required for proper functioning and identification of the associated SOP Instances. They do not specify any semantics about the Real-World Object represented by the IOD.

Table 10.5–1: **SOP Common Module Attributes**

Attribute Name	Tag	Type	Attribute Description
SOP Class ID	(0008,0016)	1	Varies with Module Instance and DIMSE Service being used. 1.2.840.100011.5.1.1.1 (Film Session) 1.2.840.100011.5.1.1.2 (Film Box) 1.2.840.100011.5.1.1.4 (Image Box)
SOP Instance UID	(0008,0018)	1	Provided by SCP(printer).
Specific Character Set	(0008,0005)	1C	Not used as expanded or replacement character sets not used.
Instance Creation Date	(0008,0012)	3	Not used.
Instance Creation Time	(0008,0013)	3	Not used.
Instance Creator UID	(0008,0014)	3	Not used.

10.5.1.2 Print Management Modules

For all user configurable tags with no default, no value will be sent if the tag is not configured.

10.5.1.2.1 Basic Film Session Presentation Module

This section defines the attributes that are common for all films of a film session. The attributes described in table 10.5–2 apply when the N-CREATE DIMSE service is used.

Table 10.5–2: **Basic Film Session Presentation Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Number of Copies	(2000,0010)	U	Defined Terms used (user configurable): 1 to 99.
Print Priority	(2000,0020)	U	Defined Terms used (user configurable): HIGH, MED, LOW.
Medium Type	(2000,0030)	U	Defined Terms used (user configurable): PAPER, BLUE FILM, CLEAR FILM.
Film Destination	(2000,0040)	U	Defined Terms used (user configurable): MAGAZINE, PROCESSOR.
Film Session Label	(2000,0050)	U	Not used.
Memory Allocation	(2000,0060)	U	Not used.

10.5.1.2.2 Basic Film Session Relationship Module

Table 10.5–3: **Basic Film Session Relationship Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Referenced Film Box Sequence	(2000,0050)	U	Not used.
>Referenced SOP Class UID	(0008,1150)	U	
>Referenced SOP Instance UID	(0008,1155)	U	

10.5.1.2.3 Basic Film Box Presentation Module

The attributes described in Table 10.5–4 apply when the N-CREATE DIMSE service is used.

Table 10.5–4: **Basic Film Box Presentation Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Image Display Format	(2010,0010)	M	Standard\1,1 Standard\1,2 Standard\2,2 Standard\2,3 Standard\3,3 Standard\3,4 Standard\3,5 Standard\4,4 Standard\4,5 Standard\4,6
Annotation Display Format ID	(2010,0030)	U	Not used.
Film Orientation	(2010,0040)	U	Defined Terms used (user configurable): PORTRAIT, LANDSCAPE
Film Size ID	(2000,0050)	U	Defined Terms used (user configurable): 8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	U	Defined Terms used (user configurable): REPLICATEW,BILINEAR, CUBIC, NONE
Smoothing Type	(2010,0080)	U	Not used.
Border Density	(2010,0100)	U	Defined Terms used (user configurable): BLACK, WHITE
Empty Image Density	(2010,0110)	U	Defined Terms used (user configurable): BLACK, WHITE
Min Density	(2010,0120)	U	Limited by printer
Max Density	(2010,0130)	U	Limited by printer
Trim	(2010,0140)	U	Not used.
Configuration Information	(2010,0150)	U	User configurable

10.5.1.2.4 Basic Film Box Relationship Module

This section defines the attributes that describe the common parameters, which apply for all images on a given sheet of film.

Table 10.5–5: **Basic Film Box Relationship Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Referenced Film Session Sequence	(2010,0500)	M	Used
>Referenced SOP Class UID	(0008,1150)	M	Film Session SOP Class UID
>Referenced SOP Instance UID	(0008,1155)	M	Referenced Film Session SOP
Referenced Image Box Sequence	(2010,0510)	U	Not used.
>Referenced SOP Class UID	(0008,1150)	U	
>Referenced SOP Instance UID	(0008,1150)	U	
Referenced Basic Annotation Sequence	(2010,0520)	U	Not used.
>Referenced SOP Class UID	(0008,1150)	U	
>Referenced SOP Instance UID	(0008,1150)	U	

10.5.1.2.5 Image Box Pixel Presentation Module

The attributes described in Table 10.5–6 apply when the DIMSE Service N-SET is used.

Table 10.5–6: **Image Box Pixel Presentation Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Image Position	(2020,0010)	M	1-n
Polarity	(2020,0020)	U	Not used
Requested Image Size	(2020,0030)	U	Not used
Basic Grayscale Image Sequence	(2020,0110)	M	
>Samples Per Pixel	(0028,0002)	M	Value = '1'
>Photometric Interpretation	(0028,0004)	M	MONOCHROM2, 0 = Black, 255 = White
>Rows	(0028,0010)	M	600 pixels
>Columns	(0028,0011)	M	800 pixels
>Pixel Aspect Ratio	(0028,0034)	MC	Not used
>Bits Allocated	(0028,0100)	M	Value always = 0008H
>Bits Stored	(0028,0101)	M	Value always = 0008H
>High Bit	(0028,0102)	M	Value always = 0007H
>Pixel Representation	(0028,0103)	M	Defined Value '0' - unsigned integer
>Pixel Data	(7FE0,0010)	M	Gray pixel data
Basic Color Image Sequence	(2020,0111)	M	
>Samples Per Pixel	(0028,0002)	M	Value = '3'
>Photometric Interpretation	(0028,0004)	M	RGB
>Rows	(0028,0010)	M	600 pixels
>Columns	(0028,0011)	M	800 pixels
>Pixel Aspect Ratio	(0028,0034)	MC	Not used
>Bits Allocated	(0028,0100)	M	Value always = 0008H
>Bits Stored	(0028,0101)	M	Value always = 0008H
>High Bit	(0028,0102)	M	Value always = 0007H
>Pixel Representation	(0028,0103)	M	Defined Value '0' - unsigned integer
>Pixel Data	(7FE0,0010)	M	Color pixel planes data

Table 10.5–6: **Image Box Pixel Presentation Module Attributes (continued)**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Planar Configuration	(0028,0006)	M	0001H, Planar. Red plane first, then green, and blue

10.5.1.2.6 Printer Module

This section defines the attributes that are used to monitor the status of the printer. The attributes described in Table 10.5–7 apply when the DIMSE Service N-GET is used.

