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# DICOM

## Conformance Statement

### Philips Ultrasound System 3300

### Models: 3300 G, 3300 W and 3300 C

## Overview

The 3300 implements the necessary DICOM<sup>®</sup> services to download worklists from an information system, save acquired Ultrasound (US) images and associated Structured Reports to a network storage device, CD, USB Flash Device or USB Hard Drive, print to a networked hardcopy device, and inform the information system about the work actually done. Table 1 provides an overview of the supported network services, Table 2 lists the supported Media Storage Application Profiles, and Table 3 lists the supported Structured Report Templates.

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<sup>®</sup> DICOM is the registered trademark of the National Electrical Manufacturers Association for its standards publications relating to digital communications of medical information.

**Table I  
NETWORK SERVICES**

<b>SOP Classes</b>	<b>User of Service (SCU)</b>	<b>Provider of Service (SCP)</b>
<b>Transfer</b>		
Ultrasound Image Storage	Yes	No
Ultrasound Multi-frame Image Storage	Yes	No
Storage Commitment Push Model SOP Class	Yes	No
Comprehensive SR	Yes	No
<b>Query/Retrieve</b>		
<b>Workflow Management</b>		
Modality Worklist Information Model - FIND	Yes	No
Modality Performed Procedure Step SOP Model	Yes	No
<b>Print Management</b>		
Basic Grayscale Print Management Meta SOP Class	Yes	No
Basic Color Print Management Meta SOP Class	Yes	No
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No
Printer SOP Class	Yes	No

**Table 2  
MEDIA SERVICES**

<b>Media Storage Application Profile</b>	<b>Write Files (FSC or FSU)</b>	<b>Read Files (FSR) <sup>(1)(2)</sup></b>
<b>Compact Disk - Recordable</b>		
STD-US-SC-SF&MF-CDR	Option	Option
<b>Universal Serial Bus</b>		
STD-GEN-USB	Option	Option

(1) Structured Reports are not imported to the system.

(2) Only reads and imports data from other 3300 systems.

**Table 3  
STRUCTURED REPORTS**

<b>Concept Name</b>	<b>Supported</b>
OB-GYN Ultrasound Procedure Report	Yes
Echocardiography Procedure Report	Yes

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## I. Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

### I.1 Purpose of this Document

Context: Expansion of Headings and sub-headings

- Introduction
- Purpose of this Document

The Digital Imaging and Communications in Medicine (DICOM) standard was originally developed by a joint committee of the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) to

*“Facilitate the open exchange of information between digital imaging computers”.*

It specifies how medical images and related clinical information are passed between medical devices.

The DICOM Conformance Statement (DCS) is a required document for any device that claims conformance to DICOM. Since the DICOM standard specifies the structure and content of this document (PS3.2 - 2004) a DCS describes the DICOM capabilities and key features of a particular product in a standardized, defined manner.

This DCS defines the DICOM capabilities and key features of 3300 ultrasound imaging system.

For a hospital’s Information Technology (IT) department, matching DICOM Conformance Statements between vendor product offerings is a key element to determine interconnectivity between vendors’ devices.

This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

## **I.2 Intended Audience**

Context: Expansion of Headings and sub-headings

- Introduction
- Intended Audience

This Conformance Statement is intended for:

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

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

### 1.3 Overview of DICOM product offering

Context: Expansion of Headings and sub-headings

- Introduction
  - Overview of DICOM product offering

The services supported by 3300's DICOM subsystem are derived from the following customer needs:

<b>Name</b>	<b>Customer Need</b>	<b>Options package</b>
Optioning	Ability to purchase some features and not others.	N/A
Archival	Archival of digital images to: <ol style="list-style-type: none"> <li>1. Removable media or</li> <li>2. Across the network</li> </ol>	<ol style="list-style-type: none"> <li>1. DICOM Media</li> <li>2. DICOM Networking</li> </ol>
Storage Commitment	Ability to transfer ownership of acquired images and Structured Report to a PACS.	DICOM Networking
Printing of medical images	Printing to a DICOM compatible printer.	DICOM Networking
Verification	Ability to verify the existence of and communicate with a DICOM server on the network.	DICOM Networking
Modality WorkList (MWL)	Ability to obtain lists of patients and procedures from the hospital's information system.	DICOM Networking
Modality Performed Procedure Step (MPPS)	Ability to update the information in the hospital's information system with regard to the status of a scheduled procedure.	DICOM Networking
DICOM SR	Archival of structured report (for obstetric, gynecology and cardiac studies) to: <ol style="list-style-type: none"> <li>1. Removable media or</li> <li>2. Across the network</li> </ol>	DICOM Structured Reporting

The base 3300 system will be sold with no DICOM services enabled. Customers requiring functionality beyond that provided by the base system purchase DICOM services as options on top of the base system.

3300 Medical Systems offers customers three DICOM options:

1. DICOM Media      Capability to read/write studies from/to a CD-R, CD-RW, USB Flash Device, or USB Hard Drive.
2. DICOM Networking      Capability to store studies across a network, transfer ownership of studies to the PACS and print a hardcopy to a DICOM printer. Capability to request lists of scheduled work from the hospital's information system and the ability to update study status information in the hospital's information system. Enabled via access codes.
3. DICOM Structured Reporting      Capability to generate and store structured report for obstetric, gynecology and cardiac studies to DICOM formatted media and across the network. DICOM Structured Reporting option cannot be purchased without purchasing the DICOM Networking option.

Note: DICOM Networking encompasses what in 3300 had been two separate options: DICOM Basic and DICOM Advanced.

While the DICOM Conformance Statement is not intended to be a complete 3300 product specification, some areas of this document will refer to system operation where it is necessary to add a context for the discussion or to help explain a capability.

## **I.4 Sources for this Document**

Context: Expansion of Headings and sub-headings

- Introduction
  - Sources for this Document

The source for this document is:

- American College of Radiology-National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications in Medicine (DICOM) V3.0. 2004

## **I.5 Important Note to the Reader**

Context: Expansion of Headings and sub-headings

- Introduction
- Important Note to the Reader

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

### **Interoperability**

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

### **Validation**

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

### **New versions of the DICOM Standard**

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

## 1.6 Acronyms, Abbreviations and Glossary of Terms

Context: Expansion of Headings and sub-headings

- Introduction
  - Acronyms, Abbreviations and Glossary of Terms

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.

ACC -----	American College of Cardiology
ACR-----	American College of Radiology Initiated the DICOM standardization effort in the early 1980's.
AE-----	Application Entity A software process that implements DICOM. 3300 uses a single AE.
AE Title -----	AE's require a unique 'AE Title', typically set up during installation through 3300's setup key on the control panel. Application Entities (AE's) identify themselves to each other via the AE Title at application level.
ANSI-----	American National Standard Institute
ASE -----	American Society of Echocardiography
Association -----	A connection between AE's for DICOM exchange.
ASCII -----	American Standard Code for Information Exchange Known for standardizing codes for text.
Attribute -----	Attributes are the components of an object (IOD), describing its properties. Examples of attributes are Patient Name, Patient ID etc. Each attribute has a unique DICOM tag.
Big Endian-----	An encoding method for storing the most significant Byte in the high order bits of a 16 bit word. Motorola based CPU's expect information to be stored this way. Exchanged as part of the transfer syntax. Conversion to little endian would require swapping each byte within the words.
CD-R -----	Compact Disk, Read Only(Write once) An option for the physical specification for the DICOM media exchange standard and used by 3300 as a removable media device. This is a write once, read many times device.

- CD-RW ----- Compact Disk, multi-write.  
An option for the physical specification for the DICOM media exchange standard and used by 3300 as a removable media device.
- DICOM ----- Digital Imaging and Communications In Medicine  
Version 3.0 is the current defined version and is that used by this in this document.
- DICOM Media ----- A DICOM option that can be purchased by the customer, it allows the user to write DICOM study's to removable media.
- DICOM Networking ----- A DICOM option that can be purchased by the customer, it allows the user to perform network export of DICOM studies and DICOM print as well as to select a procedure from a Modality Worklist and to send study status information to the department scheduler. It includes DICOM Media.
- DICOM SR----- A standard for documents that incorporates references to images and associated data. Each DICOM Structured Report encodes only what is meant, not how it is intended to be displayed, printed or otherwise presented.
- DICOM Structured Reporting – A DICOM option that can be purchased by the customer, it allows the user to generate and store structured report for Obstetrics, Gynecology and cardiac studies to a DICOM formatted media and across the network.
- DICOMDIR ----- The standard directory structure specified for DICOM media exchange.
- DIMSE ----- DICOM Message Service Element.  
The DICOM set of commands (e.g. C\_ECHO, C\_STORE, etc.)
- 3300 ----- Philips Ultrasound Medical Systems' 3300 ultrasound system.
- Image Format ----- A term that refers to the Photometric interpretation and Transfer Syntax treated as single item. For example the Image Format 'Palette Color, RLE Compressed' is consists of a Photometric Interpretation of 'Palette Color' and a Transfer Syntax of 'RLE Compressed'.
- Explicit VR ----- Explicit Value Representation  
A transfer syntax which is negotiated by which the receiver is explicitly told the VR syntax and context. This is in contrast to Implicit VR.
- FSC----- File-set creator  
The function of a device that creates DICOM exchange media, typically an acquisition device such as an ultrasound. 3300 is a FSC.

FSR -----	File-set reader The function of a device that reads DICOM exchange media - typically a viewing station. 3300 is also a FSR and can view studies created by other 3300 systems.
FSU-----	File-set updater The function of a device that can read DICOM exchange media and update the DICOMDIR.
Implementation Class UID	A unique number, which is exchanged during the set up of the association, by which 3300 identifies itself. This UID is guaranteed not to change for a specific release of 3300.
Implicit VR -----	Implicit Value Representation A transfer syntax which is negotiated by which the receiver is assumed to know the VR syntax and context.
HIS -----	Hospital Information System
IOD -----	Information Object Definition Specification of a DICOM object such as a US Image Object.
ISO -----	International Standards Organization
JPEG -----	An image compression technique created by the Joint Photographic Experts Group
Little Endian -----	An encoding method by which the least significant byte is stored in the high order bits in a 16 bit word. This is how Intel based CPU's store data.
LUT -----	Look Up Table Specifying mapping from specific values such as pixel values into luminance.
Modality-----	An acquisition system such as CT, MR, US. 3300 is an ultrasound (US) modality.
Module -----	A group of attributes, specified as a unit for convenience reasons. Examples are Patient module, Study module etc.
MONOCHROME2 -----	A color format for images in which the pixel values are grayscale values with a range of 0-255, 0 represents a Black pixel and 255 represent a White pixel. See PaletteColor, YBR and RGB for other color formats.
MPPS-----	Modality Performed Procedure Step Used by 3300 for informing a department scheduler of the status of a study.
MWL -----	Modality WorkList Used to provide on the 3300 system a Worklist of scheduled procedures.

NEMA -----	National Electrical Manufacturers Association US trade organization, members of which defined the first version of the DICOM standard together with the ACR.
PACS -----	Picture Archiving and Communications System An image archive.
PaletteColor -----	A color format for images in which the pixel values are indices into a color table. See RGB, YBR and MONOCHROME2 for other color formats.
PDU-----	Protocol Data Unit Packet that is created at the DICOM lower-level protocol.
Pixel-----	Smallest, single element or dot of an image.
Pixel Spacing-----	Physical distance in the patient between the center of each pixel, specified by a numeric pair – adjacent row spacing (delimiter) adjacent column spacing (in mm).
RGB-----	A color format for images in which the pixel values contain the red, green and blue color intensities. See PaletteColor, YBR and MONOCHROME2 for other color formats.
RIS-----	Radiology Information System Which typically schedules and maintains patient demographic information.
RLE -----	Run Length Encoding A lossless image compression scheme.
SCP -----	Service Class Provider DICOM AE that functions as a server or ‘provides’ a service such as Storage, Print etc.
SCU-----	Service Class User DICOM AE that functions as a client, or uses a service, i.e. for printing, storage etc.
Service Class -----	A service class is a group of one or more SOP classes e.g. the Storage Service class contains all the storage SOP classes (CT_STORE, US_STORE etc).
SOP -----	Service Object Pair Combination of a service such as US_STORE and an object such as image.
SR-----	Structured Report
TCP/IP-----	Transmission Control Protocol/Internet Protocol The communication standard supported by DICOM.

- Transfer Syntax----- Encoding specification of DICOM messages, negotiated while setting up an association. Examples of different transfer syntaxes are Little Endian or Big Endian, Implicit or Explicit VR, or a compression scheme (such as RLE or JPEG).
- Type ----- Specification of rule for whether an attribute has to be present in an object. Type 1 attributes are required; Type 2 are required but can be left blank when unknown; Type 3 are optional.
- U/U ----- Usage specification for a specific service, meaning (user-) optional for SCU and mandatory for SCP.
- U/M ----- Usage specification for a specific service, meaning (user-) optional for both SCU and SCP.
- UID ----- Unique Identifier  
A world-wide unique numbering scheme which is used by the NEMA to, for example, identify SOP classes, syntaxes etc and vendors for identifying SOP instances.
- US ----- Ultrasound
- USB----- Acronym for Universal Serial Bus. It is an external peripheral interface standard for communication between a computer and external peripherals over a cable using bi-serial transmission.
- USB Flash Drive----- A small, portable flash memory card that plugs into a computer's USB port.
- USB Hard Drive----- A portable disk drive that plugs into a computer's USB port.
- VM ----- Value Multiplicity  
Defining whether or not an attribute can have multiple elements, for example multiple phone numbers.
- VR ----- Value Representation  
The definition of rules and encoding of groups of similar attributes. For example the VR Person Name (PN) specifies exactly the sequence of last name, first name etc.
- YBR ----- A color format for images in which the pixel values contain one luminance and two chrominance planes. See PaletteColor, RGB and MONOCHROME2 for other color formats.

3D/PanView ----- Philips Ultrasound Medical System's 3300 Fetal-3D and Panoramic View options

## 2. Implementation Model

Context: Expansion of Headings and sub-headings

➤ Implementation Model

This section describes the functional relationship between the device and the DICOM services:

Customer Need	Provided in options package	Functionality	DICOM Service Classes Required
Optioning	Bundled	Ability to install/remove optional features	
Archive to Media	Bundled	Saving BMP's, AVI's, and HTML docs to media	
		Formatting removable media: USB flash device, USB Hard drive and CD-RW.	
	DICOM Media	Saving DICOM studies to removable media: USB flash device, USB Hard drive, CD-R, CD-RW.	Media Storage Service Class – File Set Creator Media Storage Service Class – File Set Updater
Retrieval from Media	DICOM Media	Reading DICOM studies from removable media	Media Storage Service Class – File Set Reader
Archive to Network	DICOM Networking	Network export of DICOM studies.	Storage SCU
		Transfer ownership of acquired images to a PACS.	Storage Commitment SCU

<b>Customer Need</b>	<b>Provided in options package</b>	<b>Functionality</b>	<b>DICOM Service Classes Required</b>
Print	Bundled	Print images to PC based printers, non-DICOM film printers.	
	DICOM Networking	Print studies to a DICOM printer – both color and B&W.	Print Management SCU
Modality Worklist (MWL)	DICOM Networking	Request modality worklists from the Modality Worklist Server.	MWL SCU
Modality Performed Procedure Step (MPPS)	DICOM Networking	Inform the hospital of the status of a performed procedure.	MPPS SCU
DICOM SR	DICOM Structured Reporting	Network/media export of DICOM structured report files for Obstetrics, Gynecology and Cardiac studies.	SR Storage SCU
		Transfer ownership of generated DICOM SR files to a PACS.	SR Storage Commitment SCU
Setup	DICOM Networking	Verification that a network device is a DICOM server.	Verification SCU

Customer Need	Provided in options package	Functionality	DICOM Service Classes Required
		Response to requests from the network to verify that 3300 is a DICOM device.	Verification SCP
		Set the AE Title for 3300; Specify which network server is the primary and the secondary storage SCP, storage commit SCP, SR storage SCP, SR storage commit SCP; List servers, add servers etc	

**2.1 Application Data Flow Diagrams**

**2.1.1 Network Relationships**

The diagram in Figure I.1-1 represents the relationship between 3300’s Application Entity and it’s use of DICOM to real-world activities. Figure I.1-1 shows the relationships for DICOM activities on the network.

Figure I.1-1 Network Relationships



The left side of the diagram (labeled 'Local') represents the 3300 system being described in this DICOM Conformance Statement. The right side (labeled 'Remote') represents equipment that 3300 is meant to exchange information with (the Hospital/Clinic), and the vertical line in between is the DICOM Interface.

The long rectangular gray box represents the one and only Application Entity that is used in the implementation of all 3300's DICOM services. This single AE supports all the 3300 services: print, primary storage, secondary storage, structured report storage, image storage commitment, structured report storage commitment, verification, MVWL and MPPS.

Since an AE must have a unique AE Title across a hospital's network (HIS), the user can configure the AE's title through setup. The dotted rectangular boxes within the Application Entity represent the various DICOM services used (SCU) and supported (SCP).

The circles, on the left side of the diagram, represent real-world activities that a user can perform with the 3300 system, such as saving a study and acquiring an image.

The diagram shows that 3300 supports storing images to a remote PACS (primary and secondary if configured), as well as transferring ownership of the images/reports to an image / report manager so that the study can automatically be deleted from 3300's hard-drive.

Images can be:

A study can be selected, by the user, from a list of studies on 3300's local hard-drive, and manually exported.

The diagram shows that 3300 supports storage and store commitment of structured report (SR) to a remote PACS. 3300 allows the user to configure Image archival SCP and SR archival SCP as different AEs, however this is not a restriction and the user can use same SCP for both. It is to be noted that SR is exported only for obstetric, gynecology and cardiac type studies.

SRs can be:

Sent to the SR Storage SCP by the user using manual export.

3300 also supports printing studies to a grayscale or color DICOM printer. As with storing studies to a remote PACS, images can be printed as soon as they are acquired (but only when there are enough to fill a page); they can be batched for printing all at once when the study is saved, or the study can be selected manually for printing.

If color images are sent to a grayscale printer, they will be converted to grayscale. If both a color and grayscale printer is configured, color images will be routed to the color printer and grayscale images will be routed to the grayscale printer.

3300 supports Modality Worklists (MWL) and Modality Performed Procedure Step (MPPS.) These two capabilities work together to allow 3300 to communicate with a Hospital Information System (HIS) to obtain and display lists of patients scheduled for imaging procedures and to update the HIS whenever the status of a scheduled procedure changes (for example, when a scheduled study is completed.)

The diagram shows that when a study is started (circle 'Start Study'), 3300 sends an MPPS Study Started message to the department system scheduler (MPPS SCP) and when the user finishes the study a MPPS Study Completed message is sent to the department system scheduler (circle 'Save Study'). It also shows that the user can discontinue a study (circle 'Don't Save Study'), in which case a MPPS Study Discontinued message is sent to the department system scheduler.

The user can disconnect the network cable and use 3300 in walk-about or portable mode. When reconnected to the network, 3300 will process any queued jobs including storage, printing and Storage Commitment. Queued MPPS status updates will also be performed. Also, on reconnect, 3300 resumes the periodic retrieval of the modality worklist.

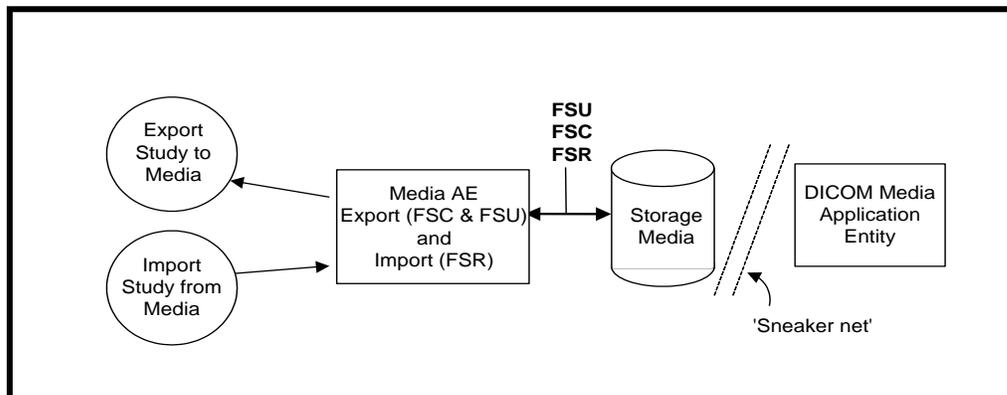
## 2.1.2 Removable Media Relationships

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Application Data Flow Diagrams
    - Removable Media Relationships

The diagram in Figure I.1-2 represents the relationship between 3300's Application Entity and it's use of DICOM to real-world activities. Figure I.1-2 shows the relationships for DICOM activities involving local storage to removable media.

Figure I.1-2 Removable Media Relationships



As with the previous diagram, circles represent real-world activities performed on the 3300 system.

The diagram shows that 3300 supports the writing of DICOM study's to the ultrasound systems removable media (CD-R, CD-RW, USB Flash Device, or USB Hard Drive). Writing of a DICOM study includes writing of images by default. DICOM SR files of obstetrics, gynecology and cardiac study types are written in case the package DICOM Structured Reporting is purchased. This is useful for exporting the studies to the image / report archive when the hospitals network is down. It is also useful for long term archival to CD of studies for sites that have not purchased the networking capability provided in the 'Networking' package.

3300 can also read back into the system DICOM studies (or proprietary backup format studies) that it, another 3300 system has previously written to removable media. However, since 3300 is not an image archive but an image modality, it will not allow a user to read studies into the system that were not generated by an 3300 system. 3300, when it reads back a study from media, does not read back SR.

## 2.2 Functional Definition of 3300 AE

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE

3300 is implemented as a single AE. The DICOM AE Title and Port number are configurable by the user through the 'Setup' screens. The default AE Title that 3300 will use is the host name of the computer. Since AE Titles must be unique across a hospital's network and computer names must also be unique, some institutions institute a policy where the AE Title is derived from the computer name. 3300 supports this by allowing the user to specify a fixed string for a prefix and suffix. The AE Title is then generated from the prefix, the computer's name and the suffix.

The default port number is 104 but as with the AE Title, the port number can be configured by the user.

There are ten real-world activities that the 3300 AE performs. These are:

1. Storage of DICOM studies (Images and SRs) to a PACS,
2. Issuing of Storage Commitment requests (on images and SRs) to a PACS,
3. Verification of the existence of DICOM servers on the hospital's network,
4. Printing DICOM studies to a B&W or color printer,
5. Responding to a verification request from a remote DICOM server,
6. Saving a DICOM study to removable media,
7. Reading a DICOM study from removable media,
8. Writing and Reading a study to/from removable media in Non-DICOM formats
9. Obtaining a list of scheduled work from the HIS via the MWL Server, and
10. Updating the HIS whenever a scheduled procedure changes using the MPPS Server.

These real-world activities are described, in general terms, in the following sub-sections.

### 2.2.1 Storage of DICOM studies to a PACS

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Storage of DICOM studies to a PACS

3300 acts as a Service Class User (SCU) of the 'Ultrasound Image Store', 'Ultrasound Multi-frame Image Store' and 'Comprehensive SR' SOP Classes using DIMSE C-STORE commands to transmit images and SRs to the storage server. It provides a set of DICOM configuration settings used to set up the network interface and storage options. The configurable options include specification of the DICOM storage server (host-name, port number and AE Title) for both image storage and SR storage. These options can be accessed through the DICOM Setup screen.

Just before the first image is sent from the system, the storage AE establishes an association with the primary (and if configured secondary) storage SCP and maintains the open association as long as images for storage are in the queue to that SCP. If the queue empties, the storage AE will close the association. This process will repeat for subsequent images. Therefore, images sent quickly one after the other would share the same association. This reduces overhead and improves performance. Therefore

- Where the user presses the save icon in review mode, the images acquired since the last save are sent to the storage SCP - all the images will be sent on the same association.

Similar to the image storage, an association is opened with SR storage server and all the SRs associated with the study are sent to the SCP before closing the association.

If any images (or SRs, if applicable) in a study are not successfully stored to the Storage SCP (or SR storage SCP), then the study is marked with an icon indicating failure in the 'Search for Study' screen. If the user subsequently manually exports the study, all the images (and SRs if applicable) will be resent to the Primary Storage SCP and (if defined) the Secondary Storage SCP. As mentioned, all images will be sent - both those that were previously successfully stored and those that failed. The Storage SCP will detect, without detrimental consequences (per the DICOM standard), that some images are duplicates.

### 2.2.1.1 Monochromization and Intelli-Store

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Storage of DICOM studies to a PACS
      - Monochromization and Intelli-Store

3300 allows the user to select photometric interpretation and transfer syntax of the image pixel data so that 3300's images can be viewed with a wide range of DICOM viewers. 3300 supports RGB, PALETTE\_COLOR, MONOCHROME2 and YBR\_FULL\_422 photometric interpretations. If MONOCHROME2 is selected, the color images are monochromized (converted to 8 bit grayscale) before transfer to PACS.

Intelli-store feature of 3300 allows the user to send Black & White images in MONOCHROME2 format and color images in a different format (e.g. Color images in RGB and B&W images in MONOCHROME2).

If a study which contains images to be exported in different transfer-syntaxes (intelli-store), and if the PACS(SCP) does not support all the transfer-syntaxes in which the images need to be exported, then the export of the study fails and none of the images will be exported.

### 2.2.2 Verification of the existence of DICOM server on the hospitals network

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Verification of the existence of DICOM server on the hospitals network

When the user configures one of the SCP servers (for example the Primary Storage SCP or B&W printer SCP), he/she can optionally 'ping' the SCP to verify it is a DICOM server, it is on-line and it is enabled to communicate with this 3300 system.

When the user requests a 'DICOM Ping', the verification SCU will initiate an association with the remote server and send a C-Echo request to the server.

### 2.2.3 Printing DICOM studies to a B&W or color printer

3300 serves as a print SCU and sends images to a remote DICOM print device.

#### 2.2.3.1 Monochromization and Intelli-print

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Printing DICOM studies to a B&W or color printer
      - Monochromization and intelli-print

The operator can configure up to two print SCPs: one B&W and one COLOR. If only a B&W print SCP is configured, then color images will be converted to grayscale. If both B&W and color print SCP's are defined then 3300 uses an "intelli-print" process to send color images to the color SCP and grayscale images to the B&W SCP.

If both a color and BW printer are configured, 3300 creates two separate requests for printing, one for the color images in the study and the other for the gray images. These two requests lead to two separate Print Jobs, and since, 3300 executes only one print job at a time, these jobs would be executed sequentially.

