

SIEMENS

syngo® SC2000™ Workplace

DICOM Conformance Statement

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CONFORMANCE STATEMENT OVERVIEW

The *syngo*® SC2000™ Workplace supports the following DICOM Application Entities:

- Verification
 - o Verification AE
- Transfer
 - o Storage AE
 - o Storage Commitment AE
- Query / Retrieve
 - o Query AE
 - o Retrieve AE

Table 1. NETWORK SERVICES

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
VERIFICATION		
Verification AE		
Verification	Yes	Yes
TRANSFER		
Storage AE		
Ultrasound Image Storage	Yes	Yes
Ultrasound Multi-frame Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Comprehensive SR	Yes	Yes
Raw Data Storage	Yes	Yes
Storage Commitment AE		
Storage Commitment Push Model	Yes	No
QUERY / RETRIEVE		
Query AE		
Study Root Query/Retrieve Information Model – FIND	Yes	No
Retrieve AE		
Study Root Query/Retrieve Information Model – MOVE	Yes	No

Table 2. UID VALUES

SOP Class Name	SOP Class UID	Category
Verification AE		
Verification	1.2.840.10008.1.1	Verification
Storage AE		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Transfer
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Transfer
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Transfer
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Transfer
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Transfer
Storage Commitment AE		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Transfer
Query AE		
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Query / Retrieve
Retrieve AE		
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Query / Retrieve

Table 3. MEDIA SERVICES

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
DVD—Recordable		
STD-US-ID-SF-DVD	Yes	No**
STD-US-ID-MF-DVD	Yes	
Compact Disk—Recordable		
STD-US-ID-SF-CDR	Yes	No**
STD-US-ID-MF-CDR	Yes	

** The syngo SC2000 Workplace supports reading DICOM part 10 files from external Media.

Table of Contents

1	INTRODUCTION	8
1.1	REVISION HISTORY	8
1.2	AUDIENCE	8
1.3	REMARKS.....	8
1.4	TERMS AND DEFINITIONS.....	9
1.5	BASICS OF DICOM COMMUNICATION.....	11
1.6	ABBREVIATIONS	12
1.7	REFERENCES	12
2	NETWORKING	13
2.1	IMPLEMENTATION MODEL.....	13
2.1.1	Application Data Flow.....	13
2.1.2	Functional Definition of AE's	14
2.1.3	Sequencing of Real-World Activities	16
2.2	AE SPECIFICATIONS.....	17
2.2.1	Storage AE	17
2.2.2	Storage Commitment AE.....	22
2.2.3	Query AE	25
2.2.4	Retrieve AE	28
2.3	NETWORK INTERFACES	30
2.3.1	Physical Network Interface.....	30
2.3.2	Additional Protocols.....	30
2.3.3	IPv4 and Ipv6 Support.....	30
2.4	CONFIGURATION.....	30
2.4.1	Local Host – TCP/IP and General	31
3	MEDIA INTERCHANGE	32
3.1	IMPLEMENTATION MODELS	32
3.1.1	Application Data Flow Diagram	32
3.1.2	Functional definitions of Aes	33
3.1.3	Sequencing of Real-World Activities	33
3.1.4	File Meta Information for Implementation Class and Version	33
3.2	AE SPECIFICATIONS.....	33
3.2.1	Media Storage AE Specification.....	33
3.2.2	Implementation Identifying Information	34
3.3	Media Storage Application Profile.....	34
3.3.1	DICOMDIR Keys	34
3.3.2	Compliance to STD-GEN-CDR	36
3.3.3	Compliance to STD-US-SC-MF-CDR	36
3.3.4	Compliance to STD-US-ID-MF-CDR.....	36
4	SUPPORT OF CHARACTER SETS.....	37
4.1	CHARACTER SETS FOR <i>syngo</i> SC2000 Workplace	37

5	SECURITY	37
5.1	SECURITY PROFILES.....	37
5.2	ASSOCIATION LEVEL SECURITY	37
5.3	APPLICATION LEVEL SECURITY	37
6	ANNEXES	38
6.1	IOD CONTENTS.....	38
6.1.1	Created SOP Instances.....	38
7	Appendices	53
7.1	Appendix A: Echocardiography Structured Report	53
7.1.1	Patient Characteristics	53
7.1.2	Left Ventricle.....	53
7.1.3	Right Ventricle	60
7.1.4	Left Atrium	62
7.1.5	Right Atrium.....	63
7.1.6	Aortic Valve	63
7.1.7	Mitral Valve.....	64
7.1.8	Pulmonic Valve.....	66
7.1.9	Tricuspid Valve.....	67
7.1.10	Aorta.....	68
7.1.11	Pulmonary Artery.....	69
7.1.12	Vena Cava.....	69
7.1.13	Pulmonary Venous Structure	70
7.1.14	Cardiac Shunt Study	71
7.1.15	Private Section: Coronary Artery.....	72
7.1.16	Private Section: Left Ventricular Analysis	73
7.1.17	Private Section: Right Ventricular Analysis	74
7.2	Appendix B: Supported Units in Structured Reports	75

List of Tables

Table 2-1: SOP Classes for Storage AE	17
Table 2-2: DICOM Application Context.....	18
Table 2-3: Number of Associations as an Association Initiator for Storage AE.....	18
Table 2-4: Number of Associations as an Association Acceptor for Storage AE	18
Table 2-5: Asynchronous Nature as an Association Initiator for Storage AE	18
Table 2-6: DICOM Implementation Class and Version for Storage AE	18
Table 2-7: Proposed Presentation Contexts for Storage AE	19
Table 2-8: Photometric Interpretation	20
Table 2-9: DICOM Command Response Status Handling Behavior	20
Table 2-10: DICOM Command Communication Failure Behavior.....	20
Table 2-11: Storage C-STORE Response Status	22
Table 2-12: SOP Classes for Storage Commitment AE	22
Table 2-13: DICOM Application Context.....	22
Table 2-14: Number of Associations as an Association Initiator for Storage Commitment AE	23
Table 2-15: Number of Associations as an Association Acceptor for Storage Commitment AE.....	23
Table 2-16: Asynchronous Nature as an Association Initiator for Storage Commitment AE.....	23
Table 2-17: DICOM Implementation Class and Version for Storage Commitment AE	23
Table 2-18: Proposed Presentation Contexts for Storage Commitment AE.....	24
Table 2-19: DICOM Command Response Status Handling Behavior	24
Table 2-20: DICOM Command Communication Failure Behavior.....	24
Table 2-21: Proposed Presentation Contexts for Storage Commitment AE.....	25
Table 2-22: DICOM Command Response Status Handling Behavior	25
Table 2-23: SOP Classes for Query AE.....	25
Table 2-24: DICOM Application Context.....	26
Table 2-25: Number of Associations as an Association Initiator for Query AE.....	26
Table 2-26: Number of Associations as an Association Acceptor for Query AE	26
Table 2-27: Asynchronous Nature as an Association Initiator for Query AE	26
Table 2-28: DICOM Implementation Class and Version for Query AE.....	26
Table 2-29: Proposed Presentation Contexts for Query AE	27
Table 2-30: DICOM Command Response Status Handling Behavior	27
Table 2-31: DICOM Command Communication Failure Behavior.....	27
Table 2-32: SOP Classes for Retrieve AE	28
Table 2-33: DICOM Application Context.....	28
Table 2-34: Number of Associations as an Association Initiator for Retrieve AE	28
Table 2-35: Number of Associations as an Association Acceptor for Retrieve AE.....	28
Table 2-36: Asynchronous Nature as an Association Initiator for Retrieve AE	29
Table 2-37: DICOM Implementation Class and Version for Retrieve AE	29
Table 2-38: Proposed Presentation Contexts for Retrieve AE and Activity MOVE SCU	29
Table 2-39: DICOM Command Response Status Handling Behavior	30
Table 2-40: DICOM Command Communication Failure Behavior.....	30
Table 3-1: Implementation Class/Version Name – Media Interchange	33
Table 3-2: Application Profiles, Activities, and Roles for DICOM Exchange Media	33
Table 3-3: DICOM Implementation Class and Version for Media Storage AE	34
Table 3-4: DICOMDIR Keys.....	34
Table 3-5: STD-GEN-CDR Supported SOP Classes	36
Table 3-6: STD-US-SC-MR-CDR Supported SOP Classes	36
Table 3-7: STD-US-MF-CDR Supported SOP Classes.....	37

List of Figures

Figure 2-1. Functional Overview	13
Figure 2-2. Functional Overview (Continued)	14
Figure 2-3. Sequence Diagram for Real-World Activities	16
Figure 2-4. Sequence Diagram for Real-World Activities (continued)	17
Figure 3-1. Media Application Data Flow Diagram	32

1 INTRODUCTION

This document describes the conformance to the ACR-NEMA DICOM 3.0 Standard by the *syngo*® SC2000™ Workplace, version VA11A from Siemens Healthcare. It shall establish the conformance specifications for this system only, and does not apply to other products offered by Siemens Healthcare or its affiliates.

The *syngo* SC2000 Workplace is a device used to review SC2000-generated ultrasound studies. These studies can be sent using DICOM standard protocols and definitions to other DICOM compliant devices that support SOP classes as defined in Table 2-1: SOP Classes for Storage AE in this document.

The DICOM standard provides a well-defined set of structures and protocols that allow inter-operability of a wide variety of medical imaging devices. The *syngo* SC2000 Workplace provides support for essential services related to ultrasound scanning and connectivity to DICOM compliant devices. *Syngo* SC2000 Workplaces will not support all features supported by the DICOM standard. This document clearly states the DICOM services and data classes that are supported by the applications included with the *syngo* SC2000 Workplace. The intent of this document is to allow users and other vendors who also conform to the DICOM standard to exchange information within the specific context of those elements of the DICOM standard that the *syngo* SC2000 Workplace supports.

This document is written with respect to the adopted portions of the DICOM standard, Version 3. The following sections of this document follow the outline specified in the DICOM Standard NEMA publication PS3.2.¹

1.1 REVISION HISTORY

Version	Date of Issue	Author	Changes
VA11A	15 May 2009	Clinical Workflow – Clinical Integration Group	Released for the <i>syngo</i> ® SC2000™ Workplace, VA11A

1.2 AUDIENCE

This document is written for the people that need to understand how the *syngo* SC2000 Workplace will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product’s functionality, and how that functionality integrates with other devices that support compatible DICOM features.

1.3 REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between the *syngo* SC2000 Workplace and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard.

¹ Second part of the DICOM standard: NEMA Standards Publication PS3.2-2008, Digital Imaging and Communications in Medicine (DICOM), Part 2: Conformance

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality as SCU and SCP, respectively.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Siemens and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [1]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity.
- Test procedures should be defined and tests should be performed by the user to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.
- The standard will evolve to meet the users' future requirements. Siemens is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens representative for the most recent product information.

1.4 TERMS AND DEFINITIONS

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

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

ACUSON SC2000™ system – The volume imaging ultrasound system used with the *syngo* SC2000 Workplace; also referred to as the SC2000.

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

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

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

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

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

Attribute Macro - A set of Attributes that are described in a single table that is referenced by multiple Module or other tables.

Information Object Definition (IOD) – A data abstraction of a class of similar Real-World Objects which defines the nature and attributes relevant to the class of Real-World objects represented. Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Integrating the Healthcare Enterprise (IHE) – An initiative sponsored by the Radiological Society of North America (RSNA) to document and demonstrate standards-based methods of sharing information in support of optimal patient care. For additional information, see www.rsna.org/ihe.

Functional Group - A set of logically related Attributes that are likely to vary together. May be used in Multi-frame IODs to describe parameters which change on a per frame basis.

Joint Photographic Experts Group (JPEG) – Joint Photographic Experts Group, The group was organized in 1986, issuing a standard in 1992, which was approved in 1994 as ISO 10918-1. The JPEG standard is used by DICOM applications.

Media Application Profile – The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs), see DICOM PS3.11.

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

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

Picture Archiving and Communications Systems (PACS) – A DICOM server that accepts medical images from another DICOM system and stores the images for later retrieval.

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

Protocol Data Unit (PDU) – A packet (piece) of a DICOM message sent across the network. It contains protocol control information and user data. Devices must specify the maximum size packet they can receive for DICOM messages.

Request (RQ) – A request from one DICOM AE for service from another DICOM AE.

Response (RSP) – A response from one DICOM AE to the request for service from another DICOM AE.

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

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

Service Class User (SCU) – The role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).

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

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

Structured Report (SR) – A DICOM object which contains measurement, calculations, diagnoses, image references, and other non-image information concerning a patient exam.

syngo® SC2000™ Workplace – The workplace of this conformance statement that is used with the ACUSON SC2000 volume imaging ultrasound system; also referred to as the SC2000 Workplace.

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

Transfer Syntax – The encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

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

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

1.5 BASICS OF DICOM COMMUNICATION

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

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts*. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

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

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

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

1.6 ABBREVIATIONS

ACR	American College of Radiology
AE	DICOM Application Entity
AET	DICOM Application Entity Title
ASCII	American Standard Code for Information Interchange
DB	Database
DCS	DICOM Conformance Statement
DSA	Digital Subtraction Angiography
IIDC	Image-Intensifier Distortion Correction
IOD	DICOM Information Object Definition
ISO	International Standard Organization
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
RIS	Radiology Information System
SC	Storage Commitment
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute
US	Ultrasound

1.7 REFERENCES

- [1] Digital Imaging and Communications in Medicine (DICOM), PS 3.1-2008 – PS 3.18-2008, National Electrical Manufacturers Association (NEMA).
- [2] IHE Radiology Technical Framework, Vol. I – IV, http://www.ihe.net/Technical_Framework.

2 NETWORKING

This section contains the syngo SC2000 Workplace networking related services.

2.1 IMPLEMENTATION MODEL

SC2000 Workplace users can review SC2000 system studies directly from the system hard drive. Studies can also be transferred to DICOM workstations and archive servers on a network. Storage Commitment can be used to insure that patient images and data is safely committed. Measurements from Cardiac exams can be exported as DICOM SR Objects. Measurements from Cardiac exams can be exported as DICOM SR Objects.

SC2000 Workplace Real World Activities are indicated by “Real World Activity” names while “SC2000 Workplace AE” indicates the invoked Application Entity. Similarly, the activities associated with service providers are indicated as “Real World Service Activity.”

2.1.1 Application Data Flow

Figure 2-1 and Figure 2-2 provide a functional overview of the SC2000 Workplace’s Application Entities (AE). Relationships are shown between user-invoked activities (in the circles at the left of the AEs) and the associated real-world activities provided by DICOM service providers (in the circles at the right of the AEs).

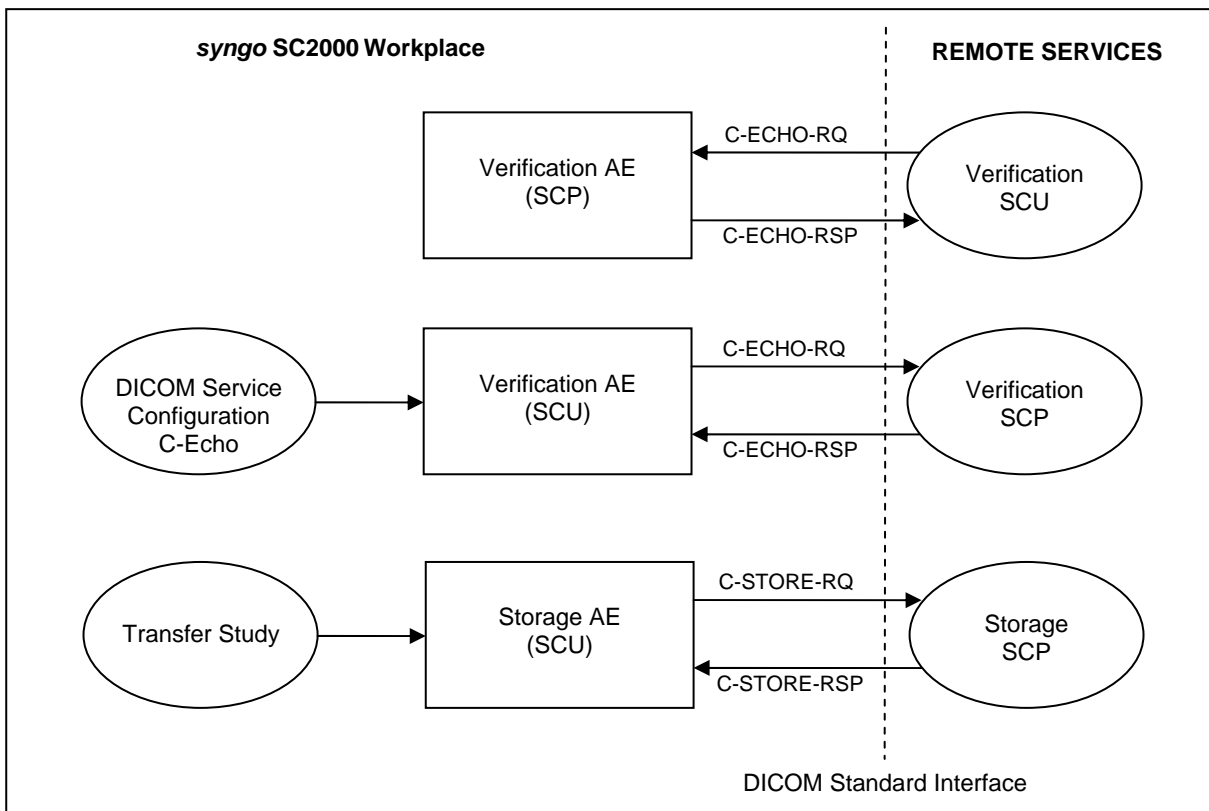


Figure 2-1. Functional Overview

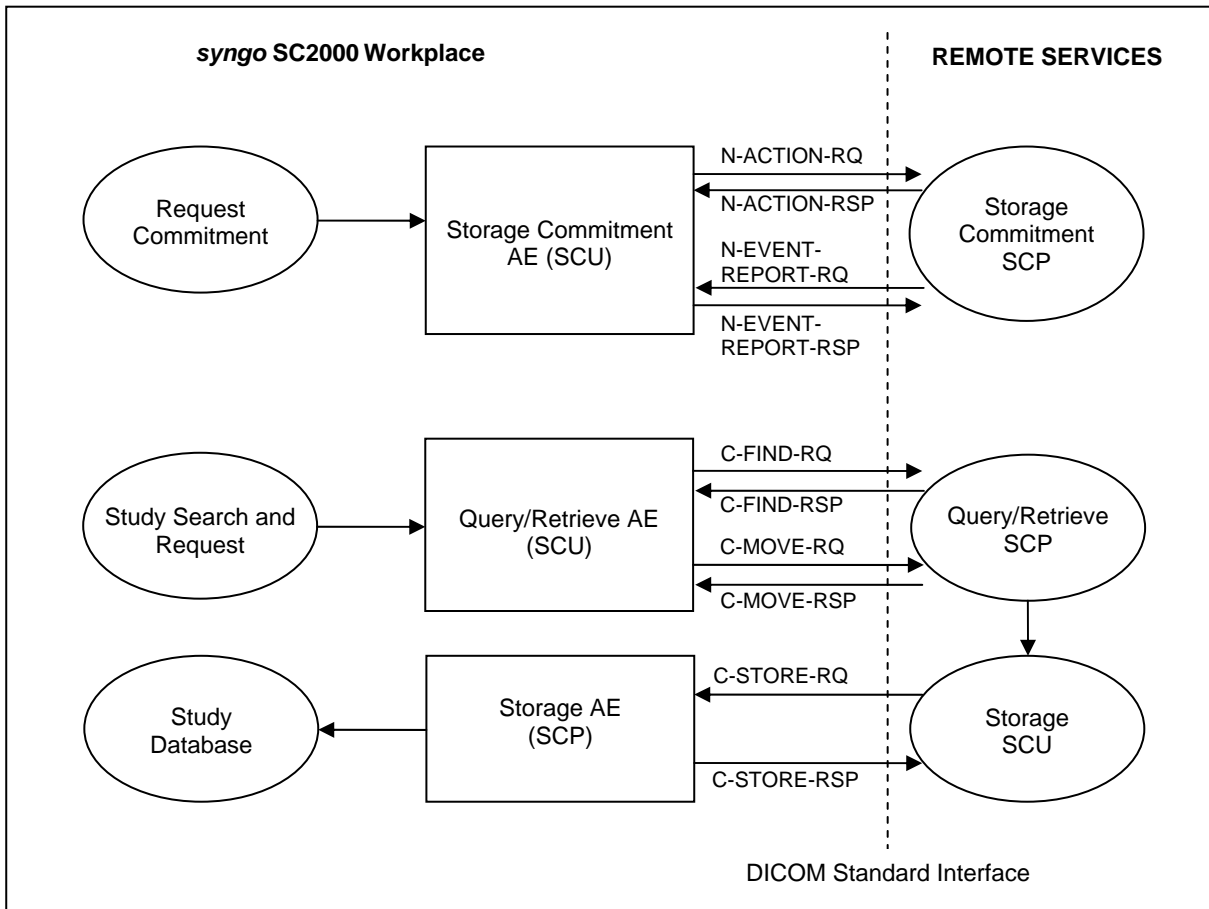


Figure 2-2. Functional Overview (Continued)