Table 10.5–7: **Printer Module Attributes**

Attribute Name	Tag	Usage (SCU)	Attribute Description
Printer Status	(2110,0010)	U	Defined Values: NORMAL, WARNING, FAILURE. WARNING and FAILURE are reported to user.
Printer Status Info	(2110,0020)	U	Reported to user.
Printer Name	(2110,0030)	U	Ignored
Manufacturer	(0008,0070)	U	Ignored
Manufacturer Model Name	(0008,1090)	U	Not used
Device Serial Number	(0018,1000)	U	Not used
Software Versions	(0018,1020)	U	Not used
Date Last Calibration	(0018,1200)	U	Not used
Last Calibration	(0018,1201)	U	Not used

11 Study Root Retrieve Information Model Definition

11.1 Introduction

This section specifies the use of the DICOM Study Root Query/Retrieve Model used to organize data and against which a Query/Retrieve will be performed. The contents of this section are:

- Information Model Description
- Information Model Entity-Relationship Model
- Information Model Keys

11.2 Study Root Information Model Description

This section defines the implementation of the Study Root Query/Retrieve Information Model.

11.3 Study Root Information Model Entity-Relationship Model

11.3.1 Entity Description

Please refer to DICOM Standard Part 3 (Information Object Definitions) for a description of each of the entities contained within the Study Root Information Model.

11.3.2 Voluson E8 Mapping of DICOM Entities

Table 11.3–1: **Mapping of DICOM Entities to Equipment Entities**

DICOM	Equipment
STUDY	Patient
SERIES	Exam

11.4 Information Model Keys

Please refer to DICOM Standard PS 3.4 (Service Class Specifications) for a description of each of the levels contained within the Study Root Query/Retrieve Information Model. The following Level descriptions are included to specify what data elements are supported and what type of matching can be applied. It should be noted that they are the same ones as defined in the DICOM Standard PS 3.4 (Service Class Specifications).

11.4.1 Study Level

This section defines the keys at the Study Level of the Study Root Query/Retrieve Information Model that are supported by this implementation.

Table 11.4–1: **Study Level Attributes - Study Root Q/R Information Model**

Attribute Name	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Referring Physicians Name	(0008,0090)	R
Study Description	(0008,1030)	O
Performing Physicians Name	(0008,1050)	O
Operators Name	(0008,1070)	O
Admitting Diagnoses Description	(0008,1080)	O
Patients Name	(0010,0010)	R
Patient ID	(0010,0020)	U
Patients Birth Date	(0010,0030)	O
Patients Sex	(0010,0040)	O
Patients Size	(0010,1020)	O
Patients Weight	(0010,1030)	O
Study Instance UID	(0020,000D)	U
Number of Patient Related Studies	(0020,1200)	O
Number of Study Related Series	(0020,1206)	O

The following conventions are used to defined they of keys used in Query/Retrieve Information Models. Please refer to DICOM Standard part 4 for details on what Unique, Optional and Required attribute means.

Table 11.4–2: **Conventions**

Symbol	Description
U	Unique Key Attribute
O	Optional ey Attribute
R	Unique Key Attribute

Table 11.4–3: **Q/R Study Level and Location for Retrieve Attributes**

Attribute Name	Tag	Type	Attribute Description
Query Retrieve Level	(0008,0052)	–	Value=STUDY

Table 11.4–4: **Q/R Specific Character Set Attributes**

Attribute Name	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	–	Set to ISO IR 100 if extended characters are used in query. ISO IR 100 is supported in responses.

11.4.2 Series Level

This section defines the keys at the Series Level of the Study Root Query/Retrieve Information Model that are supported by this implementation.

The Modality is always set to the value US.

Table 11.4–5: **Series Level Attributes - Study Root Q/R Information Model**

Attribute Name	Tag	Type
Study Date	(0008,0020)	O
Series Date	(0008,0021)	O
Study Time	(0008,0030)	O
Series Time	(0008,0031)	O
Modality	(0008,0060)	R
ReferringPhysiciansName	(0008,0090)	O
StudyDescription	(0008,1030)	O
PerformingPhysiciansName	(0008,1050)	O
OperatorsName	(0008,1070)	O
AdmittingDiagnosesDescription	(0008,1080)	O
PatientsName	(0010,0010)	O
PatientID	(0010,0020)	O
PatientsBirthDate	(0010,0030)	O
PatientsSex	(0010,0040)	O
PatientsSize	(0010,1020)	O
PatientsWeight	(0010,1030)	O
StudyInstanceUID	(0020,000D)	O
SeriesInstanceUID	(0020,000E)	U
NumberOfPatientRelatedStudies	(0020,1200)	O
NumberOfStudyRelatedSeries	(0020,1206)	O
NumberOfSeriesRelatedImages	(0020,1209)	O

The following conventions are used to defined they of keys used in Query/Retrieve Information Models. Please refer to DICOM Standard part 4 for details on what Unique, Optional and Required attribute means.

