Local

Remote

DICOM
Standard
Interface

*S*ecur
*V*iew~RT~ and TechMate

DICOM Conformance Statement
PN MAN-00533

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SecurView~RT~ and TechMate DICOM Conformance Statement

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1.0 Overview

The Hologic SecurView$_{RT}$ and TechMate Workstations are used primarily by radiologic technologists to view digital mammography images. The SecurView$_{RT}$ and TechMate Workstations implement the necessary DICOM services to receive images and related information from networked devices, query for images and related information from a networked storage device, retrieve images and related information from a networked storage device, send and receive Notices with SecurView$_{DX}$ Workstations, and print to a networked hardcopy device.

Table 1-1 provides an overview of the network services supported by the SecurView$_{RT}$ and TechMate Workstations.

Table 1-1
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Computed Radiography Image Storage	No	Yes
Digital X-Ray Image Storage – For Presentation	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	No	Yes
Secondary Capture Image Storage	No	Yes
Ultrasound Image Storage	No	Yes
Ultrasound Multi-frame Image Storage	No	Yes
Ultrasound Image Storage (Retired)	No	Yes
Ultrasound Multi-frame Image Storage (Retired)	No	Yes
Mammography CAD SR	No	Yes
Grayscale Softcopy Presentation State Storage	Yes	Yes
Print Management		
Basic Grayscale Print Management Meta SOP Class: *includes Basic Film Session, Basic Film Box, Basic Grayscale Image Box, Printer*	Yes	No
Query/Retrieve		
Study Root Query/Retrieve Information Model - FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No

2.0 Introduction

Hologic, Inc. develops and markets a full line of mammography products including the SecurView$_{RT}$ and TechMate Workstations, for use by the radiologic technologists to facilitate easier image workflow with the SecurView$_{DX}$ diagnostic workstation and the Selenia full-field digital mammography system.

The SecurView$_{RT}$ and TechMate Workstations provide a user interface for viewing digital mammography and Ultrasound breast imaging procedures, and for exchanging Notices with SecurView$_{DX}$ Workstations. The SecurView$_{RT}$ and TechMate Workstations include a graphical user interface (GUI) with a pointing device, keyboard, and one display.

2.1. Audience

This document contains the DICOM conformance claim for the SecurView$_{RT}$ and TechMate Workstations. This document is intended to aid in connecting a SecurView$_{RT}$ or TechMate Workstation to other components that make use of the DICOM standard for interconnecting networked diagnostic review workstation devices.

The information within this document applies to SecurView$_{RT}$ and TechMate Software version 2-0-x. The reader of this document should be familiar with the DICOM standard and PACS components that utilize the standard.

2.2. Remarks

A DICOM conformance statement—the structure and content of which are stipulated by the DICOM standard—is intended to aid in determining the suitability of interconnecting digital imaging devices. References to specific functionality in a conformance statement are not sufficient to guarantee interoperability between components. The following should be considered when evaluating interoperability:

- The SecurView$_{RT}$ and TechMate Workstation conformance statement provides a starting point for ascertaining whether the product can communicate with other systems.

- The only way to know for certain whether a SecurView$_{RT}$ or TechMate Workstation can interoperate with other systems is to perform connectivity testing.

- This document represents a best effort to document the functionality of commercial versions of the SecurView$_{RT}$ and TechMate Workstations and is not a functional specification of any Hologic component or product. Hologic reserves the right to make changes at any time to the functionality of the DICOM components described herein, and is committed to following the evolution of the DICOM standard.

2.3. Definitions, Terms and Abbreviations

ACR: American College of Radiology

AE: Application Entity

CAD: Computer Aided Detection

DICOM: Digital Imaging and Communications in Medicine

DIMSE: DICOM Message Service Element

GSPS: Grayscale Softcopy Presentation State

IOD: Information Object Definition

LUT: Lookup Table

NEMA: National Electrical Manufacturers Association

PACS: Picture Archive and Communications System (image management & long-term storage)