2.1.2 Functional Definition of AE's

The SCP components of the SC2000 Workplace operate as background server processes. They exist as soon as the system is powered up and wait for association requests. Upon accepting an association with a negotiated Presentation Context they start to receive and process the request described in the following sections.

2.1.2.1 Verification AE

The DICOM verification service can be used for diagnostic purposes. When used as a diagnostic tool, Verification will return the following messages to the user:

- C-Echo discovery result: Succeeded
- C-Echo discover result: Failed

Verification is available for each service configuration accessed through the Network/Printing pages of User Configuration:

- Store Configuration
- Storage Commitment Configuration
- Query Retrieve Configuration

The SC2000 Workplace supports the Verification service as a SCP and SCU. As a SCU, Verification is activated when the C-Echo button is selected on a service configuration page.

2.1.2.2 Storage AE

The SC2000 Workplace acts as SCU and SCP for the C-STORE DICOM network service.

As an SCU, the SC2000 Workplace Storage Application Entity originates associations for transfer of DICOM Ultrasound single frame images, multi-frame images, raw data objects, and Comprehensive Structured Reports to remote Application Entities.

The system supports automatic and manual storage of captured objects. Manual transfers can be initiated through the export dialog on the Data View UI. If configured for automatic transfer, the system can either transfer objects "in progress" or "on study close":

- The system automatically stores an image as soon as it is captured and saved to the local disk while the study is currently open and in-progress.
- The system automatically stores all the images belonging to the current study as it closes.

The "in-progress" method distributes the network load over time. The "on study close" method lets the user store studies more accurately in the server. During review of a study, undesired images may be deleted before the study is closed.

In the event of a network failure during a background store, the Storage SCU maintains a queue of failed C-STORE requests. These are periodically retried subsequent to the end of the study. The queue is also retried upon power cycling of the SC2000 Workplace.

The storage request consists of data describing the composite image objects selected for storage and the destination AET. An association is negotiated with the destination AE and the image data is transferred using the C-STORE DIMSE Service. The transfer status is reported to the initiator of the Storage request.

As an SCP, the SC2000 Workplace Application Entity accepts storage requests from configured DICOM nodes and stores received objects into the local database. The C-STORE DIMSE service is used for storing the images.

2.1.2.3 Storage Commitment AE

The SC2000 Workplace serves as a SCU for the DICOM Storage Commitment service. Upon successful completion of a storage job, the system uses the N-ACTION DIMSE Service to request storage commitment from a DICOM storage SCP. This can either be the same as the storage destination or storage commitment can be requested from a different server depending on the system configuration.

The user configures Storage Commitment from the Networking/Printing pages of the User Configuration. The SC2000 Workplace requests commitment of images and structured reports and, upon successful acknowledgement from the storage server, marks the study on the system hard drive as "Archived" (AD). Storage Commitment Request is always sent in an additional Association.

2.1.2.4 Query/Retrieve AE

The query/retrieve service class defines an application-level class of services which facilitates the management of images and patient data against the well-defined information model of DICOM and allows a DICOM AE to retrieve images from a remote DICOM node or to request a remote DICOM AE to initiate a transfer of images to another DICOM AE. The SC2000 Workplace DICOM query/retrieve application supports the query/retrieve services as an SCU.

The Query SCU initiates a C-FIND request to the remote SCP and is invoked directly by the user, using the query parameters entered in the Data View UI. The remote SCP returns a list of responses with defined data, which are displayed to the user. The user can decide to start retrieval or to issue another query.

The SC2000 Workplace supports

- the Study Root Query Model.

As the Move SCU, the system initiates a C-MOVE request to the remote Retrieve SCP. The remote Retrieve SCP in turn starts C-STORE suboperations to the Storage SCP.

2.1.3 Sequencing of Real-World Activities

This section describes the sequencing of Real-World Activities performed by the Application Entities using a UML sequence diagram. Real-World Activities are depicted as vertical bars and arrows show the events exchanged between them.

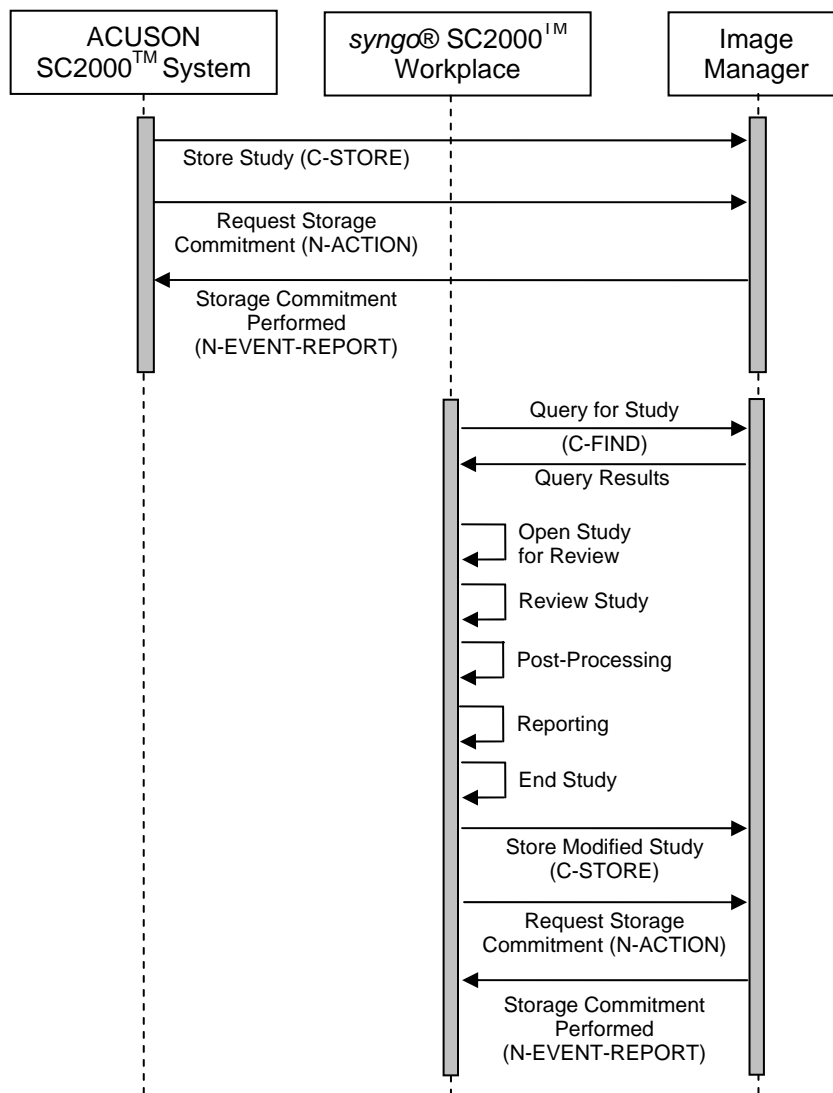


Figure 2-3. Sequence Diagram for Real-World Activities

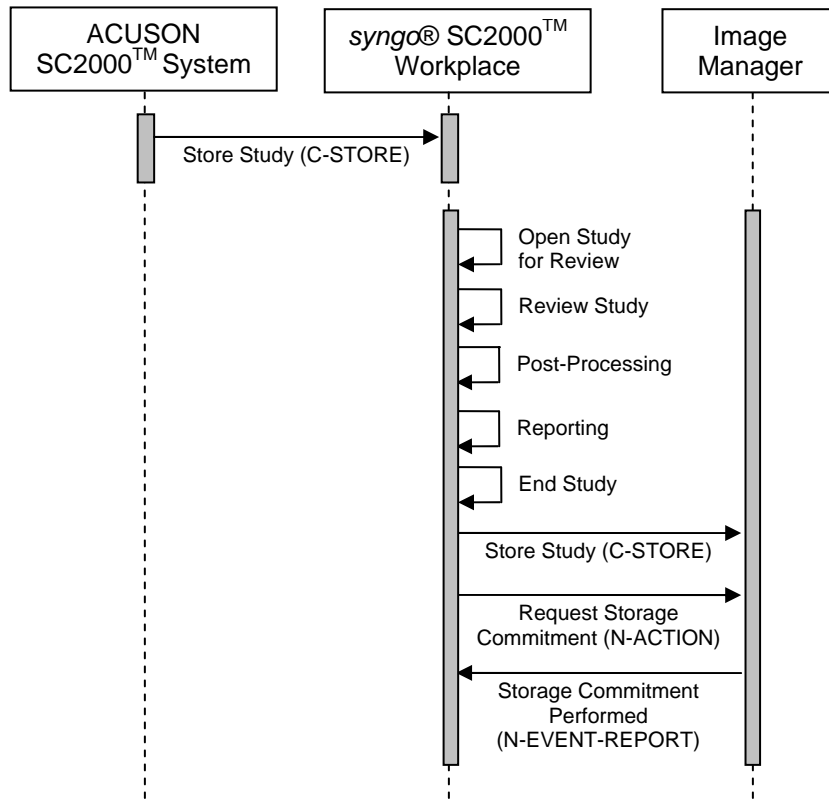


Figure 2-4. Sequence Diagram for Real-World Activities (continued)

2.2 AE SPECIFICATIONS

2.2.1 Storage AE

2.2.1.1 SOP Classes

Table 2-1:
SOP Classes for Storage AE

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Supported Storage SOP Classes			
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	YES	YES
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	YES	YES
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	YES	YES
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	YES	YES
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	YES	YES

2.2.1.2 Association Policies

2.2.1.2.1 General

**Table 2-2:
DICOM Application Context**

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

2.2.1.2.2 Number of Associations

**Table 2-3:
Number of Associations as an Association Initiator for Storage AE**

Maximum number of simultaneous associations	10
--	----

**Table 2-4:
Number of Associations as an Association Acceptor for Storage AE**

Maximum number of simultaneous associations	Configurable between 1 and 4, default: 4
--	---

2.2.1.2.3 Asynchronous Nature

The SC2000 Workplace supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side, the Window size proposed is infinite. On the SCP side, any non-infinite maximum size will be accepted.

**Table 2-5:
Asynchronous Nature as an Association Initiator for Storage AE**

Maximum number of outstanding asynchronous transactions	Infinite
--	----------

2.2.1.2.4 Implementation Identifying Information

**Table 2-6:
DICOM Implementation Class and Version for Storage AE**

Implementation Class UID	1.3.12.2.1107.5.99.3.20080101
Implementation Version Name	SIEMENS

2.2.1.3 Association Initiation Policy (Storage SCU)

The SC2000 Workplace initiates associations while processing the service operations and internal messages as shown below.

Operation or Real-World Activity	Association for
Send Instance	C-STORE, C-ECHO

2.2.1.3.1 Activity “Send To”

2.2.1.3.1.1 Description and Sequencing of Activities

Storage of a DICOM object is either triggered by a C-MOVE request initiated by an external DICOM AE to the SC2000 Workplace or internally in the SC2000 Workplace.

If an association to a remote Application Entity could successfully be established, each image will be transferred one after another via the same open association.

The automatic retry mechanism is configurable. The user can configure the number of retries as well as the time interval between two retries.

Retry is done if:

- a) The network connection has been lost from the SCU perspective. In this case, retry is performed as soon as the network connection is available again.
- b) The partner is not reachable for other reasons (e.g. partner node has broken down). For this case, a (global, configurable) timeout has been implemented after which retry is performed.

2.2.1.3.1.2 Proposed Presentation Contexts

For all supported images (see SOP Classes in Table 2-1: SOP Classes for Storage AE), the following Transfer Syntaxes are supported.

**Table 2-7:
Proposed Presentation Contexts for Storage AE**

1.2.840.10008.1.2.2	Explicit Value Representation Big Endian
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian
1.2.840.10008.1.2	Implicit Value Representation Little Endian: Default Transfer Syntax for DICOM
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]): Default Transfer Syntax for Lossless JPEG Image Compression
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression

2.2.1.3.1.3 Photometric Interpretation

Photometric Interpretation (color mode of the pixel image data) is not a negotiable parameter in DICOM 3.0. The Photometric Interpretation Attribute (0028,0004) is set depending on the transfer syntax and the system configuration.

**Table 2-8:
Photometric Interpretation**

SOP Class		Transfer Syntax		Photometric Interpretation
Name	UID	Name List	UID List	
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	RGB
		Explicit VR Little Endian	1.2.840.10008.1.2.1	
		JPEG Lossless	1.2.840.10008.1.2.4.70	
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	RGB
		Explicit VR Little Endian	1.2.840.10008.1.2.1	
Ultrasound Multi-frame Image Storage (Clips)	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy (Baseline)	1.2.840.10008.1.2.4.50	YBR_FULL_422

2.2.1.3.1.4 SOP Specific Conformance to SOP Classes

The SC2000 Workplace will not add or change private attributes, even if case objects are compressed or the image header is updated according to IHE [2] Patient Information Reconciliation.

Refer to section 6.1.1, Created SOP Instances, for a detailed list of attributes.

**Table 2-9:
DICOM Command Response Status Handling Behavior**

Service Status	Further Meaning	Error Code	Behavior
Error	Sending partially or completely failed	Any none null Code	Failure reported to user and storage job is cancelled. (percentage of transferred instances is shown)
Success	Image is successfully stored on file system.	0000	Success reported to user

**Table 2-10:
DICOM Command Communication Failure Behavior**

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s). The system retries according to the configured retry parameters.
Association Aborted	Failure reported to user and the storage job is cancelled.

2.2.1.4 Association Acceptance Policy

The SC2000 Workplace attempts to accept a new association for

- DIMSE C-STORE

service operations.

Generally, associations are accepted if all of the following conditions are true:

- The "called AET" matches one of the configured Application Entity Titles of the SC2000 Workplace.
- The "calling AET" is allowed to connect to SC2000 Workplace. This check can be disabled.
- The maximum number of incoming associations is not reached.
- At least one Proposed Presentation Context is supported.

If a Proposed Presentation Context contains more than one Transfer Syntax, the one in the following priority list is chosen (if applicable for the SOP class):

- 1) Explicit Value Representation Little Endian
- 2) Implicit Value Representation Little Endian
- 3) Explicit Value Representation Big Endian
- 4) JPEG Baseline (Process 1)
- 5) JPEG Extended (Process 2 & 4)
- 6) JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14)
- 7) JPEG 2000 Image Compression (Lossless Only)
- 8) JPEG 2000 Image Compression
- 9) RLE Lossless

2.2.1.4.1 Activity “Receive Instances”

2.2.1.4.1.1 Description and Sequencing of Activities

The SC2000 Workplace receiving process will accept an association, receive any images transmitted on that association and store the images on disk. It will store some header attributes in the database in order to allow clients to query these attributes.

2.2.1.4.1.2 Accepted Presentation Contexts

1.2.840.10008.1.2.2	Explicit Value Representation Big Endian
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian
1.2.840.10008.1.2	Implicit Value Representation Little Endian: Default Transfer Syntax for DICOM
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only)
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression (Process 4 only)
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]): Default Transfer Syntax for Lossless JPEG Image Compression
1.2.840.10008.1.2.5	RLE Lossless

2.2.1.4.1.3 SOP Specific Conformance to SOP Classes

In case of a successful C-STORE operation, the image has successfully been written on disk either in Explicit Little Endian format or in the compression format received.

The Storage AE of the SC2000 Workplace returns the status “success” when the data is stored to disk and a minimal image header validation has been performed.

The following header attributes must be available and filled:

- Patient Name,
- Study Instance UID,
- Series Instance UID and
- SOP Instance UID

**Table 2-11:
Storage C-STORE Response Status**

Service Status	Further Meaning	Error Code	Reason
Success	Success	0x0000	Image received correctly (success notification is done after receiving, before indexing and storing)

2.2.1.4.1.4 Other SOP Specific Behavior

- If an image is received that is already stored in the database – identified by the SOP Instance UID – the new image will be ignored. The existing instance is not superseded.
- The Patient Quadruplet (Patient's Name, Patient ID, Date of Birth, Patient Sex) is internally used for unique identification. The Patient ID is specified as a "type 2" attribute by DICOM. Therefore the attribute must be in the message but it may be empty. If the Patient ID is missing, it will be generated and inserted to the index by the SC2000 Workplace for internal purposes.