Table 11.4–6: **Q/R Study Level and Location for Retrieve Attributes**

Attribute Name	Tag	Type	Attribute Description
Query Retrieve Level	(0008,0052)	–	Value=STUDY

Table 11.4–7: **Q/R Specific Character Set Attributes**

Attribute Name	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	–	Set to ISO IR 100 if extended characters are used in query. ISO IR 100 is supported in responses.

A Standard Extended and Private Context Groups

Table A.0–8: **Context ID 12003 Extended OB-GYN DATES**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		11778-8	EDD
LN		11779-6	EDD from LMP
LN		11781-2	EDD from average ultrasound age
LN		11780-4	EDD from ovulation date
LN		11955-2	LMP
LN		33066-2	Estimated LMP by EDD
LN		11976-8	Ovulation date
LN		33067-0	Conception Date
GEK		99001-0	Conception Date by GA
GEK		99001-1	Conception Date from EDD
GEK		99002-0	Day of Cycle
GEK		99003-0	EDD by GA
GEK		99003-1	EDD from Conception Date
GEK		99004-0	Expected Ovulation
GEK		99005-0	Gestational Age
GEK		99005-1	Gestational Age by Conception Date
GEK		99005-2	Gestational Age by EDD
GEK		99005-3	Gestational Age by LMP
GEK		99007-0	EDD from composite ultrasound age

Table A.0–9: **Context ID 12004 Extended Fetal Biometry Ratios**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		11947-9	HC/AC
LN		11871-1	FL/AC
LN		11872-9	FL/BPD
LN		11823-2	Cephalic Index
LN		11873-7	FL/HC
GEK		99401-0	Va/HEM
GEK		99402-0	Vp/HEM
GEK		99403-0	CC/TC

Table A.0–10: **Context ID 12005 Extended Fetal Long Bones Measurement**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		11979-2	Abdominal Circumference
LN		11818-2	Anterior-Posterior Abdominal Diameter
LN		11819-0	Anterior-Posterior Trunk Diameter
LN		11820-8	Biparietal Diameter
LN		11860-4	Cisterna Magna
LN		11963-6	Femur Length
LN		11965-1	Foot length
LN		11984-2	Head Circumference
LN		11851-3	Occipital-Frontal Diameter
LN		11862-0	Tranverse Abdominal Diameter
LN		11863-8	Trans Cerebellar Diameter
LN		11864-6	Transverse Thoracic Diameter
LN		11853-9	Left Kidney thickness
LN		11834-9	Left Kidney length
LN		11825-7	Left Kidney width
LN		11855-4	Right Kidney thickness
LN		11836-4	Right Kidney length
LN		11827-3	Right Kidney width
GEK		99502-0	Abdominal Diameter
GEK		99503-0	Binocular Distance
99VP		990202-1	Ear
GEK		99505-0	Fetal Trunk Area
GEK		99506-0	Min Abdominal Diameter
GEK		99507-0	AxT (APTD * TTD)
SRT		GD705	Volume
GEK		99508-0	nasal bone length
GEK		99010-0	Cardiac Circumference
LN		11988-3	Thoracic Circumference
GEK		99008-0	Cavum Septum Pellicidum
LN		11792-7	Follicle Diameter
GEK		99706-6	Fibroid Diameter

Table A.0–11: **Context ID 12008 OB-GYN Amniotic Sac**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		11624-4	First Quadrant Diameter
LN		11626-9	Second Quadrant Diameter
LN		11625-1	Third Quadrant Diameter
LN		11623-6	Fourth Quadrant Diameter
SRT		M-02550	Diameter

Table A.0–11: **Context ID 12008 OB-GYN Amniotic Sac (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		11627-7	Amniotic Fluid Index

Table A.0–12: **Context ID 12011 Extended Ultrasound Pelvis and Uterus**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		11961-0	Cervix Length
LN		12145-9	Endometrium Thickness
LN		11842-2	Uterus Length
LN		11865-3	Uterus Width
LN		11859-6	Uterus Height
LN		33192-6	Uterus Volume
LN		11840-6	Left Ovary Length
LN		11829-9	Left Ovary Width
LN		11857-0	Left Ovary Height
LN		12164-0	Left Ovary Volume
LN		11841-4	Right Ovary Length
LN		11830-7	Right Ovary Width
LN		11858-8	Right Ovary Height
LN		12165-7	Right Ovary Volume

Table A.0–13: **Context ID 12013 Extended Gestational Age Equations and Tables**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		11885-1	Gestational Age by LMP
LN		11884-4	Average Ultrasound Age
LN		11889-3	AC, Campbell 1975
LN		33537-2	AC, Jeanty 1982
LN		33077-9	Abdominal Diameter, Lessoway 1998
LN		11901-6	BPDa, Hadlock 1982
LN		33086-0	BPD-oi, Chitty 1997
LN		33087-8	BPD-oo, Chitty 1997
LN		11918-0	Fibula, Merz 1987
GEK		99300-0	AD, Marsal
LN		33072-0	AC, ASUM 2000
LN		11892-7	AC, Hadlock 1984