#### 2.2.3.2 Batch Mode and Manual Print

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Printing DICOM studies to a B&W or color printer
      - Batch Mode and Manual Print

In Batch Mode, where all the images are printed when the user closes (and saves) the study, all the images will be sent on the same association. Each page will contain the configured number of images. The last page may be a partial page if there are not enough images to fill the page; this ensures that a printed page cannot have images from multiple studies

### 2.2.3.3 Send-As-You-Go Mode

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Printing DICOM studies to a B&W or color printer
    - Send-As-You-Go Mode

In send-as-you-go mode, as images are acquired they are held until a full page of images is ready for printing. When a full page of images is ready for printing, 3300 will open an association with the printer, send the images and then close the association.

When the study is closed (or Saved), any partially filled page is printed. As with Batch Mode, this ensures that a printed page cannot have images from multiple studies

### 2.2.4 Responding to a verification request from a remote DICOM server

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Responding to a verification request from a remote DICOM server

The ultrasound system employs a Verification SCP to reply to verification requests sent by remote devices. This will allow the remote device to ensure the availability of 3300 on the network, within the constraints of the network topology, and timeout values.

3300 employs a 'high security' paradigm for responding to verification requests by remote devices. This means, 3300 will only respond to C-Echo requests from DICOM Servers that it knows about. Specifically, the following steps must have been performed:

1. In DICOM Setup, add the DICOM server to the list of DICOM servers.
2. Assign the server to the appropriate role.

### 2.2.5 Saving a DICOM study to removable media

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Saving a DICOM study to removable media

3300 is a DICOM file set creator (FSC) and updater (FSU). Studies can be saved (exported) to 3300's removable media (CD-R/ CD-RW, USB Flash Device, USB Hard Drive), in DICOM format, for long-term storage. Also, if a customer chooses not to purchase DICOM Networking, then DICOM media can be used as a 'sneaker-net' to get DICOM studies off 3300 and onto the PACS.

### 2.2.6 Reading a DICOM study from removable media

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Reading a DICOM study from removable media

3300 is a DICOM file set reader (FSR). Studies that 3300 has saved to removable media may also be loaded into another 3300 system or even into the same 3300 system (as long as the original study has already been deleted). Since 3300 is not an image review station, it will check the originator of the study and only import studies created by another 3300 system.

Even though 3300 supports writing of SRs to the media, read back of SR is not supported.

### 2.2.7 Writing and Reading a study to/from removable media in Non-DICOM formats

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Writing and Reading a study to/from removable media in Non-DICOM formats

Users that do not purchase DICOM Media can write the images in DICOM studies to removable media as bmp's and AVI's. Images written in this format cannot be read back

They can also write a study to removable media in an 3300 proprietary format that includes patient demographic information and can then be read back into (the same) or another 3300 system. This format, however, is not DICOM and cannot be read by non-3300 systems.

### **2.2.8 Obtaining a list of scheduled work from the HIS via the MWL Server**

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Obtaining a list of scheduled work from the HIS via the MWL Server

3300 acts as a Service Class User (SCU) of the 'Modality Worklist (MWL)' SOP Class using DIMSE C-FIND commands to retrieve lists of scheduled protocols (imaging sessions) from the HIS.

A set of standard MWL queries is available (e.g. Show today's worklist entries, show today's worklist entries assigned to this system, show yesterday, today and tomorrow's worklist entries etc.). The user can also configure their own queries based on start date, AE Title of performing 3300 etc.

The current work lists can be retrieved manually (when the 3300 system is connected to the network) or automatically polled in the background.

### **2.2.9 Updating the status of a scheduled procedure using the MPPS Server**

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Functional Definition of 3300 AE
    - Updating the status of a scheduled procedure using the MPPS Server

3300 also acts as a Service Class User (SCU) of the 'Modality Performed Procedure Step (MPPS)' SOP Class.

The start procedure message (N-CREATE) is sent when the user presses the OK button on the Patient ID Window to bring up live imaging. The MPPS Server is also notified, with a N-SET command, when the study is completed (when the study is saved to 3300's disk and closed), or when it is discontinued (when the study is closed without saving.)

## 2.3 Sequencing of Real-World Activities

Context: Expansion of Headings and sub-headings

- Implementation Model
  - Sequencing of Real-World Activities

For printing and storing using the Print Gray Image, Print Color Image, and Store Image commands, the user must have previously completed the Patient ID screen (which creates a study). For accessing and updating procedures scheduled by the HIS, the 3300 user must first select a patient from the Patient Selection screen which displays a list of patients scheduled for procedures on 3300.

### 3. Application Entity Specifications

3300 is implemented as a single AE.

#### 3.1 3300 AE Specification

##### 3.1.1 Association Establishment Policies

###### 3.1.1.1 General

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Establishment Policies
      - General

The following Application Context Name will be proposed and recognized by 3300:

- DICOM 3.0 Application Context **I.2.840.10008.3.1.1.1**

The PDU size is configurable with a minimum size of 128 and a maximum size of 16,352. The default PDU size is 16,352.

### 3.1.1.2 Number of Associations

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Establishment Policies
      - Number of Associations

3300 **establishes** one association per destination at a time. The total number of associations possible at one time is 9: one B&W Printer, one Color Printer, one Primary Storage Server, one Secondary Storage Server, one Storage Commitment server, one SR storage server, one SR commitment server, one MWL server, and one MPPS server.

3300 accepts simultaneous associations for Storage Commitment and Verification. If multiple servers issue a Storage Commitment or verification request at the same time, 3300 will accept all the associations. The maximum number of simultaneous associations **accepted** by 3300 is limited only by resource constraints.

### 3.1.1.3 Asynchronous Nature

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Establishment Policies
      - Asynchronous Nature

3300 allows a single outstanding operation on any association. Therefore, 3300 does not support asynchronous operations window negotiation, other than Storage Commitment reverse-role negotiation for N-Event Report's.

### 3.1.1.4 Implementation Identifying Information

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Establishment Policies
      - Implementation Identifying Information

Element	Implementation Value
Implementation Class UID	1.3.46.670589.14.1.0
Implementation Version Name	3300

**Table 4 : Implementation Identifying Information**

Note: This Class UID and Version Name will be used for the release of 3300 described in this DICOM Conformance Statement. The Class UID and Version Name may be updated with subsequent 3300 releases to capture the version level of the new release, however the Implementation Version Name for the 3300 product will always start with the characters “3300” and the Implementation Class UID will always be of the form 1.3.46.670589.14.1.0

### 3.1.2 Association Initiation by Real-World Activity

#### 3.1.2.1 Storage of DICOM studies to a PACS

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS

The 3300 provides standard conformance to the following DICOM V3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID	Role
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	SCU
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCU
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33	SCU

**Table 5: SOP Classes Supported by Network Storage AE**

### 3.1.2.1.1 Associated Real-World activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Associated Real-World activity

Note: In the following sections if a study has SR (obstetric, gynecology or cardiac), association is initiated with the SR storage server. Even if the image storage server and SR storage server are same, association used for SR(s) export is different from the association used for image export.

Unless stated otherwise, the following description applies to both image and SR storage.

The user can also configure the photometric interpretation and transfer syntax of the image pixel data so that 3300's images can be viewed with a wide range of DICOM viewers.

For an export to the PACS the user can specify different image formats for the Primary and Secondary Storage SCP. The user can choose from one of the following image formats:

- Palette Color, RLE Compressed
- Palette Color, Uncompressed (Implicit VR, Little Endian)
- Palette Color, Uncompressed (Explicit VR, Little Endian)
- RGB, RLE Compressed
- RGB, Uncompressed (Implicit VR, Little Endian)
- RGB, Uncompressed (Explicit VR, Little Endian)
- YBR FULL 422, JPEG compressed.
- MONOCHROME2, RLE Compressed
- MONOCHROME2, Uncompressed (Implicit VR, Little Endian)
- MONOCHROME2, Uncompressed (Explicit VR, Little Endian)

It is possible for a user to configure the image format such that Black & White images are always sent using MONOCHROME2 format while color images are sent in a different format (as per user's selection). This feature is referred to as intelli-store.

**Notes:**

Palette Color – Pixels are indices into a palette

RGB - pixels are intensities of Red, Green and Blue color components

YBR FULL 422 - pixels are described by one luminance and two chrominance planes, sampled with twice as much luminance as chrominance

MONOCHROME2 – pixels are grayscale values with a range of 0-255, 0 represents a Black pixel and 255 represents a White pixel.

3300 will try to negotiate the transfer using the appropriate transfer syntax as per the user selected image format. The Image transfer could fail if the storage SCP does not support the transfer syntax.

If a study contains images to be exported in different transfer-syntaxes (intelli-store), and if the PACS(SCP) does not support all the transfer-syntaxes in which the images need to be exported, then the export of the study fails and none of the images will be exported.

In case of export failure 3300 will report an error condition to the user in the 'Search for Studies' screen. Therefore, as a network administrator you should not configure 3300 to send the images in formats not supported by your image archive.

For manual export to removable media the user has the same choices of image format as supported in network export. The intelli-store feature is also available for export to removable media.

The table below describes the behavior of the Network Storage AE in response to various error conditions and C-STORE-RSP status indicators. This description is applicable for image as well as SR storage.

### Establishing the association

<b>Condition</b> (After C-Store)	<b>Status Codes</b> (C-Store-RSP)	<b>Response</b>
NO RESPONSE	Not Applicable	The user can then manually restart the job at some later date. The failure is logged to the DICOM log file as an error.
Refused	A7xx	If the Storage SCP server refuses the association, then the association attempt is aborted. The user can then manually restart the job at some later date. The failure is logged to the DICOM log file as an error.

### During image transfer

<b>Condition</b> (After C-Store)	<b>Status Codes</b> (C-Store-RSP)	<b>Response</b>
Read Timeout	Not Applicable	The user can then manually restart the job at some later date. The failure is logged to the DICOM log file as an error.
Error	A9xx, Cxxx, 0122, Other	3300 will treat all errors as failure of Storage request (also called as Job). The user can then manually restart the job at some later date. The failure is logged to the DICOM log file as an error.
Warning	D000, B000, B006, B007 0111	If the Storage SCP issues a warning on a particular image (perhaps it had to use coercion, 3300 logs the warning to the DICOM log file as an informational event and continues on as if the image was successfully stored to the PACS (see row below).

<b>Condition</b> (After C-Store)	<b>Status Codes</b> (C-Store-RSP)	<b>Response</b>
Success	0000	When an image is successfully stored to the Storage SCP (PACS), 3300 will keep a record of the successful storage. If all the images in the job are successfully stored, 3300 will notify the user (through an icon on the list of studies). And the job will be removed from the job manager.

**Table 6: Responses to Image Storage Error Conditions**

### 3.1.2.1.2 Proposed Presentation Context

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context

Each time the Network Storage service initiates an association in response to the store request, it requests services summarized in the table below.

<b>Abstract Syntax</b>		<b>Transfer Syntax</b>		<b>Role</b>	<b>Extended Negotiation</b>
<b>Name</b>	<b>UID</b>	<b>Name List</b>	<b>UID List</b>		
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	JPEG baseline (Used if Image Format is YBR)	1.2.840.10008.1.2.4.50	SCU	None

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage SOP Class		DICOM RLE Lossless (Used if Image format is 'Palette Color, RLE Compressed' or 'RGB, RLE Compressed' or 'MONOCHROME2, RLE Compressed')	1.2.840.10008.1.2.5		
		DICOM Implicit VR Little Endian (Used if Image format is 'Palette Color, Uncompressed ILE' or 'RGB, Uncompressed ILE' or 'MONOCHROME2, Uncompressed ILE')	1.2.840.10008.1.2		
		DICOM Explicit VR Little Endian (Used if Image format is 'Palette Color, Uncompressed ELE' or 'RGB, Uncompressed ELE' or 'MONOCHROME2, Uncompressed ELE')	1.2.840.10008.1.2.1		
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	JPEG baseline (Used if Image Format is YBR)	1.2.840.10008.1.2.4.50	SCU	None
		DICOM RLE Lossless (Used if Image format is 'Palette Color, RLE Compressed' or 'RGB, RLE Compressed' or 'MONOCHROME2, RLE Compressed')	1.2.840.10008.1.2.5		

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		DICOM Implicit VR Little Endian (Used if Image format is 'Palette Color, Uncompressed ILE' or 'RGB, Uncompressed ILE' or 'MONOCHROME2, Uncompressed ILE')	1.2.840.10008.1.2		
		DICOM Explicit VR Little Endian (Used if Image format is 'Palette Color, Uncompressed ELE' or 'RGB, Uncompressed ELE' or 'MONOCHROME2, Uncompressed ELE')	1.2.840.10008.1.2.1		
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**Table 7: Transfer Syntaxes**

The values of certain image attributes used in the transfer of each image depend on the Image Format as configured by the user in DICOM Setup (or specified during a manual export) as well as the type of image acquired.

The ten tables below, one for each image format, describe the relationships among these parameters.

### 1. Palette Color, RLE Compressed

Image Type	Resultant Attribute Values						
	Transfer Syntax (0002,0010)	File SOP Class UID (0002.0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>1</sup>	RLE Lossless (1.2.840.10008.1. 2.5)	Ultrasound Image Storage (1.2.840.10008.5. 1.4.1.1.6.1)	PALETTE COLOR	1	8	564  (520 without borders)	800  (688 without borders)
2D color Image	RLE Lossless (1.2.840.10008.1. 2.5)	Ultrasound Image Storage (1.2.840.10008.5. 1.4.1.1.6.1)	PALETTE COLOR	1	16	564  (520 without borders)	800  (688 without borders)
2D B&W loop	RLE Lossless (1.2.840.10008.1. 2.5)	Ultrasound Multi- frame Image Storage (1.2.840.10008.5. 1.4.1.1.3.1)	PALETTE COLOR	1	8	564  (520 without borders)	800  (688 without borders)
2D color loop	RLE Lossless (1.2.840.10008.1. 2.5)	Ultrasound Multi- frame Image Storage (1.2.840.10008.5. 1.4.1.1.3.1)	PALETTE COLOR	1	16	564  (520 without borders)	800  (688 without borders)
Report	RLE Lossless (1.2.840.10008.1. 2.5)	Ultrasound Image Storage (1.2.840.10008.5. 1.4.1.1.6.1)	PALETTE COLOR	1	16	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1. 2.1)	Ultrasound Image Storage (1.2.840.10008.5. 1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1. 2.1)	Ultrasound Multi- frame Image Storage (1.2.840.10008.5. 1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1. 2.1)	Ultrasound Image Storage (1.2.840.10008.5. 1.4.1.1.6.1)	RGB	3	8	520	680

### 2. Palette Color, Uncompressed (Implicit VR, Little Endian)

<sup>1</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

Resultant Attribute Values							
Image Type	Transfer Syntax (0002.0010)	File SOP Class UID (0002.0002)	Photometric Interpretation (0028.0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>2</sup>	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	PALETTE COLOR	1	8	564 (520 without borders)	800 (688 without borders)
2D color Image	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	PALETTE COLOR	1	16	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	PALETTE COLOR	1	8	564 (520 without borders)	800 (688 without borders)
2D color loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	PALETTE COLOR	1	16	564 (520 without borders)	800 (688 without borders)
Report	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	PALETTE COLOR	1	16	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

### 3. Palette Color, Uncompressed (Explicit VR, Little Endian)

Resultant Attribute Values							
Image Type	Transfer Syntax (0002.0010)	File SOP Class UID (0002.0002)	Photometric Interpretation (0028.0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>3</sup>	Explicit VR Little Endian	Ultrasound Image Storage	PALETTE COLOR	1	8	564	800

<sup>2</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value. p

<sup>3</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

	(1.2.840.10008.1.2.1)	(1.2.840.10008.5.1.4.1.1.6.1)				(520 without borders)	(688 without borders)
2D color Image	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	PALETTE COLOR	1	16	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	PALETTE COLOR	1	8	564 (520 without borders)	800 (688 without borders)
2D color loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	PALETTE COLOR	1	16	564 (520 without borders)	800 (688 without borders)
Report	Explicit VR Little Endian (1.2.840.10008.1.2.1) (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	PALETTE COLOR	1	16	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

#### 4. RGB, RLE Compressed

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002,0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>4</sup>	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D color Image	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage	RGB	3	8	564	800

<sup>4</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

		(1.2.840.10008.5.1.4.1.1.6.1)				(520 without borders)	(688 without borders)
2D B&W loop	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D color loop	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
Report	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

5. RGB, Uncompressed (Implicit VR, Little Endian)

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002,0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>5</sup>	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D color Image	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)

<sup>5</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

2D color loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
Report	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

## 6. RGB, Uncompressed (Explicit VR, Little Endian)

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002,0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>6</sup>	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D color Image	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
2D color loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	564 (520 without borders)	800 (688 without borders)
Report	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	564	800

<sup>6</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

	(1.2.840.10008.1.2)						
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

### 7. MONOCHROME2, RLE Compressed

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002,0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028,0002)	Bits allocated (0028,0100)	Rows (0028,0010)	Cols (0028,0011)
2D B&W Image	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color Image	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color loop	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
Report	RLE Lossless (1.2.840.10008.1.2.5)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

**8. MONOCHROME2, Uncompressed (Implicit VR, Little Endian)**

Image Type	Resultant Attribute Values						
	Transfer Syntax (0002,0010)	File SOP Class UID (0002.0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028,0002)	Bits allocated (0028,0100)	Rows (0028,0010)	Cols (0028,0011)
2D B&W Image	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color Image	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color loop	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
Report	Implicit VR Little Endian (1.2.840.10008.1.2)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian	Ultrasound Image Storage	RGB	3	8	520	680

(1.2.840.10008.1.2.1)	(1.2.840.10008.5.1.4.1.1.6.1)					
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9. MONOCHROME2, Uncompressed (Explicit VR, Little Endian)

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002.0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028,0002)	Bits allocated (0028,0100)	Rows (0028,0010)	Cols (0028,0011)
2D B&W Image	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color Image	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
2D color loop	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	MONOCHROME2	1	8	564 (520 without borders)	800 (688 without borders)
Report	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	MONOCHROME2	1	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

10. YBR, JPEG Compressed

Resultant Attribute Values							
Image Type	Transfer Syntax (0002,0010)	File SOP Class UID (0002,0002)	Photometric Interpretation (0028,0004)	Samples Per Pixel (0028, 0002)	Bits allocated (0028, 0100)	Rows (0028, 0010)	Cols (0028, 0011)
2D B&W Image <sup>7</sup>	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	YBR_FULL_422	3	8	564 (520 without borders)	800 (688 without borders)
2D color Image	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	YBR_FULL_422	3	8	564 (520 without borders)	800 (688 without borders)
2D B&W loop	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	YBR_FULL_422	3	8	564 (520 without borders)	800 (688 without borders)
2D color loop	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	YBR_FULL_422	3	8	564 (520 without borders)	800 (688 without borders)
Report	JPEG Baseline Process 1 (1.2.840.10008.1.2.4.50)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	YBR_FULL_422	3	8	564	800
3D single frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680
3D multi frame	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Multi-frame Image Storage (1.2.840.10008.5.1.4.1.1.3.1)	RGB	3	8	520	680
Panview	Explicit VR Little Endian (1.2.840.10008.1.2.1)	Ultrasound Image Storage (1.2.840.10008.5.1.4.1.1.6.1)	RGB	3	8	520	680

**Tables 8: Image Attributes based upon Photometric Interpretation and Image Type**

Notes:

1. The bits allocated (0028,0100) and the bits stored (0028,0101) are always the same.
2. The high bit (0028,0102) is always one less than the bits allocated.
3. The pixel representation (0028,0103) is always zero

<sup>7</sup> 2D B&W Image include "Colorized" images, which map a sample to a color instead of a gray scale value.

4. Ultrasound color data present (0028,0014) is always 1 for RGB, Palette Color, YBR FULL 422 images and will be 0 for Monochrome2 images.
5. 3D and Panview images always employ an RGB photometric interpretation irrespective of the 'image format' configured by the user. Also 3D and Panview images are slightly smaller (520 rows by 680 columns) than 2D images.
6. 2D stills and loops may be acquired including the top and right border information or without borders. Stress 'quad' loops are 245 rows by 320 columns and never have top or side information borders.

### 3.1.2.1.2.1 SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class

The 3300 AE uses the Ultrasound Image IOD Modules for both Ultrasound Image (1.2.840.10008.5.1.4.1.1.6.1) and Ultrasound Multi-frame Image (1.2.840.10008.5.1.4.1.1.3.1) IODs as follows in the following sub-sections:

### 3.1.2.1.2.1.1 Ultrasound Image & Ultrasound multi-frame image Storage Modules Used

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - US Image & US multi-frame image Storage Modules Used

For each SOP class, DICOM defines what modules must be supported. A module simply defines a set of DICOM tags that must be present in the DICOM file.

Per the DICOM standard (PS3.3-2004 A.1.3), modules may be mandatory, optional or conditionally mandatory:

- **Mandatory** modules shall be supported per the definitions, semantics and requirements defined in PS3.3-2004, Annex C.
- **User Option** Modules may or may not be supported. If an optional Module is supported, the Level 1 (and Level 2) Attribute Types specified in the Modules shall be supported.
- **Conditional** Modules are Mandatory Modules if specific conditions are met. If the specified conditions are not met, this Module shall not be supported; that is, no information defined in that Module shall be sent.

The following table defines the modules that are supported by 3300 for ultrasound images when they are sent to a Storage SCP (PACS), either Primary or Secondary.

Module	US Image (Still)		US Multi-frame Image (Loop)	
	DICOM Standard	Supported in 3300	DICOM Standard	Supported in 3300
Patient	Mandatory	✓	Mandatory	✓
General Study	Mandatory	✓	Mandatory	✓
Patient Study	User Option	✓	User Option	✓
General Series	Mandatory	✓	Mandatory	✓
Frame of Reference	User Option		User Option	
Synchronization	User Option		User Option	
General Equipment	Mandatory	✓	Mandatory	✓
General Image	Mandatory	✓	Mandatory	✓
Image Pixel	Mandatory	✓	Mandatory	✓
Palette Color Lookup Table	Conditional	✓	Conditional	✓
Contrast/Bolus	Conditional		Conditional	
Cine	Unused		Mandatory	✓
Multi-Frame	Unused		Mandatory	✓
Ultrasound Image	Mandatory	✓	Mandatory	✓
Overlay Plane	Unused		User Option	
Curve Identification	Mandatory	Not used since Curve & Curve Id is mutually exclusive with Image Pixel	Mandatory	Not used since Curve & Curve Id is mutually exclusive with Image Pixel
Curve	Mandatory		Mandatory	
Audio	User Option		User Option	
VOI LUT	User Option		User Option	
SOP Common	Mandatory	✓	Mandatory	✓

For each module that must be present in an ultrasound image that is going to be sent to a storage SCP, a subsequent sub-section defines the tags in that module that are supported by 3300.

Note: *Unused type "3" tags are **not** listed.*



### 3.1.2.1.2.1.2 Patient Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Patient Module

The Patient Module (PS3.3-2004, Table C.7.1.1) defines attributes that provide information about the Patient who is the subject of a diagnostic Study. This module is mandatory for storage of ultrasound single-frame or multi-frame images.

\*Note: If MWL is enabled, the user-generated values in the table below are provided by the modality worklist.

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Patient's Name	0010,0010	2	PN	Patient's full name.	✓		Entered by user from the Patient ID screen.
Patient ID	0010,0020	2	LO	Primary hospital identification number or code for the patient.	✓	✓ <sup>A</sup>	Entered by user from the Patient ID screen. This maps to the MRN field of the Patient ID screen and can be up to a maximum of 18 characters.  Note A: If the user does not enter a value, the system will automatically generate one.
Patient's Birth Date	0010,0030	2	DA	Birth date of the patient.	✓		Entered by user from the Patient ID screen. If the user does not enter a value, the system includes this tag as the empty string.
Patient's Sex	0010,0040	2	CS	Sex of the named patient. Enumerated Values: M = male F = female O = other	✓		Selected from a drop-down list, by the user, from the Patient ID screen. If the user selects 'Unknown', this attribute is the empty string.
Other Patient IDs	0010,1000	3	LO	Other identification numbers or codes used to identify the patient.	✓		Entered by user from the Patient ID screen. This maps to the Alternate ID Number of the Patient ID screen. If the user does not enter a value, the tag is not sent.

### 3.1.2.1.2.1.3 General Study Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - General Study Module

The General Study Module (PS3.3-2004, Table C.7.2.1) defines Attributes that provide information about the Study that was performed. This module is mandatory for storage of ultrasound single-frame or multi-frame images.

\*Note: If MWL is enabled, the user-generated values in the table below are provided by the modality worklist.



Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Study ID	0020,0010	2	SH	User or equipment generated Study identifier.		✓	A system generated Study identifier that is unique only within the 3300 system that generated the study. The Study Identifier starts at 1 and is incremented by one for each new study created on that system. Study Identifiers will not be unique across multiple 3300 systems.
Accession Number	0008,0050	2	SH	A RIS generated number, which identifies the order for the Study.	✓		Entered by user from the Patient ID screen. If the user enters a value for this field, then it must be unique. If the user does not enter a value, the system includes this tag as the empty string.
Study Description	0008,1030	3	LO	Institution-generated description or classification of the Study (component) performed.	✓		Configurable by the user through setup. Can either be a fixed list or (for users with a MWL server), can be obtained from the MWL Server. The string used will be the first non-empty string from the following list: <ul style="list-style-type: none"> <li>○ Requested Procedure description tag (0032,1060),</li> <li>○ Scheduled Procedure Step description tag (0040,0007)</li> <li>○ Scheduled Procedure Step, "Code Meaning" tag (0008,0104)</li> <li>○ Reason for the requested procedure tag (0040,1002)</li> <li>○ Reason for imaging service request tag (0040,2001)</li> </ul>

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	

### 3.1.2.1.2.1.4 Patient Study Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Patient Study Module

The Patient Study Module (PS3.3-2004, Table C.7.2.2) defines Attributes that provide information about the Patient at the time the Study was performed. This module is optional for storage of ultrasound single-frame or multi-frame images.

\*Note: If MWL is enabled, the user-generated values in the table below are provided by the modality worklist.

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Patient's Size	0010,1020	3	DS	Length or size of the Patient, in meters.	✓		Entered by user from the Patient ID screen. If the user does not enter a value, this tag is not sent.
Patient's Weight	0010,1030	3	DS	Weight of the Patient, in kilograms.	✓		Entered by user from the Patient ID screen. If the user does not enter a value, this tag is not sent.
Additional Patient's History	0010,21B0	3	LT	Additional information about the Patient's medical history.	✓		Entered by user from the Patient ID screen. If the user does not enter a value, this tag is not sent.