2.2.2 Storage Commitment AE

2.2.2.1 SOP Classes

**Table 2-12:
SOP Classes for Storage Commitment AE**

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Supported Storage Commitment SOP Classes			
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes

2.2.2.2 Association Policies

2.2.2.2.1 General

**Table 2-13:
DICOM Application Context**

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

2.2.2.2.2 Number of Associations

**Table 2-14:
Number of Associations as an Association Initiator for
Storage Commitment AE**

Maximum number of simultaneous associations	Unlimited
--	-----------

**Table 2-15:
Number of Associations as an Association Acceptor for
Storage Commitment AE**

Maximum number of simultaneous associations	Configurable between 1 and 4, default: 4
--	---

2.2.2.2.3 Asynchronous Nature

The SC2000 Workplace supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

**Table 2-16:
Asynchronous Nature as an Association Initiator for
Storage Commitment AE**

Maximum number of outstanding asynchronous transactions	Infinite
--	----------

2.2.2.2.4 Implementation Identifying Information

**Table 2-17:
DICOM Implementation Class and Version for
Storage Commitment AE**

Implementation Class UID	1.3.12.2.1107.5.99.3.20080101
Implementation Version Name	SIEMENS

2.2.2.3 Association Initiation Policy (Storage Commitment SCU)

The SC2000 Workplace initiates associations while processing the service operations and internal messages as shown below.

Operation or Real-World Activity	Association for
Storage Commitment	N-ACTION N-EVENT-REPORT

2.2.2.3.1 Activity “Send Initial Storage Commitment”

2.2.2.3.1.1 Description and Sequencing of Activities

After Sending Images to the Archive, the SC2000 Workplace will initiate a Storage Commitment request if configured. The SC2000 Workplace initiates a new association in order to send the N-ACTION-RQ to the SCP.

2.2.2.3.1.2 Proposed Presentation Contexts

**Table 2-18:
Proposed Presentation Contexts for Storage Commitment AE**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

There is no extended negotiation as an SCU.

2.2.2.3.1.3 SOP Specific Conformance to SOP Classes

**Table 2-19:
DICOM Command Response Status Handling Behavior**

Service Status	Further Meaning	Error Code	Behavior
Error	No Retry on Failure	Any none null Code	Failure reported to user
Success	Storage Commitment Reply noticed.	0000	Success reported to user

**Table 2-20:
DICOM Command Communication Failure Behavior**

Exception	Behavior
Timeout	Failure reported to user
Association Aborted	Failure reported to user

2.2.2.3.2 Activity “Send Reply to Commitment Requests on separate associations”

2.2.2.3.2.1 Description and Sequencing of Activities

The SC2000 Workplace system accepts the N-EVENT-REPORT-RQ on a separate association from the N-ACTION-RQ.

2.2.2.3.2.2 Proposed Presentation Contexts

**Table 2-21:
Proposed Presentation Contexts for Storage Commitment AE**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

There is no extended negotiation as an SCU.

2.2.2.3.2.3 SOP Specific Conformance for SOP Classes

**Table 2-22:
DICOM Command Response Status Handling Behavior**

Service Status	Further Meaning	Error Code	Behavior
Error	Storage Commitment Reply ignored.	Any none null Code	Storage Commitment will not be repeated.
Success	Storage Commitment Reply noticed.	0000	Success reported to user.

There is no special failure behavior.

2.2.2.4 Association Acceptance Policy

Storage Commitment AE does not accept Association requests.

2.2.3 Query AE

2.2.3.1 SOP Classes

The SC2000 Workplace provides Standard Conformance to the following DICOM V3.0 SOP Classes as SCP/SCU.

**Table 2-23:
SOP Classes for Query AE**

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Supported Query SOP Classes			
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No

2.2.3.2 Association Policies

2.2.3.2.1 General

**Table 2-24:
DICOM Application Context**

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

2.2.3.2.2 Number of Associations

**Table 2-25:
Number of Associations as an Association Initiator for Query AE**

Maximum number of simultaneous associations	Unlimited
--	-----------

**Table 2-26:
Number of Associations as an Association Acceptor for Query AE**

Maximum number of simultaneous associations	Configurable between 1 and 4, default: 4
--	--

2.2.3.2.3 Asynchronous Nature

The SC2000 Workplace supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

**Table 2-27:
Asynchronous Nature as an Association Initiator for Query AE**

Maximum number of outstanding asynchronous transactions	Infinite
--	----------

2.2.3.2.4 Implementation Identifying Information

**Table 2-28:
DICOM Implementation Class and Version for Query AE**

Implementation Class UID	1.3.12.2.1107.5.99.3.20080101
Implementation Version Name	SIEMENS

2.2.3.3 Association Initiation Policy (Query SCU)

The SC2000 Workplace will initiate new associations for the following operations as an SCU.

Operation or Real-World Activity	Association for
Querying a Remote Node	C-FIND

2.2.3.3.1 Activity “Querying a Remote Node”

2.2.3.3.1.1 Description and Sequencing of Activities

The associated Real-World activity is a C-Find request initiated by the user of the SC2000 Workplace. The user specifies some attributes the system should use to query its database. If the query user successfully establishes an association to the remote Application Entity, it will send a C-Find request (according to the query model) and will then return the results to the application.

2.2.3.3.1.2 Proposed Presentation Contexts

The SC2000 Workplace will propose Presentation Contexts as shown in the following table.

**Table 2-29:
Proposed Presentation Contexts for Query AE**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/ Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	No

2.2.3.3.1.3 SOP Specific Conformance to SOP Classes

Refer to section 6.1.1, Created SOP Instances, for a detailed list of attributes.

The SC2000 Workplace checks for the following status codes in the Query SCP's C-Find-Response.

**Table 2-30:
DICOM Command Response Status Handling Behavior**

Service Status	Further Meaning	Error Code	Behavior
Error	No Auto Retry on failure	Any none null Code	Failure reported to user
Success	Success logged on the job queue	0000	Success reported to user

**Table 2-31:
DICOM Command Communication Failure Behavior**

Exception	Behavior
Timeout	Failure reported to user
Association Aborted	Failure reported to user

The SC2000 Workplace supports the following query levels:

- Study

2.2.3.4 Association Acceptance Policy

Query AE does not accept Association requests.

2.2.4 Retrieve AE

2.2.4.1 SOP Classes

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

**Table 2-32:
SOP Classes for Retrieve AE**

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Supported Query/Retrieve SOP Classes			
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes

2.2.4.2 Association Policies

2.2.4.2.1 General

**Table 2-33:
DICOM Application Context**

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

2.2.4.2.2 Number of Associations

**Table 2-34:
Number of Associations as an Association Initiator for Retrieve AE**

Maximum number of simultaneous associations	Unlimited
--	-----------

**Table 2-35:
Number of Associations as an Association Acceptor for Retrieve AE**

Maximum number of simultaneous associations	Configurable between 1 and 4, default: 4
--	--

2.2.4.2.3 Asynchronous Nature

The SC2000 Workplace supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

**Table 2-36:
Asynchronous Nature as an Association Initiator for Retrieve AE**

Maximum number of outstanding asynchronous transactions	Infinite
--	----------

2.2.4.2.4 Implementation Identifying Information

**Table 2-37:
DICOM Implementation Class and Version for Retrieve AE**

Implementation Class UID	1.3.12.2.1107.5.99.3.20080101
Implementation Version Name	SIEMENS

2.2.4.3 Association Initiation Policy

The SC2000 Workplace Retrieve AE sends a C-MOVE-RQ to an SCP node to retrieve images.

2.2.4.3.1 Activity “Move SCU”

2.2.4.3.1.1 Description and Sequencing of Activities

The C-MOVE-RQs are used to retrieve the referenced instances. The Retrieve AE supports the query model Study Root.

2.2.4.3.1.2 Accepted Presentation Contexts

**Table 2-38:
Proposed Presentation Contexts for Retrieve AE and Activity MOVE SCU**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	No

There is no extended negotiation as an SCU.

2.2.4.3.1.3 SOP Specific Conformance to Move SCU Classes

At association establishment time, the C-MOVE presentation context shall be negotiated. When the C-MOVE-RQ is processed, the Move Destination attribute (receiver of images) is ignored. However, the Move Destination AE must conform to the DICOM conventions (value representation AE).

**Table 2-39:
DICOM Command Response Status Handling Behavior**

Service Status	Further Meaning	Error Code	Behavior
Error	No Auto retry on failure	Any none null Code	Failure reported to user (percentage of transferred instances is shown)
Success	Success logged on the job queue	0000	Success reported to user

**Table 2-40:
DICOM Command Communication Failure Behavior**

Exception	Behavior
Timeout	Failure reported to user
Association Aborted	Failure reported to user

2.2.4.4 Association Acceptance Policy

Retrieve AE does not accept Association requests.

2.3 NETWORK INTERFACES

2.3.1 Physical Network Interface

The SC2000 Workplace is independent from the physical medium over which TCP/IP executes; it inherits this from the OS system upon which it executes.

2.3.2 Additional Protocols

None.

2.3.3 IPv4 and IPv6 Support

IPv4 supported, IPv6 not supported.

2.4 CONFIGURATION

DICOM and networking parameters can be configured for both the local SC2000 Workplace and remote DICOM Service Class Providers through the User Configuration – Networking/Printing pages.

2.4.1 Local Host - TCP/IP and General

The SC2000 Workplace's local network parameters are configurable. The following network parameters can be configured for the SC2000 Workplace:

- Host Name
- IP address
- Network IP mask
- Router/Gateway IP addresses
- DICOM Storage and Application Entity Titles
- Printer

2.4.1.1 DICOM Storage Configuration

Remote DICOM Storage and Storage Commitment Service Class Providers are configured through the Store Configuration or Storage Commitment Configuration of the User Configuration – Networking/Printing pages. The following parameters can be configured for each device:

- Host name
- IP address
- AET - Application Entity Title
- Port number
- Proposed transfer syntaxes

3 MEDIA INTERCHANGE

3.1 IMPLEMENTATION MODELS

3.1.1 Application Data Flow Diagram

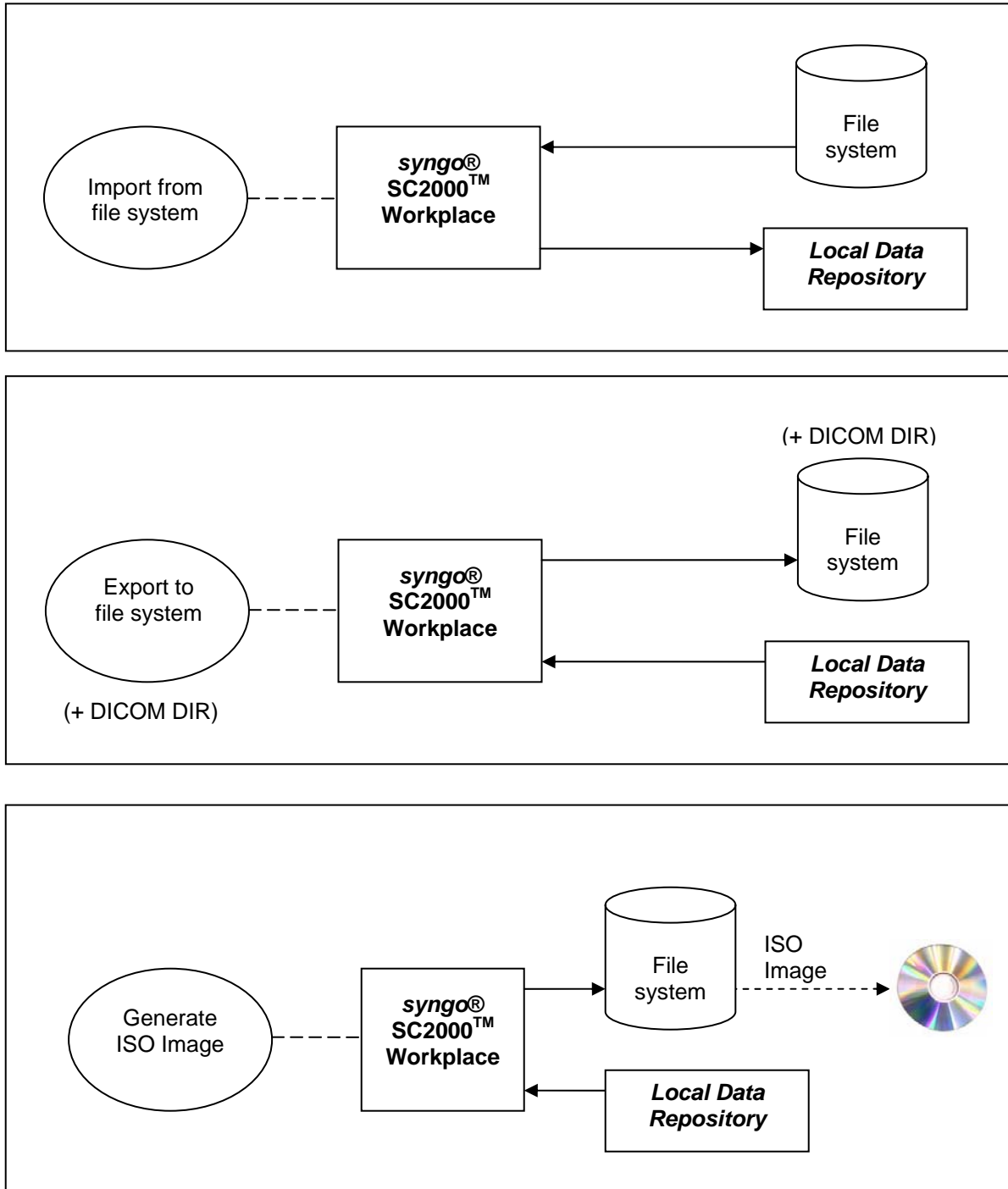


Figure 3-1. Media Application Data Flow Diagram

The SC2000 Workplace provides the functionality to Import or Export DICOM Instances to and from the File System. During exportation, a DICOMDIR may also be generated. A complete ISO Image ready-to-burn can be generated. All SOP Classes defined in Table 2-1: SOP Classes for Storage AE are supported for the Import/Export functionality.

3.1.2 Functional definitions of AEs

The SC2000 Workplace is capable of

- creating a new File-set in the File System (Export to ...)
- importing SOP Instances from the File System onto local storage

3.1.3 Sequencing of Real-World Activities

Not applicable.

3.1.4 File Meta Information for Implementation Class and Version

**Table 3-1:
Implementation Class/Version Name – Media Interchange**

File Meta Information Version	0x0001
Implementation Class UID	1.3.12.2.1107.5.99.3.20080101
Implementation Version Name	SIEMENS

3.2 AE SPECIFICATIONS

3.2.1 Media Storage AE Specification

The SC2000 Workplace system Media Storage AE provides conformance to the following DICOM SOP Classes as an FSC. The following specifications apply to the AE.

When configuring an uncompressed Transfer Syntax, the STD-US and STD-GEN application profile classes will be extended to store instances of the following SOP classes in compressed format.

**Table 3-2:
Application Profiles, Activities, and Roles for DICOM Exchange Media**

Application Profiles Supported	Real World Activity	Role
STD-GEN-CDR STD-US-SC-MF-CDR STD-US-ID-MF-CDR	Create CD-R	FSC/FSU

3.2.2 Implementation Identifying Information

**Table 3-3:
DICOM Implementation Class and Version for Media Storage AE**

Implementation Class UID	1.3.12.2.1107.5.9.20080101
Implementation Version Name	SIEMENS

3.3 Media Storage Application Profile

3.3.1 DICOMDIR Keys

The DICOMDIR file will contain the following attributes for the levels Patient - Study - Series - Image (valid for all Application profiles described in this section).

**Table 3-4:
DICOMDIR Keys**

Attribute Name	Tag	Type	Notes
File-Set Identification			
File-set ID	(0004,1130)	2	Volume label of media
Directory Information			
Offset of the First Directory Record of the Root Directory Entry	(0004,1200)	1	
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	1	
File-set Consistency Flag	(0004,1212)	1	0000H
Directory Record Sequence	(0004,1220)	2	
> Offset of the Next Directory Record	(0004,1400)	1C	
> Record In-use flag	(0004,1410)	1C	FFFFH
> Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1C	
> Directory Record Type	(0004,1430)	1C	PATIENT, STUDY, SERIES, IMAGE, SR DOCUMENT, RAW DATA
> Referenced File ID	(0004,1500)	1C	contains the filename on media for the Directory Records of Type IMAGE, SR DOCUMENT, RAW DATA
> Referenced SOP Class UID in File	(0004,1510)	1C	for the Directory Records of Type IMAGE, SR DOCUMENT, RAW DATA
> Referenced SOP Instance UID in File	(0004,1511)	1C	for the Directory Records of Type IMAGE, SR DOCUMENT, RAW DATA
> Referenced Transfer Syntax UID in File	(0004,1512)	1C	for the Directory Records of Type IMAGE, SR DOCUMENT, RAW DATA
> Record Selection Keys	see below		

Attribute Name	Tag	Type	Notes
Patient Keys			Directory Record Type PATIENT
Specific Character Set	(0008,0005)	1C	
Patient's Name	(0010,0010)	2	
Patient ID	(0010,0020)	1	
Date Of Birth	(0010,0030)	3	
Patient's Sex	(0010,0040)	3	
Study Keys			Directory Record Type STUDY
Specific Character Set	(0008,0005)	1C	
Study Date	(0008,0020)	1	
Study Time	(0008,0030)	1	
Accession Number	(0008,0050)	2	
Study Description	(0008,1030)	2	
Study Instance UID	(0020,000D)	1C	
Study ID	(0020,0010)	1	Will be generated automatically, if not present. Value = "-"
Series Keys			Directory Record Type SERIES
Specific Character Set	(0008,0005)	1C	
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Modality	(0008,0060)	1	
Institution name	(0008,0080)	3	
Institution Address	(0008,0081)	3	
Performing Physician	(0008,1050)	3	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	1	
Image Keys			Directory Record Type IMAGE
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	3	
SOP Class UID	(0008,0016)	3	
SOP Instance UID	(0008,0018)	3	
Content Date	(0008,0023)	3	
Content Time	(0008,0033)	3	
Instance Number	(0020,0013)	1	
Rows	(0028,0010)	3	
Columns	(0028,0011)	3	
Image Position Patient	(0020,0032)	3	
Image Orientation Patient	(0020,0037)	3	
Pixel Spacing	(0028,0030)	3	
Calibration Image	(0050,0004)	3	
SR Document Keys			Directory Record Type SR Document
Specific Character Set	(0008,0005)	1C	

Attribute Name	Tag	Type	Notes
Content Date	(0008,0023)	1	
Content Time	(0008,0033)	1	
Instance Number	(0020,0013)	1	
Raw Data Keys			Directory Record Type RAW DATA
Specific Character Set	(0008,0005)	1C	
Image Type	(0008,0008)	3	
SOP Class UID	(0008,0016)	3	
SOP Instance UID	(0008,0018)	3	
Content Date	(0008,0023)	3	
Content Time	(0008,0033)	3	
Acquisition Number	(0020,0012)	3	
Instance Number	(0020,0013)	1	

3.3.2 Compliance to STD-GEN-CDR

The SC2000 Workplace conforms to the STD-GEN-CDR profile. The following SOP Classes will be supported as an FSC.