Table A.0–13: **Context ID 12013 Extended Gestational Age Equations and Tables (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		33073-8	AC, Hansmann1985
LN		11893-5	AC, Jeanty 1984
LN		33075-3	AC, Mertz 1988
LN		33076-1	AC, Shinozuka 1996
GEK		99301-0	AC, Tokyo
GEK		99301-1	AC, JSUM 2001
GEK		99301-2	AC, Kurmanavicius
GEK		99301-3	AC, Chitty
GEK		99301-4	AC, Nicolaides
GEK		99301-5	AC, Hobbins
GEK		99301-6	AC, CFEF
GEK		99302-0	APAD, Merz
GEK		99303-0	APTD, Hansmann
LN		33078-7	AxT, Shinozuka 1996
GEK		99323-0	AxT, Tokyo
GEK		99304-0	BOD, Jeanty
LN		33079-5	BPD, ASUM 1989
LN		11902-4	BPD, Hadlock 1984
LN		33538-0	BPD, Hansmann 1986
LN		11905-7	BPD, Jeanty 1984
LN		11906-5	BPD, Kurtz 1980
LN		33081-1	BPD, Mertz 1988
LN		33082-9	BPD, Osaka 1989
LN		33083-7	BPD, Rempen 1991
LN		11907-3	BPD, Sabbagha 1978
LN		33084-5	BPD, Shinozuka 1996
LN		33085-2	BPD, Tokyo 1986
GEK		99305-0	BPD, JSUM 2001
GEK		99305-1	BPD, Kurmanavicius
GEK		99305-2	BPD, Chitty
GEK		99305-3	BPD, Nicolaides
GEK		99305-4	BPD, Hobbins
GEK		99305-5	BPD, Campbell
GEK		99305-6	BPD, CFEF
GEK		99305-7	BPD, Johnsen
GEK		99305-8	BPD, Marsal
GEK		99305-9	BPD, ASUM-Old
GEK		99306-0	Cerebellum, Hill
GEK		99306-1	Cerebellum, Chitty
GEK		99306-2	Cerebellum, Goldstein
GEK		99306-3	Cerebellum, Nicolaides
GEK		99306-4	Cerebellum, Hobbins
LN		33089-4	CRL, ASUM 1991

Table A.0–13: **Context ID 12013 Extended Gestational Age Equations and Tables (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		33090-2	CRL, ASUM 2000
LN		33091-0	CRL, Daya 1993
LN		11910-7	CRL, Hadlock 1992
LN		33540-6	CRL, Hansmann 1986
LN		11913-1	CRL, Nelson 1981
LN		33093-6	CRL, Osaka 1989
LN		33094-4	CRL, Rempen 1991
LN		11914-9	CRL, Robinson 1975
LN		33095-1	CRL, Shinozuka 1996
LN		33096-9	CRL, Tokyo 1986
GEK		99309-0	CRL, JSUM 2001
GEK		99309-1	CRL, Marsal
LN		33088-6	Clavical length,Yarkoni 1985
LN		33098-5	FL, Chitty 1997
LN		11920-6	FL, Hadlock 1984
LN		11921-4	FL, Hansmann 1985
LN		11922-2	FL, Hohler 1982
GEK		99310-0	FL, Jeanty
GEK		99310-1	FL, Merz
GEK		99310-2	FL, Tokyo
GEK		99310-3	FL, Warda
GEK		99310-4	FL, JSUM 2001
GEK		99310-5	FL, Shinozuka 1996
GEK		99310-6	FL, Osaka
GEK		99310-7	FL, Kurmanavicius
GEK		99310-8	FL, ASUM 2000
GEK		99310-9	FL, Nicolaides
GEK		99310-10	FL, Hobbins
GEK		99310-11	FL, ASUMOLD
GEK		99310-12	FL, CFEF
GEK		99310-13	FL, Marsal
GEK		99310-14	FL, OBRIEN
GEK		99311-0	FTA, Osaka
LN		33097-7	Fibula, Jeanty 1983
GEK		99312-0	GS, Rempen
GEK		99312-1	GS, Hansmann
GEK		99312-2	GS, Hollaender
GEK		99312-3	GS, Hellman
GEK		99312-4	GS, Tokyo
GEK		99313-0	HC, Hadlock
GEK		99313-1	HC, Hansmann
GEK		99313-2	HC, Merz
GEK		99313-3	HC, Jeanty

Table A.0–13: **Context ID 12013 Extended Gestational Age Equations and Tables (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
GEK		99313-4	HC, Kurmanavicius
GEK		99313-5	HC, ASUM
GEK		99313-6	HC, Chitty
GEK		99313-7	HC, Nicolaides
GEK		99313-8	HC, CFEF
GEK		99313-9	HC, JOHNSON
GEK		99314-0	HL, Jeanty
GEK		99314-1	HL, Osaka
GEK		99314-2	HL, ASUM
GEK		99314-3	HL, Hobbins
GEK		99314-4	HL, Merz
GEK		99315-0	LV, Tokyo
GEK		99316-0	OFD, Hansmann
GEK		99316-1	OFD, Jeanty
GEK		99316-2	OFD, Kurmanavicius
GEK		99316-3	OFD, ASUM
GEK		99316-4	OFD, Chitty
GEK		99316-5	OFD, Nicolaides
GEK		99316-6	OFD, Merz
GEK		99317-0	RAD, Jeanty
GEK		99317-1	RAD, Merz
GEK		99318-0	TAD, Merz
GEK		99318-1	TAD, CFEF
GEK		99319-0	TIB, Merz
GEK		99319-1	TIB, Jeanty
GEK		99320-0	TTD, Hansmann
GEK		99321-0	ULNA, Jeanty
GEK		99321-1	ULNA, Merz
GEK		99322-0	MAD, Eik-Nes
GEK		99322-1	MAD, Kurmanavicius
GEK		99323-0	EFW, Hadlock
GEK		99323-1	EFW, Tokyo
GEK		99323-2	EFW, JSUM (2001)
GEK		99323-3	EFW, Shinozuka
GEK		99323-4	EFW, Osaka
GEK		99324-0	HC/AC, Campbell 1977
GEK		99324-1	FL/HC, Hadlock 1984
GEK		99324-2	HSVa/HEM, Hansmann
GEK		99324-3	HSVa/HEM, Nicolaides
GEK		99324-4	HSVp/HEM, Nicolaides
LN		33118-1	Length of Vertebra, Tokyo 1986