### 3.1.2.1.2.1.5 General Series Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - General Series Module

The General Series Module (PS3.3-2004, Sec C.7.3.1, Table C.7-5) defines Attributes that identify and describe general information about a Series within a Study. This module is mandatory for storage of ultrasound single-frame or multi-frame images. Each 3300 Study can have more than one series.

\*Note: If MWL is enabled, the user-generated values in the table below are provided by the modality worklist.



Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Performing Physician's Name	0008,1050	3	PN	Name of the physicians administering the Series.	✓		Entered by user from the Patient ID screen. This maps to the 'Performed by' field of the Patient ID screen. If the user does not enter a value, this tag is not sent.  The intent is for the user to enter the performing physicians initials and the system limits the user to entering a maximum of five characters. The characters entered map to the 'Last Name' component of the Person Name.
Operator's Name	0008,1070	3	PN	Name of the operator (or technician) using the system.		✓	Entered by the system as the same text as 'Performing Physician's Name', (tag 0008,1050).
Patient Position	0018,5100	2C	CS	Required for CT and MR images. See C.7.3.1.1.2 of the DICOM standard for Defined Terms and further explanation.	N/A	N/A	Not used as not required for Ultrasound (US).

### 3.1.2.1.2.1.6 General Equipment Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - General Equipment Module

The General Equipment Module (PS3.3-2004, Sec C.7.5.1, Table C.7-8) defines attributes that identify and describe the piece of equipment that produced a Series of Images. This module is mandatory for storage of ultrasound single-frame or multi-frame images.

Attribute Name	Tag	Type	V R	Description	Generated by		Value
					Usr	Sys	
Manufacturer	0008,0070	2	LO	Manufacturer of the equipment that produced the digital images.		✓	"3300"
Institution Name	0008,0080	3	LO	Institution where the equipment that produced the composite instances is located.	✓		<p>Entered by the user from the 'System' tab in the 'Setup' screen ('Top Border' button).</p> <p>Note: If the user imports an 3300 study that was generated at another institution and opens the study the institution name displayed along the top border of the system screen is the institution viewing the images not the institution where the image was acquired. The institution name where the image was acquired can however be burned into the image. Also, if the user exports the study to removable media or to a networked PACS and changes the format of the image data in some way either by exporting it in a different image format from the internal format (Palette Color, RLE) or by applying a display compensation curve, then the institution name is changed to the current institution.</p>

### 3.1.2.1.2.1.7 General Image Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - General Image Module

The General Image Module (PS3.3-2004, Sec C.7.6.1, Table C.7-9) defines Attributes that describe an image within a particular series. This module is optional for storage of ultrasound single-frame or multi-frame images.

All attributes are system generated.

Attribute Name	Tag	Type	VR	Description	Value
Instance Number	0020,0013	2	IS	A number that identifies this image. Note: This Attribute was named Image Number in earlier versions of this Standard.	The system computes this value as a unique number for each image in a study. The value ascends as each image is acquired but the value does not start at "1" for each study. Gaps may be present if images were deleted before DICOM store was requested.
Patient Orientation	0020,0020	2C	CS	Patient direction of the rows and columns of the image.	The system sends the empty tag for 2D and is not used for PanView/3D images.
Content Date	0008,0023	2C	DA	The date the image pixel data creation started. Required if image is part of	The system computes this value as the date that image was acquired. . The format is yyyyymmdd.

Attribute Name	Tag	Type	VR	Description	Value
				a series in which the images are temporally related. <i>Note: This Attribute was formerly known as Image Date.</i>	
Content Time	0008,0033	2C	TM	The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related. <i>Note: This Attribute was formerly known as Image Time.</i>	The system computes this value as the time that image was acquired. The format is hhmmss
Image Type	0008,0008	3	CS	Image identification characteristics.	The system computes this value as the four component multi-value attribute:  “<Pixel Data Characteristics> / <Patient Examination Characteristics> / <Modality Specific Characteristics> / <Implementation Specific Identifiers>”  <b>&lt;Pixel Data Characteristics&gt;</b>  <u>Palette Color &amp; RGB:</u> “ORIGINAL” denotes original source-data  <u>YBR:</u>

Attribute Name	Tag	Type	VR	Description	Value
					<p>“DERIVED” denotes pixels that have been derived from the original – in this case by lossy compression.</p> <p><u>MONOCHROME2:</u>                      “DERIVED” denotes pixels that have been derived from the original – in this case by grayscale transformations.</p> <p><b>&lt;Patient Examination Characteristics&gt;</b>                      Always “PRIMARY”</p> <p><b>&lt;Modality Specific Characteristics&gt;</b>                      This is based on the user-selected entry in the drop down list ‘Additional Data Type’ on the Patient Id screen. It is mapped to the most appropriate value from the DICOM standard (Ex: “ABDOMINAL”).</p> <p><b>&lt;Implementation Specific Identifiers&gt;”</b>                      Always blank.</p> <p>Note: The third and fourth fields are <b>not</b> present in 3D and PanView images.</p>

Attribute Name	Tag	Type	VR	Description	Value
Acquisition Date	0008,0022	3	DA	The date the acquisition of data that resulted in this image started	The system uses the same value as the Content Date, tag 0008,0023.
Acquisition Time	0008,0032	3	TM	The time the acquisition of data that resulted in this image started	The system uses the same value as the Content time, tag 0008,0033.
Acquisition Datetime	0008,002A	3	DT	The date and time that the acquisition of data that resulted in this image started.	The system generates this as a combination of Acquisition Date and Acquisition Time. . The format is <code>yyyymmddhhmmss.ffffff</code>
Image Comments	0020,4000	3	LT	User-defined comments about the image.	Images (2D,3D etc): Not Used Reports: "Report Version x Page x of x"
Ultrasound Color Data Present	0028,0014	3	US	This element indicates if any ultrasound color data is present in an image.	1 – for RGB, Palette color, YBR FULL 422 image. 0 – for Monochrome2 image.
Lossy Image Compression	0028,2110	3	CS	Specifies whether an Image has undergone lossy image compression. Enumerated Values: 00 = Image has NOT been subjected to lossy image compression. 01 = Image has been subjected to lossy image compression.	00 - for uncompressed images or RLE compressed images. 01 – for JPEG compressed images.

### 3.1.2.1.2.1.8 Image Plane Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Image Plane Module

The Image Plane Module (PS3.3-2004, Sec C.7.6.2, Table C.7-10) defines attributes that describe the pixel array of a two dimensional image plane. This module is optional for storage of ultrasound single-frame or multi-frame images.

Attribute Name	Tag	Type	VR	Description	Value
Pixel Spacing	0028, 0030	I	DS	Physical distance in the patient between the center of each pixel, specified by a numeric pair – adjacent row spacing (delimiter) adjacent column spacing in mm	If specified by the user in DICOM Setup, Media Export Setup, or for an individual study export AND the image contains only one 2D calibration region and no Doppler or M-Mode calibration regions, then this tag is written to the DICOM file.

### 3.1.2.1.2.1.9 Image Pixel Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity

- Storage of DICOM studies to a PACS
  - Proposed Presentation Context
    - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
      - Image Pixel Module

The Image Pixel Module (PS3.3-2004, Sec C.7.6.3, Table C.7-11) defines Attributes that describe the pixel data of an image. This module is mandatory for storage of ultrasound single-frame or multi-frame images.

Attribute Name	Tag	Type	VR	Description	Value
Samples per Pixel	0028,0002	I	US	Number of samples (planes) in this image.	Based on the 'Image Format' that is set by the user in DICOM Setup.  Palette Color Mode: 2D B/W and Color stills/loops: 1 3D & Panview: 3 Reports: 1  RGB Mode: 2D B/W and Color stills/loops: 3 3D & Panview: 3 Reports: 3  YBR Mode: 2D B/W and Color stills/loops: 3 3D & Panview: 3 Reports: 3  Monochrome Mode: Always: 1
Photometric Interpretation	0028,0004	I	CS	Specifies the intended interpretation of the pixel data.	2D Images & Reports: Based on the 'Image Format' that is set by the user in DICOM Setup. Can be either: PALETTE COLOR, RGB, or

Attribute Name	Tag	Type	VR	Description	Value
					YBR_FULL_422 or MONOCHROME2 3D & Panview Images: Always RGB
Rows	0028,0 010	I	US	Number of rows in the image.	2D B/W & Color stills/loops acquired with top & right border: 564 2D B/W & Color stills/loops acquired <u>without borders</u> : 520 2D B/W & Color stills/loops from stress: 245 Reports: 564 3D & PanView: 520
Columns	0028,0 011	I	US	Number of columns in the image	2D B/W & Color stills/loops acquired with top & right border: 800 2D B/W & Color stills/loops acquired <u>without borders</u> : 688 2D B/W & Color stills/loops from stress: 320 Reports: 800 3D & PanView: 680
Bits Allocated	0028,0 100	I	US	Number of bits allocated for each pixel sample.	Based on the 'Image Format' that is set by the user in DICOM Setup.  Palette Color Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 16 bits  RGB Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 8 bits

Attribute Name	Tag	Type	VR	Description	Value
					YBR Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 8 bits  Monochrome Mode: 8 bits
Bits Stored	0028,0101	I	US	Number of bits stored for each pixel sample.	Based on the 'Image Format' that is set by the user in DICOM Setup. The number of Bits Stored and Bits Allocated are always the same.  Palette Color Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 16 bits  RGB Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 8 bits  YBR Mode: 2D B&W, 3D & PanView: 8 bits 2D Color & Reports: 8 bits  Monochrome Mode: 8 bits

Attribute Name	Tag	Type	VR	Description	Value
High Bit	0028,0102	I	US	Most significant bit for pixel sample data.	<p>Based on the 'Image Format' that is set by the user in DICOM Setup. The High Bit is always one less than the Bits Allocated.</p> <p>Palette Color Mode:                      2D B&amp;W, 3D &amp; PanView: 7 bits                      2D Color &amp; Reports: 15 bits</p> <p>RGB Mode:                      2D B&amp;W, 3D &amp; PanView: 7 bits                      2D Color &amp; Reports: 7 bits</p> <p>YBR Mode:                      2D B&amp;W, 3D &amp; PanView: 7 bits                      2D Color &amp; Reports: 7 bits</p> <p>Monochrome Mode: 7 bits</p>
Pixel Representation	0028,0103	I	US	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values: 0000H = unsigned integer. 0001H = 2's complement	000H (Unsigned integers)

Attribute Name	Tag	Type	VR	Description	Value
Pixel Data	7FE0,0010	I	OB	A data stream of the pixel samples which comprise the Image.	The pixel data of the DICOM image.
Planar Configuration	0028,0006	IC	US		<p>Palette Color Images: Not present            RGB Images: Always zero (color-by-pixel)            YBR: Images: Always zero (color-by-pixel)            Monochrome Images: Not present</p> <p>Note: 3D and Panview images are always RGB, therefore this tag will always be zero for 3D and Panview images even if the user defines the image export format to be Palette Color.</p>
Pixel Aspect Ratio	0028,0034	IC	IS	Ratio of the vertical size and horizontal size of the pixels in the image specified by a pair of integer values where the first value is the vertical pixel size, and the second value is the horizontal pixel size.	Always 1/1.
Windows Center	0028,1050	3	IS	Meaningful only if Photometric Interpretation (0028,0004) is MONOCHROME2.	$2^{n-1}$ where n is the number of bits per pixel n = 8 Center = 128 n = 16 Center = 32768
Windows Width	0028,1051	IC	IS	Required if Window Center (0028, 1050) is present.	$2^n$ where n is the number of bits per pixel n = 8 Width = 256 n = 16 Width = 65536

Attribute Name	Tag	Type	VR	Description	Value
Red Palette Color Lookup Table Descriptor	0028,1 101	IC	US	Specifies the format of the Red Palette Color Lookup Table Data	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10.
Green Palette Color Lookup Table Descriptor	0028,1 102	IC	US	Specifies the format of the Green Palette Color Lookup Table Data	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10.
Blue Palette Color Lookup Table Descriptor	0028,1 103	IC	US	Specifies the format of the Blue Palette Color Lookup Table Data	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10..
Red Palette Color Lookup Table Data	0028,1 201	IC	OW	Red Palette Color Lookup Table Data.	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10.
Green Palette Color Lookup Table Data	0028,1 202	IC	OW	Green Palette Color Lookup Table Data.	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10.
Blue Palette Color Lookup Table Data	0028,1 203	IC	OW	Blue Palette Color Lookup Table Data.	See 'Palette Color Lookup Table Module', section 3.1.2.1.2.1.10.

### 3.1.2.1.2.1.10 Palette Color Lookup Table Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Palette Color Lookup Table Module

The Palette Color Lookup Module (PS3.3-2004, Sec C.7.9, Table C.7-22) defines Attributes that describe the Lookup table data for images with Palette Color photometric interpretation. This module is present for 3300 2D B/W and Color stills/loops but is not present in (RGB) files created by 3300's 3D/Panview application.

All attributes are system generated.

Attribute Name	Tag	Type	VR	Description	Value
Red Palette Color Lookup Table Descriptor	0028,1101	IC	US	Specifies the format of the Red Palette Color Lookup Table Data	Used only for 2D and REPORT acquired as image. B&W stills & loops: 256, 0, 16 Color stills & loops: 0, 0, 16 REPORT(acquired as image): xx, 0, 16 where 'xx' is a variable value. <b><i>This tag and other tags related to Palette Color are not present in 3DIPanView since these files are RGB.</i></b>
Green Palette Color Lookup Table Descriptor	0028,1102	IC	US	Specifies the format of the Green Palette Color Lookup Table Data	Used only for 2D and REPORT acquired as image. B&W stills & loops: 256, 0, 16 Color stills & loops: 0, 0, 16

Attribute Name	Tag	Type	VR	Description	Value
					REPORT(acquired as image): xx, 0, 16 where 'xx' is a variable value.
Blue Palette Color Lookup Table Descriptor	0028,1103	IC	US	Specifies the format of the Blue Palette Color Lookup Table Data	Used only for 2D and REPORT acquired as image. B&W stills & loops: 256, 0, 16 Color stills & loops: 0, 0, 16 REPORT(acquired as image): xx, 0, 16 where 'xx' is a variable value.
Red Palette Color Lookup Table Data	0028,1201	IC	OW	Red Palette Color Lookup Table Data.	Used only for 2D.
Green Palette Color Lookup Table Data	0028,1202	IC	OW	Green Palette Color Lookup Table Data.	Used only for 2D.
Blue Palette Color Lookup Table Data	0028,1203	IC	OW	Blue Palette Color Lookup Table Data.	Used only for 2D.
Segmented Red Palette Color Lookup Table Data	0028,1221	IC	OW	Segmented Red Palette Color Lookup Table Data.	Not used
Segmented Green Palette Color Lookup Table Data	0028,1222	IC	OW	Segmented Green Palette Color Lookup Table Data.	Not used
Segmented Blue Palette Color Lookup Table Data	0028,1223	IC	OW	Segmented Blue Palette Color Lookup Table Data.	Not used



### 3.1.2.1.2.1.11 Cine Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Cine Module

The Cine Module (PS3.3-2004, Sec C.7.6.5, Table C.7-13) defines Attributes of a Multi-frame Cine image. This module is mandatory for Multi-frame images but is not used for Single-frame images.

All attributes are system generated.

Attribute Name	Tag	Type	VR	Value
Recommended Display Frame Rate	0008,2144	3	IS	Used for Multiframe
Cine Rate	0018,0040	3	IS	Used for Multiframe
Effective Series Duration	0018,0072	3	DS	Used for Multiframe
Frame Time Vector	0018,1065	IC	DS	An array that contains the real time increments (in msec) between frames for a Multi-frame image. Present if Frame Increment Pointer (0028,0009) points to Frame Time Vector.
Frame Time	0018,1063	IC	DS	Nominal time (in msec) per individual frame. Present if Frame Increment Pointer (0028,0009) points to Frame Time. Note: - If you export a study to removable media using Average Frame Time (0018,1063), on import back into the system only the images up to but not including the loop will be imported. However the

				study on media is fine and can be imported onto a PACS without any problems.
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**3.1.2.1.2.1.12 Multi-Frame Module**

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - Multi-Frame Module

The Multi-Frame Module (PS3.3-2004, Sec C.7.6.6, Table C.7-14) defines Attributes of a Multi-frame pixel data image. This module is mandatory for Multi-frame images but is not used for Single-frame images. All attributes are system generated.

Attribute Name	Tag	Type	VR	Value
Number of Frames	0028,0008	I	IS	Used
Frame Increment Pointer	0028,0009	I	AT	Configurable by the user in DICOM Setup. If the user selects a loop timing preference where each frame in a loop has the same duration then Frame Increment Pointer takes the value 0018,1063 (Frame Time). If the user selects a loop timing preference where each frame in a loop has the different duration then Frame Increment Pointer takes the value 0018,1065 (Frame Time Vector).

### 3.1.2.1.2.1.13 US Region Calibration Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - US Region Calibration Module

The US Region Calibration Module (PS3.3-2004, Sec C.8.5.5.1, Table C.8-17) defines Attributes that describe an ultrasound region calibration. This module is optional for ultrasound.

All attributes are system generated.

Attribute Name	Tag	Type	VR	Value
Sequence of Ultrasound Regions	0018,6 011	I	SQ	Used
Region Spatial Format	0018,6 012	I	US	Used
Region Data Type	0018,6 014	I	US	Used
Region Flags	0018,6 016	I	UL	Used
Region Location Min X0	0018,6 018	I	UL	Used
Region Location Min Y0	0018,6 01A	I	UL	Used
Region Location Max X1	0018,6 01C	I	UL	Used

Attribute Name	Tag	Type	VR	Value
Region Location Max YI	0018,6 01E	I	UL	Used
Reference Pixel X0	0018,6 020	I	SL	Used
Reference Pixel Y0	0018,6 022	I	SL	Used
Physical Units X Direction	0018,6 024	I	US	Used
Physical Units Y Direction	0018,6 026	I	US	Used
Ref Pixel Physical Value X	0018,6 028	I	FD	Used
Ref Pixel Physical Value Y	0018,6 02A	I	FD	Used
Physical Delta X	0018,6 02C	I	FD	Used
Physical Delta Y	0018,6 02E	I	FD	Used

The values for the attribute: Region Spatial Format and Region Data Type are mapped as given below in the table:

Mode	Region Spatial Format (Tag: 0018,6012)	Region Data Type (Tag: 0018,6014)
2D	1	0x01 (i.e. Tissue)
M-Mode	2	0x00 (i.e. None or not applicable)
Doppler or Spectral	3	0x00 (i.e. None or not applicable)
Physio	4	0x0A (i.e. ECG Trace)

### 3.1.2.1.2.1.14 US Image Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Ultrasound Image Storage SOP Class
            - US Image Module

The US Image Module (PS3.3-2004, Sec C.8.5.6, Table C.8-18) defines attributes that describe ultrasound images. This module is mandatory for storage of ultrasound single-frame or multi-frame images.

Attribute Name	Tag	Type	VR	Value
Samples per Pixel	002 8,00 02	I	US	See 'Image Pixel Module' Section 3.1.2.1.2.1.9
Photometric Interpretation	002 8,00 04	I	CS	See 'Image Pixel Module' Section 3.1.2.1.2.1.9
Bits Allocated	002 8,01 00	I	US	See 'Image Pixel Module' Section 3.1.2.1.2.1.9
Bits Stored	002 8,01 01	I	US	See 'Image Pixel Module' Section 3.1.2.1.2.1.9
High Bit	002 8,01 02	I	US	See 'Image Pixel Module' Section 3.1.2.1.2.1.9

Attribute Name	Tag	Type	VR	Value
Planar Configuration	002 8,00 06	IC	US	See 'Image Pixel Module' Section 3.1.2.1.2.1.9
Pixel Representation	002 8,01 03	I	US	Always zero
Frame Increment Pointer	002 8,00 09	IC	AT	See 'Multi-Frame Module' section 3.1.2.1.2.1.12
Image Type	000 8,00 08	3	CS	See 'General Image Module' 3.1.2.1.2.1.7.
Lossy Image Compression	002 8,21 10	IC	CS	See 'General Image Module' 3.1.2.1.2.1.7.
Ultrasound Color Data Present	002 8,00 14	3	US	"0" when image format is MONOCHROME2, "1" for B/W and Color 2D and 3D/PanView stills/loops.
Number of Stages	000 8,21 24	2C	IS	Number of stages in a protocol. <i>For stress Multiframe images only, or else this tag is not used.</i>
Number of Views in Stage	000 8,21 2A	2C	IS	Number of views in a stage. <i>For stress Multiframe images only</i>
Stage Name	000 8,21 20	3	SH	Used in protocols <i>For stress Multiframe images only</i>
Stage Number	000 8,21 22	3	IS	Which stage in a protocol. <i>For stress Multiframe images only</i>

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>VR</b>	<b>Value</b>
View Name	000 8,21 27	3	SH	The name of the view. <i>For stress Multiframe images only</i>
View Number	000 8,21 28	3	IS	Number of event timers used during acquisition <i>For stress Multiframe images only.</i> 1, 2, or 3 Null if timers not used
Number of Event Timers	000 8,21 29	3	IS	If the stage requires a timer, the number of event timers used at the time of acquisition of a Multi-frame image.
Event Elapsed Time(s)	000 8,21 30	3	DS	If the stage requires a timer, an array of values associated with each event timer. Units in milliseconds.
Event Timer Name(s)	000 8,21 32	3	LO	If the stage requires a timer, the name that identifies the event timer.
Acquisition Datetime	000 8,00 2A	1C	DT	See 'General Image Module' section 3.1.2.1.2.1.7
Heart Rate	001 8,10 88	3	IS	Beats per minute. <i>For stress Multiframe images only (with ECG connected)</i>



				<p>If provided the attribute contains all the characters sets used (this is a multi-value attribute). See section 8 titled “Support for Extended Character Sets” for more information on the character sets that this system uses.</p> <p>The most likely scenario that would require a non Basic Character set would be when the system has been set to a locale that uses non Basic characters (e.g. Russia or Japan) AND the user has entered one of these characters into the Patient Identification screen,</p>
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**3.1.2.1.2.2 SOP Specific Conformance Statement for Comprehensive Structured Report Storage SOP Class**

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Comprehensive Structured Report Storage SOP Class

The following table defines the modules that are supported by 3300 for SR when they are sent to a SR Storage SCP (PACS).

<b>IE</b>	<b>Module</b>	<b>Reference</b>
Patient	Patient	3.1.2.1.2.1.2
Study	General Study	3.1.2.1.2.1.3
	Patient Study	3.1.2.1.2.1.4
Series	SR Document Series	3.1.2.1.2.2.1
Equipment	General Equipment	3.1.2.1.2.1.6
Document	SR Document General	3.1.2.1.2.2.2
	SR Document Content	3.1.2.1.2.2.3
	SOP Common	3.1.2.1.2.1.15

For 'Patient', 'General Study', 'Patient Study', 'General Equipment' and 'SOP Common' modules, attribute tags supported by 3300 are defined under SOP specific conformance for US Image module. For the rest of the modules, following subsections define the tags that are supported by 3300.

### 3.1.2.1.2.2.1 SR Document Series Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Comprehensive Structured Report Storage SOP Class
            - SR Document Series Module

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Modality	0008,0060	I	CS	Modality type. Enumerated Value: SR = SR Document		✓	SR
Series Instance UID	0020,000E	I	UI	Unique identifier of the Series.		✓	This is in the same format as Series Instance UID for Image.
Series Number	0020,0011	I	IS	A number that identifies the Series.		✓	Series number for SR series always starts from 2. If a study has two SRs (for example obstetric and cardiac) the series number for these two SRs would be 2 and 3.

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Referenced Performed Procedure Step Sequence	0008,1 111	2	SQ	Identifies the Performed Procedure Step SOP Instance for which the Series is created.		✓	If an MPPS server is configured, this sequence identifies MPPS SOP instance created for this study.
>Referenced SOP Class UID	0008,1 150	1C	UI	Identifies the referenced SOP Class.		✓	MPPS SOP Class = "1.2.840.10008.3.1.2.3.3"
> Referenced SOP Instance UID	0008,1 155	1C	UI	Identifies the referenced SOP Instance.		✓	MPPS instance UID of the performed procedure step generating this SR.

### 3.1.2.1.2.2.2 SR Document General Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Comprehensive Structured Report Storage SOP Class
            - SR Document General Module

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Instance Number	0020,0013	I	IS	A number that identifies the SR Document.		✓	The system computes this value as a unique number for each SR in a study. The value ascends as each SR is created and the value starts at "0" for each study.
Completion Flag	0040,A491	I	CS	The estimated degree of completeness of this SR Document.		✓	PARTIAL
Verification Flag	0040,A493	I	CS	Indicates whether this SR Document is Verified.		✓	UNVERIFIED
Content Date	0008,0023	I	DA	The date the document content creation started.		✓	Date of the SRDocument creation.

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Content Time	0008,0033	1	TM	The time the document content creation started.		✓	Time of the SRDocument creation.
Referenced Request Sequence	0040,A370	1C	SQ	Identifies Requested Procedures which are being fulfilled (completely or partially) by creation of this Document.		✓	This sequence will be present in the study has been started from the Modality work list.
>Study Instance UID	0020,000D	1	UI	Unique identifier for the Study.		✓	As received from MWL.
>Referenced Study Sequence	0008,1110	2	SQ	Uniquely identifies the Study SOP Instance.		✓	This sequence will be present with 0 items in the sequence.
>Accession Number	0008,0050	2	SH	Accession number		✓	As received from MWL
>Requested Procedure ID	0040,1001	2	SH	Requested Procedure ID		✓	As received from MWL
>Requested Procedure Description	0032,1060	2	LO	Description of the requested procedure		✓	As received from MWL
>Requested Procedure Code	0032,1064	2	SQ	A sequence that conveys the requested		✓	Will be present with no items.

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Sequence				procedure.			

### 3.1.2.1.2.2.3 SR Document Content Module

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Storage of DICOM studies to a PACS
        - Proposed Presentation Context
          - SOP Specific Conformance Statement for Comprehensive Structured Report Storage SOP Class
            - SR Document Content Module

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Content Template Sequence	0040, A504	IC	SQ	Template that describes the content of this SR Document.		✓	
>Template Identifier	0040, DB00	I	CS	Template Identifier		✓	5000 (for ob/gyn) or 5200 (for cardiac)
>Mapping Resource	0008,0105	I	CS			✓	DCMR
Content Sequence	0040, A730	IC	SQ	Sequence of Content Items.		✓	Sequence of content items as defined in TID5000 (Ob/GYN) or TID5200 (Cardiac)
>Relationship Type	0040, A010	I	CS	The type of relationship between parent content item and this item.		✓	CONTAINS

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
>Include Document Relationship Macro							Refer to appendix A.1 for OB/GYN content and appendix A.2 for cardiac content.
>Include Document Content Macro							Refer to appendix A.1 for OB/GYN content and appendix A.2 for cardiac content.