**Table 3-5:
STD-GEN-CDR Supported SOP Classes**

IOD	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	Yes	No	No

3.3.3 Compliance to STD-US-SC-MF-CDR

For media conforming to the STD-US-SC-MF-CDR profiles the following SOP Classes and transfer syntaxes will be supported as an FSC.

**Table 3-6:
STD-US-SC-MR-CDR Supported SOP Classes**

IOD	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
Ultrasound Multi-frame Image Storage (Clips)	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy (Baseline) 1.2.840.10008.1.2.4.50	Yes	No	No

The following Photometric Interpretations are supported by FSC:

- RGB - Ultrasound Image Storage only
- YBR_FULL_422 - Ultrasound Multi-frame Image Storage (Clips) only

3.3.4 Compliance to STD-US-ID-MF-CDR

For media conforming to the STD-US-ID-MF-CDR profiles the following SOP Classes and transfer syntaxes will be supported as an FSC.

**Table 3-7:
STD-US-MF-CDR Supported SOP Classes**

IOD	SOP Class UID	Transfer Syntax and UID	FSC	FSR	FSU
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian 1.2.840.10008.1.2.1	Yes	No	No

4 SUPPORT OF CHARACTER SETS

4.1 CHARACTER SETS FOR *syngo* SC2000 Workplace

The *syngo* SC2000 Workplace supports the ISO 8859 Latin 1 (ISO-IR 100) character set.

5 SECURITY

5.1 SECURITY PROFILES

- PS 3.15 Annex F: Network Address Management Profiles: DHCP Client, DNS Client supported
- PS 3.15 Annex G: Time Synchronization Profiles supported

5.2 ASSOCIATION LEVEL SECURITY

It is possible to configure whether the DICOM Server will only answer to known AETs or to any AET.

5.3 APPLICATION LEVEL SECURITY

- For configuration and maintenance, the Service Technician must login with a separate password.

6 ANNEXES

6.1 IOD CONTENTS

6.1.1 Created SOP Instances

6.1.1.1 US Image IOD Attributes

Module	Attribute	Tag	Type	Notes
Patient	Patient's Name	(0010,0010)	2	Copied from existing study
	Patient ID	(0010,0020)	2	Copied from existing study
	Patient's Birth Date	(0010,0030)	2	Copied from existing study
	Patient's Sex	(0010,0040)	2	Copied from existing study
	Other Patient IDs	(0010,1000)	3	Copied from existing study
General Study	Study Instance UID	(0020,000D)	1	Copied from existing study
	Study Date	(0008,0020)	2	Created
	Study Time	(0008,0030)	2	Created
	Referring Physician's Name	(0008,0090)	2	Copied from existing study
	Study ID	(0020,0010)	2	Created
	Accession Number	(0008,0050)	2	Copied from existing study
	Study Description	(0008,1030)	3	Copied from existing study
	Referenced Study Sequence	(0008,1110)	3	Copied from existing study
	>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C		
Patient Study	Patient's Weight	(0010,1030)	3	Copied from existing study
General Series	Modality	(0008,0060)	1	Set to US
	Series Instance UID	(0020,000E)	1	Created
	Series Number	(0020,0011)	2	Set to 1...n
	Performing Physicians' Name	(0008,1050)	3	Copied from existing study
	Protocol Name	(0018,1030)	3	Copied from existing study
	Operators' Name	(0008,1070)	3	Copied from existing study
	Referenced Performed Procedure Step Sequence	(0008,1111)	3	Set to zero length
	Request Attributes Sequence	(0040,0275)	3	Set to zero length
General Equipment	Manufacturer	(0008,0070)	2	Set to "SIEMENS"
	Institution Name	(0008,0080)	3	Copied from existing study
	Station Name	(0008,1010)	3	Set to the computer's host name
	Manufacturer's Model Name	(0008,1090)	3	Set to "ACUSON SC2000"
	Device Serial Number	(0018,1000)	3	Set to "Not Available"
	Software Versions	(0018,1020)	3	Set to "VA11A"
General Image	Instance Number	(0020,0013)	2	1...n
	Patient Orientation	(0020,0020)	2C	Set to zero length
	Content Date	(0008,0023)	2C	Created
	Content Time	(0008,0033)	2C	Created
	Acquisition Date	(0008,0022)	2	Created
	Acquisition Time	(0008,0032)	3	Created

Module	Attribute	Tag	Type	Notes
	Derivation Description	(0008,2111)	3	
	Source Image Sequence	(0008,2112)	3	Used if 3D rendering to reference Raw Data Objects.
	>Referenced SOP Class UID	(0008,1150)	1C	
	>Referenced SOP Instance UID	(0008,1155)	1C	
	>Referenced Frame Number	(0008,1160)	3	
	Lossy Image Compression Ratio	(0028,2112)	3	
Image Pixel	Rows	(0028,0010)	1	Set to 768
	Columns	(0028,0011)	1	Set to 1024
	Pixel Data	(7FE0,0010)	1	
US Region Calibration	Sequence of Ultrasound Regions	(0018,6011)	1	One created for each US region displayed
	>Region Location Min x0	(0018,6018)	1	
	>Region Location Min y0	(0018,601A)	1	
	>Region Location Max x1	(0018,601C)	1	
	>Region Location Max y1	(0018,601E)	1	
	>Physical Units X Direction	(0018,6024)	1	
	>Physical Units Y Direction	(0018,6026)	1	
	>Physical Delta X	(0018,602C)	1	
	>Physical Delta Y	(0018,602E)	1	
	>Reference Pixel x0	(0018,6020)	3	
	>Reference Pixel y0	(0018,6022)	3	
	>Ref. Pixel Physical Value X	(0018,6028)	3	
	>Ref. Pixel Physical Value Y	(0018,602A)	3	
	>Region Spatial Format	(0018,6012)	1	
	>Region Data Type	(0018,6014)	1	
	>Region Flags	(0018,6016)	1	
>Pulse Repetition Frequency	(0018,6032)	3	Color Flow and Doppler regions only	
>Doppler Correction Angle	(0018,6034)	3	Doppler regions only	
US Image	Samples Per Pixel	(0028,0002)	1	Set to 3.
	Photometric Interpretation	(0028,0004)	1	See Table 2-8
	Bits Allocated	(0028,0100)	1	Set to 8
	Bits Stored	(0028,0101)	1	Set to 8
	High Bit	(0028,0102)	1	Set to 7
	Planar Configuration	(0028,0006)	1C	Set to 0 (color-by-pixel)
	Pixel Representation	(0028,0103)	1	Set to 0 (unsigned integer)
	Image Type	(0008,0008)	2	Normally ORIGINAL/PRIMARY.
	Lossy Image Compression	(0028,2110)	1C	= 01 if compressed
	Ultrasound Color Data Present	(0028,0014)	1C	Set to 1 if Color Flow or Pseudo Color in image
	Heart Rate	(0018,1088)	3	
	Transducer Data	(0018,5010)	3	Probe name
	Transducer Type	(0018,6031)	3	
	Focus Depth	(0018,5012)	3	
SOP Common	SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.6.1
	SOP Instance UID	(0008,0018)	1	Created
	Specific Character Set	(0008,0005)	1C	Set to ISO_IR 100

Module	Attribute	Tag	Type	Notes
	Instance Creation Date	(0008,0012)	3	Created
	Instance Creation Time	(0008,0013)	3	Created
Standard Extended SOP Class - Standard and Private Attributes				
Private	Private Creator	(0119,0010)	3	Set to "SIEMENS Ultrasound SC2000"
	Volume Rate	(0119,1013)	3	

6.1.1.2 US Multiframe Image IOD Attributes

Module	Attribute	Tag	Type	Notes
Patient	Patient's Name	(0010,0010)	2	Copied from existing study
	Patient ID	(0010,0020)	2	Copied from existing study
	Patient's Birth Date	(0010,0030)	2	Copied from existing study
	Patient's Sex	(0010,0040)	2	Copied from existing study
	Other Patient IDs	(0010,1000)	3	Copied from existing study
General Study	Study Instance UID	(0020,000D)	1	Copied from existing study
	Study Date	(0008,0020)	2	Created
	Study Time	(0008,0030)	2	Created
	Referring Physician's Name	(0008,0090)	2	Copied from existing study
	Study ID	(0020,0010)	2	Created
	Accession Number	(0008,0050)	2	Copied from existing study
	Study Description	(0008,1030)	3	Copied from existing study
	Referenced Study Sequence	(0008,1110)	3	Copied from existing study
	>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C		
Patient Study	Patient's Weight	(0010,1030)	3	Copied from existing study
General Series	Modality	(0008,0060)	1	Set to US
	Series Instance UID	(0020,000E)	1	Created
	Series Number	(0020,0011)	2	Set to 1...n
	Performing Physicians' Name	(0008,1050)	3	Copied from existing study
	Protocol Name	(0018,1030)	3	Copied from existing study
	Operators' Name	(0008,1070)	3	Copied from existing study
	Referenced Performed Procedure Step Sequence	(0008,1111)	3	Set to zero length
	Request Attributes Sequence	(0040,0275)	3	Set to zero length
General Equipment	Manufacturer	(0008,0070)	2	Set to "SIEMENS"
	Institution Name	(0008,0080)	3	Copied from existing study
	Station Name	(0008,1010)	3	Set to the computer's host name
	Manufacturer's Model Name	(0008,1090)	3	Set to "ACUSON SC2000"
	Device Serial Number	(0018,1000)	3	Set to "Not Available"
	Software Versions	(0018,1020)	3	Set to "VA11A"
General Image	Instance Number	(0020,0013)	2	1...n
	Patient Orientation	(0020,0020)	2C	Set to zero length
	Content Date	(0008,0023)	2C	Created
	Content Time	(0008,0033)	2C	Created
	Acquisition Date	(0008,0022)	2	Created

Module	Attribute	Tag	Type	Notes
	Acquisition Time	(0008,0032)	3	Created
	Source Image Sequence	(0008,2112)	3	
	>Referenced SOP Class UID	(0008,1150)	3	
	>Referenced SOP Instance UID	(0008,1155)	1C	
	Lossy Image Compression Ratio	(0028,2112)	3	Only used with JPEG Lossy compression
Image Pixel	Rows	(0028,0010)	1	Set to 600
	Columns	(0028,0011)	1	Set to 800
	Pixel Data	(7FE0,0010)	1	
Cine	Frame Time	(0018,1063)	1C	
	Frame Time Vector	(0018,1065)	1C	1 to Number of Frames
Multi-Frame	Number of Frames	(0028,0008)	1	
US Region Calibration	Sequence of Ultrasound Regions	(0018,6011)	1	One created for each US region displayed
	>Region Location Min x0	(0018,6018)	1	
	>Region Location Min y0	(0018,601A)	1	
	>Region Location Max x1	(0018,601C)	1	
	>Region Location Max y1	(0018,601E)	1	
	>Physical Units X Direction	(0018,6024)	1	
	>Physical Units Y Direction	(0018,6026)	1	
	>Physical Delta X	(0018,602C)	1	
	>Physical Delta Y	(0018,602E)	1	
	>Reference Pixel x0	(0018,6020)	3	
	>Reference Pixel y0	(0018,6022)	3	
	>Ref. Pixel Physical Value X	(0018,6028)	3	
	>Ref. Pixel Physical Value Y	(0018,602A)	3	
	>Region Spatial Format	(0018,6012)	1	
	>Region Data Type	(0018,6014)	1	
	>Region Flags	(0018,6016)	1	
	>Transducer Frequency	(0018,6030)	3	
>Pulse Repetition Frequency	(0018,6032)	3	Color Flow and Doppler regions only	
>Doppler Correction Angle	(0018,6034)	3	Doppler regions only	
US Image Module	Samples Per Pixel	(0028,0002)	1	Set to 3 Set to 1 if RGB to MONOCHROME2 is Configured for remote destination
	Photometric Interpretation	(0028,0004)	1	See Table 2-8
	Bits Allocated	(0028,0100)	1	Set to 8
	Bits Stored	(0028,0101)	1	Set to 8
	High Bit	(0028,0102)	1	Set to 7
	Planar Configuration	(0028,0006)	1C	Set to 0 (color-by-pixel)
	Pixel Representation	(0028,0103)	1	Set to 0 (unsigned integer)
	Frame Increment Pointer	(0028,0009)	1C	Sequencing by Frame Time Vector (0018,1065)
	Image Type	(0008,0008)	2	DERIVED / PRIMARY
Lossy Image Compression	(0028,2110)	1C	Set to 01	

Module	Attribute	Tag	Type	Notes
	R Wave Time Vector	(0018,6060)	3	
	Ultrasound Color Data Present	(0028,0014)	1C	Set to 1 if Color Flow or Pseudo Color in image
	Heart Rate	(0018,1088)	3	
	Transducer Data	(0018,5010)	3	Probe name
	Transducer Type	(0018,6031)	3	
	Focus Depth	(0018,5012)	3	
SOP Common	SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.6.1
	SOP Instance UID	(0008,0018)	1	Created
	Specific Character Set	(0008,0005)	1C	Set to ISO_IR 100
	Instance Creation Date	(0008,0012)	3	Created
	Instance Creation Time	(0008,0013)	3	Created
Standard Extended SOP Class - Standard and Private Attributes				
Standard Extended SOP Class	Waveform Sequence	(5400,0100)	3	
	>Acquisition Datetime	(0008,002A)	3	
	> Trigger Time Offset	(0018,1069)	1C	
	>Waveform Originality	(003A,0004)	1	ORIGINAL
	>Number of Waveform Channels	(003A,0005)	1	1
	>Number of Waveform Samples	(003A,0010)	1	
	>Sampling Frequency	(003A,001A)	1	
	>Channel Definition Sequence	(003A,0200)	1	
	>>Channel Source Sequence	(003A,0208)	1	
	>>>Include 'Code Sequence Macro'			
	>Channel Sensitivity	(003A,0210)	1C	
	>>Channel Sensitivity Units Sequence	(003A,0211)	1C	
	>>>Include 'Code Sequence Macro'			
	>>Waveform Bits Stored	(003A,021A)	1	
	>Waveform Bits Allocated	(5400,1004)	1	
	>Waveform Sample Interpretation	(5400,1006)	1	
>Waveform Data	(5400,1010)	1		
Private	Private Creator	(0119,0010)	3	Set to "SIEMENS Ultrasound SC2000"
	Volume Rate	(0119,1013)	3	

6.1.1.3 Secondary Capture Image IOD Attributes

Module	Attribute	Tag	Type	Notes
Patient	Patient's Name	(0010,0010)	2	Copied from existing study
	Patient ID	(0010,0020)	2	Copied from existing study
	Patient's Birth Date	(0010,0030)	2	Copied from existing study
	Patient's Sex	(0010,0040)	2	Copied from existing study
	Other Patient IDs	(0010,1000)	3	Copied from existing study
General Study	Study Instance UID	(0020,000D)	1	Copied from existing study
	Study Date	(0008,0020)	2	Created
	Study Time	(0008,0030)	2	Created
	Referring Physician's Name	(0008,0090)	2	Copied from existing study

Module	Attribute	Tag	Type	Notes
	Study ID	(0020,0010)	2	Created
	Accession Number	(0008,0050)	2	Copied from existing study
	Study Description	(0008,1030)	3	Copied from existing study
	Referenced Study Sequence	(0008,1110)	3	Copied from existing study
	>Referenced SOP Class UID	(0008,1150)	1C	
	>Referenced SOP Instance UID	(0008,1155)	1C	
Patient Study	Patient's Weight	(0010,1030)	3	Copied from existing study
General Series	Series Instance UID	(0020,000E)	1	Created
	Series Number	(0020,0011)	2	Set to 1...n
	Performing Physicians' Name	(0008,1050)	3	Copied from existing study
	Protocol Name	(0018,1030)	3	Copied from existing study
	Operators' Name	(0008,1070)	3	Copied from existing study
	Referenced Performed Procedure Step Sequence	(0008,1111)	3	Set to zero length
	Request Attributes Sequence	(0040,0275)	3	Set to zero length
General Equipment	Manufacturer	(0008,0070)	2	Set to "SIEMENS"
	Institution Name	(0008,0080)	3	Copied from existing study
	Station Name	(0008,1010)	3	Set to the computer's host name
	Manufacturer's Model Name	(0008,1090)	3	Set to "ACUSON SC2000"
	Device Serial Number	(0018,1000)	3	Set to "Not Available"
	Software Versions	(0018,1020)	3	Set to "VA11A"
SC Equipment	Conversion Type	(0008,0064)	1	Set to WSD
	Modality	(0008,0060)	3	Set to US
General Image	Instance Number	(0020,0013)	2	1...n
	Patient Orientation	(0020,0020)	2C	Set to zero length
	Content Date	(0008,0023)	2C	Created
	Content Time	(0008,0033)	2C	Created
	Image Type	(0008,0008)	3	ORIGINAL/PRIMARY
	Acquisition Date	(0008,0022)	2	Created
	Acquisition Time	(0008,0032)	3	Created
	Lossy Image Compression	(0028,2110)	1C	= 01 if JPEG Lossy compression
	Lossy Image Compression Ratio	(0028,2112)	3	Only used with JPEG Lossy compression
Image Pixel	Samples Per Pixel	(0028,0002)	1	Set to 3
	Photometric Interpretation	(0028,0004)	1	See Table 2-8
	Rows	(0028,0010)	1	Set to 768
	Columns	(0028,0011)	1	Set to 1024
	Bits Allocated	(0028,0100)	1	Set to 8
	Bits Stored	(0028,0101)	1	Set to 8
	High Bit	(0028,0102)	1	Set to 7
	Pixel Representation	(0028,0103)	1	Set to 0 (unsigned integer)
	Pixel Data	(7FE0,0010)	1	
	Planar Configuration	(0028,0006)	1C	Set to 0 (color-by-pixel)
SC Image	Pixel Spacing	(0028,0030)	1C	
SOP Common	SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
	SOP Instance UID	(0008,0018)	1	Created

Module	Attribute	Tag	Type	Notes
	Specific Character Set	(0008,0005)	1C	Set to ISO_IR 100
	Instance Creation Date	(0008,0012)	3	Created
	Instance Creation Time	(0008,0013)	3	Created