Table A.0–14: **Context ID 12015 Extended Fetal Growth Equations and Tables**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		33546-3	AC (derived) by GA, Chitty 1994
LN		33556-2	BPD outer-inner by GA, Chitty 1994
LN		33152-0	BPD outer-outer by GA, Chitty 1994
LN		33157-9	Cephalic Index by GA, Chitty 1994
LN		33158-7	Cephalic Index by GA, Hadlock 1981
LN		33163-7	EFW by GA, Hansmann 1986
LN		33181-9	TCD by GA Goldstein 1987
GEK		99200-0	AD, Marsal
LN		33145-4	AC by GA, ASUM 2000
LN		33146-2	AC by GA, Hadlock 1984
LN		33147-0	AC (measured) by GA, Chitty 1994
LN		33148-8	AC by GA, Merz 1988
LN		33149-6	AC by GA, Shinozuka 1996
GEK		99201-0	AC by GA, Hansmann
GEK		99201-1	AC by GA, Tokyo
GEK		99201-2	AC by GA, JSUM 2001
GEK		99201-3	AC by GA, Jeanty
GEK		99201-4	AC by GA, Kurmanavicius
GEK		99201-5	AC by GA, Nicolaides
GEK		99201-6	AC by GA, CFEF
GEK		99202-0	APAD by GA, Merz
GEK		99203-0	APTD by GA, Hansmann
GEK		99204-0	BOD by GA, Jeanty
LN		33151-2	BPD by GA, ASUM 2000
LN		33198-3	BPD by GA, Hadlock 1984
LN		33154-6	BPD by GA, Merz 1988
LN		33156-1	BPD by GA, Shinozuka 1996
LN		33153-8	BPD by GA, Jeanty 1982
LN		33155-3	BPD by GA, Rempen 1991
GEK		99205-0	BPD by GA, Hansmann
GEK		99205-1	BPD by GA, Sabbagha
GEK		99205-2	BPD by GA, Tokyo
GEK		99205-3	BPD by GA, JSUM 2001
GEK		99205-4	BPD by GA, Osaka
GEK		99205-5	BPD by GA, Kurmanavicius
GEK		99205-6	BPD by GA, Chitty
GEK		99205-7	BPD by GA, Nicolaides
GEK		99205-8	BPD by GA, Campbell
GEK		99205-9	BPD by GA, CFEF
GEK		99205-10	BPD by GA, Marsal
GEK		99205-11	BPD by GA, ASUM-Old
GEK		99206-0	Cerebellum by GA, Hill
GEK		99206-1	Cerebellum by GA, Goldstein
GEK		99206-2	Cerebellum by GA, Nicolaides

Table A.0–14: **Context ID 12015 Extended Fetal Growth Equations and Tables (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
GEK		99207-0	Clavicle by GA, Yarkoni
GEK		99208-0	CM by GA, Nicolaides
LN		33159-5	CRL by GA ASUM 2000
LN		33161-1	CRL by GA, Shinozuka 1996
LN		33160-3	CRL by GA, Rempen1991
GEK		99209-0	CRL by GA, Hansmann
GEK		99209-1	CRL by GA, Hadlock
GEK		99209-2	CRL by GA, Robinson
GEK		99209-3	CRL by GA, Tokyo
GEK		99209-4	CRL by GA, JSUM 2001
GEK		99209-5	CRL by GA, Osaka
GEK		99209-6	CRL by GA, Marsal
LN		33164-5	Fibula by GA, Jeanty 1983
LN		33165-2	FL by GA, ASUM 2000
LN		33166-0	FL by GA, Hadlock 1984
LN		33167-8	FL by GA, Chitty 1994
LN		33168-6	FL by GA, Jeanty 1982
LN		33169-4	FL by GA, Merz 1988
LN		33170-2	FL by GA, Shinozuka 1996
GEK		99210-0	FL by GA, Hansmann
GEK		99210-1	FL by GA, Tokyo
GEK		99210-2	FL by GA, Warda
GEK		99210-3	FL by GA, JSUM 2001
GEK		99210-4	FL by GA, Osaka
GEK		99210-5	FL by GA, Kurmanavicius
GEK		99210-6	FL by GA, Nicolaides
GEK		99210-7	FL by GA, CFEF
GEK		99210-8	FL by GA, Marsal
GEK		99210-9	FL by GA, OBRIEN
GEK		99211-0	FTA by GA, Osaka
LN		33171-0	GS by GA, Rempen 1991
GEK		99212-0	GS by GA, Hollaender
GEK		99212-1	GS by GA, Hellman
GEK		99212-2	GS by GA, Tokyo
LN		33172-8	HC by GA, ASUM 2000
LN		33173-6	HC by GA, Hadlock 1984
LN		33174-4	HC derived by GA, Chitty 1994
LN		33175-1	HC by GA, Jeanty 1982
LN		33176-9	HC by GA, Merz 1988
GEK		99213-0	HC by GA, Hansmann
GEK		99213-1	HC by GA, Kurmanavicius
GEK		99213-2	HC by GA, Nicolaides
GEK		99213-3	HC by GA, CFEF
LN		33177-7	Humerus Length by GA, ASUM 2000