### 3.1.2.2 Issuing of Storage Commitment requests to an image manager

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Issuing of Storage Commitment requests to an image manager

3300 provides Standard Conformance to the following DICOM V3.0 **Storage Commitment** SOP Class as an SCU.

SOP Class Name	SOP Class UID	Role
Storage Commitment Push Model	1.2.840.10008.1.20.1	SCU

**Table 9: SOP Class Supported by Storage Commitment service**

3300 sends images to the storage server for permanent storage. The request for Storage Commitment may then be transmitted from 3300 together with a list of references to one or more SOP instances. This action is invoked through the DIMSE N-ACTION primitive.

### 3.1.2.2.1 Associated Real-World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Issuing of Storage Commitment requests to an image manager
        - Associated Real-World Activity

Storage Commitment is initiated when a study is successfully exported to the Primary Storage SCP. Storage to the Primary Storage SCP can be performed manually by the user. The Primary Storage SCP and Storage Commitment SCP can be different AE's.

Storage Commitment Association Behavior (By Save Study)

User Action	DICOM Activity – Storage Commitment Device Association	Association Status
Save Study	Each Save Study operation will initiate an association with the SCP server, and send an N-Action Request, containing a list of all images that need to be committed. The Association is then released after receiving the N-ACTION-RSP from the SCP Server.	Association closed.
Reverse Role Negotiation	The system will remain available as long as it is connected to the network to receive Storage Commitment responses from the SCP server. The SCP will send an N-Event Report with status. Then the association is released.	Association closed.

### 3.1.2.2.2 Proposed Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Issuing of Storage Commitment requests to an image manager
        - Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian (Preferred, see Note)	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

**Table 10: Storage Commitment - Presentation Context**

Note: If the Storage Commitment server accepts both Explicit VR Little Endian and Implicit VR Little Endian then 3300 will use Explicit VR Little Endian as a transfer syntax.

In addition to the presentation contexts mentioned in the above table, 3300 will propose the presentation contexts associated with storage SOP classes. However, the actual association will always use the presentation context as mentioned in the table 7.

### 3.1.2.2.2.1 SOP Specific Conformance Statement for Storage Commitment SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Issuing of Storage Commitment requests to an image manager
        - Proposed Presentation Contexts
          - SOP Specific Conformance Statement for Storage Commitment SOP Class

3300 provides standard conformance to the DICOM Storage Commitment Service Class.

3300 supports the following elements for this SOP class as an SCU. The Transaction UID Attribute (0008,1195) value generated by 3300 uniquely identifies each Storage Commitment Request.

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	I	Transaction UID	0008,1195
		Referenced SOP Sequence	0008,1199
		>Referenced SOP Class UID	0008,1150
		>Referenced SOP Instance UID	0008,1155

**Table 11 – Storage Commitment Request – Attributes**

Subsequently, 3300 expects N-EVENT-REPORT's from the storage commit server although 3300 does not assume that the event will arrive at any particular time. 3300 does not wait but will process the event whenever it arrives.

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000		N-EVENT-REPORT message understood.
Error	Failed	0110		N-EVENT-REPORT message was not processed successfully.

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**Table 12 - Storage Commitment status codes**

### 3.1.2.3 Verification of the existence of DICOM server on the hospitals network

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Verification of the existence of DICOM server on the hospitals network

3300 provides standard conformance to the DICOM V3.0 SOP Class as shown in the table below.

<b>SOP Class Name</b>	<b>SOP Class UID</b>	<b>Role</b>
Verification SOP Class	1.2.840.10008.1.1	SCU

**Table 13: SOP Class Supported by Verification Service**

### 3.1.2.3.1 Associated Real-World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Verification of the existence of DICOM server on the hospitals network
        - Associated Real-World Activity

The user can verify the existence of a DICOM server on the hospitals network, through a button in the 'DICOM Setup' screen. When the user presses this button, 3300 will initiate the association.

### 3.1.2.3.2 Proposed Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Verification of the existence of DICOM server on the hospitals network
        - Proposed Presentation Contexts

Only one association is established for each verification attempt. However, the proposed presentation contexts not only includes the 'Verification SOP class' but also includes all the SOP classes that 3300 could possibly be connected to as Servers. This is done in order to retrieve the capabilities of the remote Server.

The table below lists all the proposed presentation contexts.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Ultrasound Multiframe Image Store	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG baseline	1.2.840.10008.1.2.4.50		
Ultrasound Image Store		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG baseline	1.2.840.10008.1.2.4.50		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Modality Worklist-Find	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

Table 14: Proposed Presentation Contexts

### 3.1.2.3.2.1 SOP Specific Conformance Statement for the Verification SOP class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Verification of the existence of DICOM server on the hospitals network
        - Proposed Presentation Contexts
          - SOP Specific Conformance Statement for the Verification SOP class

The C-ECHO request primitive is sent to the Verification SCP. The Verification SCP with a status indicator of success returns the C-ECHO response primitive. The absence of a C-ECHO response within a specific timeout period is an indication that the server cannot be located through the Verification service.

### 3.1.2.4 Printing DICOM studies to a B&W or color printer

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer

3300 provides standard conformance to the following DICOM V3.0 SOP Class as an SCU.

SOP Class Name	SOP Class UID	Role
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	SCU
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	SCU

**Table 15: SOP Classes Supported by Print Service**

The meta SOP classes are defined by the set of supported SOP classes.

The SOP class “Basic Grayscale Print Management Meta” is defined by the following set of supported SOP classes.

- Basic Film Session SOP Class
- Basic Film Box SOP Class
- Basic Grayscale Image Box SOP Class
- Printer SOP Class

The SOP class “Basic Color Print Management Meta” is defined by the following set of supported SOP classes.

- Basic Film Session SOP Class
- Basic Film Box SOP Class
- Basic Color Image Box SOP Class
- Printer SOP Class

The following implementation remarks are important to understand 3300’s usage of DICOM Print.

- The number of Film Boxes per Film Session is one.
- The number of images per Film Box is one.

- The images to be printed on one film are rendered by the 3300 into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image), use of color or not. A rough indication is 20 Mbytes. One should take this into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).
- 3300 will release the association when the print command is given (i.e. the NACTION Request for the Film Box); the association is not kept open for receiving N-EVENTREPORT's of the Printer SOP Class.

### 3.1.2.4.1 Associated Real World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Associated Real World Activity

3300 issues Print Management requests to an SCP supporting the DICOM V3.0 Print services, in order to produce hard copy representations of DICOM images, based on user requests.

### 3.1.2.4.2 Proposed Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts

Print AE supports the following Presentation Contexts for **Print**.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Explicit VR Little Endian (Preferred, see Note)	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
Basic Color Print Management Meta	1.2.840.10008.5.1.1.1.8	Explicit VR Little Endian (Preferred, see Note)	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

**Table 16: Print Presentation Contexts**

Note: If the print server accepts both Explicit VR Little Endian and Implicit VR Little Endian then 3300 will send the images using Explicit VR Little Endian.

3300 provides standard conformance to all the supported SOP classes of the “meta” SOP Classes, “Basic Grayscale Print Management Meta” and “Basic Color Print Management Meta”. These SOP Classes are –

1. Basic Film Session SOP Class
2. Basic Film Box SOP Class
3. Basic Grayscale Image Box SOP Class
4. Basic Color Image Box SOP Class
5. Printer SOP Class

The SOP specific conformance of these classes is described below.

**3.1.2.4.2.1 SOP Specific Conformance to Basic Film Session SOP Class**

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts
          - SOP Specific Conformance to Basic Film Session SOP Class

3300 requests the following DIMSE-N commands for the Basic Film Session SOP Class: N-CREATE

I = Generated By

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
Number of Copies	2000,0010	U	Number of duplicate copies to print	DICOM supports an integer number.	✓		1 to 99	1
Print Priority	2000,0020	U	Print priority sets the 'importance' of your print job relative to other jobs received by the printer.	DICOM supports: LOW, MEDIUM, HIGH Print priorities		✓	HIGH	
Medium Type	2000,0030	U	The type of media the printer prints on.	DICOM Supports PAPER, CLEAR FILM & BLUE FILM s as well as 'Printer Specific' options	✓		PAPER CLEAR FILM BLUE FILM	Not Sent
Film Destination	2000,0040	U	The processed film will be stored in a film	DICOM supports PROCESSOR and MAGAZINE as well	✓		PROCESSOR MAGAZINE	Not Sent

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
			magazine or processor.	as 'Printer Specific' options				
Film Session Label	2000,0050	U	Human readable label that identifies the film session.	Always sends "Philips Ultrasound Medical Systems"	✓		"Philips Ultrasound Medical Systems"	"Philips Ultrasound Medical Systems"

**Table 17 Basic Film Session Attributes**

**3.1.2.4.2.2 SOP Specific Conformance to Basic Film Box SOP Class**

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts
          - SOP Specific Conformance to Basic Film Box SOP Class

3300 requests the following DIMSE-N commands for the Basic Film Box SOP Class: N-CREATE

I = Generated By

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
Image Display Format	2010,0010	M	Images are arranged on the film in a rectangular grid. The columns and rows control the layout.	DICOM Supports STANDARD\cols,rows as well as SLIDE, ROW/COL symmetric and printer specific options.	✓		STANDARD\cols,rows Cols: 1..99, Rows: 1..99 Note: <b>Applied Value for this attribute (which is sent to the Print SCP) is always STANDARD\1,1. This is because, 3300 internally creates a single 1x1 image</b>	Always set to STANDARD\1,1

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
							corresponding to one page. This (large) image is formed based on the user selected value (e.g. STANDARD\2, 3) and the images that are part of the Print request.	
Film Orientation	2010,0040	U	The orientation of the printed film or paper.	DICOM Supports: PORTRAIT & LANDSCAPE	✓		PORTRAIT LANDSCAPE	PORTRAIT
Film Size ID	2010,0050	U	The overall size of the film or paper.	DICOM Supports all the user options as well as 'Printer Specific' options	✓		8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX14IN, 11INX17IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, A4, A3	8INX10IN
Magnification Type	2010,0060	U	Interpolation type by which the printer magnifies or decimates the image in order	Defined Terms: REPLICATE BILINEAR CUBIC NONE	✓		None Cubic Bilinear Replicate Printer Specific	Not Sent

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
			to fit the image in the image box on film.					
Border Density	2010,0100	U	Density of the film areas surrounding and between images on the film.	Defined Terms: BLACK WHITE i where i represents the desired density in hundreds of OD (e.g. 150 corresponds with 1.5 OD)		✓	Always set to BLACK	Always set to BLACK
Empty Image Density	2010,0110	U	Density of the image box area on the film that contains no image.	Defined Terms: BLACK WHITE i where i represents the desired density in hundredths of OD (e.g. 150 corresponds with 1.5 OD)		✓	Always set to BLACK	Always set to BLACK

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
Min Density	2010,0120	U	Minimum density of the images on the film. If Min Density is lower than minimum printer density then Min Density is set to minimum printer density.	Entered in hundredths of Optical Density (OD)	✓		0 - 999	Not Sent
Max Density	2010,0130	U	Maximum density of the images on the film. If Max Density is higher than maximum printer density than Max Density is set to maximum printer density.	Entered in hundredths of Optical Density (OD)	✓		0 - 999	Not Sent
Trim	2010,0140	U	Draw frame box around each image	DICOM Supports: YES or NO		✓	"NO"	
Configuration Information	2010,0150	U	Printer-specific configuration Information	DICOM supports a config ID # or a config string	✓		Config ID # Or Config string	"CS000"

Attribute Name	Tag	Usage	Attribute Description	DICOM Notes	I		Value	
					U	S	Options	Default
Referenced Film Session Sequence	2010,0500	M	Referenced Film Session Sequence	N/A		✓	Always set	
>Referenced SOP Class UID	0008,1150	M	>Referenced SOP Class UID	N/A		✓	Always set	
>Referenced SOP Instance UID	0008,1155	M	>Referenced SOP Instance UID	N/A		✓	Always set	

**Table 18 Basic Film Box Attributes**

**N-ACTION**

3300 provides all possible printer settings. For a specific printer, the user must check the manufacturer’s documentation to determine the subset of available settings that the printer actually supports. For example, if the user configures the B&W printer to use a film-size of 141nx171N but the maximum film size supported by the printer is 8\_51NX111N, then the printer may reject the images.

**3.1.2.4.2.3 SOP Specific Conformance to Basic Grayscale Image Box SOP Class**

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts
          - SOP Specific Conformance to Basic Grayscale Image Box SOP Class

Print AE issues the following DIMSE-N commands for the Basic Grayscale Image Box SOP Class:

N-SET

Attribute Name	Tag	Usage	Description	Generated By		Value	
				Usr	Sys	Options	Default
Image Position	2020,0010	M	The position of the image on the media		✓	Always set to 1	
Polarity	2020,0020	U	Polarity of image on media (NORMAL or REVERSE)		✓	NORMAL	
Basic Grayscale Image Sequence Type	2020,0110	M	The image data attributes		✓	Always set (but only for B&W Images.)	
>Samples Per Pixel	0028,0002	M	The number of data samples per pixel		✓	Always set (1)	
>Photometric Interpretation	0028,0004	M	Interpretation of pixel data (MONOCHROME1/2, PALETTE COLOR, RGB, etc.)		✓	Always set (MONOCHROME2)	

Attribute Name	Tag	U s a g e	Description	Generated By		Value	
				Usr	Sys	Options	Default
>Rows	0028,0010	M	The number of rows in the image, specified by the value sizeY in the setup dialog.	✓		Always set	
>Columns	0028,0011	M	The number of columns in the image, specified by the value sizeX in the setup dialog.	✓		Always set	
>Bits Allocated	0028,0100	M	Number of bits per pixel allocated		✓	Always set (8)	
>Bits Stored	0028,0101	M	Number of bits per pixel actually stored		✓	Always set (8)	
>High Bit	0028,0102	M	The most-significant-bit in the pixel		✓	Always set (7)	
>Pixel Representation	0028,0103	M	Pixel representation (unsigned – 0 or signed – 1)		✓	Always set (0)	
>Pixel Data	7FE0,0010	M	The pixel data		✓	Always set	

Table 19 Basic Grayscale Image Box Attributes

### 3.1.2.4.2.4 SOP Specific Conformance to Basic Color Image Box SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts
          - SOP Specific Conformance to Basic Color Image Box SOP Class

Print AE issues the following DIMSE-N commands for the Basic Color Image Box SOP Class: N-SET.

Attribute Name	Tag	Usage	Description	Generated By		Value	
				Usr	Sys	Options	Default
Image Position	2020,0010	M	Same as 3.1.2.4.2.3, SOP Specific Conformance to Basic Grayscale Image Box SOP Class				
Polarity	2020,0020	U	Same as 3.1.2.4.2.3, SOP Specific Conformance to Basic Grayscale Image Box SOP Class				
Basic Color Image Sequence	2020,0111	M	The image data attributes		✓	Always set (but only for Color Images.)	
>Samples Per Pixel	0028,0002	M	The number of data samples per pixel		✓	Always set (3)	
>Photometric Interpretation	0028,0004	M	Interpretation of pixel data (MONOCHROME1/2, PALETTE COLOR, RGB, etc.)		✓	Always set (RGB)	
>Planar Configuration	0028,0006	M	Planar configuration (color-by-pixel = 0 or color-by-plane = 1)	✓		Configurable by user in DICOM Setup as either color-by-pixel or color-by-plane.	

Attribute Name	Tag	Usage	Description	Generated By		Value	
				Usr	Sys	Options	Default
>Rows	0028,0010	M	The number of rows in the image, specified by the value sizeY in the setup dialog.	✓		Always set	
>Columns	0028,0011	M	The number of columns in the image, specified by the value sizeX in the setup dialog.	✓		Always set	
>Bits Allocated	0028,0100	M	Number of bits per sample allocated		✓	Always set (8)	
>Bits Stored	0028,0101	M	Number of bits per sample actually stored		✓	Always set (8)	
>High Bit	0028,0102	M	The most-significant-bit in the sample		✓	Always set (7)	
>Pixel Representation	0028,0103	M	Pixel representation (unsigned – 0 or signed – 1)		✓	Always set (0)	
>Pixel Data	7FE0,0010	M	The pixel data		✓	Always set	

**Table 20 Basic Color Image Box Attributes**

### 3.1.2.4.2.5 SOP Specific Conformance to Printer SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Printing DICOM studies to a B&W or color printer
        - Proposed Presentation Contexts
          - SOP Specific Conformance to Printer SOP Class

3300 issues the following DIMSE-N commands for the Printer SOP Class:

N-GET.

<b>Attribute Name</b>	<b>Tag</b>	<b>Usage SCU/SCP</b>
Printer Status	2110,0010	U/M
Printer Status Info	2110,0020	U/M
Printer Name	2100,0030	U/M
Manufacturer	0008,0070	U/M
Manufacturer's Model Name	0008,1090	U/M
Device Serial Number	0018,1000	U/M
Software Version	0018,1020	U/M

**Table 21 Printer Attributes**

Note: These printer commands are issued for internal use only. The printer status is never reported back to the user.

### 3.1.2.5 Obtaining a list of scheduled work from the HIS via Modality Worklists

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Obtaining a list of scheduled work from the HIS via Modality Worklists

3300 provides Standard Conformance to the following DICOM V3.0 **Worklist Management** SOP Class as an SCU.

SOP Class Name	SOP Class UID	Role
Modality Worklist Info Model - FIND	1.2.840.10008.5.1.4.3.1	SCU

**Table 22: SOP Class Supported by Worklist Management Service**

3300 requests the transfer of worklists with the DIMSE C-FIND command.

### 3.1.2.5.1 Associated Real-World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Obtaining a list of scheduled work from the HIS via Modality Worklists
        - Associated Real-World Activity

3300 obtains scheduled worklists from the Modality Worklist Server in two ways; the user can manually request a fresh copy of the desired worklist from the Modality Worklist Server by pressing the Refresh button on the Patient Selection screen, also requests can be made on a polled basis in the background, with a polling interval configured by the user.

The user can then press it to perform a manual refresh of 3300's worklist: 3300 will first negotiate a C-ECHO with the server to verify that the MWL server is live and if live, perform the C-Find.

Note that if 3300 is not connected to the Modality Worklist Server network, the worklist cached in 3300 may be out-of-date with the worklist maintained by the Modality Worklist Server. Nevertheless, the cached worklist is available for use on portable exams.

When 3300 is reconnected to the network a fresh copy of the current list is requested.

### 3.1.2.5.2 Proposed Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Obtaining a list of scheduled work from the HIS via Modality Worklists
        - Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Info Model – FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian (Preferred, see Note)	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

**Table 23: Worklist Management - Presentation Context**

Note: If the worklist server accepts both Explicit VR Little Endian and Implicit VR Little Endian then 3300 will use Explicit VR Little Endian as a transfer syntax.

### 3.1.2.5.2.1 SOP Specific Conformance Statement for the Modality Worklist SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Obtaining a list of scheduled work from the HIS via Modality Worklists
        - Proposed Presentation Contexts
          - SOP Specific Conformance Statement for the Modality Worklist SOP Class

3300 provides standard conformance to the DICOM Worklist Management Service Class.

The table below describes the use of attributes as both Matching Key values in the C-FIND request message, and as Return Keys in the set of C-FIND-RSP messages. The Matching Key Usage follows the DICOM Standard for attribute matching, including Single Value matching and Range matching. For those Matching Keys that are used by 3300, the Attribute Type as defined by DICOM is indicated: Required or Optional. These values indicate the degree to which the MWL SCP must support the attribute as a Matching Key.

Similarly, the Attribute Type of values used as Return Keys is given as defined by DICOM: Type 1 (required), Type 1C (conditionally required), Type 2 (required but may be NULL), Type 2C (conditionally required but may be NULL), or Type 3 (optional).

An empty value in the Matching Key column means that this value is not used as a matching key. An empty value in the Return Key column means that 3300 ignores this value. If an attribute that is non-mandatory to the SCU is not used by 3300 as a matching key and its value as a return key is ignored, the attribute is omitted from the list of attributes. However, the list contains all the attributes, which are part of the C-FIND message sent by 3300, even if they are not used as matching key or its value as return key is ignored.

Attribute Name	Tag	Matching Key Usage	Return Key Usage
<b>SOP Common</b>			
Specific Character Set	0008, 0005		Ignored by 3300.
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	0040, 0100	Required	Type 1

<b>Attribute Name</b>	<b>Tag</b>	<b>Matching Key Usage</b>	<b>Return Key Usage</b>
> Scheduled Station AE Title	0040, 0001	Required	Type 1 Set in MPPS.
> Scheduled Procedure Step Start Date	0040, 0002	Required	Type 1 Used in Patient Selection screen. Set in MPPS.
> Scheduled Procedure Step Start Time	0040, 0003	Required	Type 1 Used in Patient Selection screen. Set in MPPS.
> Scheduled Procedure Step End Date	0040, 0004		Type 3 Ignored by 3300.
> Scheduled Procedure Step Time	0040, 0005		Type 3 Ignored by 3300.
> Modality	0008, 0060	Required	Type 1 Set in MPPS.
> Requested Contrast Agent	0032, 1070		Type 3 Ignored by 3300
> Scheduled Performing Physician's Name	0040, 0006		Type 2 Sets "Performing Physician's Name" in the MPPS.
> Scheduled Procedure Step Description	0040, 0007		Type 1C Set in MPPS and images. May be used to set "Description" field on the Patient Selection screen, and "Study

Attribute Name	Tag	Matching Key Usage	Return Key Usage
			Description" in images: 2nd choice, configurable
> Scheduled Station Name	0040, 0010		Type 2 Ignored by 3300
> Scheduled Procedure Step Location	0040, 0011		Type 2 Sets "Location" field on the Patient Selection screen.
> Pre-Medication	0040, 0012		Type 2C Ignored by 3300
> Scheduled Procedure Step Status	0040, 0020		Type 3 Ignored by 3300.
> Comments on the Scheduled Procedure Step	0040, 0400		Type 3 Ignored by 3300
> Scheduled Action Item Code Sequence	0040, 0008		Type 1C Set as "Scheduled Action Item Code Sequence" and "Performed Action Item Code Sequence" in MPPS, and as "Scheduled Protocol Code Sequence" in images.
>> Code Value	0008, 0100	Required	Type 1 Set in MPPS and images.
>> Coding Scheme Designator	0008, 0102	Required	Type 1 Set in MPPS and images.

Attribute Name	Tag	Matching Key Usage	Return Key Usage
>> Coding Scheme Version	0008, 0103		Type 3 If present, set in MPPS and images.
>> Code Meaning	0008, 0104		Type 3 If present, set in MPPS and images.  May also be used to set "Description" field on the Patient Selection screen, and "Study Description" in images: 3rd choice, configurable
> Scheduled Procedure Step ID	0040, 0009	Required	Type I Set in MPPS and images.
Requested Procedure			
Requested Procedure ID	0040, 1001	Required	Type I Set in MPPS and images.
Requested Procedure Description	0032, 1060		Type IC Set in MPPS.  May also be used to set "Description" field on the Patient Selection screen, and "Study Description" in images: 1st choice, configurable
Requested Procedure Code Sequence	0008, 1064		Type IC If present, set as "Procedure Code Sequence" in MPPS.

Attribute Name	Tag	Matching Key Usage	Return Key Usage
> Code Value	0008, 0100		Type 1C Set in MPPS.
> Coding Scheme Designator	0008, 0102		Type 1C Set in MPPS.
> Coding Scheme Version	0008, 0103		Type 3 If present, set in MPPS.
> Code Meaning	0008, 0104		Type 3 If present, set in MPPS.
Study Instance UID	0020, 000D	Required	Type 1 Set in MPPS and images.
Referenced Study Sequence	0008, 1110		Type 2 Set in MPPS and images.
> Referenced SOP Class UID	0008, 1150		Type 1C Ignored.
> Referenced SOP Instance UID	0008, 1155		Type 1C Set in MPPS and images.
Reason for the Requested Procedure	0040, 1002		Type 3 May be used to set "Indication" field on the Patient Selection screen: 1st choice, configurable
Names of Intended Recipients of Results	0040, 1010		Type 3 Ignored by 3300.

<b>Attribute Name</b>	<b>Tag</b>	<b>Matching Key Usage</b>	<b>Return Key Usage</b>
Requested Procedure Comments	0040, 1400		Type 3 Ignored by 3300
Imaging Service Request			
Accession Number	0008, 0050		Type 2 Displayed on Patient ID screen. Set in MPPS and images.
Referring Physician's Name	0008, 0090		Type 2 Sets "Referring Physician" in the Patient ID screen and the 'Patient Selection' screen.
Reason for Imaging Service Request	0040, 2001		Type 3 May be used to set "Indication" field on the Patient Selection screen: 2nd choice, configurable
Imaging Service Request Comments	0040, 2400		Type 3 Ignored by 3300.
Requesting Physician	0032, 1032		Type 3 Ignored by 3300.
Requesting Service	0032, 1033		Type 3 Ignored by 3300.
Current Patient Location	0038, 0300		Type 3 Ignored by 3300.

<b>Attribute Name</b>	<b>Tag</b>	<b>Matching Key Usage</b>	<b>Return Key Usage</b>
<b>Visit Relationship</b>			
Referenced Patient Sequence	0008, 1120		Type 2 Set in MPPS.
> Referenced SOP Class UID	0008, 1150		Type 2 Ignored.
> Referenced SOP Instance UID	0008, 1155		Type 2 Set in MPPS.
<b>Patient Identification</b>			
Patient Name	0010, 0010	Required	Type 1 Displayed on 'Patient ID' screen and 'Patient Selection' screen. Set in MPPS and used as a tag in images.
Patient ID	0010, 0020	Required	Type 1 Displayed in "MRN" field of 'Patient ID' screen and 'Patient Selection' screen. Set in MPPS and used as a tag in images.
<b>Patient Demographic</b>			
Patient's Birth Date	0010, 0030		Type 2 Sets the "DOB" field on the Patient ID and Patient Selection screen.