6.1.1.4 Comprehensive SR IOD Attributes

Module Name	Attribute	Tag	Type	Notes
Patient	Patient's Name	(0010,0010)	2	Copied from existing study
	Patient ID	(0010,0020)	2	Copied from existing study
	Patient's Birth Date	(0010,0030)	2	Copied from existing study
	Patient's Sex	(0010,0040)	2	Copied from existing study
	Other Patient IDs	(0010,1000)	3	Copied from existing study
General Study	Study Instance UID	(0020,000D)	1	Copied from existing study
	Study Date	(0008,0020)	2	Created
	Study Time	(0008,0030)	2	Created
	Referring Physician's Name	(0008,0090)	2	Copied from existing study
	Study ID	(0020,0010)	2	Created
	Accession Number	(0008,0050)	2	Copied from existing study
	Study Description	(0008,1030)	3	Copied from existing study
	Referenced Study Sequence	(0008,1110)	3	Copied from existing study
	>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C		
Patient Study	Patient's Age	(0010,1010)	3	Copied from existing study
	Patient's Size	(0010,1020)	3	Copied from existing study
	Patient's Weight	(0010,1030)	3	Copied from existing study
General Equipment	Manufacturer	(0008,0070)	2	Set to "SIEMENS"
	Institution Name	(0008,0080)	3	Copied from existing study
	Station Name	(0008,1010)	3	Set to the computer's host name
	Manufacturer's Model Name	(0008,1090)	3	Set to "ACUSON SC2000"
	Device Serial Number	(0018,1000)	3	Set to "Not Available"
	Software Versions	(0018,1020)	3	Set to "VA11A"
SR Document Series	Modality	(0008,0060)	1	Defined term "SR" used
	Series Instance UID	(0020,000E)	1	Uniquely generated by the SC2000
	Series Number	(0020,0011)	1	Internally generated; incremented for each new exam within a study
	Reference Performed Procedure Step Sequence	(0008,1111)	2	Set to zero length
SR Document General	Instance Number	(0020,0013)	1	Internally generated; incremented for each new SR document within a study
	Completion Flag	(0040,A491)	1	Defined Term "PARTIAL" used
	Verification Flag	(0040,A493)	1	Defined Term "UNVERIFIED" used
	Content Date	(0008,0023)	1	Date of creation
	Content Time	(0008,0033)	1	Time of creation

Module Name	Attribute	Tag	Type	Notes
	Referenced Request Sequence	(0040,A370)	1C	Copied from existing study
	>Study Instance UID	(0020,000D)	1	
	>Accession Number	(0008,0050)	2	
	>Requested Procedure ID	(0040,1001)	2	
	>Requested Procedure Description	(0032,1060)	2	
	>Requesting Physician	(0032,1032)	3	
	>Scheduled Procedure Step ID	(0040,0009)	3	
	Performed Procedure Code Sequence	(0040,A372)	2	Set to zero length
SR Document Content	Value Type	(0040,A040)	1	CONTAINER
	Concept Name Code Sequence	(0040,A043)	1C	
	>Code Value	(0008,0100)	1	Set to "125200"
	>Coding Scheme Designator	(0008,0102)	1	Set to "DCM"
	>Code Meaning	(0008,0104)	1	Set to "Adult Echocardiography Procedure Report"
	Continuity of Content	(0040,A050)	1	SEPARATE
	Content Template Sequence	(0040,A504)	1C	Template ID
	>Mapping Resource	(0008,0105)	1	Set to "DCMR"
	>Template Identifier	(0040,DB00)	1	Set to "5200" for Adult Echocardiography Procedure Report
SOP Common	Content Sequence	(0040,A730)	1C	See Appendix for content of "Adult Echocardiography Procedure Report"
	SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.7
	SOP Instance UID	(0008,0018)	1	Created
	Specific Character Set	(0008,0005)	1C	Set to ISO_IR 100
Standard Extended SOP Class - Standard and Private Attributes				
SR Document Series	Performing Physician's Name	(0008,1050)	3	Copied from existing study
	Performed Procedure Step ID	(0040,0253)	3	Copied from existing study
	Operators' Name	(0008,1070)	3	Copied from existing study
Private	Private Creator Name	(0021,0010)		Set to "syngoDynamics_Reporting"
	Private Creator Data	(0021,10AD)		Byte stream
Private	Private Creator Name	(0029,0010)		Set to "SIEMENS CSA REPORT"
	syngo Report Type	(0029,1008)		Set to "US_ADULT_ECHO"
	syngo Report Version	(0029,1009)		Set to "1.1"
Private	Private Creator Name	(0077,0010)		Set to "SIEMENS SYNGO EVIDENCE DOCUMENT DATA"
	Evidence Document Template Name	(0077,1010)		Set to "SiemensUS_AdultEchoReport"
	Evidence Document Template Version	(0077,1011)		Set to "1.1"
	Private Creator Data	(0077,1020)		Byte stream
	Private Creator Data	(0077,1021)		Byte stream
	Framework Version	(0077,1030)		Set to "0.1"
	Private Creator Data	(0077,1040)		Byte stream

6.1.1.5 Raw Data IOD Attributes

Module	Attribute	Tag	Type	Notes
Patient	Patient's Name	(0010,0010)	2	Copied from existing study
	Patient ID	(0010,0020)	2	Copied from existing study
	Patient's Birth Date	(0010,0030)	2	Copied from existing study
	Patient's Sex	(0010,0040)	2	Copied from existing study
	Other Patient IDs	(0010,1000)	3	Copied from existing study
General Study	Study Instance UID	(0020,000D)	1	Copied from existing study
	Study Date	(0008,0020)	2	Created
	Study Time	(0008,0030)	2	Created
	Referring Physician's Name	(0008,0090)	2	Copied from existing study
	Study ID	(0020,0010)	2	Created
	Accession Number	(0008,0050)	2	Copied from existing study
	Study Description	(0008,1030)	3	Copied from existing study
	Referenced Study Sequence	(0008,1110)	3	Copied from existing study
	>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C		
Patient Study	Patient's Weight	(0010,1030)	3	Copied from existing study
General Series	Modality	(0008,0060)	1	Set to US
	Series Instance UID	(0020,000E)	1	Created
	Series Number	(0020,0011)	2	Set to 1...n
	Performing Physicians' Name	(0008,1050)	3	Copied from existing study
	Protocol Name	(0018,1030)	3	Copied from existing study
	Operators' Name	(0008,1070)	3	Copied from existing study
	Referenced Performed Procedure Step Sequence	(0008,1111)	3	Set to zero length
	Request Attributes Sequence	(0040,0275)	3	Set to zero length
General Equipment	Manufacturer	(0008,0070)	2	Set to "SIEMENS"
	Institution Name	(0008,0080)	3	Copied from existing study
	Station Name	(0008,1010)	3	Set to the computer's host name
	Manufacturer's Model Name	(0008,1090)	3	Set to "ACUSON SC2000"
	Device Serial Number	(0018,1000)	3	Set to "Not Available"
	Software Versions	(0018,1020)	3	Set to "VA11A"
General Image	Patient Orientation	(0020,0020)	2C	Set to zero length
	Image Type	(0008,0008)	3	
Acquisition Context	Acquisition Context Sequence	(0040,0555)	2	Zero Length
Raw Data	Instance Number	(0020,0013)	2	A number that identifies the image, system generated, should be sequential in acquisition order
	Content Date	(0008, 0023)	1	Date when creation of this object started
	Content Time	(0008, 0033)	1	Time when creation of this object started
	Acquisition DateTime	(0008,002A)	3	Date and time when acquisition started.

Module	Attribute	Tag	Type	Notes
Raw Data	Creator-Version UID	(0008,9123)	1	Unique identification for the equipment and version of the software that has created this object
	Source Image Sequence	(0008,2112)	1C	Image object that was used to derive this object. Required if Acoustic Data Sequence (0019,1002) is not present. This mechanism will be used to store updated bookmarks without including the complete pixel data.
	>Referenced SOP Class UID	(0008,1050)	1	SOP Class UID for Raw Data IOD
	>Referenced SOP Instance UID	(0008,1155)	1	SOP Instance UI of the Raw Data object that was used to derive this object
	Referenced Image Sequence	(0008,1140)	3	Reference to the 2D Image representing this view
	>Referenced SOP Class UID	(0008,1050)	1	SOP Class UID for the DICOM Ultrasound Image Storage SOP Class or the DICOM Ultrasound Multi-Frame Image Storage SOP Class
	>Referenced SOP Instance UID	(0008,1155)	1	SOP Instance UI of the referenced image
	Private Creator Data Element	(0119,0010)	1	SIEMENS Ultrasound SC2000
	Private Creator Data Element	(7FD1,0010)	1	SIEMENS Ultrasound SC2000
	Private Creator Data Element	(0129,0010)	1	SIEMENS Ultrasound SC2000
	Acoustic Meta Information Version	(0119,1000)	1	Version number of acoustic control information
	Raw Data Object Type	(0129,1030)	1	Defined Term for Object Type <ul style="list-style-type: none"> • VOLUME • APPLICATION STATE • EXAM STATE
	Common Acoustic Meta Information	(0119,1001)	1C	Control information describing the acoustic data, which is common to all frames. Required if Source Image Sequence is not present
	Multi Stream Sequence	(0119,1002)	1C	Sequence of acoustic data blocks for multiple streams. One sequence per stream. Required if source image sequence is not present.
	>Acoustic Data Sequence	(0119,1003)	1C	Sequence for chunks of acoustic data for specific control information and acoustic data chunks. One item per chunk. One sequence per transaction.
	>>Per Transaction Acoustic Control Information	(0119,1004)	1	Transaction data, one for each transaction

Module	Attribute	Tag	Type	Notes
Raw Data	>>Acoustic Data Offset	(0119,1005)	1	Offset of current Volume in Acoustic Image and Footer Data. One per transaction per stream
	>>Acoustic Data Length	(0119,1006)	1	Length of current Volume in Acoustic Image and Footer Data One per transaction per stream
	>>Footer Offset	(0119,1007)	1	Offset of footer for current Volume in Acoustic Image and Footer Data One per transaction per stream
	>>Footer Length	(0119,1008)	1	Length of footer for current Volume in Acoustic Image and Footer Data One per transaction per stream
	>Acoustic Stream Number	(0119, 1009)	1C	Identification of acoustic stream number. One per stream
	>Acoustic Stream Type	(0119.1010)	1C	Identification of acoustic stream type. One per stream
	Acoustic Image and Footer Data	(7FD1,1000)	1	Acoustic image data frame
	Cine Parameters	(0129,1020)	3	Cine Parameters
	Acquisition UI Data	(0129, 1021)	3	Information about acquisition UI
	MPR View Sequence	(0129,1000)	3	Sequence for MPR views. One item for each view.
	>View Code Sequence	(0054,0220)	3	One item for each view
	>>Code Value	(0008,0100)	1C	Use CID 12226 for Echocardiography Views. Required if at least one sequence item is available.
	>>Coding Scheme Version	(0008,0103)	1C	
	>>Code Meaning	(0008,0104)	1C	
	>Bookmark UID	(0029,1002)	1C	Unique identifier for this view. Required if Sequence is present.
	>Plane origin vector	(0129,1003)	1C	Center point of the plane. Required if Sequence is present.
	>Row vector	(0129,1004)	1C	Required if Sequence is present. Vector for the direction of the rows in the MPR.
	>Column vector	(0129,1005)	1C	Required if Sequence is present. Vector for the direction of the columns in the MPR
	>Referenced Image Sequence	(0008,1140)	3	Reference to the 2D Image representing this view
	>>Referenced SOP Class UID	(0008,1150)	1	SOP Class UID for the DICOM Ultrasound Image Storage SOP Class or the DICOM Ultrasound Multi-Frame Image Storage SOP Class.
	>>Referenced SOP Instance UID	(0008,1155)	1	SOP Instance UI of the referenced image

Module	Attribute	Tag	Type	Notes
Raw Data	Visualization Sequence	(0129,1006)	3	Sequence for Volume Rendered views. One item for each view.
	>View Code Sequence	(0054,0220)	3	One item for each view
	>>Code Value	(0008,0100)	1C	Use CID 12226 for Echocardiography Views. Required if at least one sequence item is available.
	>>Coding Scheme Version	(0008,0103)	1C	
	>>Code Meaning	(0008,0104)	1C	
	>Bookmark UID	(0129,1007)	1C	Unique identifier for this view. Required if Sequence is present.
	>Visualization Information	(0129,1008)	1C	Volume Rendering Parameters. Required if Sequence is present.
	>Referenced Image Sequence	(0008,1140)	3	Reference to the 2D Image representing this view
	>>Referenced SOP Class UID	(0008,1150)	1	SOP Class UID for the DICOM Ultrasound Image Storage SOP Class or the DICOM Ultrasound Multi-Frame Image Storage SOP Class
	>>Referenced SOP Instance UID	(0008,1155)	1	SOP Instance UI of the referenced image
	Application State Sequence	(0129,1009)	3	Sequence of application states. One item for each application that was started online
	>Application State Information	(0129,1010)	1C	Application state information.
	>Referenced Bookmark Sequence	(0129,1011)	1C	Sequence of bookmarks which were used in this application. One item for each referenced view
	>>Referenced Bookmark UID	(0129,1012)	1C	UID of the view which the application ran on.
	>Referenced Image Sequence	(0008,1140)	3	Reference to the 2D Image representing this view
	>>Referenced SOP Class UID	(0008,1050)	1	SOP Class UID for the DICOM Ultrasound Image Storage SOP Class or the DICOM Ultrasound Multi-Frame Image Storage SOP Class.
	>>Referenced SOP Instance UID	(0008,1155)	1	SOP Instance UI of the referenced image
US Image	Acquisition Date	(0008,0022)	3	The date of the acquisition of this image
	Acquisition Time	(0008,0032)	3	The time of the acquisition of this image
	R Wave Time Vector	(0018,6060)	3	Vector of time offsets of the r-waves peaks relative to the start of Acquisition Datetime of the image data.

Module	Attribute	Tag	Type	Notes
	Trigger Time	(0018,1060)	3	Time Interval measured in msec for the start of the R-Wave to the beginning of data taking
	Nominal Interval	(0018,1062)	3	Average R-R interval used for this data in msec
	Heart Rate	(0018,1088)	3	Beats per minute
	Transducer Data	(0018,5010)	3	Manufacturer defined description of the transducer used
	Transducer Type	(0018,6031)	3	Defined Term use one of the following: SECTOR_PHASED, SECTOR_MECH, SECTOR_ANNULAR, LINEAR, CURVED LINEAR, SINGLE CRYSTAL, SPLIT XTAL CWD, IV_PHASED, IV_ROT XTAL, IV_ROT MIRROR, ENDOCAV_PA, ENDOCAV_MECH, ENDOCAV_CLA, ENDOCAV_AA, ENDOCAV_LINEAR, VECTOR_PHASED
	Mechanical Index	(0018,5022)	3	The thermal and/or mechanical indices, when made available by a manufacturer, are defined according to the <i>Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment</i>
	Soft Tissue Thermal Index	(0018,5027)	3	
	Soft Tissue-focus Thermal Index	(0018,5028)	3	
	Volume Rate	(0119,1013)	3	Volumes per second
	SOP Common	SOP Class UID	(0008,0016)	1
SOP Instance UID		(0008,0018)	1	Created
Specific Character Set		(0008,0005)	1C	From MWL or set to ISO_IR 100
Instance Creation Date		(0008,0012)	3	Created
Instance Creation Time		(0008,0013)	3	Created

6.1.1.6 Query: C-Find

The SC2000 Workplace DICOM Query/Retrieve SCU supports hierarchical queries with all mandatory search keys. The interactive querying of attributes on IMAGE level is not supported by the Query SCU. Though, retrieval of individual Objects is possible. The following table describes the search keys for the different query models that the SCU supports. Matching is either wildcard, which means that the user can supply a string containing wildcards, or universal, which means that the attribute is requested as return value.

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Patient Level					
Patient Name	(0010,0010)	R	Wildcard	Enter value	Yes
Patient ID	(0010,0020)	U	Wildcard	Enter value	Yes

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Patient's Birth date	(0010,0030)	O	Universal (Null)	Enter value	Yes
Patient's Sex	(0010,0040)	O	Universal (Null)	Enter value	Yes
Study Level					
Patient Name	(0010,0010)	R	Wildcard	Enter value	Yes
Patient ID	(0010,0020)	R	Wildcard	Enter value	Yes
Patient's Birth date	(0010,0030)	O	Universal (Null)	Enter value	Yes
Patient's Sex	(0010,0040)	O	Universal (Null)	Enter value	Yes
Study Instance UID	(0020,000D)	U	Universal (Null)		No
Study ID	(0020,0010)	R	Universal (Null)	Enter value	Yes
Study Date	(0008,0020)	R	Universal (Null)	Enter value	Yes
Study Time	(0008,0030)	R	Universal (Null)	-	Yes
Accession Number	(0008,0050)	R	Universal (Null)	Enter value	Yes
Study Description	(0008,1030)	O	Universal (Null)	Enter value	Yes
Referring Physician's Name	(0008,0090)	O	Universal (Null)	Enter value	Yes
Name of Physician Reading Study	(0008,1060)	O	Universal (Null)	Enter value	Yes
Modalities in Study	(0008,0061)	O	Universal (Null)	Enter value	Yes
Retrieve AE Title	(0008,0054)	O	Universal (Null)		No
Number of Study related Series	(0020,1206)	O	Universal (Null)		Yes
Number of Study related Instances	(0020,1208)	O	Universal (Null)		No
Series Level					
Series Instance UID	(0020,000E)	U	Universal (Null)		No
Series Number	(0020,0011)	R	Universal (Null)		Yes
Modality	(0008,0060)	R	Universal (Null)	Enter value	Yes
Performing Physician	(0008,1050)	O	Universal (Null)	Enter value	Yes
Retrieve AE Title	(0008,0054)	O	Universal (Null)		Yes
Protocol Name	(0018,1030)	O	Universal (Null)		No
Performed Procedure Step Start Date	(0040,0244)	O	Universal (Null)		Yes
Performed Procedure Step Start Time	(0040,0245)	O	Universal (Null)		Yes
Requested Attribute Sequence	(0040,0275)	O	Universal (Null)		Yes
> Requested Procedure ID	(0040,1001)	O	Universal (Null)		Yes
> Scheduled Procedure ID	(0040,0009)	O	Universal (Null)		Yes
Number of Series related Instances	(0020,1209)	O	Universal (Null)		Yes
Image Level					
SOP Instance UID	(0008,0018)	U	Single value		No
Image Number	(0020,0013)	R	Universal (Null)		Yes
Retrieve AE Title	(0008,0054)	O	Universal (Null)		No
Instance Date	(0008,0023)	O	Universal (Null)		No
Instance Time	(0008,0033)	O	Universal (Null)		No
Number of Frames	(0028,0008)	O	Universal (Null)		Yes
Content Date	(0008,0023)	O	Single value, Range matching, Universal	Enter value	Yes
Content Time	(0008,0033)	O	Single value, Range matching,	Enter value	Yes

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
			Universal		
Referenced Request Sequence	(0040,A370)	O	Sequence matching		Yes
>Accession Number	0008,0050)	O	Single value, Universal		Yes
>Requested Procedure ID	(0040,1000)	O	Single value, Universal		Yes

7 Appendices

7.1 Appendix A: Echocardiography Structured Report

This appendix lists the DICOM Structured Report (SR) mappings used in the Cardiac Structured Reports of the syngo SC2000 Workplace SR files.