PDU: Protocol Data Unit

Q/R: Query/Retrieve

SC: Secondary Capture

SCP: Service Class Provider

SCU: Service Class User

SOP: Service Object Pair

SR: Structured Report

TCP/IP: Transmission Control Protocol/Internet Protocol

UID: Unique Identifier

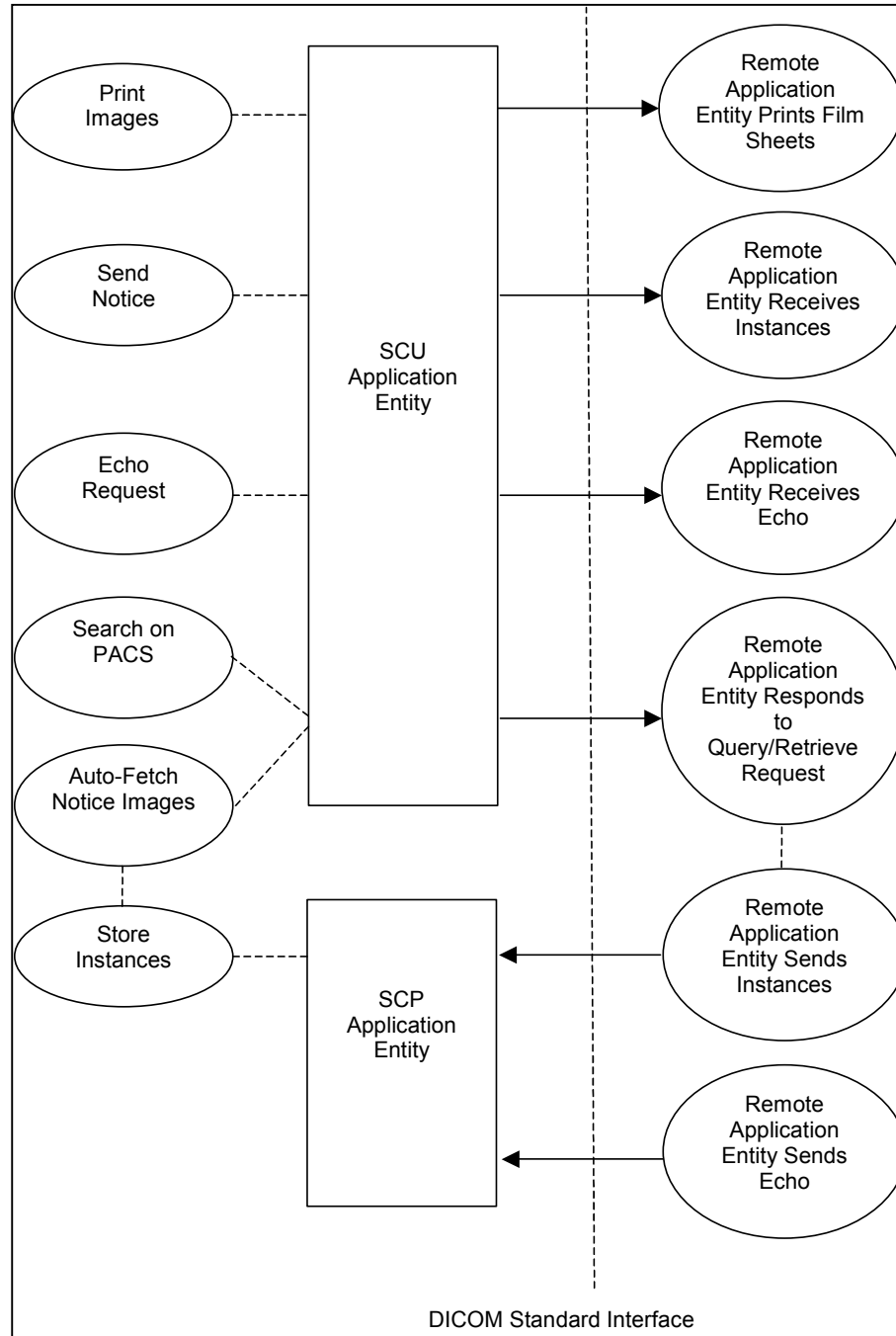**VOI:** Value of Interest

VPN: Virtual Private Network

2.4. References

- ACR-NEMA DICOM Standard, 2006

3.0 Networking

3.1. Implementation Model

3.1.1 Application Data Flow

- The Print Images real world activity triggers the SCU Application Entity to print selected images to film on a selected remote AE (Printer).

- The Send Notice real world activity triggers the SCU Application Entity to send a Notice (markings, annotations on one image) created by the radiologic technologist to a selected remote AE that is a SecurView$_{DX}$ Workstation.

- The Echo Request real world activity triggers the SCU Application Entity to send an echo request to a selected remote AE.

- The Search on PACS real world activity triggers the SCU Application Entity to query a remote AE for patient studies and series, and provides the list of series matching the query request. The user selects patient series to be retrieved. The SCU Application Entity issues a retrieve request for each image of the selected series.

- The SCP Application Entity is always available to receive instances from a remote AE, and triggers the Store Instances real world activity to make them available to the user.

- If configured to do so, the Store Instances real world activity may trigger the Auto-Fetch Notice Images real world activity. The Auto-Fetch Notice Images real world activity triggers the SCU Application Entity to query and retrieve the image referenced in a Notice received from a SecurView$_{DX}$ Workstation, if the image is not already on the SecurView$_{RT}$ or TechMate Workstation.