Attribute Name	Tag	Matching Key Usage	Return Key Usage
			Set in MPPS.
Patient's Birth Time	0010, 0032		Type 3 Sets the patient DOB field in the MWL patient entry screen. In the DOB field both time and date is present.
Patient Sex	0010, 0040		Type 2 Sets the "Gender" field on the 'Patient ID' screen and 'Patient Selection' screen. Set in MPPS.
Other Patient Ids	0010, 1000		Type 3 Sets the alternate patient id field, also sent to MPPS if configured. If more than one "Other Patient Ids" are sent, then only the first "Other Patient id" is used.
Patient Age	0010, 1010		Type 3 Used to set the patient age field in the MWL patient entry screen.
Patient's Weight	0010, 1030		Type 2 Sets the "Weight" field on the 'Patient ID' and 'Patient Selection' screens.
Patient's Size	0010, 1020		Type 3

Attribute Name	Tag	Matching Key Usage	Return Key Usage
			Sets the "Height" field on the 'Patient ID' and 'Patient Selection' screens.
Ethnic Groups	0010, 2160		Type 3 Ignored by 3300.
Additional Patient History	0010, 21B0		Type 3 Ignored by 3300.
Patient Comments	0010, 4000		Type 3 Ignored by 3300.
Patient Medical			
Pregnancy Status	0010, 21C0		Type 3 Ignored by 3300.
Medical Alerts	0010, 2000		Type 3 Ignored by 3300.

**Table 24: Modality Worklist Usage in the Worklist Management service**

### 3.1.2.6 Updating the status of a scheduled procedure

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Updating the status of a scheduled procedure

3300 provides Standard Conformance to the following DICOM V3.0 Modality Performed Procedure Step (MPPS) SOP Class as an SCU.

SOP Class Name	SOP Class UID	Role
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	SCU

**Table 25: SOP Class Supported by MPPS service**

The system uses N-CREATE and N-SET commands to notify the MPPS Server whenever the status of a patient's study has changed.

### 3.1.2.6.1 Associated Real-World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Updating the status of a scheduled procedure
        - Associated Real-World Activity

The opening of a study marks the beginning of a new Modality Performed Procedure Step (MPPS). At this time, a MPPS record is created on the MPPS SCP through the use of the N-CREATE service. If the MPPS SCP is unavailable at the time the first image is stored, the request is queued and will be sent when the MPPS SCP is available.

When the user ends the scheduled procedure by closing the study and saving any changes, the MPPS status is “Completed”. Alternatively, the user may choose to cancel acquisition, the study is saved in local storage and the MPPS status becomes “Discontinued”. At this time, the Study Management AE attempts to modify the MPPS on the MPPS SCP through the use of the N-SET service. If the MPPS SCP is unavailable, the request is queued and will be sent when the MPPS SCP is available.

### 3.1.2.6.2 Proposed Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Updating the status of a scheduled procedure
        - Associated Real-World Activity
          - Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.1000 8.3.1.2.3.3	Explicit VR Little Endian (Preferred, see Note)	1.2.840.10008.1. 2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1. 2		

**Table 26: MPPS - Presentation Context**

Note: If the SCP accepts both Explicit VR Little Endian and Implicit VR Little Endian then 3300 will use Explicit VR Little Endian.

### 3.1.2.6.2.1 SOP Specific Conformance Statement for the MPPS SOP Class

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Initiation by Real-World Activity
      - Updating the status of a scheduled procedure
        - Associated Real-World Activity
          - Proposed Presentation Contexts
            - SOP Specific Conformance Statement for the MPPS SOP Class

3300 provides standard conformance to the DICOM MPPS Service Class.

The updated attributes are shown in Table 21. The “N\_CREATE Usage” column shows the attributes transmitted when the status of the study changes to “IN\_PROGRESS”. The “N-SET Usage” column shows the attributes transmitted when the status of the study changes to “COMPLETED” or “DISCONTINUED”.

Note: The following fields are copied from the selected MWL entry to the Patient ID screen:

Accession Number,  
 Patient’s Name,  
 Patient’s ID,  
 Patient’s Birth Date  
 Patient’s Sex  
 Referring Physician’s Name  
 Study description

Usually, the performing physician will accept the information in the Patient ID Screen, as is, however the physician has the option of editing the information before starting the study. If the physician edits this information then the MPPS N-CREATE command that is sent to the MPPS server on study start will use the edited information and not the original MWL information.

Attribute Name	Tag	N-CREATE Usage	N-SET Usage
Specific Character Set	0008,0005	Not used, even though some attributes may contain characters from the Latin I character set	Not used, even though some attributes may contain characters

Attribute Name	Tag	N-CREATE Usage	N-SET Usage
			from the Latin 1 character set
<b>Performed Procedure Step Relationship</b>			
Scheduled Step Attribute Sequence	0040,0 270	Present	Not allowed
> Study Instance UID	0020,0 00D	If available from the MWL; else synthesized by the host imaging system	Not allowed
> Referenced Study Sequence	0008,1 110	If present in MWL else NULL	Not allowed
>> Referenced SOP Class UID	0008,1 150	Detached Study Mgmt SOP Class: 1.2.840.10008.3.1.2.3.1	Not allowed
>> Referenced SOP Instance UID	0008,1 155	From the MWL, if present; else the SOP Instance UID of this study.	Not allowed
> Accession Number	0008,0 050	From the "Accession number" field of the Patient ID screen	Not allowed
> Requested Procedure ID	0040,1 001	If available from the MWL; else NULL	Not allowed
> Requested Procedure Description	0032,1 060	If available from the MWL; else NULL	Not allowed
> Scheduled Procedure Step ID	0040,0 009	If available from the MWL; else NULL	Not allowed
> Scheduled Procedure Step Description	0040,0 007	If available from the MWL; else NULL	Not allowed
> Scheduled Protocol Code Sequence	0040,0 008	If available from the MWL; else NULL	Not allowed
>> Code Value	0008,0 100	From the MWL	Not allowed
>> Coding Scheme Designator	0008,0 102	From the MWL	Not allowed
>> Coding Scheme Version	0008,0 103	From the MWL	Not allowed
>> Code Meaning	0008,0 104	From the MWL	Not allowed

<b>Attribute Name</b>	<b>Tag</b>	<b>N-CREATE Usage</b>	<b>N-SET Usage</b>
Patient Name	0010,0 010	Generated from the "Name" fields of the Patient ID screen	Not allowed
Patient ID	0010,0 020	From the "MRN" field of the Patient ID screen	Not allowed
Patient's Birth Date	0010,0 030	From the "Birth Date" field of the Patient ID screen	Not allowed
Patient Sex	0010,0 040	From the "Gender" field of the Patient ID screen	Not allowed
Referenced Patient Sequence	0008,1 120	If available from the MWL; else NULL	Not allowed
> Referenced SOP Class UID	0008,1 150	Detached Patient Mgmt SOP Class UID 1.2.840.10008.3.1.2.1.1	Not allowed
> Referenced SOP Instance UID	0008,1 155	If available from the MWL; else NULL	Not allowed
<b>Performed Procedure Step Information</b>			
Performed Procedure Step ID	0040,0 253	If available from the MWL, else generated by 3300	Not allowed
Performed Station AE Title	0040,0 241	AE Title of 3300	Not allowed
Performed Station Name	0040,0 242	Same as the 'Performed Station AE Title', tag (0040,0241)	Not allowed
Performed Location	0040,0 243	If available from the MWL, else NULL	Not allowed
Performed Procedure Step Start Date	0040,0 244	Date of the acquisition of the first image in the study	Not allowed
Performed Procedure Step Start Time	0040,0 245	Time of the acquisition of the first image in the study	Not allowed
Performed Procedure Step Status	0040,0 252	"IN PROGRESS"	"COMPLETED" or "DISCONTINUED"
Performed Procedure Step Description	0040,0 254	If "Scheduled Procedure Description" available from MWL, else "Indication" field from Patient ID screen	Not used

<b>Attribute Name</b>	<b>Tag</b>	<b>N-CREATE Usage</b>	<b>N-SET Usage</b>
Performed Procedure Type Description	0040,0255	If "Scheduled Procedure Description" available from MWL, else "Indication" field from Patient ID screen	Not used
Procedure Code Sequence	0008,1032	If "Requested Procedure Code Sequence" available from the MWL; else generated by 3300	If "Requested Procedure Code Sequence" available from the MWL; else NULL
> Code Value	0008,0100	From the MWL	From the MWL
> Coding Scheme Designator	0008,0102	From the MWL	From the MWL
> Coding Scheme Version	0008,0103	If available from the MWL; else omitted	If available from the MWL; else omitted
> Code Meaning	0008,0104	If available from the MWL; else omitted	If available from the MWL; else omitted
Performed Procedure Step End Date	0040,0250	NULL (empty string sent)	This value is same as Performed Procedure Step Start Date value in N-CREATE.
Performed Procedure Step End Time	0040,0251	NULL (empty string sent)	This value is same as Performed Procedure Step Start Time value in N-CREATE.
<b>Image Acquisition Results</b>			
Modality	0008,0060	"US"	Not allowed
Study ID	0020,0010	If MWL is used, set to "Requested Procedure ID" if available from the MWL; else the empty string. This "DICOM Study ID" differs from the value of "Study ID" in DICOM images.	Not allowed

<b>Attribute Name</b>	<b>Tag</b>	<b>N-CREATE Usage</b>	<b>N-SET Usage</b>
Performed Protocol Code Sequence	0040,0 260	If "Scheduled Protocol Code Sequence" available from the MWL; else NULL	If "Scheduled Protocol Code Sequence" available from the MWL; else NULL
> Code Value	0008,0 100	From the MWL	From the MWL
> Coding Scheme Designator	0008,0 102	From the MWL	From the MWL
> Coding Scheme Version	0008,0 103	If available from the MWL; else omitted	If available from the MWL; else omitted
> Code Meaning	0008,0 104	If available from the MWL; else omitted	If available from the MWL; else omitted
Performed Series Sequence	0040,0 340	One item representing the series used for this MPPS	One item representing the series used for this MPPS
> Performing Physician's Name	0008,1 050	From the "Performed By" field of the Patient ID screen	From the "Performed By" field of the Patient ID screen
> Protocol Name	0018,1 030	"CLR Standard" for all exams.	"CLR Standard" for all exams.
> Operator's Name	0008,1 070	From the "Performed By" field of the Patient ID screen; else NULL	From the "Performed By" field of the Patient ID screen; else NULL
> Series Instance UID	0020,0 00E	Synthesized by 3300	Synthesized by 3300
> Series Description	0008,1 03E	NULL	NULL
> Retrieve AE Title	0008,0 054	NULL	NULL
> Referenced Image Sequence	0008,1 140	NULL	NULL
> Referenced Non-image Composite SOP Instance Sequence	0040,0 220	NULL	NULL
<b>Table 27: Modality Performed Procedure Step N-CREATE and N-SET Attributes</b>			



### 3.1.3 Association Acceptance Policy

#### 3.1.3.1 Responding to a verification request from a remote DICOM server

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Acceptance Policy
      - Responding to a verification request from a remote DICOM server

3300 provides standard conformance to the DICOM V3.0 SOP Class as shown in the Table below.

SOP Class Name	SOP Class UID	Role
Verification SOP Class	1.2.840.10008.1.1	SCP

**Table 28: SOP Class Supported by Verification service**

### 3.1.3.1.1 Associated Real-World Activity

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Acceptance Policy
      - Responding to a verification request from a remote DICOM server
        - Associated Real-World Activity

The ultrasound system employs a Verification SCP to reply to verification requests sent by remote devices. This will allow the remote device to ensure the availability of 3300 on the network, within the constraints of the network topology, and timeout values.

3300 employs a 'high security' paradigm and will only respond to C-Echo requests from DICOM Servers that it knows about. Specifically, the following steps must have been performed:

1. In DICOM Setup, add the DICOM server to the list of DICOM servers.
2. Assign the server to the appropriate role.

### 3.1.3.1.2 Accepted Presentation Contexts

Context: Expansion of Headings and sub-headings

- Application Entity Specifications
  - 3300 AE Specification
    - Association Acceptance Policy
      - Responding to a verification request from a remote DICOM server
        - Accepted Presentation Contexts

Only one association is established for each verification attempt. When the association is opened, the presentation contexts noted in Table 29 are accepted.

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

**Table 29: Accepted Presentation Contexts**

#### 4. 3300 as a Media Storage Application

The implementation model, application data flow diagram, functional definition of the 3300 AE, sequencing of real world activities are the same as in section 2.

##### 4.1 File Meta Information for the 3300 AE

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - File Meta Information for the 3300 AE

Element	Implementation Value
Implementation Class UID	1.3.46.670589.14.1.0
Implementation Version Name	3300

**Table 30: Implementation Identifying Information**

## 4.2 Real-World Activities

### 4.2.1 Saving a DICOM Study to removable media

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Saving a DICOM Study to removable media

The 3300 AE conforms to the Application Profile for Ultrasound Media Storage applications. For all SOP Classes described in the Application Profile, this AE performs in the role of File Set Creator (FSC) and File Set Updater (FSU). The particular physical media available is 3.5" MOD, CD-R, USB Flash Device or USB Hard Drive. For previously imported studies, 3300 will export the IODs using the transfer syntax and tags that were used when 3300 originally imported the study.

Supported Application Profile	Real-World Activity	Roles	Service Class Option
STD-US-SC-SF&MF	Export Study	FSC and FSU	Interchange
STD-US-ID-SF&MF	Export Study	FSC and FSU	Interchange

**Table 31: Export study to DICOM media**

The Export DICOM Objects Application Entity acts as FSC and FSU using the Interchange Option.

When saving a DICOM study to removable media, the user can specify the photometric interpretation and transfer syntax used to create DICOM files on the media. The options available to users are listed in Table 26.

<b>Transfer Syntax and Photometric Interpretation options for removable media</b>
Uncompressed (DICOM Implicit VR Little Endian) Palette Color
Uncompressed (DICOM Explicit VR Little Endian) Palette Color
RLE (lossless) Compression Palette Color
Uncompressed (DICOM Implicit VR Little Endian) RGB
Uncompressed (DICOM Explicit VR Little Endian) RGB
RLE (lossless) Compression RGB
Uncompressed (DICOM Implicit VR Little Endian) MONOCHROME2
Uncompressed (DICOM Explicit VR Little Endian) MONOCHROME2
RLE (lossless) Compression MONOCHROME2
JPEG (lossy) Compression YBR

**Table 32: Photometric Interpretation and Transfer Syntax Options for Saving to Removable Media**

3300 creates special 3D and PanView internal files called 'dataset' files that are never exported to a PACS but may be optionally exported to media. These DICOM files are not exported in network storage since they are only of use to 3300's 3D/PanView application and 3300 does not support networked Query/Retrieve. However, these files may optionally be exported to media with the rest of the study for archival purposes. The study could later be imported into an 3300 system and the user would be able to click on the dataset file to enter into the 3D/PanView application

The image dimensions of PanView datasets are not fixed. The number of rows and columns in a PanView dataset image varies based on the characteristics of the PanView image acquisition.

#### **4.2.2 Reading a DICOM study from removable media**

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media

When requested to read the media directory, the Import DICOM Objects Application Entity acts as FSR using the Interchange Option,

The user choosing the Import operation from a menu initiates importing images. See the system user manuals for a description of the specific user interface capabilities.

The 3300 AE conforms to the Application Profile for Ultrasound Media Storage applications. For all SOP Classes described in the Application Profile, this AE performs in the role of File Set Reader (FSR). The particular physical media available is 3.5" CD-R, CD-RW, USB Flash Device or USB Hard Drive. Image Display and Spatial Calibration of Single and Multi-Frame image objects on any media in the Ultrasound Application Profile is therefore supported.

<b>Supported Application Profile</b>	<b>Real-World Activity</b>	<b>Roles</b>	<b>Service Class Option</b>
STD-US-SC-SF&MF-CDR	Import Studies	FSR	Interchange
STD-GEN-USB	Import Studies	FSR	Interchange

**Table 33: Media Import Application Profiles**

3300's DICOM Study Import feature is designed for importing studies that *were originally exported from 3300*. The system will not allow the user to import ultrasound studies created by another manufacturer's system or not an 3300 System.

## SOP Specific Conformance For “Media Storage Directory Storage” SOP Class

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - SOP Specific Conformance For “Media Storage Directory Storage”

3300 uses this SOP class for Media export as well as Media import. Since 3300 doesn't support import of SR, some of the attributes are not used during import. The 'usage' column explains these attributes.

Type 1, 1C, 2, and 2C data elements present in the Basic Directory Object are supported as required in DICOM 3.0, Parts 3 and 10. They are used for properly navigating through the directory data structures, recognizing and conforming to the character set being used, and the Import Study user interface to aid in the selection of objects to import. Data elements that elicit behavior that is specific to the Application Entity are described in the sections below. If Type 2 data elements are null or if Type 3 data elements are absent, the data elements are ignored by the system and the corresponding display fields in the user interface screen(s) are left blank.

#### 4.2.2.1 File-Set Identification Module

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - File-Set Identification Module

Contents of the File-set Identification Module are not displayed or otherwise used in this version of 3300.

#### 4.2.2.2 Directory Information Module

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - Directory Information Module

All data elements are used as described in DICOM 3.0 Part 3 for Basic Directory Object Definitions. As stated in the Ultrasound Application Profile, “The (DICOMDIR) Directory shall include Directory Records of PATIENT, STUDY, SERIES, and IMAGE corresponding to the information object files in the File-set”. Given this requirement, 3300 uses these directory records to identify the study to import. If there are DICOM image files on the import media that do not appear in the DICOMDIR Directory Information Module (either because references to these files were omitted or because the Directory Information Module, optional in DICOM but required in the Ultrasound Application Profile, does not exist), these files are not recognized by the system.

3300 ignores directory Record Types other than those above.

3300 also ignores the “File-set consistency Flag” (0004, 1212).

#### 4.2.2.2.1 Patient Directory Record

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - Directory Information Module
        - Patient Directory Record

Attribute Name	Tag	Type	Usage
Specific Character Set	0008, 0005	1C	The default DICOM character set and optional set ISO-IR 100 (Latin 1) are supported. See Section A.7 for details.
Directory Record Type	0004, 1430	1C	PATIENT
Patient Name	0010, 0010	2	Displayed to help the user identify the patient folder in which to place the studies for this patient.
Patient ID	0010, 0020	1	Displayed to help the user identify the patient folder in which to place the studies for this patient.

**Table 34: Specific Usage of Patient Directory Record Information**

#### 4.2.2.2.2 Study Directory Record

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - Directory Information Module
        - Study Directory Record

Attribute Name	Tag	Type	Usage
Specific Character Set	0008, 0005	IC	The Default DICOM character set and optional set ISO-IR 100 (Latin I) are supported. See Section A.7 for details.
Directory Record Type	0004, 1430	IC	STUDY
Study Date	0008, 0020	I	Used in displaying list of studies to user
Study Time	0008, 0030	I	Used in displaying list of studies to user
Accession Number	0008, 0050	2	Stored in the system database
Study Description	0008, 1030	2	Generated
Study Instance UID	0020, 000D	IC	Stored in the system database
Study ID	0020, 0010	I	Stored in the system database

**Table 35: Specific Usage of Study Directory Record Information**

#### 4.2.2.2.1 Series Directory Record

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - Directory Information Module
        - Series Directory Record

Attribute Name	Tag	Type	Usage
Specific Character Set	0008, 0005	1C	The default DICOM character set and optional set ISO-IR 100 (Latin I) are supported. See Section A.7 for details.
Directory Record Type	0004, 1430	1C	SERIES
Modality	0008, 0060	1	Only US is supported. Other modalities are ignored.
Series Description	0008, 103E	3	Stored
Series Number	0020, 0011	1	Stored
Series Instance UID	0020, 000E	1	Stored

**Table 36: Specific Usage of Series Directory Record Information**

#### 4.2.2.2.2 Image Directory Record

Context: Expansion of Headings and sub-headings

- 3300 as a Media Storage Application
  - Real-World Activities
    - Reading a DICOM study from removable media
      - Directory Information Module
        - Image Directory Record

Attribute Name	Tag	Type	Usage
Specific Character Set	0008,0005	1C	The default DICOM character set and optional set ISO-IR 100 (Latin 1) are supported. See Section A.7 for details.
Directory Record Type	0004,1430	1C	IMAGE
Referenced File ID	0004,1500	1C	Used
Referenced SOP Class UID in File	0004,1510	1C	Used
Referenced SOP UID in File	0004,1511	1C	Used
Referenced Transfer Syntax UID in File	0004,1512	1C	Used
Content Date	0008,0023	3	Used for ordering the thumbnail display. On Export, comes from the image.
Content Time	0008,0033	3	Used for ordering the thumbnail display. On Export, comes from the image.
Instance Number	0020,0013	3	A number that identifies the image number.

**Table 37: Specific Usage of Image Directory Record Information**

## **5. Communications Profiles**

3300 provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

## 6. Extensions/Specializations/Privatizations

### 6.1 General

Context: Expansion of Headings and sub-headings

- Extensions/Specializations/Privatizations
  - General

The following private tag is used by 3300 to indicate a private group:

Tag	VR	Value
0031,0060	LO	“Philips US Imaging 60”

The following private tag is used by 3300’s display compensation application:

Tag	VR	Value
0031,6030	UL	Private data

The following private tag is used by 3300 as part of the algorithm that determines when to add the pixel spacing tag:

Tag	VR	Value	
0031,6031	UL	Private data	

### 6.2 2D

Context: Expansion of Headings and sub-headings

- Extensions/Specializations/Privatizations
  - 2D

The Pixel Spacing tag is added to the exported DICOM file when the user has configured this tag to be included and the image is either a 2D only image or a 2D dual image with the same calibration for both images:

Attribute Name	Tag	Type	VR	Description	Generated by		Value
					Usr	Sys	
Pixel Spacing	0028,0030	3	DS	Physical distance in the patient between the center of each pixel, specified by a numeric pair – adjacent row spacing (delimiter) adjacent column spacing (in mm).		✓	Adjacent row spacing / Adjacent column spacing (in mm)

### 6.3 3D Stills and Loops, and PanView

Context: Expansion of Headings and sub-headings

- Extensions/Specializations/Privatizations
  - 3D Stills and Loops, and PanView

3D and PanView image files contain the following private tags for use by 3300's 3D/PanView application:

Attribute Name	Tag	Type	VR	Description	Value
Private Creator	7777,0010		LO	3D/PanView component type	"3300"
	7777,1001		DA	Date 3D/PanView internal 'dataset' file was acquired	
	7777,1002		CS	Type of 3D or PanView	3D Still: "3D STILL" 3D Loop: "3D MOVIE" PanView still: "PANVIEW STILL"

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>VR</b>	<b>Description</b>	<b>Value</b>
	7777, 1003		LO	Internal 3D/PanView software version number	"2.0"
	7777, 1014		LT	Private string	

## 7. Configuration

The DICOM setup screen allows the user to configure a significant number of options including (but not limited to):

- For the 3300 system, it's AE Title, IP address and Port number.
- For DICOM servers, Alias Name, their AE Title, port number, IP address.
- For Storage SCP's and for media storage, the image format (including Monochrome2, RGB, Palette color and YBR/JPEG), loop timing, pixel spacing, display compensation.
- For DICOM Printers, many DICOM configuration settings
- For a MWL server, the query parameters: scheduled procedure date start range, modality, AE Title.

## 8. Support for Extended Character Sets

3300 will offer support for Japanese, Chinese, and Russian. This includes translating system text into these languages and allowing the user to input Japanese, Chinese, and Cyrillic characters into the system. One important aspect of this is that the user will be able to enter these special characters into the Patient ID screen.

The present DICOM standard allows Code Extension Techniques for multi-byte characters. Therefore, as well as the default character set (ISO-IR 6), 3300 supports the following extended character sets:

- ISO-IR 100 Latin Alphabet No. 1
- ISO-IR 87 Japanese Kanji (ideographic), Hiragana (phonetic) and Katakana (phonetic)
- ISO-IR 13 Japanese Katakana (phonetic)
- ISO-IR 159 Supplementary Kanji (ideographic)
- ISO-IR 144 Russian Cyrillic

### Important Note:

When an Application Entity which does not support Code Extension Techniques receives a Data Set which includes multi-byte characters from an 3300 system, misrepresentation of characters may occur.

The DICOM standard states that it is the responsibility of the Application Entity which receives the Data Sets to take whatever action is considered necessary to minimize the effect of misrepresented characters. It is not the responsibility of the 3300 system to take such action.

## 8.1 Support for Russian and Japanese Markets

3300 uses "Code-extension techniques" to encode Japanese stroke based characters and Russian Cyrillic characters in DICOM tags with value representations of SH, LO, ST, LT, UT, and PN.

The technique requires two things in a DICOM file that contains these characters:

1. Add the Optional Specific Character Set TAG (0008,0005) and set the value to the list of identifiers for all the non-standard character sets that will appear in any string in the file separated by backslashes. For example:

For Japanese systems:

(0008,0005) = "ISO 2022 IR 13\ISO 2022 IR 87\ISO 2022 IR 159\ISO 2022 IR 100"

For Russian systems:

(0008,0005) = "ISO 2022 IR 144\ISO 2022 IR 100"

For English systems:

(0008,0005) = "ISO 2022 IR 100"

2. Embed escape sequences in the strings that contain Asian or Cyrillic characters to cause the DICOM interpreting code to switch from one character set to another.

The escape sequences to be used are defined as:

"<ESC>\$B" ISO - IR 87 Japanese Kanji (ideographic), Hiragana (phonetic), Katakana (phonetic)

"<ESC>(B" ISO - IR 6 ASCII - DICOM default character set

"<ESC>\$(D" ISO - IR 159 Supplementary Kanji (ideographic)

"<ESC>(J" ISO - IR 144 Russian Cyrillic

## 8.2 Additional Support for Japanese Markets

Japanese markets will have additional fields to the Patient ID screen so that the user can enter the Roman, Ideographic, and Phonetic representations of a patient's name.

The DICOM patient name field, tag (0010,0010) of type PN, is a single string field that contains up to five components (last, first, middle, title, honorific) in up to three language variants (Roman, Idiographic, and Phonetic.) The format of the patient name field is:

"Roman-last^Roman-first^Roman-middle^Roman-prefix^Roman-suffix=  
Ideographic-last^Ideographic-first^Ideographic-middle^Ideographic-prefix^Ideographic-suffix=  
Phonetic-last^Phonetic-first^Phonetic-middle^Phonetic-prefix^Phonetic-suffix"

In the above string the five components are separated with the '^' Ascii character and the three language variants are separated by the '=' Ascii character. The only required component is the Roman Last name. All other components are optional. Trailing '^' and '=' characters can be excluded.

When this string is encoded in a DICOM image file or DICOMDIR directory file, the escape sequences appropriate for the character sets used are inserted into the string for storage as a single-byte string. On media import the escape sequences are removed.