Table A.0–14: **Context ID 12015 Extended Fetal Growth Equations and Tables (continued)**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
GEK		99214-0	HL by GA, Jeanty
GEK		99214-1	HL by GA, Osaka
GEK		99214-2	HL by GA, Merz
GEK		99215-0	LV by GA, Tokyo
LN		33178-5	OFD by GA, ASUM 2000
LN		33179-3	OFD by GA, Chitty 1994
GEK		99216-0	OFD by GA, Hansmann
GEK		99216-1	OFD by GA, Jeanty
GEK		99216-2	OFD by GA, Kurmanavicius
GEK		99216-3	OFD by GA, Nicolaides
GEK		99216-4	OFD by GA, Merz
LN		33180-1	Radius by GA, Jeanty 1983
GEK		99217-0	RAD by GA, Merz
GEK		99218-0	TAD by GA Merz
GEK		99218-1	TAD by GA CFEF
GEK		99219-0	TIB by GA Jeanty
GEK		99219-1	TIB by GA Merz
GEK		99220-0	TTD by GA Hansmann
GEK		99221-0	ULNA by GA Jeanty
GEK		99221-1	ULNA by GA Merz
GEK		99222-0	MAD by GA Eik-Nes
GEK		99222-1	MAD by GA Kurmanavicius
LN		33150-4	AxT by GA, Shinozuka 1996
GEK		99223-0	AxT by GA, Tokyo
GEK		99224-0	NBL by GA, Sonek
GEK		99224-1	NBL by GA, Bunduki
GEK		99225-0	Length of Vertebra by GA, Tokyo

Table A.0–15: **Context ID 12019 Extended OB-GYN FETUS SUMMARY**

Coding Scheme Designator (0008, 0102)	Coding Scheme Version (0008, 0103)	Code Value (0008, 0100)	Code Meaning (0008, 0104)
LN		18185-9	Gestational Age
LN		11888-5	Composite Ultrasound Age
LN		11885-1	Gestational Age by LMP
LN		11727-5	Estimated Weight
LN		11767-1	EFW percentile rank
LN		11948-7	Fetal Heart Rate
LN		11884-4	Average Ultrasound Age
LN		11781-2	EDD from average ultrasound age
GEK		99900-1	EDD from composite ultrasound age

Table A.0–16: **Context ID 12111 Extended Abdominal Arteries (lateral)**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
SRT		T-F1810	Umbilical Artery
SRT		T-F1820	Umbilical Vein
SRT		T-46980	Ovarian Artery
SRT		T-48780	Ovarian Vein
SRT		T-46820	Uterine Artery
SRT		T-49010	Uterine Vein
SRT		T-F1412	Vitelline Artery of Placenta
SRT		T-F1413	Vitelline Vein of Placenta
SRT		T-46710	Common Iliac Artery
99VP		VP-0001	Ductus venosus vein
SRT		T-40003	Entire Vessel
SNM3	3.4	T-45010	Carotid Artery

Table A.0–17: **Context ID 12121 Extended Vascular Indices and Ratios**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		20167-3	Acceleration Index
SRT		G-0371	% Area Reduction
SRT		G-0372	% Diameter Reduction
LN		12008-9	Pulsatility Index
LN		12023-8	Resistivity Index
LN		12144-2	Systolic to Diastolic Velocity Ratio
LN		33867-3	Velocity ratio
GEK		99500-0	Pressure Gradient mean
GEK		99012-0	Peak Diastolic Velocity
GEK		99013-0	Peak velocity index for veins

Table A.0–18: **Context ID 12122 Extended Other Vascular Properties**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		20168-1	Acceleration Time
LN		20217-6	Deceleration Time
SRT		G-0364	Vessel lumen diameter
SRT		G-0365	Vessel outside diameter
LN		20354-7	Velocity Time Integral

Table A.0–18: **Context ID 12122 Extended Other Vascular Properties (continued)**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		8867-4	Heart Rate
GEK		99501-0	Cycle Time

Table A.0–19: **Context ID 3627 Extended Measurement Type**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
SRT		G-A437	Maximum
SRT		R-404FB	Minimum
SRT		R-00317	Mean
GEK		99006-0	last

Table A.0–20: **Context ID 99102 Extended AMNIOTIC SAC**

Coding Scheme Designator (0008, 0102)	**Coding Scheme Version (0008, 0103)**	**Code Value (0008, 0100)**	**Code Meaning (0008, 0104)**
LN		11627-7	Amniotic Fluid Index
GEK		99009-0	AMNIOTIC FLUID INDEX LEN q1
GEK		99009-1	AMNIOTIC FLUID INDEX LEN q2
GEK		99009-2	AMNIOTIC FLUID INDEX LEN q3
GEK		99009-3	AMNIOTIC FLUID INDEX LEN q4
GEK		99009-4	AMNIOTIC FLUID INDEX.SUM (four quadrant index)

B Standard Extended and Private Templates

Table B.0–21: **Extension of TID 5000 OB-GYN Ultrasound Procedure Report (Doppler)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125000, DCM, "OB-GYN Ultrasound Procedure Report")	1	M		
2	>	HAS CONCEPT MOD	INCLUDE	DTID (1204) Language of Content Item and Descendants	1	U		
3	>	HAS OBS CONTEXT	INCLUDE	DTID (1001) Observation Context	1	U		
4	>	CONTAINS	INCLUDE	DTID (5001) Patient Characteristics	1	U		
7	>	CONTAINS	INCLUDE	DTID (5002) OB-GYN Procedure Summary Section	1	U		
8	>	CONTAINS	INCLUDE	DTID (5004) Fetal Biometry Ratio Section	1-n	U		
9	>	CONTAINS	INCLUDE	DTID (5005) Fetal Biometry Section	1-n	U		
10	>	CONTAINS	INCLUDE	DTID (5006) Long Bones Section	1-n	U		
11	>	CONTAINS	INCLUDE	DTID (5007) Fetal Cranium Section	1-n	U		
12	>	CONTAINS	INCLUDE	DTID (5009) Fetal Biophysical Profile Section	1-n	U		
13	>	CONTAINS	INCLUDE	DTID (5011) Early Gestation Section	1-n	U		
14	>	CONTAINS	INCLUDE	DTID (5010) Amniotic Sac Section	1-n	U		
15	>	CONTAINS	INCLUDE	DTID (99004) Amniotic Sac Section	1	U		deprecated
16	>	CONTAINS	INCLUDE	DTID (5015) Pelvis and Uterus Section	1	U		
17	>	CONTAINS	INCLUDE	DTID (5012) Ovaries Section	1	U		