The mappings follow the DICOM SR Template TID 5200: Echocardiography Procedure Report, as described in PS 3.16-2008 of the DICOM Standard, and are organized in a manner similar to TID 5200. The **Label** column identifies the on-screen worksheet label associated with a measurement. All private code values use the Coding Scheme Designator "99SIEMENS".

[...] contains additional information about the measurement.

The **HR** column indicates if a measurement has an individual heart rate associated it. The heart rate is defined in the SR with HAS PROPERTIES, NUM, Heart Rate (LN, 8867-4) with VM of 1.

7.1.1 Patient Characteristics

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	Age	Subject Age (DCM, 121033)	
	Sex	Subject Sex (DCM, 121032)	
	BP	Systolic Blood Pressure (SRT, F-008EC)	
		Diastolic Blood Pressure (SRT, F-008ED)	
	BSA	Body Surface Area (LN, 8277-6)	
	[Not shown]	Body Surface Area Formula (LN, 8278-4)	[Always set to: BSA(DuBois) = 0.007184*WT^0.425*HT^0.725 (DCM, 122241)]

7.1.2 Left Ventricle

These measurements appear on the Left Ventricle, Left Ventricle Volumes, or M-mode worksheet.

* indicates that the measurement also appears on the Diastology worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	Measurements of Image Mode: 2D mode (SRT, G-03A2)		
	IVS, Diastole	Interventricular Septum Diastolic Thickness (LN, 18154-5)	Image View: Parasternal long axis (SRT, G-0396)
	IVS, PSAX, Diastole	Interventricular Septum Diastolic Thickness (LN, 18154-5)	Image View: Parasternal short axis (SRT, G-0397)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	IVS, Systole	Interventricular Septum Systolic Thickness (LN, 18158-6)	Image View: Parasternal long axis (SRT, G-0396)
	IVS, PSAX, Systole	Interventricular Septum Systolic Thickness (LN, 18158-6)	Image View: Parasternal short axis (SRT, G-0397)
X	LV Area, LV MOD, A2C Diast	Left Ventricular Diastolic Area (SRT, G-0375)	Image View: Apical two chamber (SRT, G-A19B)
X	LV Area, LV MOD, A4C Diast	Left Ventricular Diastolic Area (SRT, G-0375)	Image View: Apical four chamber (SRT, G-A19C)
X	LV Area pap, PSAX, Diastole	Left Ventricular Diastolic Area (SRT, G-0375)	Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
X	LV Area, LV MOD, A2C Sys	Left Ventricular Systolic Area (SRT, G-0374)	Image View: Apical two chamber (SRT, G-A19B)
X	LV Area, LV MOD, A4C Sys	Left Ventricular Systolic Area (SRT, G-0374)	Image View: Apical four chamber (SRT, G-A19C)
X	LVID, Diastole	Left Ventricle Internal End Diastolic Dimension (LN, 29436-3)	Image View: Parasternal long axis (SRT, G-0396)
X	LVID chord, PSAX, Diastole	Left Ventricle Internal End Diastolic Dimension (LN, 29436-3)	Image View: Parasternal short axis at the level of the mitral chords (SRT, G-0399)
X	LVID pap, PSAX, Diastole	Left Ventricle Internal End Diastolic Dimension (LN, 29436-3)	Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
	LV Epi Area pap, PSAX, Diastole	Left Ventricle Epicardial Diastolic Area (SRT, G-0379)	
X	Major Axis, LV MOD, A2C Diast	Left Ventricle diastolic major axis (LN, 18077-8)	Image View: Apical two chamber (SRT, G-A19B)
X	Major Axis, LV MOD, A4C Diast	Left Ventricle diastolic major axis (LN, 18077-8)	Image View: Apical four chamber (SRT, G-A19C)
X	Major Axis, LV MOD, A2C Sys	Left Ventricle systolic major axis (LN, 18076-0)	Image View: Apical two chamber (SRT, G-A19B)
X	Major Axis, LV MOD, A4C Sys	Left Ventricle systolic major axis (LN, 18076-0)	Image View: Apical four chamber (SRT, G-A19C)
	LV Major, SCLAX, Systole	Left Ventricle systolic major axis (LN, 18076-0)	Image View: Subcostal long axis (SRT, G-039E)
X	Minor Axis, LV MOD, A2C Diast	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical two chamber (SRT, G-A19B)
X	Minor Axis, LV MOD, A4C Diast	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X	Minor Axis, LV MOD, A2C Sys	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical two chamber (SRT, G-A19B)
X	Minor Axis, LV MOD, A4C Sys	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
X	LVID, Systole	Left Ventricle Internal Systolic Dimension (LN, 29438-9)	Image View: Parasternal long axis (SRT, G-0396)
X	LVID chord, PSAX, Systole	Left Ventricle Internal Systolic Dimension (LN, 29438-9)	Image View: Parasternal short axis at the level of the mitral chords (SRT, G-0399)
X	LVID pap, PSAX, Systole	Left Ventricle Internal Systolic Dimension (LN, 29438-9)	Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
X	LVOT Diam s	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Left Ventricle Outflow Tract (SRT, T-32650)
	LVPW, Diastole	Left Ventricle Posterior Wall Diastolic Thickness (LN, 18152-9)	Image View: Parasternal long axis (SRT, G-0396)
	LVPW chord, PSAX, Diastole	Left Ventricle Posterior Wall Diastolic Thickness (LN, 18152-9)	Image View: Parasternal short axis at the level of the mitral chords (SRT, G-0399)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	LVPW pap, PSAX, Diastole	Left Ventricle Posterior Wall Diastolic Thickness (LN, 18152-9)	Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
	LVPW, Systole	Left Ventricle Posterior Wall Systolic Thickness (LN, 18156-0)	Image View: Parasternal long axis (SRT, G-0396)
	LVPW chord, PSAX, Systole	Left Ventricle Posterior Wall Systolic Thickness (LN, 18156-0)	Image View: Parasternal short axis at the level of the mitral chords (SRT, G-0399)
	LVPW pap, PSAX, Systole	Left Ventricle Posterior Wall Systolic Thickness (LN, 18156-0)	Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
	IVS/LVPW	Interventricular Septum to Posterior Wall Thickness Ratio (LN, 18155-2)	
	IVS %Thck	Interventricular Septum % Thickening (LN, 18054-7)	Image View: Parasternal long axis (SRT, G-0396)
	LV CI, Cubed	Cardiac Index (SRT, F-32110)	Measurement Method: Cube Method (DCM, 125206)
	LV CI, LV MOD, A2C	Cardiac Index (SRT, F-32110)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
	LV CI, LV MOD, A4C	Cardiac Index (SRT, F-32110)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV CI, LV MOD, Biplane	Cardiac Index (SRT, F-32110)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV CI, Teich	Cardiac Index (SRT, F-32110)	Measurement Method: Teichholz (DCM, 125209)
	LV CO, Cubed	Cardiac Output (SRT, F-32100)	Measurement Method: Cube Method (DCM, 125206)
	LV CO, LV MOD, A2C	Cardiac Output (SRT, F-32100)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
	LV CO, LV MOD, A4C	Cardiac Output (SRT, F-32100)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV CO, LV MOD, Biplane	Cardiac Output (SRT, F-32100)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV CO, Teich	Cardiac Output (SRT, F-32100)	Measurement Method: Teichholz (DCM, 125209)
	LV HR, Cubed	Composite heart rate for LV CO, Cubed (99SIEMENS, LVHRCOCube2D)	
	HR, LV MOD, A2C	Composite heart rate for LV CO, MOD A2C (99SIEMENS, LVHRCOA2C)	
	HR, LV MOD, A4C	Composite heart rate for LV CO, MOD A4C (99SIEMENS, LVHRCOA4C)	
	HR, LV MOD, Biplane	Composite heart rate for LV CO, MOD Biplane (99SIEMENS, LVHRCOMODBF)	
	LV HR, Teich	Composite heart rate for LV CO, Teichholz (99SIEMENS, LVHRCOTEich2D)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	LV EF, Cubed	Left Ventricular Ejection Fraction (LN, 18043-0)	Measurement Method: Cube Method (DCM, 125206)
	LV EF, LV MOD, A2C	Left Ventricular Ejection Fraction (LN, 18043-0)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
	LV EF, LV MOD, A4C	Left Ventricular Ejection Fraction (LN, 18043-0)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV EF, LV MOD, Biplane	Left Ventricular Ejection Fraction (LN, 18043-0)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV %FAC, LV MOD, A2C	Left Ventricular Fractional Area Change (SRT, G-0376)	Measurement Method: Teichholz (DCM, 125209)
	LV %FAC, LV MOD, A4C	Left Ventricular Fractional Area Change (SRT, G-0376)	Image View: Apical two chamber (SRT, G-A19B)
	LV %FS, Cubed	Left Ventricular Fractional Shortening (LN, 18051-3)	Image View: Apical four chamber (SRT, G-A19C)
	LV %FS	Left Ventricular Fractional Shortening (LN, 18051-3)	Measurement Method: Cube Method (DCM, 125206)
	LV %FS, Teich	Left Ventricular Fractional Shortening (LN, 18051-3)	Image View: Parasternal long axis (SRT, G-0396)
	LV Major, max	Left Ventricular Fractional Shortening (LN, 18051-3)	Measurement Method: Teichholz (DCM, 125209)
	LV Mass, AL	Left Ventricle systolic major axis (LN, 18076-0)	Derivation: Maximum (SRT, G-A437)
	LV Mass/BSA, AL	Left Ventricle Mass (LN, 18087-7)	Measurement Method: Area-Length Single Plane (DCM, 125205)
	LV Mass/BSA, TE	Mass/BSA (99SIEMENS, MassBSAIndex)	Measurement Method: Area-Length Single Plane (DCM, 125205) Index: Body Surface Area (LN, 8277-6)
	LV Mass/Ht, AL	Mass/BSA (99SIEMENS, MassBSAIndex)	Measurement Method: Left Ventricle Mass by Truncated Ellipse (DCM, 125222) Index: Body Surface Area (LN, 8277-6)
	LV Mass/Ht, TE	Mass/Height (99SIEMENS, MassHtIndex)	Measurement Method: Area-Length Single Plane (DCM, 125205) Index: Patient Height (LN, 8302-2)
	LV Mass, TE	Mass/Height (99SIEMENS, MassHtIndex)	Measurement Method: Left Ventricle Mass by Truncated Ellipse (DCM, 125222) Index: Patient Height (LN, 8302-2)
	LV Mean Wall Thickness, PSAX, Diastole	Left Ventricle Mass (LN, 18087-7)	Measurement Method: Left Ventricle Mass by Truncated Ellipse (DCM, 125222)
	LV Minor Rad pap, PSAX, Diastole	Left Ventricle Posterior Wall Diastolic Thickness (LN, 18152-9)	Derivation: Mean (SRT, R-00317)
	X Semi-Maj Axis, LV MOD, A4C Diast	Minor Radius (99SIEMENS, MinorRadius)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Parasternal short axis at the Papillary Muscle level (SRT, G-039B)
	X Tr Semi-Maj Axis, LV MOD, A4C Diast	Left Ventricle Semi-major Axis Diastolic Dimension (SRT, G-0377) Left Ventricle Truncated Semi-major Axis Diastolic Dimension (SRT, G-0378)	
	LV SI, Cubed	Stroke Index (SRT, F-00078)	Measurement Method: Cube Method (DCM, 125206)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	LV SI, LV MOD, A2C	Stroke Index (SRT, F-00078)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B) Index: Body Surface Area (LN, 8277-6)
	LV SI, LV MOD, A4C	Stroke Index (SRT, F-00078)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C) Index: Body Surface Area (LN, 8277-6)
	LV SI, LV MOD, Biplane	Stroke Index (SRT, F-00078)	Measurement Method: Method of Disks, Biplane (DCM, 125207) Index: Body Surface Area (LN, 8277-6)
	LV SI, Teich	Stroke Index (SRT, F-00078)	Measurement Method: Teichholz (DCM, 125209)
	LV SV, Cubed	Stroke Volume (SRT, F-32120)	Measurement Method: Cube Method (DCM, 125206)
	LV SV, LV MOD, A2C	Stroke Volume (SRT, F-32120)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
	LV SV, LV MOD, A4C	Stroke Volume (SRT, F-32120)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV SV, LV MOD, Biplane	Stroke Volume (SRT, F-32120)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV SV, Teich	Stroke Volume (SRT, F-32120)	Measurement Method: Teichholz (DCM, 125209)
	LV Vol d, Cubed	Left Ventricular End Diastolic Volume (LN, 18026-5)	Measurement Method: Cube Method (DCM, 125206)
X	LV Vol, LV MOD, A2C Diast	Left Ventricular End Diastolic Volume (LN, 18026-5)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
X	LV Vol, LV MOD, A4C Diast	Left Ventricular End Diastolic Volume (LN, 18026-5)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV Vol, LV MOD, BP Diast	Left Ventricular End Diastolic Volume (LN, 18026-5)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV Vol d, Teich	Left Ventricular End Diastolic Volume (LN, 18026-5)	Measurement Method: Teichholz (DCM, 125209)
	Vol BSA, LV MOD, A2C Diast	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical two chamber (SRT, G-A19B) Index: Body Surface Area (LN, 8277-6)
	Vol BSA, LV MOD, A4C Diast	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C) Index: Body Surface Area (LN, 8277-6)
	Vol BSA, LV MOD, BP Diast	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Diastole (SRT, F-32010) Measurement Method: Method of Disks, Biplane (DCM, 125207) Index: Body Surface Area (LN, 8277-6)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	Vol BSA, LV MOD, A2C Sys	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical two chamber (SRT, G-A19B) Index: Body Surface Area (LN, 8277-6)
	Vol BSA, LV MOD, A4C Sys	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C) Index: Body Surface Area (LN, 8277-6)
	Vol BSA, LV MOD, BP Sys	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Systole (SRT, F-32020) Measurement Method: Method of Disks, Biplane (DCM, 125207) Index: Body Surface Area (LN, 8277-6)
	LV Vol s, Cubed	Left Ventricular End Systolic Volume (LN, 18148-7)	Measurement Method: Cube Method (DCM, 125206)
X	LV Vol, LV MOD, A2C Sys	Left Ventricular End Systolic Volume (LN, 18148-7)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical two chamber (SRT, G-A19B)
X	LV Vol, LV MOD, A4C Sys	Left Ventricular End Systolic Volume (LN, 18148-7)	Measurement Method: Method of Disks, Single Plane (DCM, 125208) Image View: Apical four chamber (SRT, G-A19C)
	LV Vol, LV MOD, BP Sys	Left Ventricular End Systolic Volume (LN, 18148-7)	Measurement Method: Method of Disks, Biplane (DCM, 125207)
	LV Vol s, Teich	Left Ventricular End Systolic Volume (LN, 18148-7)	Measurement Method: Teichholz (DCM, 125209)
	LVOT area	Cardiovascular Orifice Area (SRT, G-038E)	Finding Site: Left Ventricle Outflow Tract (SRT, T-326650)
	LVOT SV	Stroke Volume (SRT, F-32120)	Finding Site: Left Ventricle Outflow Tract (SRT, T-326650) Image View: Parasternal long axis (SRT, G-0396)
	LV PW %thck, 2D	Left Ventricle Posterior Wall % Thickening (LN, 18053-9)	
	[Not shown]	LV vol, d MOD A2C (disk <n>) (99SIEMENS, LVvdMODA2Cdisk<n>) where <n> = 0..19	
	[Not shown]	LV vol, d MOD A4C (disk <n>) (99SIEMENS, LVvdMODA4Cdisk<n>) where <n> = 0..19	
	[Not shown]	LV vol, s MOD A2C (disk <n>) (99SIEMENS, LVvsMODA2Cdisk<n>) where <n> = 0..19	
	[Not shown]	LV vol, s MOD A4C (disk <n>) (99SIEMENS, LVvsMODA4Cdisk<n>) where <n> = 0..19	
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
	MV Close-Open Duration, Myocardial Performance Index	MV Close-Open Duration (99SIEMENS, MVCloseOpenDur)	
	LV dP/dt	Left Ventricle dP/dt (99SIEMENS, LVdPdt)	
X	LV ET	Left Ventricular ejection time (DCM, 122211)	
X	LV IVCT	Left Ventricular Isovolumic Contraction Time (SRT, G-037E)	
	* LV IVRT	Left Ventricular Isovolumic Relaxation Time (LN, 18071-1)	
X	LVOT Vmax	Peak Velocity (LN, 11726-7)	Finding Site: Left Ventricle Outflow Tract (SRT, T-326650)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
X	LVOT VTI	Velocity Time Integral (LN, 20354-7)	Finding Site: Left Ventricle Outflow Tract (SRT, T-32650)
	LV ed press	Pressure (99SIEMENS, Pressure)	Cardiac Cycle Point: End Diastole (SRT, F-32011)
	LV Tei Index	Left Ventricular Index of Myocardial Performance (SRT, G-037F)	
	LV press s	Pressure (99SIEMENS, Pressure)	Cardiac Cycle Point: Systole (SRT, F-32020)
Measurements of Image Mode: M mode (SRT, G-0394)			
	IVS d	Interventricular Septum Diastolic Thickness (LN, 18154-5)	
	IVS s	Interventricular Septum Systolic Thickness (LN, 18158-6)	
X	LVID d	Left Ventricle Internal End Diastolic Dimension (LN, 29436-3)	
X	LV ET	Left Ventricular ejection time (DCM, 122211)	
X	LV PEP	Pre-ejection Period (99SIEMENS, PEP)	
X	LVID s	Left Ventricle Internal Systolic Dimension (LN, 29438-9)	
	LVPW d	Left Ventricle Posterior Wall Diastolic Thickness (LN, 18152-9)	
	LVPW s	Left Ventricle Posterior Wall Systolic Thickness (LN, 18156-0)	
	PE d	Pericardial Effusion Diameter (99SIEMENS, DiampE)	Cardiac Cycle Point: Diastole (SRT, F-32010)
	IVS/LVPW	Interventricular Septum to Posterior Wall Thickness Ratio (LN, 18155-2)	
	IVS %Thck	Interventricular Septum % Thickening (LN, 18054-7)	
	LV CI	Cardiac Index (SRT, F-32110)	Index: Body Surface Area (LN, 8277-6)
	Wall Stress, Circum	Circumferential Wall Stress (99SIEMENS, WScircum)	
	LV CO	Cardiac Output (SRT, F-32100)	
	LV HR	Composite heart rate for M-mode LV CO (99SIEMENS, LVHRCOMmode)	
	LV EF	Left Ventricular Ejection Fraction (LN, 18043-0)	
	LV ETc	Left Ventricular ejection time, corrected (99SIEMENS, ETlvc)	
	LV ET HR	Composite heart rate for M-Mode LV Ejection Time (99SIEMENS, LVHRETMmode)	
	LV %FS	Left Ventricular Fractional Shortening (LN, 18051-3)	
	LV Mass, ASE	Left Ventricle Mass (LN, 18087-7)	Measurement Method: ASE
	Mean Vcfc	Mean Velocity of Circumferential, corrected (99SIEMENS, MeanVcfc)	
	Mean Vcfc HR	Composite HR for LV Mean Velocity of Circumferential, corrected (99SIEMENS, LVHRmeanVcfc)	
	Wall Stress, Merid	Meridian Wall Stress (99SIEMENS, WSMerid)	
	LV PEPc	Pre-ejection Period, corrected (99SIEMENS, PEPcorr)	
	LV PEPc HR	Composite heart rate for LV Pre-ejection Period, corrected (99SIEMENS, LVHRPEPcorr)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	LV PE/ET	Left Ventricular PE/ET (99SIEMENS, RATIOlvpep_et)	
	LV SI	Stroke Index (SRT, F-00078)	Index: Body Surface Area (LN, 8277-6)
	LV SV	Stroke Volume (SRT, F-32120)	
	LV Vol d	Left Ventricular End Diastolic Volume (LN, 18026-5)	
	LV Vol s	Left Ventricular End Systolic Volume (LN, 18148-7)	
	LVPW %Thck	Left Ventricle Posterior Wall % Thickening (LN, 18053-9)	
	EPSS/LVIDd	EPSS to Diastolic LVID Ratio (99SIEMENS, RATIOepss_lvidd)	
	LV Mass/BSA, ASEcorr	Mass/BSA (99SIEMENS, MassBSAIndex)	Measurement Method: ASE corrected (99SIEMENS, ASEcorr) Index: Body Surface Area (LN, 8277-6)
	LV Mass/Ht, ASEcorr	Mass/Height (99SIEMENS, MassHtIndex)	Measurement Method: ASE corrected (99SIEMENS, ASEcorr) Index: Patient Height (LN, 8302-2)
	LV Mass, ASEcorr	Left Ventricle Mass (LN, 18087-7)	Measurement Method: ASE corrected (99SIEMENS, ASEcorr)
	LV Mass/BSA, ASE	Mass/BSA (99SIEMENS, MassBSAIndex)	Measurement Method: ASE
	LV Mass/Ht, ASE	Mass/Height (99SIEMENS, MassHtIndex)	Measurement Method: ASE
	LVOT Diam s	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Left Ventricle Outflow Tract (SRT, T-32650) Cardiac Cycle Point: Systole (SRT, F-32020)