### 8.3 Support for Chinese Markets

The current DICOM standard as of this release of 3300 does not support Chinese character sets. 3300 however provides support for Chinese customers so that they can enter text using Chinese characters.

If the system is set up for Chinese, then (unlike for Japanese markets) the user can enter just one version of the patient name. This would make Chinese systems work in the same way as Russian, English, French, Italian, and Spanish systems. The Chinese user will be able to enter the patient name using a combination of Chinese and Roman characters – all of the characters will appear wherever the system displays the patient name (image, report, Search for Study window, etc.).

Since the DICOM Standard does not offer support for Chinese characters, all Chinese characters entered into the Patient ID screen will be lost if a user exports or backs up a study to media. This will be noticed when the study is imported back into the system; upon import, each Chinese character will be replaced with a question mark ("??") character. The question marks will make it obvious to the user that the characters were lost.

If the user enters a patient name that consists entirely of Chinese characters, then the name will come back as "??????"?. In this case, the user will have to identify the study in the "Import Study" and "Search for Study" windows by the MRN. If the user enters a patient name that consists of a combination of Roman and Chinese characters, then Roman characters will be preserved, and the name will come back as something like "Lee ???????"?. This will give users who like to back up their studies the flexibility of entering a patient name with a combination of Roman and Chinese characters, and have at least part of the name come back during import.

Note that the original Chinese name will be "burned into" study images that are exported to media. These Chinese characters will remain on the images when the studies are imported back into the system.

## A. Appendix – Structured Report Templates

Note that all the concepts defined privately by Philips equipment have the CSD value as '99PMSBLUS'.

### A.1 OB – GYN structured report template

3300 implements the OB-GYN template (TID 5000) from the DICOM standard, part 16. This appendix describes the scope and manner that 3300 measurements appear in DICOM SR.

Measurements and calculations performed for Obstetric and Gynecology studies will lead to creation of "OB-GYN Ultrasound Procedure Report" structured report document. Measurements can be performed by pressing the 'Calc' key on 3300 control panel. Measurements and calculations available in the menu can be configured through the setup application. It is also possible to configure the measurement unit (Metric or U.S).

All concepts with value type (VT) NUM will always have a 'MeasurementUnitCodeSequence' that specifies the unit of the measurement. The CSD for all units will be UCUM (Unified Code for Units) and CV and CM will be based on application configuration and will confirm to UCUM standards.

#### A.1.1 Template specific conformance for TID 5000

The template for the root of the content tree for TID 5000 and its use in the 3300 context is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (I25000, DCM, "OB-GYN Ultrasound Procedure Report")	✓	This is the root 'CONTAINER'
2	>	HAS CONCEPT MOD	INCLUDE	DTID (I204) Language of Content Item and Descendants	x	This module is not used in 3300 at present.
3	>	HAS OBS CONTEXT	INCLUDE	DTID (I001) Observation Context	x	Although DICOM specifies this as a mandatory section, none of the attributes under DTID 1001 are mandatory.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
4	>	CONTAINS	INCLUDE	DTID (5001) Patient Characteristics	✓	Refer to A.1.1.1 for 3300 usage of this.
5	>	CONTAINS	CONTAINER	DT (111028, DCM, "Image Library")	✓	Contains list of 'IMAGE' items on which the measurements have been performed. Subsequent measurement concept content items refer to these IMAGE items using INFERRED FROM relationship.
6	>>	CONTAINS	IMAGE	No purpose of reference	✓	One or more 'IMAGE' items on which the measurements have been performed.
7	>	CONTAINS	INCLUDE	DTID (5002) OB-GYN Procedure Summary Section	✓	Refer to A.1.1.2 for 3300 usage of this.
8	>	CONTAINS	INCLUDE	DTID (5004) Fetal Biometry Ratio Section	✓	Concepts in CID 12004 will be used, refer to A.1.1.3 for 3300 usage of this.
9	>	CONTAINS	INCLUDE	DTID (5005) Fetal Biometry Section	✓	Concepts in CID 12005 will be used, refer to A.1.1.4 for 3300 usage of this.
10	>	CONTAINS	INCLUDE	DTID (5006) Long Bones Section	✓	Concepts in CID 12006 will be used, refer to A.1.1.5 for 3300 usage of this.
11	>	CONTAINS	INCLUDE	DTID (5007) Fetal Cranium Section	✓	Concepts in CID 12007 will be used, refer to A.1.1.6 for 3300 usage of this.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
12	>	CONTAINS	INCLUDE	DTID (5009) Biophysical Profile Section	✓	Refer to A.1.1.7 for 3300 usage of this.
13	>	CONTAINS	INCLUDE	DTID (5011) Early Gestation Section	✓	Concepts in CID 12009 will be used, refer to A.1.1.8 for 3300 usage of this.
14	>	CONTAINS	INCLUDE	DTID (5010) Amniotic Sac Section	✓	Concepts in CID 12008 will be used, refer to A.1.1.9 for 3300 usage of this.
15	>	CONTAINS	INCLUDE	DTID (5015) Pelvis and Uterus Section	✓	Concepts in CID 12011 will be used, refer to A.1.1.10 for 3300 usage of this.
16	>	CONTAINS	INCLUDE	DTID (5012) Ovaries Section	✓	Refer to A.1.1.11 for 3300 usage of this.
17	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section	✓	This section is used with concept modifier Laterality = Left. Refer to A.1.1.12 for 3300 usage of this.
18	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section	✓	This section is used with concept modifier Laterality = Right. Refer to A.1.1.12 for 3300 usage of this.
19	>	CONTAINS	CONTAINER	EV (121070, DCM, "Findings")	✓	This section (row 19, 20, and 21) is used to include fetus vascular measurements. Refer to section A.1.1.13 for details. Measurements from DCID (12141), 'Fetal Vasculature' are used.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
20	>>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	EV (T-F6800, SRT, "Embryonic Vascular Structure")
21	>>	CONTAINS	INCLUDE	DTID (5025) OB-GYN Fetal Vascular Measurement Group)	✓	\$AnatomyGroup = DCID (12141) Fetal Vasculature). Refer to section A.1.1.13 for details of TID 5025.
22	>	CONTAINS	CONTAINER	EV (121070, DCM, "Findings")	✓	This section (row 22, 23, and 24) is used to include pelvic vascular measurements. Refer to section A.1.1.14 for details. Measurements from DCID (12140), 'Fetal Vasculature' are used.
23	>>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	EV (T-D6007, SRT, "Pelvic Vascular Structure")
24	>>	CONTAINS	INCLUDE	DTID (5026) OB-GYN Pelvic Vascular Measurement Group)	✓	\$AnatomyGroup = DCID (12140) Pelvic Vasculature Anatomical Location. Refer to section A.1.1.14 for details of TID 5026.

#### A.1.1.1 OB-GYN Patient Characteristics (TID 5001)

Use of the template TID 5001 in the context of 3300 is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
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1			CONTAINER	EV (121118, DCM, "Patient Characteristics")	✓	
2	>	CONTAINS	NUM	EV (8302-2, LN, "Patient Height")	✓	Value is taken from PDE (Patient Data Entry) screen or from the MWL.
3	>	CONTAINS	NUM	EV (29463-7, LN, "Patient Weight")	✓	Value is taken from PDE (Patient Data Entry) screen or from the MWL.
4	>	CONTAINS	NUM	EV (11996-6, LN, "Gravida")	✓	Value is taken from PDE (Patient Data Entry) screen.
5	>	CONTAINS	NUM	EV (11977-6, LN, "Para")	✓	Value is taken from PDE (Patient Data Entry) screen.
6	>	CONTAINS	NUM	EV (11612-9, LN, "Aborta")	✓	Value is taken from PDE (Patient Data Entry) screen.
7	>	CONTAINS	NUM	EV (33065-4, LN, "Ectopic Pregnancies")	✓	Value is taken from PDE (Patient Data Entry) screen.

#### A.1.1.2 OB-GYN Procedure Summary (TID 5002)

The following table describes the use of this template in the context of 3300.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (121111, DCM, "Summary")	✓	

2	>	CONTAINS	DATE	(11955-2, LN, "LMP")	✓	Value is taken from PDE (Patient Data Entry) screen. -- Row 2, 3 and 4 are concepts from DCID 12003, "OB-GYN Dates"
3	>	CONTAINS	DATE	(11779-6, LN, "EDD from LMP")	✓	Value automatically calculated by the 3300 system based on the value entered for LMP.
4	>	CONTAINS	DATE	(11781-2, LN, "EDD from average ultrasound age")	✓	Value automatically calculated by the 3300 system based various measurements and on the LMP. If there is more than one fetus, the value used is the earliest calculated EDD amongst all fetuses.
5	>	CONTAINS	NUM	(11878-6, LN, "Number of Fetuses")	✓	Value is taken from PDE (Patient Data Entry) screen. -- This value is actually inserted as invocation of TID 300 (Measurement) with concept(s) from DCID 12001, "OB-GYN summary" passed as parameters.
6	>	CONTAINS	INCLUDE	"OB-GYN Fetus Summary" (BTID 5003)	✓	Refer to section A.1.1.2.1 for details of 3300 usage of this. This template is included 1 per fetus.
7	>	CONTAINS	TEXT	EV(121106, DCM, "Comment")	✓	Reading From Interpret Summary

8	>	CONTAINS	TEXT	EV(121106, DCM, "Comment")	✓	Reading From Interpret Comments
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#### A.1.1.2.1 OB-GYN Fetus Summary (TID 5003)

3300 uses this template to insert measurements from DCID 12019. 3300 uses a private extension to DCID 12019 to define a new Fetus Summary measurement concept for 'Peak-to-Peak time interval over two beats'.

Following table shows the extension to Fetus Summary (CID 12019) used by 3300.

CSD	CV	CM
99PMSBLUS	C12019-01	Peak-to-Peak time interval over two beats

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (125008, DCM, "Fetus Summary")	✓	
2	>	HAS OBS CONTEXT	TEXT	EV (11951-1, LN, "Fetus ID")	✓	Value of "1", "2", "3" or "4" is used as identifier of the Fetus. -- This value is actually inserted as invocation of TID 1008 (Subject context - Fetus) -- This is present only if the study has more than one fetus.

3	>	CONTAINS	TEXT	EV (I21106, DCM, "Comment")	✓	<p>This field contains all observations, findings (only the Finding text value preceded by the Finding Group Name) and the comments entered in the reporting screen on the 3300. In case of multiple fetuses, these observations are associated with the selected Fetus ID.</p> <p>For the Anatomy Visualized finding, a string 'Seen' will be displayed against the anatomy if the check box against the particular anatomy is checked in the reporting screen. A string 'Not Seen' will be displayed against the anatomy if the check box against the particular anatomy is not checked in the reporting screen.</p>
4	>	CONTAINS	NUM	(I1888-5, LN, "Composite Ultrasound Age")	✓	<p>This is a system-calculated value.</p> <p>-- This value is inserted as invocation of TID 300 (Measurement) with concepts from DCID 12019</p>
5	>	CONTAINS	NUM	(I1885-1, LN, "Gestational Age by LMP")	✓	<p>This is a system-calculated value.</p> <p>-- This value is inserted as invocation of TID 300 (Measurement) with concepts from DCID 12019</p>

6	>	CONTAINS	NUM	(I1727-5, LN, "Estimated Weight")	✓	This is a system-calculated value. -- This value is inserted as invocation of TID 300 (Measurement) with concepts from DCID 12019
7	>>	HAS CONCEPT MOD	CODE	Equation or Table	✓	Concepts from CID 12014, OB Body Fetal Weight Equations and Tables will be used. Refer to section A.1.1.16 for concepts used in 3300.
8	>	CONTAINS	NUM	(99PMSBLUS, C12019-01, Peak-to-Peak time interval over two beats)	✓	This value is inserted as invocation of TID 300 (Measurement) with concepts from DCID 12019. This concept is an extension of DCID 12019.
9	>>	HAS PROPERTIES	CODE	EV(121404,DCM, "Selection Status")	✓	Status of selection of a measurement for further processing or use.  This value is inserted as invocation of TID 310
10	>	CONTAINS	NUM	(I1948-7, LN, "Fetal heart Rate")	✓	Value is taken from the Fetal Heart Rate measurements.

### A.1.1.3 Fetal Biometry Ratio Section (TID 5004)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (I2500I, DCM, "Fetal Biometry Ratios")	✓	
2	>	HAS OBS CONTEXT	TEXT	EV (I195I-I, LN, "Fetus ID")	✓	Value of "1", "2", "3" or "4" is used as identifier of the Fetus. -- This value is actually inserted as invocation of TID 1008 (Subject context - Fetus) -- This value is present only if more than one fetus exist.
3	>	CONTAINS	NUM	Measurements from CID 12004 (Fetal Biometry Ratios) are included.	✓	These biometry measurements are added as part of invocation of Measurement (TID 300) template.

#### A.1.1.3.1 Fetal Biometry Ratios used in 3300 (CID 12004)

3300 defines an extension of CID 12004 to include HrtC / TC ratio as part of this context group. Following table shows the concepts in CID 12004 (including the private extension for 3300) that are used in 3300.

CSD	CV	Code Meaning
LN	I1947-9	HC/AC
LN	I1871-1	FL/AC
LN	I1872-9	FL/BPD
LN	I1823-2	Cephalic Index

99PMSBLUS	C12004-01	HrtC/TC (Heart Circumference/Thoracic Circumference)
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#### A.1.1.4 Fetal Biometry Section (TID 5005)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (I25002, DCM, "Fetal Biometry")	✓	
2	>	HAS OBS CONTEXT	TEXT	EV (I1951-1, LN, "Fetus ID")	✓	Will be present if more than one fetus.
3	>	CONTAINS	INCLUDE	Biometry Group (DTID 5008)	✓	Measurements from DCID I2005 are used as 'Biometry type' to invoke this template one or more number of times. Refer to section A.1.1.6.1 for details of Biometry Group template usage.

#### A.1.1.4.1 Fetal Biometry Measurements used in 3300 (CID 12005)

3300 defines a private extension to CID 12005 to include measurements available on 3300 but not (yet) defined in this context group. The following table shows the measurements from CID 12005 (including 3300 private extensions) that are used in 3300. All private extensions will use the coding scheme designator as 99PMSBLUS.

<b>CSD</b>	<b>CV</b>	<b>Code Meaning</b>
LN	11979-2	Abdominal Circumference
LN	11818-2	Anterior-Posterior Abdominal Diameter
LN	11820-8	Biparietal Diameter
LN	11965-1	Foot Length
LN	11984-2	Head Circumference
LN	11851-3	Occipital-Frontal Diameter
LN	11988-3	Thoracic Circumference
LN	11862-0	Transverse Abdominal Diameter
LN	11864-6	Transverse Thoracic Diameter
LN	11862-0	Transverse Abdominal Diameter
99PMSBLUS	C12005-01	Ear length
99PMSBLUS	C12005-02	Fetal trunk Cross sectional Area
99PMSBLUS	C12005-03	Heart Circumference
99PMSBLUS	C12005-04	Length of middle Phalanx of the 5th Digit

99PMSBLUS	CI2005-05	Renal Width
99PMSBLUS	CI2005-06	Renal length
99PMSBLUS	CI2005-07	Anterior-Posterior thoracic diameter
99PMSBLUS	CI2005-08	Transverse trunk Diameter

#### A.1.1.5 Fetal Long Bones Section (TID 5006)

Fetal Long Bones section is inserted in the SR Document in the same way as Fetal Biometry Section (Refer section A.1.1.4). \$Biometry Type used to invoke the template TID 5008 is taken from the context group Fetal Long Bones Measurement (CID 12006). All the measurements in CID 12006 are available in 3300 as described in the following table.

CSD	CV	Code Meaning
LN	11966-9	Humerus length
LN	11967-7	Radius length
LN	11969-3	Ulna length
LN	11968-5	Tibia length
LN	11964-4	Fibula length
LN	11962-8	Clavicle length
LN	11963-6	Femur Length

### A.1.1.6 Fetal Cranium Section (TID 5007)

Fetal Cranium section is inserted in the SR Document in the same way as Fetal Biometry Section (Refer section A.1.1.4). \$Biometry Type used to invoke the template TID 5008 is taken from the context group Fetal Cranium (CID 12007).

3300 defines a private extension to CID 12007 to include cranial measurements available in 3300 but not (yet) defined in CID 12007. The following table shows the measurements from CID 12007 (including 3300 private extensions) that are used in 3300. All private extensions will use the coding scheme designator as 99PMSBLUS.

CSD	CV	Code Meaning
LN	12171-5	Lateral Ventrical width
LN	11860-4	Cisterna Magna Length
LN	12146-7	Nuchal Fold thickness
LN	33070-4	Inner Orbital Diameter
LN	11629-3	Outer Orbital Diameter
LN	11863-8	Trans Cerebellar Diameter
99PMSBLUS	C12007-01	Diameter of the First Orbit
99PMSBLUS	C12007-02	Diameter of the Second Orbit

#### A.1.1.6.1 Fetal Biometry Group (TID 5008)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
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1			CONTAINER	DT(125005, DCM, "Biometry Group")	✓	
2	>	CONTAINS	NUM	Measurement of selected 'BiometryType'	✓	This row and next two rows are inserted as part of TID 300 (Measurement) invocation. If multiple measurements are made of the same biometry type, these three rows will be repeated for each measurement instance.
3	>>	INFERRED FROM	IMAGE	ReferencedContentIdentifier	✓	An ordered set of one or more integers that uniquely identify the Image in the 'Image Library' section of this SR document. This is the image from which the measurement is inferred. This item will not be present, if the measurement does not refer to any image.
4	>>	HAS CONCEPT MOD	CODE	Derivation	✓	If a user has performed more than one measurement then he / she can either use average (default) of these instances or he can specifically select one of the measured instance for using in calculations. If the selection is Average, then that average measurement instance will have a derivation modifier as (R-00317, SRT, "Mean").
5	>>	HAS PROPERTIES	CODE	Selection Status	✓	This will have a value 'Mean Value Chosen' if the Derivation is 'Mean'. In all other cases, this will have a value, 'User Chosen Value'.

6	>	CONTAINS	NUM	EV (18185-9, LN, "Gestational Age")	✓	This will be present if user has selected the corresponding gestation age calculation. For example, if the biometry type is BPD and user has selected GA (BPD) as one of the calculations (from the analysis setup application), this row will be present. 3300 system automatically calculates the GA based on standard (or user defined) equations and tables.
7	>>	INFERRED FROM	CODE	Equation or Table	✓	Concepts from CID 12013, Gestation age equations and tables will be used. Refer to section A.1.1.15 for concepts used in 3300.

#### A.1.1.7 Fetal Biophysical Profile Section (TID5009)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (125006, DCM, "Biophysical Profile")	✓	
2	>	HAS OBS CONTEXT	TEXT	EV (11951-1, LN, "Fetus ID")	✓	Will be present if more than one fetus.

3	>	CONTAINS	NUM	EV (11631-9, LN, "Gross Body Movement")	✓	3300 uses the value as entered in the reporting screen.
4	>	CONTAINS	NUM	EV (11632-7, LN, "Fetal Breathing")	✓	3300 uses the value as entered in the reporting screen.
5	>	CONTAINS	NUM	EV (11635-0, LN, "Fetal Tone")	✓	3300 uses the value as entered in the reporting screen.
6	>	CONTAINS	NUM	EV (11630-1, LN, "Amniotic Fluid Volume")	✓	3300 uses the value as entered in the reporting screen.
7	>	CONTAINS	NUM	DT (11634-3, LN, "Biophysical Profile Sum Score")	✓	3300 automatically calculates the sum of all the scores.

**A.1.1.8 Early Gestation Section (TID 5011)**

Early Gestation section is inserted in the SR Document in the same way as Fetal Biometry Section (Refer section A.1.1.4). \$Biometry Type used to invoke the template TID 5008 is taken from the context group Early Gestation Biometry Measurements (CID 12009).

<b>CSD</b>	<b>CV</b>	<b>Code Meaning</b>
LN	11957-8	Crown Rump Length
LN	11850-5	Gestational Sac Diameter
LN	33071-2	Spine Length

**A.1.1.9 Amniotic Sac section (TID 5010)**

<b>No</b>	<b>NL</b>	<b>REL WITH PARENT</b>	<b>VT</b>	<b>Concept Name</b>	<b>Used in 3300</b>	<b>Comments</b>
1			CONTAINER	DT (I21070, DCM, "Findings")	✓	
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	DT (T-F1300, SRT, "Amniotic Sac")
3	>	CONTAINS	NUM	(I1627-7, LN, "Amniotic Fluid Index")	✓	This is inserted as part of the invocation of template TID 300 (Measurement)

4	>	CONTAINS	NUM	(11624-4, LN, "First Quadrant Diameter")	✓	This is inserted as part of the invocation of template TID 300 (Measurement)
5	>>	HAS CONCEPT MOD	CODE	Derivation	✓	This will have a value 'Mean' IFF average measurement instance is used in calculations.
6	>>	HAS PROPERTIES	CODE	Selection Status	✓	This will have a value 'Mean Value Chosen' if the Derivation is 'Mean'. In all other cases, this will have a value, 'User Chosen Value'.
7	>>	INFERRED FROM	IMAGE	ReferencedContentIdentifier	✓	Refers to the image on which this measurement was done.  --- Similarly other measurements from CID 12008 are added. The concepts are – (11624-4, LN, "First Quadrant Diameter"), (11626-9, LN, "Second Quadrant Diameter"), (11625-1, LN, "Third Quadrant Diameter"), (11623-6, LN, "Fourth Quadrant Diameter")

## A.1.1.10 Pelvis and Uterus Section (TID 5015)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (125011, DCM, "Pelvis and Uterus")	✓	
2	>	CONTAINS	CONTAINER	EV (T-83000, SRT, "Uterus")	✓	DITD 5016 (LWH Volume Group) is included. Uterus volume, length and width measurements are inserted. Group Name is 'Uterus'
3	>>	CONTAINS	NUM	(33192-6, LN, "Uterus Volume")	✓	This row is inserted as part of TID 300 (Measurement) invocation. 3300 automatically calculates the volume based on L,W and H measurements.
4	>>	CONTAINS	NUM	(11842-2, LN, "Uterus Length")	✓	This row is inserted as part of TID 300 (Measurement) invocation. -- Similar to rows 4,5 and 6, the concepts for Uterus Height and Uterus Width are added too. These concepts are: (11859-6, LN, "Uterus Height") and (11865-3, LN, " Uterus Width")

5	>> >	HAS CONCEPT MOD	CODE	“Derived”	✓	This will have a value ‘Mean’ IFF the average measurement instance is used in calculations.
6	>> >	HAS PROPERTIES	CODE	Selection Status	✓	This will have a value ‘Mean Value Chosen’ if the Derivation is ‘Mean’. In all other cases, this will have a value, ‘User Chosen Value’.
7	>> >	INFERRED FROM	IMAGE	ReferencedContentItemIdentifier	✓	Refers to the image on which this measurement was done.
8	>	CONTAINS	NUM	(11961-0, LN, “Cervix Length”)	✓	This measurement is from CID 12011, “Ultrasound Pelvic and Uterus”. This is inserted as part of invocation of TID 300 (Measurement). Similar to other measurements, the concept modifier for ‘Derivation’, Selection Status and ‘Referenced Content Item’ would be present for this measurement.
9	>	CONTAINS	NUM	(12145-9, LN, “Endometrium Thickness” )	✓	This measurement is from CID 12011, “Ultrasound Pelvic and Uterus”.

## a. CID 12011 Ultrasound Pelvis And Uterus

## A.1.1.11 Ovaries Section (TID 5012)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (I21070, DCM, "Findings")	✓	
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	DT (T-87000, SRT, "Ovary")
3	>	CONTAINS	CONTAINER	EV (T-87000, SRT, "Ovary")	✓	DITD 5016 (LWH Volume Group) is included. Left ovary volume, length and width measurements are inserted. Group name is 'Ovary'
4	>>	CONTAINS	NUM	EV (I2164-0, LN, "Left Ovary Volume")	✓	This row is inserted as part of TID 300 (Measurement) invocation. 3300 automatically calculates the volume based on L, W and H measurements.

5	>> >	CONTAINS	NUM	EV (11840-6, LN, "Left Ovary Length")	✓	This row is inserted as part of TID 300 (Measurement) invocation.  -- Similar to rows 5, 6 and 7, the concepts for Ovary Height and Ovary Width are added too. These concepts are: EV (11857-0, LN, "Left Ovary Height") and EV (11829-9, LN, "Left Ovary Width")
6	>> >	HAS CONCEPT MOD	CODE	"Derived"	✓	This will have a value "Mean" IFF the average measurement instance is used in calculations.
7	>> >	HAS PROPERTIES	CODE	Selection Status	✓	This will have a value 'Mean Value Chosen' if the Derivation is 'Mean'. In all other cases, this will have a value, 'User Chosen Value'.
8	>> >	INFERRED FROM	IMAGE	ReferencedContentItemIdentifier	✓	Refers to the image on which this measurement was done.

						<p>Similarly DITD 5016 (LWH Volume Group) is included for Right ovary volume, length and width measurements. The related concepts codes are –</p> <p>\$GroupName = EV (T-87000, SRT, "Ovary")</p> <p>\$Width = EV (11830-7, LN, "Right Ovary Width")</p> <p>\$Length = EV (11841-4, LN, "Right Ovary Length")</p> <p>\$Height = EV (11858-8, LN, "Right Ovary Height")</p> <p>\$Volume= EV (12165-7, LN, "Right Ovary Volume")</p>
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**A.1.1.12 Follicles Section (TID 5013)**

SR Document may contain two instances of the Follicles section. First instance is included for left ovarian follicles and the second instance is included for right ovarian follicle. Laterality concept modifier will be used accordingly. Measurements for up to 16 follicles may be included in this section.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (121070, DCM, "Findings")	✓	
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	DT (T-87600, SRT, "Ovarian Follicle")

3	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, “Laterality”)	✓	EV (G-A101, SRT, “Left”) OR EV (G-A100, SRT, “Right”)
4	>	CONTAINS	NUM	EV (I1879-4, LN, “Number of follicles in left ovary”) OR EV (I1880-2, LN, “Number of follicles in right ovary”)	✓	Number of follicles in the ovary.
5	>	CONTAINS	CONTAINER	EV (I25007, DCM, “Measurement Group”)	✓	Template TID 5014 (Follicle Measurement Group) is included.
6	>>	HAS OBS CONTEXT	TEXT	EV (I2510, DCM, “Identifier”)	✓	3300 uses numbers “1”, “2”, “3”.. up to “16” to identify the follicle. -- Row 6, 7 and 8 are added per follicle measurement.
7	>>	CONTAINS	NUM	EV (G-D705, SRT, “Volume”)	✓	This is inserted as part of TID 300 invocation. 3300 automatically calculates the volume based on the follicle diameter.
8	>>	CONTAINS	NUM	(I1793-7, LN, “Follicle diameter”)	✓	This is inserted as part of TID 300 invocation.