Table B.0–21: **Extension of TID 5000 OB-GYN Ultrasound Procedure Report (Doppler) (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
18	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section	1	U		$Laterality = EV (G-A101, SRT, "Left") $Number = EV (11879-4, LN, "Number of follicles in left ovary")
19	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section	1	U		$Laterality = EV (G-A100, SRT, "Right") $Number = EV (11880-2, LN, "Number of follicles in right ovary")
19	>	CONTAINS	INCLUDE	EV (121070, DCM, "Findings")	1-n	U		
20	>	CONTAINS	INCLUDE	EV (121070, DCM, "Findings")	1-n	U		
21	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site"	1	M		EV (T-F6800, SRT, "Embryonic Vascular Structure")
22	>	CONTAINS	INCLUDE	DTID (5025) OB-GYN Fetal Vascular Measurement Group	1	M		$AnatomyGroup = DCID (12141) Fetal Vasculature
23	>	CONTAINS	INCLUDE	EV (121070, DCM, "Findings")	1-n	U		
24	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site"	1	M		EV (T-D6007, SRT, "Pelvic Vascular Structure")
25	>	CONTAINS	INCLUDE	DTID (5026) OB-GYN Pelvic Vascular Measurement Group	1	M		$AnatomyGroup = DCID (12140) Pelvic Vasculature Anatomical Location
26	>	CONTAINS	INCLUDE	DTID (99000) Fetus Doppler Measurements	1-n	U		$Laterality $FindingSite
27	>	CONTAINS	INCLUDE	DTID (99001) Maternal Doppler Measurement	1-n	U		$Laterality $FindingSite
28	>	CONTAINS	INCLUDE	DTID (99000) Fibroid Section	1	U		$Laterality = EV (G-A101, SRT, "Left") $Number = EV (99703-0, GEK, "Number of fibroids in left ovary")

Table B.0–21: **Extension of TID 5000 OB-GYN Ultrasound Procedure Report (Doppler) (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
29	>	CONTAINS	INCLUDE	DTID (99000) Fibroid Section	1	U		$Laterality = EV (G-A100, SRT, "Right") $Number = EV (99704-0, GEK, "Number of fibroids in right ovary")

Table B.0–22: **Extension of TID 5008 Fetal Biometry Group**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT(125005, DCM, "Biometry Group")	1	M		
2	>	CONTAINS	INCLUDE	DTID (300) Measurement	1-n	MC	At least one of 2 and 3 shall be present	$Measurement = $BiometryType $Derivation = DCID (3627) Measurement Type
3	>	CONTAINS	NUM	EV (18185-9, LN, "Gestational Age")	1	MC	At least one of 2 and 3 shall be present	Units= EV(d,UCUM,days)
4	>>	INFERRED FROM	CODE	DCID (228) Equation or Table	1	U		DCID (12013) Gestational Age Equations and Tables
5	>>	INFERRED FROM	NUM	EV (121414, DCM, "Standard deviation of Population")	Â 1	UÂ		
6	>>>	HAS PROPER-TIES	CODE	EV (121402, DCM, "Normality")	1	UC	If row 5	(SRT, R-002C4, Abnormally High) (SRT, R-002C5, Abnormally Low) (SRT, G-A460, Normal)

Table B.0–23: **Extension of TID 5010 Amniotic Sac Section**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT (125070, DCM, "Findings")	1	M		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008, "Subject Context, Fetus")	1	MC	IF this template is invoked more than once to describe more than one fetus	
3	>	HAS OBS CONTEXT	CODE	EV (G-C0E3, SRT, "Finding Site")	1	M		DT (T-F1300, SRT, "Amniotic Sac")
4	>	CONTAINS	INCLUDE	DTID (300, "Measurement")	1	M		$Measurement = DT (11627-7, LN, "Amniotic Fluid Index")
5	>	CONTAINS	INCLUDE	DTID (300, "Measurement")	4	U		$Measurement = DCID (12008) OB-GYN Amniotic Sac

Table B.0–24: **TID 99000 Fetus Doppler Measurements**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT(99000, DCM, "Fetal Doppler"	1	M		
2	>	HAS OBS CONTEXT	INCLUDE	DTID(1008) Subject Context, Fetus ID	1	MC	If this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1-n	M		$FindingSite = EV(T-45510, SNM3 "Cerebral artery") $Laterality= EV(G-A101, SRT, "Right") $TargetSiteMod = EV(G-A109, SNM3, "Medial") $MeasType = MemberOf DCID(9900)

Table B.0–24: **TID 99000 Fetus Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
4	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-45510, SNM3 "Cerebral artery") $Laterality=EV(G-A100, SRT, "Left") $TargetSiteMod = EV(G-A109, SNM3, "Medial") $MeasType = MemberOf DCID(9900)
5	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-45510, SNM3 "Cerebral artery") $Laterality= EV(G-A101, SRT, "Right") $TargetSiteMod = EV(G-A113, SNM3, "Internal") $MeasType = MemberOf DCID(9900)
6	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-45510, SNM3 "Cerebral artery") $Laterality=EV(G-A100, SRT, "Left") $TargetSiteMod = EV(G-A113, SNM3, "Internal") $MeasType = MemberOf DCID(9900)
7	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-46420, SNM3, "Hepatic Artery") $MeasType = MemberOf DCID(9900)
8	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-48720, SNM3, "Hepatic Vein") $MeasType = MemberOf DCID(9901)