3.1.2 Functional Definition of AE's

The SCU Application Entity and SCP Application Entity are implemented as two separate processes that run in the background. They are started automatically during startup of the SecurView$_{RT}$ or TechMate Workstation.

3.1.2.1 Functional Definition of SCU Application Entity

The SCU Application Entity initiates Print, Store, Echo, and Query/Retrieve requests as needed by the SecurView$_{RT}$ or TechMate Workstation.

3.1.2.2 Functional Definition of SCP Application Entity

The SCP Application Entity is available to accept echo and storage requests whenever the SecurView$_{RT}$ or TechMate Workstation is running. The SCP Application Entity stores received instances locally.

3.1.3 Sequencing of Real World Activities

For Print Images, a user triggers the SCU AE to perform DICOM print by selecting one or more images, or a portion of the screen from the reviewing display to print to a selected Print Provider.
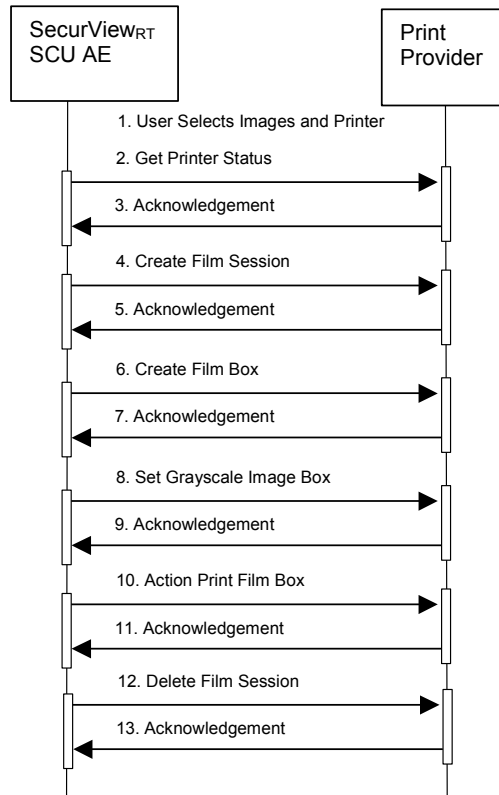
Figure 3.1-1: Print Images Sequence Diagram

For Send Notice, a user triggers the SCU AE to perform DICOM store by creating markings and/or annotations on a displayed image and requesting Send Notice to one selected remote AE.
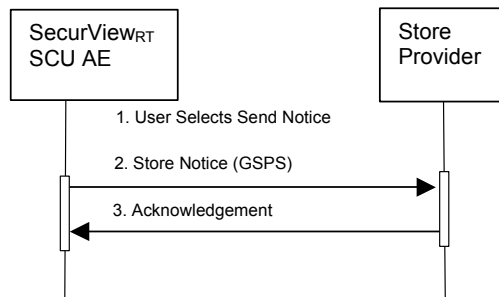
Figure 3.1-2: Send Notice Sequence Diagram

For Search on PACS, a user triggers the SCU AE to perform DICOM query/retrieve by entering search criteria and executing a query. The matching patients' series are displayed to the user. The user selects one or more series to retrieve and executes a retrieve request. The SCP AE receives the instances sent by the Query/Retrieve Provider in response to the retrieve request.
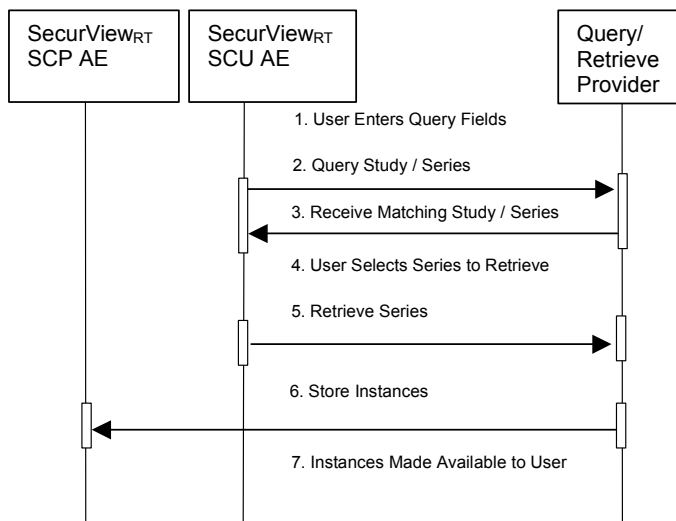
Figure 3.1-3: Search on PACS Sequence Diagram