**A.1.1.13 OB-GYN Fetus Vascular Ultrasound Measurement Group (TID 5025)**

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (T-F6800, SRT, "Embryonic Vascular Structure")	✓	
2	>	HAS OBS CONTEXT	TEXT	EV (I1951-I, LN, "Fetus ID")	✓	Will be present if more than one fetus.
3	>	CONTAINS	NUM	Measurement of selected fetal vascular anatomic location.	✓	Measurement types from TID 12119 (Vascular Ultrasound Property) for the anatomical locations specified in CID 12141 (Fetal Vasculature Anatomic Locations) are used.

**b. Fetus Vascular Measurements used in 3300**

3300 uses a private extension to CID 12141 to define a new fetal vascular anatomical location for 'Ductus Venosus'. Also, the anatomical location 'Umbilical Artery' defined in CID 12140 ('Pelvic Vasculature Anatomic Location') has been included in CID 12141 as 3300 considers this as Fetus measurement rather than Pelvic measurement.

Following table shows the extension to Fetal Vasculature Anatomical Locations (CID 12141) used by 3300.

CSD	CV	CM
99PMSBLUS	C12141-01	Ductus Venosus
SRT	T-F1810	Umbilical Artery

Following table shows the fetus vascular measurements (and calculations) used in 3300 as part of TID 5025.

<b>3300 Measurement</b>	<b>Measurement Type from CID 12119 and it's includes.</b>	<b>Vascular Anatomic Location from CID 12141</b>
Diastolic Velocity (Ductus Venosus)	(LN, 11653-3, Diastolic Velocity)	(99PMSBLUS, C12141-01, Ductus Venosus)
Systolic Velocity (Ductus Venosus)	(LN, 11726-7, Peak Systolic Velocity)	(99PMSBLUS, C12141-01, Ductus Venosus)
Time Averaged Peak Velocity (Ductus Venosus)	(LN, 11692-1, Time averaged peak velocity)	(99PMSBLUS, C12141-01, Ductus Venosus)
Diastolic Velocity (Umbilical Artery)	(LN, 11653-3, Diastolic Velocity)	(SRT, T-F180, Umbilical Artery)
Systolic Velocity (Umbilical Artery)	(LN, 11726-7, Peak Systolic Velocity)	(SRT, T-F180, Umbilical Artery)
Time Averaged Peak Velocity (Umbilical Artery)	(LN, 11692-1, Time averaged peak velocity)	(SRT, T-F180, Umbilical Artery)
Diastolic Velocity (Middle Cerebral Artery)	(LN, 11653-3, Diastolic Velocity)	(SRT, T-45600, Middle Cerebral Artery)
Systolic Velocity (Middle Cerebral Artery)	(LN, 11726-7, Peak Systolic Velocity)	(SRT, T-45600, Middle Cerebral Artery)

Time Averaged Peak Velocity (Middle Cerebral Artery)	(LN, I1692-1, Time averaged peak velocity)	(SRT, T-45600, Middle Cerebral Artery)
Pulsatility Index (Ductus Venosus)	(LN, I2008-9, Pulsatility Index)	(99PMSBLUS, C12141-01, Ductus Venosus)
Resistivity Index (Ductus Venosus)	(LN, I2023-8, Resistivity Index)	(99PMSBLUS, C12141-01, Ductus Venosus)
Systolic to Diastolic Ratio (Ductus Venosus)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(99PMSBLUS, C12141-01, Ductus Venosus)
Pulsatility Index (Middle Cerebral Artery)	(LN, I2008-9, Pulsatility Index)	(SRT, T-45600, Middle Cerebral Artery)
Resistivity Index (Middle Cerebral Artery)	(LN, I2023-8, Resistivity Index)	(SRT, T-45600, Middle Cerebral Artery)
Systolic to Diastolic Ratio (Middle Cerebral Artery)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(SRT, T-45600, Middle Cerebral Artery)
Pulsatility Index (Umbilical Artery)	(LN, I2008-9, Pulsatility Index)	(SRT, T-F180, Umbilical Artery)
Resistivity Index (Umbilical Artery)	(LN, I2023-8, Resistivity Index)	(SRT, T-F180, Umbilical Artery)

Systolic to Diastolic Ratio (Umbilical Artery)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(SRT, T-F180, Umbilical Artery)
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#### A.1.1.14 OB-GYN Pelvic Vascular Ultrasound Measurement Group (TID 5026)

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (T-D6007, SRT, "Pelvic Vascular Structure")	✓	
2	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT "Laterality")	✓	Laterality is used only if the measurement needs to be qualified with the laterality of the anatomy.
3	>	CONTAINS	NUM	Measurement of selected pelvic vascular anatomic location.	✓	Measurement types from TID 12119 (Vascular Ultrasound Property) for the anatomical locations specified in CID 12140 (Pelvic Vasculature Anatomic Locations) are used.

### c. Pelvic Vascular Measurements used in 3300

Following table shows the pelvic vascular measurements (and calculations) used in 3300 as part of TID 5026.

<b>3300 Measurement</b>	<b>Measurement Type from CID 12119 and it's includes.</b>	<b>Vascular Anatomic Location from CID 12140</b>
Diastolic Velocity (Left Ovarian Artery)	(LN, 11653-3, Diastolic Velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Systolic Velocity (Left Ovarian Artery)	(LN, 11726-7, Peak Systolic Velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Time Averaged Peak Velocity (Left Ovarian Artery)	(LN, 11692-1, Time averaged peak velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Diastolic Velocity (Right Ovarian Artery)	(LN, 11653-3, Diastolic Velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Right
Systolic Velocity (Right Ovarian Artery)	(LN, 11726-7, Peak Systolic Velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Right
Time Averaged Peak Velocity (Right Ovarian Artery)	(LN, 11692-1, Time averaged peak velocity)	(SRT, T-46980, Ovarian Artery) \$Laterality = Right
Diastolic Velocity (Uterine Artery)	(LN, 11653-3, Diastolic Velocity)	(SRT, T-46820, Uterine Artery)
Systolic Velocity (Uterine Artery)	(LN, 11726-7, Peak Systolic Velocity)	(SRT, T-46820, Uterine Artery)
Time Averaged Peak Velocity (Uterine Artery)	(LN, 11692-1, Time averaged peak velocity)	(SRT, T-46820, Uterine Artery)

Pulsatility Index (Left Ovarian Artery)	(LN, I2008-9, Pulsatility Index)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Resistivity Index (Left Ovarian Artery)	(LN, I2023-8, Resistivity Index)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Systolic to Diastolic Ratio (Left Ovarian Artery)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Pulsatility Index (Right Ovarian Artery)	(LN, I2008-9, Pulsatility Index)	(SRT, T-46980, Ovarian Artery) \$Laterality = Left
Resistivity Index (Right Ovarian Artery)	(LN, I2023-8, Resistivity Index)	(SRT, T-46980, Ovarian Artery) \$Laterality = Right
Systolic to Diastolic Ratio (Right Ovarian Artery)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(SRT, T-46980, Ovarian Artery) \$Laterality = Right
Pulsatility Index (Uterine Artery)	(LN, I2008-9, Pulsatility Index)	(SRT, T-46820, Uterine Artery)
Resistivity Index (Uterine Artery)	(LN, I2023-8, Resistivity Index)	(SRT, T-46820, Uterine Artery)
Systolic to Diastolic Ratio (Uterine Artery)	(LN, I2144-2, Systolic to Diastolic Velocity Ratio)	(SRT, T-46820, Uterine Artery)

**A.1.1.15 Gestation Age Equations & Tables used in 3300**

<b>CSD</b>	<b>CV</b>	<b>Code Meaning</b>
LN	11885-1	Gestational Age by LMP
LN	11884-4	Average Ultrasound Age
LN	11892-7	AC, Hadlock 1984
LN	11902-4	BPD, Hadlock 1984
LN	11905-7	BPD, Jeanty 1984
LN	33082-9	BPD, Osaka 1989
LN	33085-2	BPD, Tokyo 1986
LN	11917-2	CRL, Jeanty 1984
LN	33093-6	CRL, Osaka 1989
LN	33094-4	CRL, Rempen 1991
LN	11914-9	CRL, Robinson 1975
LN	33096-9	CRL, Tokyo 1986
LN	11920-6	FL, Hadlock 1984
LN	11923-0	FL, Jeanty 1984
LN	33101-7	FL, Osaka 1989
LN	33103-3	FL, Tokyo 1986
LN	11929-7	GS, Rempen 1991
LN	33108-2	GS, Tokyo 1986
LN	11932-1	HC, Hadlock 1984
LN	11934-7	HC, Jeanty 1984
LN	33117-3	Humerus Length, Osaka 1989

LN	33127-2	Spine Length, Tokyo, 1989
LN	11941-2	Tibia, Jeanty 1984
LN	33135-5	TCD, Nimrod 1986
LN	33138-9	Fetal Trunk Cross Sectional Area, Osaka 1989
LN	11944-6	Ulna, Jeanty 1984
LN	33073-8	AC, Hansmann 1985
LN	33538-0	BPD, Hansmann 1986
LN	33540-6	CRL, Hansmann 1986
LN	33541-4	FL, Hansmann 1986
LN	33542-2	FL, Merz 1988
LN	33106-6	GS, Hansmann 1982
LN	33543-0	HC, Hansmann 1986
LN	33115-7	HC Merz, 1988
LN	33120-7	OFD, Hansmann 1986
99PMSBLUS	C12013-16	AC Merz 1991
99PMSBLUS	C12013-17	BPD Merz 1991
99PMSBLUS	C12013-18	Transverse Trunk Diameter Hansmann 1986

### A.1.1.16 OB Fetal Body Weight Equations & Tables used in 3300

CSD	CV	Code Meaning
LN	11738-2	EFW by AC, BPD, Hadlock 1984
LN	11735-8	EFW by AC, BPD, FL, Hadlock 1985
LN	11732-5	EFW by AC, BPD, FL, HC, Hadlock 1985
LN	11751-5	EFW by AC, FL, Hadlock 1985
LN	11746-5	EFW by AC, FL, HC, Hadlock 1985
LN	11739-0	EFW by AC and BPD, Shepard 1982
LN	33140-5	EFW by BPD, FTA, FL, Osaka 1990
LN	33144-7	EFW by BPD, APAD, TAD, FL, Tokyo 1987

## A.2 Cardiac structured report template

3300 implements the Cardiac template (TID 5200) from the DICOM standard, part 16. This appendix describes the scope and manner that 3300 measurements appear in DICOM SR.

Measurements and calculations performed for cardiac studies will lead to creation of “Echocardiography Procedure Report” structured report document. Measurements can be performed by pressing the ‘Calc’ key on 3300 control panel. Measurements and calculations available in the menu can be configured through the setup application. It is also possible to configure the measurement unit (Metric or U.S).

All concepts with value type (VT) NUM will always have a ‘MeasurementUnitCodeSequence’ that specifies the unit of the measurement. The CSD for all units will be UCUM (Unified Code for Units) and CV and CM will be based on application configuration and will confirm to UCUM standards.

### A.2.1 Template specific conformance for TID 5200

The template for the root of the content tree for TID 5200 and its use in the 3300 context is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (125200, DCM, "Adult Echocardiography Procedure Report")	✓	This is the root 'CONTAINER'
2	>	HAS CONCEPT MOD	INCLUDE	DTID (1204) Language of Content Item and Descendants	x	This module is not used in 3300 at present.
3	>	HAS OBS CONTEXT	INCLUDE	DTID (1001) Observation Context	x	Although DICOM specifies this as a mandatory section, none of the attributes under DTID 1001 are mandatory.
4	>	CONTAINS	INCLUDE	DTID (5201) Echocardiography Patient Characteristics	✓	Refer A.2.3 for 3300 usage of this.
5	>	CONTAINS	CONTAINER	DT (111028, DCM, "Image Library")	✓	Contains list of 'IMAGE' items on which the measurements have been performed. Subsequent measurement concept content items refer to these IMAGE items using INFERRED FROM relationship.
6	>>	CONTAINS	IMAGE	No purpose of reference	✓	One or more 'IMAGE' items on which the measurements have been performed.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
7	>	CONTAINS	INCLUDE	DTID (T5200-03) Echo Procedure Summary Section	✓	Refer to A.2.2 for 3300 usage of this.
8	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12200 will be used with \$SectionSubject as 'Left Ventricle', refer to A.2.7 for 3300 usage of this.
9	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12204 will be used with \$SectionSubject as 'Right Ventricle', refer to A.2.11 for 3300 usage of this.
10	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12205 will be used with \$SectionSubject as 'Left Atrium', refer to A.2.12 for 3300 usage of this.
11	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12206 will be used with \$SectionSubject as 'Right Atrium', refer to A.2.13 for 3300 usage of this.
12	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12211 will be used with \$SectionSubject as 'Aortic Valve', refer to A.2.17 for 3300 usage of this.
13	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12207 will be used with \$SectionSubject as 'Mitral Valve', refer to A.2.14 for 3300 usage of this.
14	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12209 will be used with \$SectionSubject as 'Pulmonic Valve', refer to A.2.16 for 3300 usage of this.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
15	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12208 will be used with \$SectionSubject as 'Tricuspid Valve', refer to A.2.15 for 3300 usage of this.
16	>	CONTAINS	INCLUDE	DTID (5202) Echo Section	✓	Concepts in CID 12212 will be used with \$SectionSubject as 'Aorta', refer to A.2.18 for 3300 usage of this.
17	>	CONTAINS	CONTAINER	DTID (5202) Echo Section	✓	Concepts in CID 12217 will be used with \$SectionSubject as 'Cardiac Shunt Study', refer to A.2.19 for 3300 usage of this.
18	>	CONTAINS	CONTAINER	DTID (5204) Wall Motion Analysis	✓	This section is used to include all Wall Motion Analysis related details. Refer to A.2.6 for more details.
19	>	CONTAINS	CONTAINER	DTID (5202) Echo Section	✓	Concepts in CID 99200 will be used with \$SectionSubject as 'Left Heart', refer to A.2.32 for 3300 usage of this.
20	>	CONTAINS	CONTAINER	DTID (5202) Echo Section	✓	Concepts in CID 99200 will be used with \$SectionSubject as 'Right Heart', refer to A.2.32 for 3300 usage of this.
21	>	CONTAINS	CONTAINER	DTID (5202) Echo Section	✓	Concepts in CID 99201 will be used with \$SectionSubject as 'Patent Ductus Arteriosus', refer to A.2.33 for 3300 usage of this.

### A.2.2 Echo Procedure Summary Section (TID 5200-03)

This is a privately defined template to put all the observations, findings and comments entered for the cardiac study in the reporting screen. The following table describes the use of this template in the context of 3300.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	DT (I21111, DCM, "Summary")	✓	
2	>	CONTAINS	TEXT	EV (I21106, DCM, "Comment")	✓	This field contains all observations, findings (only the Finding text value preceded by the Finding Group Name) and the comments entered in the reporting screen on the 3300.

### A.2.3 Echocardiography Patient Characteristics (TID 5201)

Use of the template TID 5201 in the context of 3300 is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (I21118, DCM, "Patient Characteristics")	✓	
2	>	CONTAINS	NUM	EV (I21033, DCM, "Subject Age")	✓	Value is taken from PDE (Patient Data Entry) screen or from the MWL. Concepts from the DCID 7456 are used for putting the units for age.

3	>	CONTAINS	CODE	EV (I21032, DCM, "Subject Sex")	✓	Value is taken from PDE (Patient Data Entry) screen or from the MWL and the corresponding Concepts are taken from the DCID 7455.
4	>	CONTAINS	NUM	EV (8867-4, LN, "Heart Rate")	✓	Value is taken from the Heart Rate study attribute value entered in 3300 reporting application.
5	>	CONTAINS	NUM	EV (F008EC, SRT, "Systolic Blood Pressure")	✓	Value is taken from PDE (Patient Data Entry) screen.
6	>	CONTAINS	NUM	EV (F008ED, SRT, "Diastolic Blood Pressure")	✓	Value is taken from PDE (Patient Data Entry) screen.
7	>	CONTAINS	NUM	EV (8277-6, LN, "Body Surface Area")	✓	Value automatically calculated by the 3300 system based on the Height and Weight values entered on PDE (Patient Data Entry) screen.
8	>>	INFERRED FROM	CODE	EV (8248-4, LN, "Body Surface Area Formula")	x	This value is not used in 3300 at present.

#### A.2.4 Echo Section (TID 5202)

This template is invoked multiple times by passing different section subjects as 'Finding Site' value. Use of the template TID 5202 in the context of 3300 is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (I21070, DCM, "Findings")	✓	

2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	Value passed in the parameter \$SectionSubject is given here.
3	>	CONTAINS	CONTAINER	DT (I25007, DCM, "Measuremen t Group")	✓	
4	>>	HAS CONCEPT MOD	CODE	EV (G-0373, SRT,"Image Mode")	x	This value is not used in 3300 at present.
5	>>	HAS CONCEPT MOD	CODE	DT (I25203,DCM ,"Acquisition Protocol")	x	This value is not used in 3300 at present.
6	>	CONTAINS	INCLUDE	DTID (5203) Echo Measurement	✓	This template is invoked multiple times for all the measurements done on the \$SectionSubject. Refer to section A.2.5 for details of 3300 usage of this.

### A.2.5 Echo Measurement (TID 5203)

Use of the template TID 5203 in the context of 3300 is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			INCLUDE	DTID (300) Measurement	✓	
2	>>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	✓	This row is used only if the measurement or calculation this template is invoked with mandates it. Otherwise this row is not used. The values are taken from the BCID 12227.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
3	>>	INFERRED FROM	IMAGE	ReferencedContentItemIdentifier	✓	Refers to the image on which this measurement was done.
4	>>	INFERRED FROM	NUM	ReferencedContentItemIdentifier	✓	This row is used only if the measurement or calculation this template is invoked with is of type MOD Volume measurements. In this case, reference to those twenty Left Ventricle MOD Diam entries, based on which this volume measurement is calculated is given here.
	>>	HAS PROPERTIES	CODE	EV (I21404, DCM, "Selection Status")	✓	This will have a value 'Mean Value Chosen' if the Derivation is 'Mean'. In all other cases, this will have a value, 'User Chosen Value'.
5	>	HAS CONCEPT MOD	CODE	EV (G-C048, SRT, "Flow Direction")	✓	This row is used only if the measurement or calculation this template is invoked with mandates it. Otherwise this row is not used. The values are taken from the BCID 12221.
6	>	HAS CONCEPT MOD	CODE	EV (R-40899, SRT, "Respiratory Cycle Point")	x	This value is not used in 3300 at present.
7	>	HAS CONCEPT MOD	CODE	EV (R-4089A, SRT, "Cardiac Cycle Point")	✓	IFF \$Measurement = (99PMSBLUS, C12201-01, "Left Ventricle MOD Diam")

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
8	>	HAS CONCEPT MOD	CODE	EV (G-0373, SRT, "Image Mode")	✓	This row is used only if the measurement or calculation this template is invoked with mandates it. Otherwise this row is not used. The values are taken from the BCID I2224.
9	>	HAS CONCEPT MOD	CODE	EV (I11031, DCM, "Image View")	✓	This row is used only if the measurement or calculation this template is invoked with mandates it. Otherwise this row is not used. The values are taken from the BCID I2226.
10	>	HAS CONCEPT MOD	TEXT	EV (99PMSBLUS, T5203-01, "Simpson's Disk Number")	✓	IFF \$Measurement = (99PMSBLUS, C12201-01, "Left Ventricle MOD Diam")

### A.2.6 Wall Motion Analysis (TID 5204)

This template is invoked as many times as the number of the Wall Motion stages done for the stress study. Use of the template TID 5204 in the context of 3300 is described in the following table.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
1			CONTAINER	EV (I21070, DCM, "Findings")	✓	
2	>	HAS CONCEPT MOD	CODE	EV (I21058, DCM, "Procedure reported")	✓	DT (P5-B3121, SRT, "Echocardiography for Determining Ventricular Contraction")
3	>	HAS ACQ CONTEXT	CODE	EV (LN, 18139-6, "Stage")	x	This value is not used in 3300 at present.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
4	>	CONTAINS	IMAGE	EV (I25201, DCM, "Illustration of Finding")	x	This value is not used in 3300 at present.
5	>	CONTAINS	TEXT	EV (LN, I8118-0, "LV Wall Motion Segmental Findings")	x	This value is not used in 3300 at present.
6	>	CONTAINS	NUM	DT (I25202, DCM, "LV Wall Motion Score Index")	✓	3300 computes the Wall Motion Score index from the assessment done on the Wall segments for that particular stage.
7	>>	HAS CONCEPT MOD	CODE	EV (G-E048, SRT, "Assessment Scale")	✓	3300 uses the 5 Point Segment Finding Scale for Wall motion score index. Concept from BCID 12238 is used here.
8	>	CONTAINS	CONTAINER	EV (I21070, DCM, "Findings")	✓	
9	>>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	✓	DT (T-D0772, SRT, "Myocardial Wall")
10	>>	CONTAINS	CODE	EV (LN, I8179-2, "Wall Segment")	✓	3300 performs Wall motion analysis based on 16-segment assessment. Concepts for the segments are taken from the BCID 3717.
11	>> >	HAS PROPERTIES	CODE	EV (F-32050, SRT, "Cardiac Wall Motion")	✓	Concepts from DCID 3703 are used here. This row will be present only if row 12 is absent.

No	NL	REL WITH PARENT	VT	Concept Name	Used in 3300	Comments
12	>> >	HAS PROPERTIES	CODE	EV (G-C504, SRT, "Associated Morphology")	✓	Concepts from DCID 3704 are used here.  This row will be present only if row 11 is absent.
13	>> >	HAS PROPERTIES	NUM	DT (G-C1E3, SRT, "Score")	✓	

### A.2.7 CID 12200 Echocardiography Left Ventricle

This section lists the measurements and associated calculations from CID12200 (and the includes of CID 12200), which can be performed on 3300.

Code Scheme	Code Value	Concept Name
	INCLUDE CID 12220	Echocardiography Common Measurements
	INCLUDE CID 12201	Left Ventricle Linear
	INCLUDE CID 12240	Left Ventricle Area
	INCLUDE CID 12202	Left Ventricle Volume
	INCLUDE CID 12222	Orifice Flow Properties
	INCLUDE CID 12203	Left Ventricle Other
	INCLUDE CID 12239	Cardiac Output Properties

### A.2.8 CID 12201 Left Ventricle Linear

This section lists the measurements and associated calculations from CID12201, which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
LN	29436-3	Left Ventricle Internal End Diastolic Dimension
LN	29438-9	Left Ventricle Internal Systolic Dimension
LN	18051-3	Left Ventricular Fractional Shortening
LN	18154-5	Interventricular Septum Diastolic Thickness
LN	18158-6	Interventricular Septum Systolic Thickness
LN	18077-8	Left Ventricle diastolic major axis
LN	18076-0	Left Ventricle systolic major axis
LN	18156-0	Left Ventricle Posterior Wall Systolic Thickness
LN	18152-9	Left Ventricle Posterior Wall Diastolic Thickness
99PMSBLUS	C12201-01	Left Ventricle MOD Diam

### A.2.9 CID 12202 – Left Ventricle Volume

This section lists the measurements and associated calculations from CID12202, which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
LN	18026-5	Left Ventricular End Diastolic Volume
LN	18148-7	Left Ventricular End Systolic Volume
LN	18043-0	Left Ventricular Ejection Fraction

**A.2.10 CID 12203 – Left Ventricle Other**

This section lists the measurements and associated calculations from CID12203, which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
LN	18087-7	Left Ventricle Mass
LN	18071-1	Left Ventricular Isovolumic Relaxation Time

**A.2.11 CID 12204 – Echocardiography Right Ventricle**

This section lists the measurements and associated calculations from CID12204 (and the includes of 12204), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
INCLUDE CID 12222 Orifice Flow Properties		
INCLUDE CID 12239 Cardiac Output Properties		
LN	20304-2	Right Ventricular Internal Diastolic Dimension
SRT	G-0380	Right Ventricular Peak Systolic Pressure
LN	18153-7	Right Ventricular Anterior Wall Diastolic Thickness

**A.2.12 CID 12205 – Echocardiography Left Atrium**

This section lists the measurements and associated calculations from CID12205 (and the includes of 12205), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
LN	29469-4	Left Atrium Antero-posterior Systolic Dimension
LN	17985-3	Left Atrium to Aortic Root Ratio

**A.2.13 CID 12206 – Echocardiography Right Atrium**

This section lists the measurements and associated calculations from CID 12206 (and the includes of 12206), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
LN	18070-3	Right Atrium Systolic Pressure

**A.2.14 CID 12207 – Echocardiography Mitral Valve**

Apart from the below measurements, 3300 defines an extension of CID 12207 to include additional Concepts for Mitral valve as shown below.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
INCLUDE CID 12222 Orifice Flow Properties		
INCLUDE CID 12239 Cardiac Output Properties		
LN	17978-8	Mitral Valve A-Wave Peak Velocity
LN	18037-2	Mitral Valve E-Wave Peak Velocity
LN	18038-0	Mitral Valve E to A Ratio
LN	18040-6	Mitral Valve E-F Slope by M-Mode
LN	18036-4	Mitral Valve EPSS, E wave
99PMSBLUS	C12207-01	Mitral Valve D-E Excursion
99PMSBLUS	C12207-06	Mitral Valve Flow Area

**A.2.15 CID 12208 – Echocardiography Tricuspid Valve**

This section lists the measurements and associated calculations from CID 12208 (and the includes of 12208), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
INCLUDE CID 12222 Orifice Flow Properties		
LN	20296-0	Time from Q wave to Tricuspid Valve Opens

**A.2.16 CID 12209 – Echocardiography Pulmonic Valve**

This section lists the measurements and associated calculations from CID 12209 (and the includes of 12209), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
INCLUDE CID 12222 Orifice Flow Properties		
LN	20295-2	Time from Q wave to Pulmonic Valve Closes

**A.2.17 CID 12211 – Echocardiography Aortic Valve**

This section lists the measurements and associated calculations from CID 12211 (and the includes of 12211), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
INCLUDE CID 12222 Orifice Flow Properties		
LN	17996-0	Aortic Valve Cusp Separation

**A.2.18 CID 12212 – Echocardiography Aorta**

This section lists the measurements and associated calculations from CID12212 (and the includes of 12212), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
LN	18015-8	Aortic Root Diameter
LN	18012-5	Ascending Aortic Diameter

**A.2.19 CID 12217 – Echocardiography Cardiac Shunt**

This section lists the measurements and associated calculations from CID12217 (and the includes of 12217), which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
INCLUDE CID 12220 Echocardiography Common Measurements		
LN	29462-9	Pulmonary-to-Systemic Shunt Flow Ratio

**A.2.20 CID 12220 – Echocardiography Common Measurements**

This section lists the measurements and associated calculations from CID12220, which can be performed on 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
LN	8867-4	Heart rate

**A.2.21 CID 12221 – Flow Direction**

This section lists the Flow direction from CID1222, which are used by 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
SRT	R-42047	Antegrade Flow
SRT	R-42E61	Regurgitant Flow

**A.2.22 CID 12222 – Orifice Flow Properties**

Apart from below concepts, 3300 defines an extension of CID 12222 to include few more Orifice Flow property concepts.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
LN	33878-0	Volume Flow
LN	34141-2	Peak Instantaneous Flow Rate
SRT	G-038E	Cardiovascular Orifice Area
SRT	G-038F	Cardiovascular Orifice Diameter
SRT	G-0390	Regurgitant Fraction
LN	11726-7	Peak Velocity
LN	20352-1	Mean Velocity
LN	20247-3	Peak Gradient
LN	20256-4	Mean Gradient
LN	20354-7	Velocity Time Integral
LN	20280-4	Pressure Half-Time
LN	20168-1	Acceleration Time
LN	20217-6	Deceleration Time
LN	20216-8	Deceleration Slope
99PMSBLUS	C12222-01	Flow Radius
99PMSBLUS	C12222-02	Alias Velocity
99PMSBLUS	C12222-03	Pressure Half-Time Peak velocity

99PMSBLUS	CI2222-04	Minimum Velocity
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### A.2.23 CID 12223 – Echocardiography Stroke Volume Origin

This section lists the concepts from CID12223, which are used by 3300.