7.1.3 Right Ventricle

These measurements appear on the Right Heart worksheet in the Right Ventricle table or on the M-mode worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	RV Area d, A4C	Area (SRT, G-A166)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
	RV Area s, A4C	Area (SRT, G-A166)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
	RVD d, PLAX	Right Ventricular Internal Diastolic Dimension (LN, 20304-2)	Image View: Parasternal long axis (SRT, G-0396)
X	RV Major d, A4C	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X	RV Major s, A4C	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
X	RV Minor d, A4C	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X	RV Minor s, A4C	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	RVD s, PLAX	Right Ventricular Internal Systolic Dimension (LN, 20305-9)	Image View: Parasternal long axis (SRT, G-0396)
	RVAW d, PLAX	Right Ventricular Anterior Wall Diastolic Thickness (LN, 18153-7)	Image View: Parasternal long axis (SRT, G-0396)
	RVAW s, PLAX	Right Ventricular Anterior Wall Systolic Thickness (LN, 18157-8)	Image View: Parasternal long axis (SRT, G-0396)
X	RVOT Diam s	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Right Ventricle Outflow Tract (SRT, T-32550) Cardiac Cycle Point: Systole (SRT, F-32020)
	RVOT Diam s, SCLAX	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Right Ventricle Outflow Tract (SRT, T-32550) Cardiac Cycle Point: Systole (SRT, F-32020)
	RVOT area	Cardiovascular Orifice Area (SRT, G-038E)	Image View: Subcostal long axis (SRT, G-039E) Finding Site: Right Ventricle Outflow Tract (SRT, T-32550)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
	TV Close-Open Duration, Myocardial Performance Index	TV Close-Open Duration (99SIEMENS, TVCloseOpenDur)	
X	RVOT Vmax	Peak Velocity (LN, 11726-7)	Finding Site: Right Ventricle Outflow Tract (SRT, T-32550)
	RVOT VTI	Velocity Time Integral (LN, 20354-7)	Finding Site: Right Ventricle Outflow Tract (SRT, T-32550)
	RV Tei Index	Right Ventricular Index of Myocardial Performance (SRT, G-0381)	
	RVSP (TR)	Right Ventricular Peak Systolic Pressure (SRT, G-0380)	Finding Site: Tricuspid Valve (SRT, T-35100) Flow Direction: Regurgitant Flow (SRT, R-42E61)
	RVSP (VSD)	Right Ventricular Peak Systolic Pressure (SRT, G-0380)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)
Measurements of Image Mode: M mode (SRT, G-0394)			
	RVD d	Right Ventricular Internal Diastolic Dimension (LN, 20304-2)	
X	RV ET	Right Ventricular ejection time (DCM, 122213)	
x	RV PEP	Pre-ejection Period (99SIEMENS, PEP)	
	RVD s	Right Ventricular Internal Systolic Dimension (LN, 20305-9)	
	RVAW d	Right Ventricular Anterior Wall Diastolic Thickness (LN, 18153-7)	
	RVAW s	Right Ventricular Anterior Wall Systolic Thickness (LN, 18157-8)	
	RV PEPc	Pre-ejection Period, corrected (99SIEMENS, PEPcorr)	
	RV PEPc HR	Composite heart rate for RV Pre-ejection Period, corrected (99SIEMENS, RVHRPEPcorr)	
	RV PEP/ET	Right Ventricular PEP/ET (99SIEMENS, RATIOrvpep_et)	
	RV ETc	Right Ventricular ejection time, corrected (99SIEMENS, ETvc)	

7.1.4 Left Atrium

These measurements appear on the Left Atrium or M-mode worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	LA A/P s	Left Atrium Antero-posterior Systolic Dimension (LN, 29469-4)	
	Area (A2C), Diastole	Area (SRT, G-A166)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical two chamber (SRT, G-A19B)
	Area (A4C), Diastole	Area (SRT, G-A166)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
	Area (A2C), Systole	Left Atrium Systolic Area (LN, 17977-0)	Image View: Apical two chamber (SRT, G-A19B)
	Area (A4C), Systole	Left Atrium Systolic Area (LN, 17977-0)	Image View: Apical four chamber (SRT, G-A19C)
X	Major Diam (A2C), Diastole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical two chamber (SRT, G-A19B)
X	Major Diam (A4C), Diastole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X	Major Diam (A2C), Systole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical two chamber (SRT, G-A19B)
X	Major Diam (A4C), Systole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
X	Minor Diam (A4C), Diastole	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X	Minor Diam (A4C), Systole	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
	LA s/Ao d	Left Atrium to Aortic Root Ratio (LN, 17985-3)	
	Ao d/LA s	End Diastolic Aortic Root to End Systolic Left Atrium Ratio (99SIEMENS, RATIOaod_Ias)	
	Vol, Diastole	Volume (SRT, G-D705)	Cardiac Cycle Point: Diastole (SRT, F-32010)
	Vol BSA, Diastole	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Diastole (SRT, F-32010) Index: Body Surface Area (LN, 8277-6)
	Vol BSA, Systole	Volume/BSA (99SIEMENS, VolBSAIndex)	Cardiac Cycle Point: Systole (SRT, F-32020) Index: Body Surface Area (LN, 8277-6)
	Vol, Systole	Left Atrium Systolic Volume (SRT, G-0383)	
Measurements of Image Mode: M mode (SRT, G-0394)			
	LA Diam d	Diameter (SRT, M-02550)	Cardiac Cycle Point: Diastole (SRT, F-32010)
	LA Diam s	Diameter (SRT, M-02550)	Cardiac Cycle Point: Systole (SRT, F-32020)
	LA s/Ao d	Left Atrium to Aortic Root Ratio (LN, 17985-3)	

7.1.5 Right Atrium

These measurements appear on the Right Heart worksheet in the Right Atrium (A4C) table.

HR Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)		
RA Area, Diastole	Area (SRT, G-A166)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
RA Area, Systole	Right Atrium Systolic Area (LN, 17988-7)	Image View: Apical four chamber (SRT, G-A19C)
X RA Major, Diastole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X RA Minor, Diastole	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
X RA Major, Systole	Major Axis (SRT, G-A193)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
X RA Minor, Systole	Minor Axis (SRT, G-A194)	Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
RA Pressure	Right Atrium Systolic Pressure (LN, 18070-3)	

7.1.6 Aortic Valve

These measurements appear on the Ao/Aortic Valve worksheet in the Aortic Valve table or on the M-mode worksheet.

HR Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)		
X AoV Ann Diam	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Aortic Valve Ring (SRT, T-35410)
AoV Area, planim	Cardiovascular Orifice Area (SRT, G-038E)	Measurement Method: Planimetry (DCM, 125220)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.		
X AoV Accel Slope	Acceleration Slope (99SIEMENS, AccelSlope)	
X AoV AT	Acceleration Time (LN, 20168-1)	
X AoV Mean Grad	Mean Gradient (LN, 20256-4)	
X AoV Vmax	Peak Velocity (LN, 11726-7)	
X AoV VTI	Velocity Time Integral (LN, 20354-7)	
AR DT	Deceleration Time (LN, 20217-6)	Flow Direction: Regurgitant Flow (SRT, R-42E61)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
X	AR ED Vel	End Diastolic Velocity (LN, 11653-3)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
	AR Slope	Deceleration Slope (LN, 20216-8)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
X	AoV ET	Aortic Valve Ejection Time (LN, 18041-4)	
	AoV Area BSA (Vmax)	Area/BSA (99SIEMENS, AreaBSAIndex)	Measurement Method: Continuity Equation by Peak Velocity (DCM, 125214) Index: Body Surface Area (LN, 8277-6)
	AoV Area BSA (VTI)	Area/BSA (99SIEMENS, AreaBSAIndex)	Measurement Method: Continuity Equation by Velocity Time Integral (DCM, 125215) Index: Body Surface Area (LN, 8277-6)
	AoV Area (Vmax)	Area (SRT, G-A166)	Measurement Method: Continuity Equation by Peak Velocity (DCM, 125214)
	AoV Area (VTI)	Area (SRT, G-A166)	Measurement Method: Continuity Equation by Velocity Time Integral (DCM, 125215)
	AoV AT/ET	Ratio of Aortic Valve Acceleration Time to Ejection Time (SRT, G-0382)	
	AoV Pk Grad	Peak Gradient (LN, 20247-3)	
	AR ED Grad	Peak Gradient (LN, 20247-3)	Flow Direction: Regurgitant Flow (SRT, R-42E61) Cardiac Cycle Point: End Diastole (SRT, F-32011)
	AR P1/2 Time	Pressure Half-Time (LN, 20280-4)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
Measurements of Image Mode: M mode (SRT, G-0394)			
	AoV Cusp Sep	Aortic Valve Cusp Separation (LN, 17996-0)	

7.1.7 Mitral Valve

These measurements appear on the Mitral Valve worksheet or on the M-mode worksheet.

* indicates that the measurement also appears on the Diastology worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	MV Ann, A2C, Diastole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical two chamber (SRT, G-A19B)
	MV Ann, A4C, Diastole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	MV Ann, PLAX, Diastole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Parasternal long axis (SRT, G-0396)
	MV Ann, A2C, Systole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical two chamber (SRT, G-A19B)
	MV Ann, A4C, Systole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Apical four chamber (SRT, G-A19C)
	MV Ann, PLAX, Systole	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Mitral Annulus (SRT, T-35313) Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Parasternal long axis (SRT, G-0396)
	MV Diam, A/P	Cardiovascular Orifice Diameter (SRT, G-038F)	Image View: Parasternal long axis (SRT, G-0396)
	MV Area, planim	Cardiovascular Orifice Area (SRT, G-038E)	Measurement Method: Planimetry (DCM, 125220)
	MV Diam, M/L	Cardiovascular Orifice Diameter (SRT, G-038F)	Image View: Apical four chamber (SRT, G-A19C)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
X	MR VTI	Velocity Time Integral (LN, 20354-7)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
	* MV A Dur	Mitral Valve A-Wave Duration (SRT, G-0385)	
	* MV A Vmax	Mitral Valve A-Wave Peak Velocity (LN, 17978-8)	
X	MV Accel Slope	Acceleration Slope (99SIEMENS, AccelSlope)	
X	MV AT	Acceleration Time (LN, 20168-1)	
X	MV Decel Slope	Deceleration Slope (LN, 20216-8)	
	* MV DT	Deceleration Time (LN, 20217-6)	
	* MV E Vmax	Mitral Valve E-Wave Peak Velocity (LN, 18037-2)	
X	MV Mh Grad	Mean Gradient (LN, 20256-4)	
	MV Vmax	Peak Velocity (LN, 11726-7)	
X	MV VTI, Ann	Velocity Time Integral (LN, 20354-7)	Finding Site: Mitral Annulus (SRT, T-35313)
X	* MV VTI, Tips	Velocity Time Integral (LN, 20354-7)	Finding Site: Leaflet Tips (99SIEMENS, Leaflet Tips)
	* A/E	Mitral Valve A to E Ratio (99SIEMENS, MVAtoERatio)	
	MV Area, P1/2T	Cardiovascular Orifice Area (SRT, G-038E)	Measurement Method: Area by Pressure Half-Time (DCM, 125210)
	* E/A	Mitral Valve E to A Ratio (LN, 18038-0)	
	* Lateral E/E'	Mitral Valve E to Ea Ratio, lateral (99SIEMENS, MVEtoEaRatioLat)	
	* Medial E/E'	Mitral Valve E to Ea Ratio, medial (99SIEMENS, MVEtoEaRatioMed)	
	MV P1/2 Time	Pressure Half-Time (LN, 20280-4)	
	MV Pk Grad	Peak Gradient (LN, 20247-3)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	MV Regurg Vol	Volume (SRT, G-D705)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
	MV RF	Regurgitant Fraction (SRT, G-0390)	
	MV SV	Stroke Volume (SRT, F-32120)	
Measurements of Image Mode: Doppler Pulsed (SRT, R-409E4)			
	* MV Lateral A'	Late Diastolic Myocardial Velocity, lateral (99SIEMENS, AaVelocityLat)	
	* MV Medial A'	Late Diastolic Myocardial Velocity, medial (99SIEMENS, AaVelocityMed)	
	* MV Lateral E'	Early Diastolic Myocardial Velocity, lateral (99SIEMENS, EaVelocityLat)	
	* MV Medial E'	Early Diastolic Myocardial Velocity, medial (99SIEMENS, EaVelocityMed)	
	* MV Lateral S'	Systolic Myocardial Velocity, lateral (99SIEMENS, SaVelocityLat)	
	* MV Medial S'	Systolic Myocardial Velocity, medial (99SIEMENS, SaVelocityMed)	
Measurements of Image Mode: M mode (SRT, G-0394)			
	MV EF Slope	Mitral Valve E-F Slope by M-Mode (LN, 18040-6)	
	MV EPSS	Mitral Valve EPSS, E wave (LN, 18036-4)	

7.1.8 Pulmonic Valve

These measurements appear on the Pulmonary Valve worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	PV Ann Diam s, PSAX	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Pulmonic Valve Annulus (99SIEMENS, PVAnnulus) Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Parasternal short axis (SRT, G-0397)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
X	PV AT	Acceleration Time (LN, 20168-1)	
X	PV ET	Pulmonic Valve Ejection Time (LN, 18042-2)	
X	PV Mn Grad	Mean Gradient (LN, 20256-4)	
	PR Slope	Deceleration Slope (LN, 20216-8)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
X	PV Vmax	Peak Velocity (LN, 11726-7)	
X	PV VTI	Velocity Time Integral (LN, 20354-7)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	PV Area BSA (Vmax)	Area/BSA (99SIEMENS, AreaBSAIndex)	Measurement Method: Continuity Equation by Peak Velocity (DCM, 125214) Index: Body Surface Area (LN, 8277-6)
	PV Area BSA (VTI)	Area/BSA (99SIEMENS, AreaBSAIndex)	Measurement Method: Continuity Equation by Velocity Time Integral (DCM, 125215) Index: Body Surface Area (LN, 8277-6)
	PV Area (Vmax)	Pulmonic Valve Area by continuity (LN, 18096-8)	Measurement Method: Continuity Equation by Peak Velocity (DCM, 125214)
	PV Area (VTI)	Pulmonic Valve Area by continuity (LN, 18096-8)	Measurement Method: Continuity Equation by Velocity Time Integral (DCM, 125215)
	PV AT/ET	Ratio of Pulmonic Valve Acceleration Time to Ejection Time (SRT, G-0388)	
	PV Pk Grad	Peak Gradient (LN, 20247-3)	
	PV SV	Stroke Volume (SRT, F-32120)	
X	PR ED Vel	End Diastolic Velocity (LN, 11653-3)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
	PR ED Grad	Peak Gradient (LN, 20247-3)	Flow Direction: Regurgitant Flow (SRT, R-42E61) Cardiac Cycle Point: End Diastole (SRT, F-32011)

7.1.9 Tricuspid Valve

These measurements appear on the Tricuspid Valve worksheet.