Table B.0–24: **TID 99000 Fetus Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
9	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-48710, SNM3, "Inferior Vena Cava") $MeasType = MemberOf DCID(9901)
10	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-46600, SNM3, "Renal artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(9900)
11	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-46600, SNM3, "Renal artery") $Laterality = EV(G-A101, SRT, "Right") $MeasType = MemberOf DCID(9900)
12	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-46460, SNM3, "Splenic artery") $MeasType = MemberOf DCID(9900)
13	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-42070, SNM3, "Thoracic aorta") $MeasType = MemberOf DCID(9900)
14	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-F1810, SNM3, "Umbilical artery") $MeasType = MemberOf DCID(12111)
15	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-48817, SNM3, "Umbilical vein") $MeasType = MemberOf DCID(9902)

Table B.0–24: **TID 99000 Fetus Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
16	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(VP-0001, 99VP, "Ductus venosus vein") $MeasType = MemberOf DCID(9901)
17	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-45010, SNM3, "Carotid artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12140)
18	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-45010, SNM3, "Carotid artery") $Laterality = EV(G-A100, SRT, "Right") $MeasType = MemberOf DCID(12140)
19	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-F1412, SRT, "Vitelline Artery of Placenta") $MeasType = MemberOf DCID(12140)
20	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-F1810, SNM3, "Umbilical artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12111)
21	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-F1810, SNM3, "Umbilical artery") $Laterality = EV(G-A100, SRT, "Right") $MeasType = MemberOf DCID(12111)

Table B.0–24: **TID 99000 Fetus Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
22	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-45600, SRT, "Middle Cerebral Artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12141)
23	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-45600, SRT, "Middle Cerebral Artery") $Laterality = EV(G-A100, SRT, "Right") $MeasType = MemberOf DCID(12141)
24	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$FindingSite = EV(T-42000, SRT, "Aorta") $MeasType = MemberOf DCID(12141)

Table B.0–25: **TID 99001 Maternal Doppler Measurements**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT(99001, DCM, "Maternal Doppler Measurements"	1	M		
2	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(VP-0002, 99VP, "Uterine artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12111)

Table B.0–25: **TID 99001 Maternal Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(VP-0002, 99VP, "Uterine artery") $Laterality = EV(G-A101, SRT, "Right") $MeasType = MemberOf DCID(12111)
4	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(VP-0003, 99VP, "Ovarian artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12111)
5	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(VP-0003, 99VP, "Ovarian artery") $Laterality = EV(G-A101, SRT, "Right") $MeasType = MemberOf DCID(12111)
6	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(VP-0001, 99VP, "Ductus Venosus") $MeasType = MemberOf DCID(12140)
7	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-40003, SRT, "Entire Vessel") $MeasType = MemberOf DCID(12140)
8	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-45010, SNM3, "Carotid artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12111)

Table B.0–25: **TID 99001 Maternal Doppler Measurements (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
9	>	CONTAINS	INCLUDE	DTID(99100) Doppler Group	1	M		$TargetSite = EV(T-45010, SNM3, "Carotid artery") $Laterality = EV(G-A100, SRT, "Left") $MeasType = MemberOf DCID(12111)

Table B.0–26: **TID 99002 Fibroid Section**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT(121070, DCM, "Findings"	1	M		
2	>	HAS CONCEPT MOD	CODE	EV(G-C0E3, SRT, "Finding Site")	1	M		DT(99705, GEK, "Fibroid")Â
3	>	HAS CONCEPT MOD	CODE	EV(G-C171, SRT, "Laterality")	1	M		$Laterality
4	>	CONTAINS	NUM	$Number	1	M		$Measurement = EV(99706-0, GEK, "Fibroid Diameter") $Derivation = DCID (3627) Measurement Type
5	>	CONTAINS	INCLUDE	DTID (99003) Fibroid Measurement Group	1-n	U		

Table B.0–27: **TID 99003 Fibroid MEASUREMENT GROUP**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV(125007, DCM, "Measurement Group"	1	M		
2	>	HAS OBS CONTEXT	TEXT	EV(12510, DCM, "Identifier")	1	U		Unique among all groups of same laterality

Table B.0–27: **TID 99003 Fibroid MEASUREMENT GROUP (continued)**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
3	>	CONTAINS	INCLUDE	DTID (300) Measurement	1-n	U		$Measurement = EV (GD705, SRT, "Volume")
4	>	CONTAINS	INCLUDE	DTID (300) Measurement	1	M		$Measurement = EV(99706-0, GEK, "Fibroid Diameter") $Derivation = DCID (3627) Measurement Type

Table B.0–28: **Extension of TID 99004 Amniotic Sac Section**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT (125070, DCM, "Findings")	1	M		
2	>	HAS OBS CONTEXT	CODE	EV (G-C0E3, SRT, "Finding Site")	1	M		DT (T-F1300, SRT, "Amniotic Sac")
3	>	CONTAINS	INCLUDE	DTID (300, "Measurement")	1-n	M		$Measurement = DT (11627-7, LN, "Amniotic Fluid Index")
4	>	CONTAINS	INCLUDE	DTID (300, "Measurement")	4-n	U		$Measurement = DCID (99102) OB-GYN Amniotic Sac

Table B.0–29: **TID 99100 Doppler Group**

No.	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT(99100, DCM, "Doppler Group")	1	M		
2	>	CONTAINS	INCLUDE	DTID (300) Measurement	1-n	M		$Measurement = $MeasType