CSD	CV	CM
SNM3	T-32600	Left Ventricle
SNM3	T-35300	Mitral Valve
SNM3	T-42000	Aorta
SNM3	T-32650	Left Ventricle Outflow Tract
SNM3	T-32550	Right Ventricle Outflow Tract

### A.2.24 CID 12224 – Ultrasound Image Modes

This section lists the Image modes from CID12224, which are used by 3300.

CSD	CV	CM
SRT	G-03A2	2D mode
SRT	G-0394	M mode

### A.2.25 CID 12226 – Echocardiography Image View

This section lists the Image views from CID12226, which are used by 3300.

CSD	CV	CM
SRT	G-A19B	Apical two chamber
SRT	G-A19C	Apical four chamber
SRT	G-039B	Parasternal short axis at the Papillary Muscle level
SRT	G-039A	Parasternal short axis at the Mitral Valve level

**A.2.26 CID 12228 – Volume Methods**

Apart from using the below concepts for Volume methods, 3300 also extends the CID 12228 with two more concepts as given in the table.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
DCM	I25205	Area-Length Single Plane
DCM	I25226	Single Plane Ellipse
DCM	I25206	Cube Method
DCM	I25207	Method of Disks, Biplane
DCM	I25208	Method of Disks, Single Plane
DCM	I25209	Teichholz
DCM	I25211	Biplane Ellipse
99PMSBLUS	C12228-01	Bullet
99PMSBLUS	C12228-02	Method of Disks, Simpson

**A.2.27 CID 12229 – Area Methods**

This section lists the area methods from CID 12229, which are used by 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
DCM	I25214	Continuity Equation by Peak Velocity
DCM	I25215	Continuity Equation by Velocity Time Integral
DCM	I25216	Proximal Isovelocity Surface Area

**A.2.28 CID 12231 – Volume Flow Methods**

This section lists the volume flow methods from CID 12231, which are used by 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
DCM	I25216	Proximal Isovelocity Surface Area

**A.2.29 CID 12238 – Wall Motion Scoring Schemes**

This section lists the Wall Motion scoring scheme from CID12238, which are used by 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
DCM	I25224	5 Point Segment Finding Scale

**A.2.30 CID 12239 – Cardiac Output Properties**

This section lists the Cardiac Output properties from CID12239, which are used by 3300.

<b>CSD</b>	<b>CB</b>	<b>CM</b>
SRT	F-32120	Stroke Volume
SRT	F-32100	Cardiac Output

**A.2.31 CID 12240 – Left Ventricle Area**

This section lists the Left Ventricle area from CID12240, which are used by 3300.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
SRT	G-0374	Left Ventricular Systolic Area
SRT	G-0375	Left Ventricular Diastolic Area
SRT	G-0379	Left Ventricle Epicardial Diastolic Area, psax pap view
SRT	G-0376	Left Ventricular Fractional Area Change

**A.2.32 CID 99200 – Heart Measurements**

3300 uses a private context group CID 99200 to define the concepts for measurements related to heart in general. Following table shows the concepts present in this CID.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
99PMSBLUS	C99200-01	Left Heart Maximum Velocity
99PMSBLUS	C99200-02	Right Heart Maximum Velocity
99PMSBLUS	C99200-03	Left Heart Maximum Diameter
99PMSBLUS	C99200-04	Right Heart Maximum Diameter

**A.2.33 CID 99201 – Ductus Arteriosus Measurements**

3300 uses a private context group CID 99201 to define the concepts for measurements related to Ductus Arteriosus. Following table shows the concepts present in this CID.

<b>CSD</b>	<b>CV</b>	<b>CM</b>
99PMSBLUS	C99201-01	Ductus Arteriosus Flow Velocity
99PMSBLUS	C99201-02	Ductus Arteriosus Dimension

## A.2.34 Mapping between 3300 measurements and DICOM Concepts.

### A.2.34.1 Left Ventricle Measurements

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
LVIDd (2D)	Left Ventricle	<csd>LN</csd> <cv>29436-3</cv> <cm>Left Ventricle Internal End Diastolic Dimension</cm>	Image Mode = 2D
LVIDd (MM)	Left Ventricle	<csd>LN</csd> <cv>29436-3</cv> <cm>Left Ventricle Internal End Diastolic Dimension</cm>	Image Mode = MMode
LVIDs (2D)	Left Ventricle	<csd>LN</csd> <cv>29438-9</cv> <cm>Left Ventricle Internal Systolic Dimension</cm>	Image Mode = 2D
LVIDs (MM)	Left Ventricle	<csd>LN</csd> <cv>29438-9</cv> <cm>Left Ventricle Internal Systolic Dimension</cm>	Image Mode = MMode
LVPWd (2D)	Left Ventricle	<csd>LN</csd> <cv>18152-9</cv> <cm>Left Ventricle Posterior Wall Diastolic Thickness</cm>	Image Mode = 2D
LVPWd (MM)	Left Ventricle	<csd>LN</csd> <cv>18152-9</cv> <cm>Left Ventricle Posterior Wall Diastolic Thickness</cm>	Image Mode = MMode
LVPWs (2D)	Left Ventricle	<csd>LN</csd> <cv>18156-0</cv> <cm>Left Ventricle Posterior Wall Systolic Thickness</cm>	Image Mode = 2D
LVPWs (MM)	Left Ventricle	<csd>LN</csd> <cv>18156-0</cv> <cm>Left Ventricle Posterior Wall Systolic Thickness</cm>	Image Mode = MMode
IVSd (2D)	Left Ventricle	<csd>LN</csd> <cv>18154-5</cv> <cm>Interventricular Septum Diastolic Thickness</cm>	Image Mode = 2D
IVSd (MM)	Left Ventricle	<csd>LN</csd> <cv>18154-5</cv> <cm>Interventricular Septum Diastolic Thickness</cm>	Image Mode = MMode

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
IVSs (2D)	Left Ventricle	<csd>LN</csd> <cv>18158-6</cv> <cm>Interventricular Septum Systolic Thickness</cm>	Image Mode = 2D
IVSs (MM)	Left Ventricle	<csd>LN</csd> <cv>18158-6</cv> <cm>Interventricular Septum Systolic Thickness</cm>	Image Mode = MMode
LV mean PG	Left Ventricle	<csd>LN</csd> <cv>20256-4</cv> <cm>Mean Gradient</cm>	Finding Site = Left ventricle outflow tract
LV V1 max	Left Ventricle	<csd>LN</csd> <cv>11726-7</cv> <cm>Peak Velocity</cm>	Finding Site = Left ventricle outflow tract
LV V1 VTI	Left Ventricle	<csd>LN</csd> <cv>20354-7</cv> <cm>Velocity Time Integral</cm>	Finding Site = Left ventricle outflow tract
EDV (MOD-sp2)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Image Mode = 2D Measurement Method = Method of Disks, Single Plane Image View = Apical two Chamber
EDV (MOD-sp4)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Image Mode = 2D Measurement Method = Method of Disk, Single plane Image View = Apical four Chamber
LVAd ap2	Left Ventricle	<csd>SRT</csd> <cv>G-0375</cv> <cm> Left Ventricular Diastolic Area</cm>	Image Mode = 2D Image View = Apical two Chamber Measurement Method = Method of disks, single plane
LVAd ap4	Left Ventricle	<csd>SRT</csd> <cv>G-0375</cv> <cm> Left Ventricular Diastolic Area</cm>	Image Mode = 2D Image View = Apical four Chamber Measurement Method = Method of disks, single plane
LVAd apical	Left Ventricle	<csd>SRT</csd> <cv>G-0375</cv> <cm>Left Ventricular Diastolic Area</cm>	Image Mode = 2D Measurement Method = Method of Disks, Single Plane
LVAd sax epi	Left Ventricle	<csd>SRT</csd> <cv>G-0379</cv> <cm>Left Ventricle Epicardial Diastolic Area, psax pap view</cm>	Image Mode = 2D Image View = Parasternal short axis at the Papillary Muscle level
LVAd sax MV	Left Ventricle	<csd>SRT</csd> <cv>G-0375</cv> <cm>Left Ventricular Diastolic Area</cm>	Image Mode = 2D Image View = Parasternal short axis at the Mitral Valve level

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
LVAd sax PM	Left Ventricle	<csd>SRT</csd> <cv>G-0375</cv> <cm>Left Ventricular Diastolic Area</cm>	Image Mode = 2D Image View = Parasternal short axis at the Papillary Muscle level
LVAAs ap2	Left Ventricle	<csd>SRT</csd> <cv>G-0374</cv> <cm>Left Ventricular Systolic Area</cm>	Image Mode = 2D Image View = Apical two chamber Measurement Method = Method of Disks, Single Plane
LVAAs ap4	Left Ventricle	<csd>SRT</csd> <cv>G-0374</cv> <cm>Left Ventricular Systolic Area</cm>	Image Mode = 2D Image View = Apical four chamber Measurement Method = Method of Disks, Single Plane
LVAAs apical	Left Ventricle	<csd>SRT</csd> <cv>G-0374</cv> <cm>Left Ventricular Systolic Area</cm>	Image Mode = 2D Measurement Method = Method of Disks, Single Plane
LVAAs sax MV	Left Ventricle	<csd>SRT</csd> <cv>G-0374</cv> <cm>Left Ventricular Systolic Area</cm>	Image Mode = 2D Image View = Parasternal short axis at the Mitral Valve level
LVAAs sax PM	Left Ventricle	<csd>SRT</csd> <cv>G-0374</cv> <cm>Left Ventricular Systolic Area</cm>	Image Mode = 2D Image View = Parasternal short axis at the Papillary Muscle level
LVLd apical	Left ventricle	<csd>LN</csd> <cv> 18077-8</cv> <cm> Left Ventricle Diastolic Major Axis</cm>	Image Mode = 2D Measurement Method = Method of Disks, Single Plane
LVLs apical	Left ventricle	<csd>LN</csd> <cv> 18076-0</cv> <cm> Left Ventricle Systolic Major Axis</cm>	Image Mode = 2D Measurement Method = Method of Disks, Single Plane
LVOT diam	Left ventricle	<csd>SRT</csd> <cv>G-038F</cv> <cm>Cardiovascular Orifice Diameter</cm>	Finding Site = Left ventricle outflow tract Image Mode = 2D
ESV(MOD-sp2)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Image Mode = 2D Image View = Apical two chamber Measurement Method = Method of Disks, Single Plane
ESV(MOD-sp4)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Image Mode = 2D Image View = Apical four chamber Measurement Method = Method of Disks, Single Plane

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
CO(bp-el)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Biplane Ellipse
CO(Bullet)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Bullet
CO(Cubed) (2D)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Cube Image Mode = 2D
CO(Cubed) (MM)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Cube Image Mode = MMode
CO(LVOT)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Finding Site = Left ventricle outflow tract
CO(MOD-bp)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Method of Disks, Biplane
CO(mod-Simp)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Method of Disks, Simpson
CO(MOD-sp2)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Image View = Apical two chamber Measurement Method = Method of Disks, Single Plane
CO(MOD-sp4)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Image View = Apical four chamber Measurement Method = Method of Disks, Single Plane
CO(sp-el)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Method of Disks, Single Plane Ellipse
CO(Teich) (2D)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Teichholz Image Mode = 2D
CO(Teich) (MM)	Left Ventricle	<csd>SRT</csd> <cv>F-32100</cv> <cm>Cardiac Output</cm>	Measurement Method = Teichholz Image Mode = MMode
EDV(bp-el)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Biplane Ellipse
EDV(Bullet)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Bullet

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
EDV(Cubed) (2D)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Cube Image Mode = 2D
EDV(Cubed) (MM)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Cube Image Mode = MMode
EDV(MOD-bp)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Method of Disks, Biplane
EDV(mod-Simp)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Method of Disks, Simpson
EDV(sp-el)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Single plane Ellipse
EDV(Teich) (2D)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Teichholz Image Mode = 2D
EDV(Teich) (MM)	Left Ventricle	<csd>LN</csd> <cv>18026-5</cv> <cm>Left Ventricular End Diastolic Volume</cm>	Measurement Method = Teichholz Image Mode = MMode
EF(bp-el)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Biplane Ellipse
EF(Bullet)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Bullet
EF(Cubed) (2D)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Cube Image Mode = 2D
EF(Cubed) (MM)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Cube Image Mode = MMode

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
EF(MOD-bp)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Method of Disks, Biplane
EF(mod-Simp)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Method of Disk, Simpson
EF(MOD-sp2)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Method of Disks, Single plane Image View = Apical two chamber
EF(MOD-sp4)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Method of Disks, Single plane Image View = Apical four chamber
EF(sp-el)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Single plane Ellipse
EF(Teich) (2D)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Teichholz Image Mode = 2D
EF(Teich) (MM)	Left Ventricle	<csd>LN</csd> <cv>18043-0</cv> <cm>Left Ventricular Ejection Fraction</cm>	Measurement Method = Teichholz Image Mode = MMode
ESV(bp-el)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Biplane Ellipse
ESV(Bullet)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Bullet
ESV(Cubed) (2D)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Cube Image Mode = 2D
ESV(Cubed) (MM)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Cube Image Mode = MMode

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
ESV(MOD-bp)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Method of Disks, Biplane
ESV(mod-Simp)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Method of Disks, Simpson
ESV(sp-el)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Single plane Ellipse
ESV(Teich) (2D)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Teichholz Image Mode = 2D
ESV(Teich) (MM)	Left Ventricle	<csd>LN</csd> <cv>18148-7</cv> <cm>Left Ventricular End Systolic Volume</cm>	Measurement Method = Teichholz Image Mode = MMode
FS (2D)	Left Ventricle	<csd>LN</csd> <cv>18051-3</cv> <cm>Left Ventricular Fractional Shortening</cm>	Image Mode = 2D
FS (MM)	Left Ventricle	<csd>LN</csd> <cv>18051-3</cv> <cm>Left Ventricular Fractional Shortening</cm>	Image Mode = MMode
Lvmass(AL)d	Left Ventricle	<csd>LN</csd> <cv>18087-7</cv> <cm>Left Ventricle Mass</cm>	Measurement Method = Area Length Single Plane Image Mode = 2D
Lvmass(C)d	Left Ventricle	<csd>LN</csd> <cv>18087-7</cv> <cm>Left Ventricle Mass</cm>	Measurement Method = Cube Image Mode = 2D
LVMASS(C)dI	Left Ventricle	<csd>LN</csd> <cv>18087-7</cv> <cm>Left Ventricle Mass</cm>	
LVOT Area	Left Ventricle	<csd>SRT</csd> <cv>G-038E</cv> <cm>Cardiovascular Orifice Area</cm>	Finding Site = Left ventricle outflow tract Image Mode = 2D
SV(bp-el)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Biplane Ellipse

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
SV(Bullet)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Bullet
SV(Cubed) (2D)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Cube Image Mode = 2D
SV(Cubed) (MM)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Cube Image Mode = MMode
SV(LVOT)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Finding Site = Left ventricle outflow tract
SV(MOD-bp)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Method of Disks, Biplane
SV(mod-Simp)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Method of Disks, Simpson
SV(MOD-sp2)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Method of Disks, Single plane.
SV(MOD-sp4)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Image View = Apical two chamber Measurement Method = Method of Disks, Single plane.
SV(sp-el)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Image View = Apical four chamber Measurement Method = Single plane, Ellipse
SV(Teich) (2D)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Teichholz Image Mode = 2D
SV(Teich) (MM)	Left Ventricle	<csd>SRT</csd> <cv>F-32120</cv> <cm>Stroke Volume</cm>	Measurement Method = Teichholz Image Mode = MMode
IVR Time	Left Ventricle	<csd>LN</csd> <cv>18071-1</cv> <cm>Left Ventricular Isovolumic Relaxation Time</cm>	
MM HR (2D)	Left Ventricle	<csd>LN</csd> <cv>8867-4</cv> <cm>Heart rate</cm>	Image Mode = 2D
MM HR (MM)	Left Ventricle	<csd>LN</csd> <cv>8867-4</cv> <cm>Heart rate</cm>	Image Mode = MMode

### A.2.34.2 Right Ventricle Measurements

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
RVAWd (2D)	Right Ventricle	<csd>LN</csd> <cv>18153-7</cv> <cm>Right Ventricular Anterior Wall Diastolic Thickness</cm>	Image Mode = 2D
RVAWd (MM)	Right Ventricle	<csd>LN</csd> <cv>18153-7</cv> <cm>Right Ventricular Anterior Wall Diastolic Thickness</cm>	Image Mode = MMode
RVDD (2D)	Right Ventricle	<csd>LN</csd> <cv>20304-2</cv> <cm>Right Ventricular Internal Diastolic Dimension</cm>	Image Mode = 2D
RVDD (MM)	Right Ventricle	<csd>LN</csd> <cv>20304-2</cv> <cm>Right Ventricular Internal Diastolic Dimension</cm>	Image Mode = MMode
RVOT maxV	Right Ventricle	<csd>LN</csd> <cv>11726-7</cv> <cm>Peak Velocity</cm>	Finding Site = Right Ventricle Outflow Tract.
RVSP(TR)	Right Ventricle	<csd>SRT</csd> <cv>G-0380</cv> <cm>Right Ventricular Peak Systolic Pressure</cm>	

### A.2.34.3 Aortic Valve Measurements

<b>3300 Label</b>	<b>Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
ACS	Aortic Valve	<csd>LN</csd> <cv>17996-0</cv> <cm>Aortic Valve Cusp Separation</cm>	Image Mode = MMode
Max PG(AI)	Aortic Valve	<csd>LN</csd> <cv>20247-3</cv> <cm>Peak Gradient</cm>	Flow Direction = Regurgitant Flow
AI max vel	Aortic Valve	<csd>LN</csd> <cv>11726-7</cv> <cm>Peak Velocity</cm>	Flow Direction = Regurgitant Flow
Ao V2 VTI	Aortic Valve	<csd>LN</csd> <cv>20354-7</cv> <cm>Velocity Time Integral</cm>	Flow Direction = Antegrade Flow
Ao max PG	Aortic Valve	<csd>LN</csd> <cv>20247-3</cv> <cm>Peak Gradient</cm>	Flow Direction = Antegrade Flow

<b>3300 Label Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
Ao mean PG Aortic Valve	<csd>LN</csd> <cv>20256-4</cv> <cm>Mean Gradient</cm>	Flow Direction = Antegrade Flow
Ao V2 max Aortic Valve	<csd>LN</csd> <cv>11726-7</cv> <cm>Peak Velocity</cm>	
Ao max PG 2 Aortic Valve	<csd>LN</csd> <cv>20247-3</cv> <cm>Peak Gradient</cm>	Measurement Method = Simplified Bernoulli
Ao mean PG 2 Aortic Valve	<csd>LN</csd> <cv>20256-4</cv> <cm>Mean Gradient</cm>	Measurement Method = Simplified Bernoulli
AVA (I, D) Aortic Valve	<csd>SRT</csd> <cv>G-038E</cv> <cm>Cardiovascular Orifice Area</cm>	Measurement Method = Continuity Equation by Velocity Time Integral
AVA (V, D) Aortic Valve	<csd>SRT</csd> <cv>G-038E</cv> <cm>Cardiovascular Orifice Area</cm>	Measurement Method = Continuity Equation by Velocity Time Integral
Ao dec slope Aortic Valve	<csd>LN</csd> <cv>20216-8</cv> <cm>Deceleration Slope</cm>	Flow Direction = Antegrade Flow
Ao dec time Aortic Valve	<csd>LN</csd> <cv>20217-6</cv> <cm>Deceleration Time</cm>	Flow Direction = Antegrade Flow
Aortic HR Aortic Valve	<csd>LN</csd> <cv>8867-4</cv> <cm>Heart rate</cm>	

#### A.2.34.4 Aorta Measurements

<b>3300 Label Finding Site</b>	<b>DICOM Mapping</b>	<b>Optional Modifiers</b>
Ao root diam Aorta (2D)	<csd>LN</csd> <cv>18015-8</cv> <cm>AorticRoot Diameter</cm>	Image Mode = 2D
Ao root diam Aorta (MM)	<csd>LN</csd> <cv>18015-8</cv> <cm>AorticRoot Diameter</cm>	Image Mode = MMode
Asc Ao Aorta	<csd>LN </csd> <cv>18012-5</cv> <cm> Ascending Aortic Diameter</cm>	Image Mode = 2D

### A.2.35 Mapping between 3300 Wall Segment Scores and DICOM

DICOM uses ASE based Wall Segment scores in the template where Wall Motion Analysis data is given. 3300 provides Wall Segment scoring based on ASE scheme also. Below table shows the mapping between ASE Wall Segment scores and the DICOM.

<i>Mercury ASE Segment Score Name</i>	<i>DICOM Mapping</i>
UNREAD	<csd>SRT</csd> <cv> R-00378</cv> <cm> Not Evaluated</cm>
CANNOT_READ	<csd>DCM</csd> <cv> 122288</cv> <cm> Not visualized</cm>
NORMAL	<csd>SRT</csd> <cv>R-00344</cv> <cm> Normal wall motion</cm>
HYPOKINETIC	<csd>SRT</csd> <cv>R-4041B</cv> <cm> Hypokinesis</cm>
AKINETIC	<csd>SRT</csd> <cv>F-30004</cv> <cm> Akinesis</cm>
DYSKINETIC	<csd>SRT</csd> <cv> F-32052</cv> <cm>Dyskinesis</cm>
ANEURYSMAL	<csd>SRT</csd> <cv>D3-10510</cv> <cm>Ventricular Aneurysm</cm>

### A.2.36 Mapping between 3300 Wall Segment Names and DICOM

3300 uses 16 segment based assessment and below table shows the mapping of the 16 segments to the DICOM.

<i>Mercury Segment Name</i>	<i>DICOM Mapping</i>
Basal Anterior	<csd>SRT</csd> <cv>T-32619</cv> <cm> left ventricle basal anterior segment</cm>
Basal Anterolateral wall	<csd>SRT</csd> <cv>R-1007A</cv> <cm>left ventricle basal anterolateral segment</cm>

<b><i>Mercury Segment Name</i></b>	<b><i>DICOM Mapping</i></b>
Basal Posterolateral wall	<csd>SRT</csd> <cv>R-10079</cv> <cm>left ventricle basal inferolateral segment</cm>
Basal Inferior Wall	<csd>SRT</csd> <cv>T-32615</cv> <cm> left ventricle basal inferior segment</cm>
Basal Inferior Septum	<csd>SRT</csd> <cv>R-10076</cv> <cm>left ventricle basal inferoseptal segment</cm>
Basal Anterior Septum	<csd>SRT </csd> <cv> R-10075</cv> <cm>left ventricle basal anteroseptal segment</cm>
Mid-Anterior Wall	<csd>SRT</csd> <cv>T-32617</cv> <cm>left ventricle mid anterior segment</cm>
Mid-Anterolateral Wall	<csd>SRT </csd> <cv>R-1007C</cv> <cm>left ventricle mid anterolateral segment</cm>
Mid-Posterolateral Wall	<csd>SRT</csd> <cv>R-1007B</cv> <cm>left ventricle mid inferolateral segment</cm>
Mid-Inferior Wall	<csd>SRT</csd> <cv>T-32616</cv> <cm> left ventricle mid inferior segment</cm>
Mid-Inferior Septum	<csd>SRT</csd> <cv>R-10078</cv> <cm>left ventricle mid inferoseptal segment</cm>
Mid-Anterior Septum	<csd>SRT</csd> <cv>R-10077</cv> <cm> left ventricle mid anteroseptal segment</cm>
Apical Anterior Wall	<csd>SRT</csd> <cv> T-32613</cv> <cm> left ventricle apical anterior segment</cm>
Apical Lateral Wall	<csd>SRT</csd> <cv>T-3261C</cv>

<i>Mercury Segment Name</i>	<i>DICOM Mapping</i>
Apical Inferior Wall	<cm>left ventricle apical lateral segment</cm> <csd>SRT</csd> <cv>T-32618</cv>
Apical Septum	<cm> left ventricle apical inferior segment</cm> <csd>SRT</csd> <cv>T-32614</cv> <cm>left ventricle apical septal segment</cm>

### A.2.37 Not mapped measurements in 3300

<i>3300 Label</i>	<i>DICOM Mapping</i>
Aortic R-R	Not Mapped
MM R-R int (2D)	Not Mapped
MM R-R int (MM)	Not Mapped
Annular Vel	Not Mapped
Myocardial Vel	Not Mapped
EDA	Not Mapped
ESA	Not Mapped
LVLd % diff	Not Mapped
LVLs % diff	Not Mapped
Lvmass(AL)dI	Not Mapped
Lvmass(C)dI	Not Mapped
Pul V D	Not Mapped
Pul V S	Not Mapped
Pul V A wave max	Not Mapped.
FAC	Not Mapped.

**END OF DOCUMENT**