* indicates that the measurement also appears on the Diastology worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	TV Ann d, A4C	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Tricuspid Annulus (SRT, T-35111) Cardiac Cycle Point: Diastole (SRT, F-32010) Image View: Apical four chamber (SRT, G-A19C)
	TV Area, planim	Cardiovascular Orifice Area (SRT, G-038E)	Measurement Method: Planimetry (DCM, 125220)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
X	TR Vmax	Peak Velocity (LN, 11726-7)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
X	* TV A Vmax	Tricuspid Valve A Wave Peak Velocity (LN, 18030-7)	
	* TV DT	Deceleration Time (LN, 20217-6)	
X	* TV E Vmax	Tricuspid Valve E Wave Peak Velocity (LN, 18031-5)	
X	TV Mean Grad	Mean Gradient (LN, 20256-4)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	TV Vmax	Peak Velocity (LN, 11726-7)	
X	* TV VTI, Tips	Velocity Time Integral (LN, 20354-7)	Finding Site: Leaflet Tips (99SIEMENS, Leaflet Tips)
	TR Pk Grad	Peak Gradient (LN, 20247-3)	Flow Direction: Regurgitant Flow (SRT, R-42E61)
	TV P1/2 Time	Pressure Half-Time (LN, 20280-4)	
	TV Pk Grad	Peak Gradient (LN, 20247-3)	
	TV SV	Stroke Volume (SRT, F-32120)	

7.1.10 Aorta

These measurements appear on the Ao/Aortic Valve worksheet in the Aorta table or on the M-mode worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	Ao Ann Diam, s, PLAX	Cardiovascular Orifice Diameter (SRT, G-038F)	Finding Site: Aortic Valve Ring (SRT, T-35410) Cardiac Cycle Point: Systole (SRT, F-32020) Image View: Parasternal long axis (SRT, G-0396)
X	Ao Arch Diam	Aortic Arch Diameter (LN, 18011-7)	
X	Ao Arch Distal Diam	Aortic Arch Diameter (LN, 18011-7)	Topographical Modifier: Distal (SRT, G-A119)
	Ao Asc d	Ascending Aortic Diameter (LN, 18012-5)	Cardiac Cycle Point: Diastole (SRT, F-32010)
X	Ao Desc Diam	Descending Aortic Diameter (LN, 18013-3)	
	Ao Isfimus Diam	Aortic Isfimus Diameter (LN, 18014-1)	
	Ao Root d	Aortic Root Diameter (LN, 18015-8)	Finding Site: Aortic Valve Ring (SRT, T-35410) Cardiac Cycle Point: Diastole (SRT, F-32010)
	Ao Root s	Aortic Root Diameter (LN, 18015-8)	Finding Site: Aortic Valve Ring (SRT, T-35410) Cardiac Cycle Point: Systole (SRT, F-32020)
	Ao Sinus d	Aortic Root Diameter (LN, 18015-8)	Finding Site: Sinuses of Valsalva (99SIEMENS, SinusesValsalva) Cardiac Cycle Point: Diastole (SRT, F-32010)
	Ao Sinus s	Aortic Root Diameter (LN, 18015-8)	Finding Site: Sinuses of Valsalva (99SIEMENS, SinusesValsalva) Cardiac Cycle Point: Systole (SRT, F-32020)
	Ao ST jnct d	Aortic Root Diameter (LN, 18015-8)	Finding Site: Sinotubular Junction (99SIEMENS, StJunct) Cardiac Cycle Point: Diastole (SRT, F-32010)
	Ao ST jnct s	Aortic Root Diameter (LN, 18015-8)	Finding Site: Sinotubular Junction (99SIEMENS, StJunct) Cardiac Cycle Point: Systole (SRT, F-32020)
X	Coarct Diam	Diameter (SRT, M-02550)	Finding Site: Thoracic Aortic Coarctation (SRT, D4-32030)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
X	Ao Asc Mean Grad	Mean Gradient (LN, 20256-4)	Finding Site: Ascending aorta (SRT, T-42100)
	Ao Asc Vmax	Peak Velocity (LN, 11726-7)	Finding Site: Ascending aorta (SRT, T-42100)
X	Ao Desc Mean Grad	Mean Gradient (LN, 20256-4)	Finding Site: Descending aorta (SRT, T-42400)
	Ao Desc Vmax	Peak Velocity (LN, 11726-7)	Finding Site: Descending aorta (SRT, T-42400)
	Ao Asc Pk Grad	Peak Gradient (LN, 20247-3)	Finding Site: Ascending aorta (SRT, T-42100)
	Ao Desc Pk Grad	Peak Gradient (LN, 20247-3)	Finding Site: Descending aorta (SRT, T-42400)
Measurements of Image Mode: M mode (SRT, G-0394)			
	Ao Diam d	Diameter (SRT, M-02550)	Cardiac Cycle Point: Diastole (SRT, F-32010)
	Ao Diam s	Diameter (SRT, M-02550)	Cardiac Cycle Point: Systole (SRT, F-32020)

7.1.11 Pulmonary Artery

These measurements appear on the Arteries worksheet in the Pulmonary Arteries table.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
	LPA Diam s	Left Pulmonary Artery Diameter (LN, 18019-0)	Cardiac Cycle Point: Systole (SRT, F-32020)
	MPA Diam d	Main Pulmonary Artery Diameter (LN, 18020-8)	Cardiac Cycle Point: Diastole (SRT, F-32010)
	MPA Diam s	Main Pulmonary Artery Diameter (LN, 18020-8)	Cardiac Cycle Point: Systole (SRT, F-32020)
	RPA Diam s	Right Pulmonary Artery Diameter (LN, 18021-6)	Cardiac Cycle Point: Systole (SRT, F-32020)

7.1.12 Vena Cava

These measurements appear on the Right Heart worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
X	IVC Diam	Inferior Vena Cava Diameter (LN, 18006-7)	
X	SVC Diam	Diameter (SRT, M-02550)	Finding Site: Superior vena cava (SRT, T-48610)

7.1.13 Pulmonary Venous Structure

These measurements appear on the Diastology worksheet in the Pulmonary Venous Flow table.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
X	Diam, LLPV	Diameter (SRT, M-02550)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
X	Diam, LUPV	Diameter (SRT, M-02550)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
X	Diam, RLPV	Diameter (SRT, M-02550)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
X	Diam, RUPV	Diameter (SRT, M-02550)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
	A Dur, LLPV	Pulmonary Vein A-Wave Duration (SRT, G-038B)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	A Vmax, LLPV	Pulmonary Vein A-Wave Peak Velocity (99SIEMENS, VmaxPveinA)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	D Vmax, LLPV	Pulmonary Vein D-Wave Peak Velocity (99SIEMENS, VmaxPveinD)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	D VTI, LLPV	Pulmonary Vein D-Wave Velocity Time Integral (SRT, G-038D)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	S Vmax, LLPV	Pulmonary Vein S-Wave Peak Velocity (99SIEMENS, VmaxPveinS)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	S VTI, LLPV	Pulmonary Vein S-Wave Velocity Time Integral (SRT, G-038C)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	A Dur, LUPV	Pulmonary Vein A-Wave Duration (SRT, G-038B)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	A Vmax, LUPV	Pulmonary Vein A-Wave Peak Velocity (99SIEMENS, VmaxPveinA)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	D Vmax, LUPV	Pulmonary Vein D-Wave Peak Velocity (99SIEMENS, VmaxPveinD)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	D VTI, LUPV	Pulmonary Vein D-Wave Velocity Time Integral (SRT, G-038D)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	S Vmax, LUPV	Pulmonary Vein S-Wave Peak Velocity (99SIEMENS, VmaxPveinS)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	S VTI, LUPV	Pulmonary Vein S-Wave Velocity Time Integral (SRT, G-038C)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	A Dur, RLPV	Pulmonary Vein A-Wave Duration (SRT, G-038B)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	A Vmax, RLPV	Pulmonary Vein A-Wave Peak Velocity (99SIEMENS, VmaxPveinA)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	D Vmax, RLPV	Pulmonary Vein D-Wave Peak Velocity (99SIEMENS, VmaxPveinD)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	D VTI, RLPV	Pulmonary Vein D-Wave Velocity Time Integral (SRT, G-038D)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	S Vmax, RLPV	Pulmonary Vein S-Wave Peak Velocity (99SIEMENS, VmaxPveinS)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	S VTI, RLPV	Pulmonary Vein S-Wave Velocity Time Integral (SRT, G-038C)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	A Dur, RUPV	Pulmonary Vein A-Wave Duration (SRT, G-038B)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	A Vmax, RUPV	Pulmonary Vein A-Wave Peak Velocity (99SIEMENS, VmaxPveinA)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	D Vmax, RUPV	Pulmonary Vein D-Wave Peak Velocity (99SIEMENS, VmaxPveinD)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	D VTI, RUPV	Pulmonary Vein D-Wave Velocity Time Integral (SRT, G-038D)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	S Vmax, RUPV	Pulmonary Vein S-Wave Peak Velocity (99SIEMENS, VmaxPveinS)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	S VTI, RUPV	Pulmonary Vein S-Wave Velocity Time Integral (SRT, G-038C)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	A dur – MV A dur, LLPV	PV A dur - MV A dur (99SIEMENS, PVAminuMVA)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	A dur – MV A dur, LUPV	PV A dur - MV A dur (99SIEMENS, PVAminuMVA)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	A dur – MV A dur, RLPV	PV A dur - MV A dur (99SIEMENS, PVAminuMVA)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	A dur – MV A dur, RUPV	PV A dur - MV A dur (99SIEMENS, PVAminuMVA)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	S/D, LLPV	Pulmonary Vein Systolic to Diastolic Ratio (LN, 29452-0)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	S/D, LUPV	Pulmonary Vein Systolic to Diastolic Ratio (LN, 29452-0)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	S/D, RLPV	Pulmonary Vein Systolic to Diastolic Ratio (LN, 29452-0)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	S/D, RUPV	Pulmonary Vein Systolic to Diastolic Ratio (LN, 29452-0)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)
	Systolic Filling Fraction, LLPV	Pulmonary Vein Systolic Filling Fraction (99SIEMENS, PveinSysFillFrac)	Topographical Modifier: Left Lower Segment (SRT, R-4214B)
	Systolic Filling Fraction, LUPV	Pulmonary Vein Systolic Filling Fraction (99SIEMENS, PveinSysFillFrac)	Topographical Modifier: Left Upper Segment (SRT, R-40491)
	Systolic Filling Fraction, RLPV	Pulmonary Vein Systolic Filling Fraction (99SIEMENS, PveinSysFillFrac)	Topographical Modifier: Right Lower Segment (SRT, R-4049E)
	Systolic Filling Fraction, RUPV	Pulmonary Vein Systolic Filling Fraction (99SIEMENS, PveinSysFillFrac)	Topographical Modifier: Right Upper Segment (SRT, R-404A0)

7.1.14 Cardiac Shunt Study

These measurements appear on the Shunts worksheet.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
X	ASD Diam	Diameter (SRT, M-02550)	Finding Site: Atrial Septal Defect (SRT, D4-31220)
X	ASD Minor Diam	Minor Diameter (99SIEMENS, MinorDiam)	Finding Site: Atrial Septal Defect (SRT, D4-31220)
X	PDA Diam	Diameter (SRT, M-02550)	Finding Site: Patent ductus arteriosus (SRT, D4-32012)
X	Pulm side Diam	Diameter (SRT, M-02550)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)
X	Sys side Diam	Diameter (SRT, M-02550)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
X	VSD Diam	Diameter (SRT, M-02550)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)
X	VSD Major Diam	Major Diameter (99SIEMENS, MajorDiam)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)
X	VSD Minor Diam	Minor Diameter (99SIEMENS, MinorDiam)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)
Measurements are associated with CW and PW Doppler, so the image mode is not specified.			
	Pulm Side Area	Area (SRT, G-A166)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	Pulm Side CI	Cardiac Index (SRT, F-32110)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide) Index: Body Surface Area (LN, 8277-6)
	Pulm Side CO	Cardiac Output (SRT, F-32100)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)
	Pulm Side HR	Composite heart rate (99SIEMENS, CompositeHR)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)
	Pulm Side SI	Stroke Index (SRT, F-00078)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide) Index: Body Surface Area (LN, 8277-6)
	Pulm Side SV	Stroke Volume (SRT, F-32120)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)
X	Pulm Side VTI	Velocity Time Integral (LN, 20354-7)	Finding Site: Pulmonary side (99SIEMENS, PulmonarySide)
	Qp/Qs	Pulmonary-to-Systemic Shunt Flow Ratio (LN, 29462-9)	
	Qp-Qs	Difference between Pulmonary Valve CO and Aortic Valve CO (99SIEMENS, QpMinusQs)	
	Sys Side Area	Area (SRT, G-A166)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
	Sys Side CI	Cardiac Index (SRT, F-32110)	Finding Site: Systemic side (99SIEMENS, SystemicSide) Index: Body Surface Area (LN, 8277-6)
	Sys Side CO	Cardiac Output (SRT, F-32100)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
	Sys Side HR	Composite heart rate (99SIEMENS, CompositeHR)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
	Sys Side SI	Stroke Index (SRT, F-00078)	Finding Site: Systemic side (99SIEMENS, SystemicSide) Index: Body Surface Area (LN, 8277-6)
	Sys Side SV	Stroke Volume (SRT, F-32120)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
X	Sys Side VTI	Velocity Time Integral (LN, 20354-7)	Finding Site: Systemic side (99SIEMENS, SystemicSide)
	VSD Pk Grad	Peak Gradient (LN, 20247-3)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)
	VSD Vmax	Peak Velocity (LN, 11726-7)	Finding Site: Ventricular Septal Defect (SRT, D4-31150)

7.1.15 Private Section: Coronary Artery

These measurements appear on the Arteries worksheet in the Coronary Arteries table.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
Measurements of Image Mode: 2D mode (SRT, G-03A2)			
X	Circumflex Diam	Diameter (SRT, M-02550)	Finding Site: Circumflex Coronary Artery (SRT, T-43120)
X	LAD Diam	Diameter (SRT, M-02550)	Finding Site: Left Anterior Descending Coronary Artery (SRT, T-4311A)
X	Left Main Diam	Diameter (SRT, M-02550)	Finding Site: Left Main Coronary Artery (SRT, T-43107)

HR Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
X Prox Circumflex Diam	Diameter (SRT, M-02550)	Finding Site: Circumflex Coronary Artery (SRT, T-43120) Topographical Modifier: Proximal (SRT, G-A118)
X RCA Diam	Diameter (SRT, M-02550)	Finding Site: Right Coronary Artery (SRT, T-43203)

7.1.16 Private Section: Left Ventricular Analysis

These measurements appear on the LVA/RVA worksheet in the LVA table.

HR Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
ESV	Left Ventricular End Systolic Volume (LN, 18148-7)	
EDV	Left Ventricular End Diastolic Volume (LN, 18026-5)	
SV	Stroke Volume (SRT, F-32120)	
EF	Left Ventricular Ejection Fraction (LN, 18043-0)	
ESSI	End Systolic Sphericity Index (99SIEMENS, ESSI)	
EDSI	End Diastolic Sphericity Index (99SIEMENS, EDSI)	
SDI16	Systolic Dyssynchrony Index (16 segment ASE model) (99SIEMENS, SDI16)	
DISPES16	Dispersion End Systole (16 segment ASE model) (99SIEMENS, DISPES16)	
MES16	Mean ES time (16 segment ASE model) (99SIEMENS, MES16)	
PreContr16	Pre-contraction Time Volume (16 segment ASE model) (99SIEMENS, PreContr16)	
PostContr16	Post-contraction Time Volume (16 segment ASE model) (99SIEMENS, PostContr16)	
DDI16	Diastolic Dyssynchrony Index (16 segment ASE model) (99SIEMENS, DDI16)	
DISPED16	Dispersion End Diastole (16 segment ASE model) (99SIEMENS, DISPED16)	
MED16	Mean ED time (16 segment ASE model) (99SIEMENS, MED16)	
PreRelax16	Pre-relaxation Time Volume (16 segment ASE model) (99SIEMENS, PreRelax16)	
PostRelax16	Post-relaxation Time Volume (16 segment ASE model) (99SIEMENS, PostRelax16)	

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	SDI17	Systolic Dyssynchrony Index (17 segment ASE model) (99SIEMENS, SDI17)	
	DISPES17	Dispersion End Systole (17 segment ASE model) (99SIEMENS, DISPES17)	
	MES17	Mean ES time (17 segment ASE model) (99SIEMENS, MES17)	
	PreContr17	Pre-contraction Time Volume (17 segment ASE model) (99SIEMENS, PreContr17)	
	PostContr17	Post-contraction Time Volume (17 segment ASE model) (99SIEMENS, PostContr17)	
	DDI17	Diastolic Dyssynchrony Index (17 segment ASE model) (99SIEMENS, DDI17)	
	DISPED17	Dispersion End Diastole (17 segment ASE model) (99SIEMENS, DISPED17)	
	MED17	Mean ED time (17 segment ASE model) (99SIEMENS, MED17)	
	PreRelax17	Pre-relaxation Time Volume (17 segment ASE model) (99SIEMENS, PreRelax17)	
	PostRelax17	Post-relaxation Time Volume (17 segment ASE model) (99SIEMENS, PostRelax17)	

7.1.17 Private Section: Right Ventricular Analysis

These measurements appear on the LVA/RVA worksheet in the RVA table.

HR	Label	Code Meaning (Coding Scheme Designator, Code Value)	Modifiers
	ESV	Right Ventricular End Systolic Volume (99SIEMENS, RVESV)	
	EDV	Right Ventricular End Diastolic Volume (99SIEMENS, RVEDV)	
	SV	Stroke Volume (SRT, F-32120)	
	EF	Right Ventricular Ejection Fraction (99SIEMENS, RVEF)	

7.2 Appendix B: Supported Units in Structured Reports

The following UCUM units, Version 1.4, are used in the structured reports of the syngo SC2000 Workplace.

Label	Code Value	Code Meaning
bpm	bpm	beats per minute
circs/s	circs/s	circles per second
cm	cm	centimeters
cm/s	cm/s	centimeters per second
cm2	cm2	square centimeters
cm2/m2	cm2/m2	square centimeters per square meter
degrees	degrees	degrees
g	g	grams
g/cm	g/cm	grams per centimeter
g/cm2	g/cm2	grams per square centimeter
g/m2	g/m2	grams per square meter
l/min	l/min	liters per minute
l/min/m2	l/min/m2	liters per minute per square meter
m	m	meters
m/s	m/s	meters per second
m/s2	m/s2	meters per square second
m2	m2	square meters
ml	ml	milliliters
ml/m2	ml/m2	milliliters per square meter
ml/s	ml/m2	milliliters per second
ml*%	ml*%	milliliters percent
mm	mm	millimeters
mm2	mm	square millimeters
mmHg	mm[Hg]	millimeters of mercury column
mmHg/s	mm[Hg]/s	millimeters of mercury per second
ms	ms	milliseconds
msec	ms	milliseconds

Label	Code Value	Code Meaning
unitless	1	no units
%	%	percent
years	a	years
days	d	days
weeks	wk	weeks
months	mo	months