For Auto-Fetch Notice Images, receiving a Notice instance for a patient triggers the SCU AE to perform DICOM query/retrieve to search for the image referenced in the Notice, if the image is not already on the SecurView$_{RT}$ or TechMate Workstation. The SCU AE retrieves the matching instance. The SCP AE receives the instance sent by the Query/Retrieve Provider.
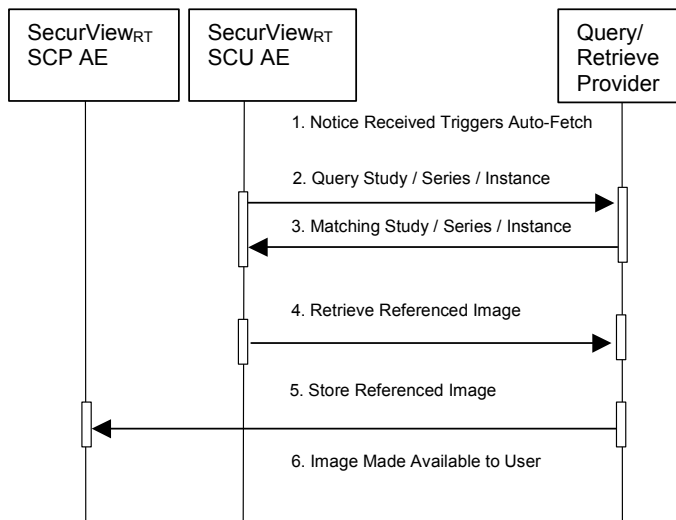
Figure 3.1-4: Auto-Fetch Notice Images Sequence Diagram

3.2. AE Specifications

3.2.1 SCU AE

3.2.1.1 SOP Classes

The SCU AE provides Standard Conformance to the following SOP Classes:

Table 3.2.1-1
SOP CLASSES FOR SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Verification	1.2.840.10008.1.1	Yes	No
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

3.2.1.2 Association Policies

3.2.1.2.1 General

The DICOM standard Application context shall be specified.

Table 3.2.1-2
DICOM APPLICATION CONTEXT

Application Context Name	1.2.840.10008.3.1.1.1

3.2.1.2.2 Number of Associations

The SCU AE supports multiple associations. There are no enforced limits for the number of open associations.

3.2.1.2.3 Asynchronous Nature

The SecurView$_{RT}$ and TechMate Workstations do not support asynchronous operations (multiple outstanding transactions over a single Association).

3.2.1.2.4 Implementation Identifying Information

Table 3.2.1-3
DICOM IMPLEMENTATION CLASS AND VERSION FOR SCU AE

Implementation Class UID	1.2.276.0.28.3.0.12.200000
Implementation Version Name	MBC_SCR_0200000

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Print Images

3.2.1.3.1.1 Description and Sequencing of Activities

Print Images is triggered when a user selects to print selected images to a selected remote Print AE either for diagnostic print or screen capture print. The SCU AE attempts to establish an association with a remote Print AE when a request to print one or more images is received. A remote Print AE configuration is predefined for each known printer manufacturer, model, and default film size.

Only one print request is permitted at a time. The user is not permitted to make another print request until the current request is completed. Each print request consists of Printer N-GET, Film Session N-CREATE, Film Box N-CREATE, Grayscale Image Box N-SET, Film Box N-ACTION, and Film Session N-DELETE. One association is negotiated per print request. The association is released after the N-DELETE response is received, if not released earlier due to failure.

3.2.1.3.1.2 Proposed Presentation Contexts

The SCU AE attempts to establish associations using the following presentation contexts:

Table 3.2.1-4
PROPOSED PRESENTATION CONTEXTS FOR PRINT IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.9	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None

3.2.1.3.1.3 SOP Specific Conformance for Print

The general behavior of the SCU AE during communication failure is summarized in the Table below. This behavior is common to all print SOP Classes supported by the SCU AE. The number of minutes to wait for a response from the remote Print AE before timing out is configurable.

Table 3.2.1-5
PRINT COMMAND COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The SCU AE releases the association, and the error is reported to the user.
Association rejected or aborted by SCP	The error is reported to the user.

The SCU AE provides baseline conformance. The SCU AE uses 12-bit grayscale images for print if supported by the remote Print AE. 8-bit grayscale is used otherwise. This section describes the DIMSE services and the attributes supported for various remote Print AEs.

3.2.1.3.1.3.1 Specific Conformance to Basic Film Session SOP Class

Table 3.2.1-6 - Basic Film Session SOP Class: Supported DIMSE operations

Name	Description
N-CREATE	Creates the film session
N-DELETE	Deletes the film session

Table 3.2.1-7 - Basic Film Session SOP Class: Supported Attributes

Attribute Name	Tag	Supported Values	Default Value
Number Of Copies	(2000,0010)	1	1
Print Priority	(2000,0020)	MED	MED
Medium Type	(2000,0030)	BLUE FILM CLEAR FILM MAMMO BLUE FILM PAPER	Predefined per Printer

The behavior of the SCU AE when encountering status codes in a N-CREATE or N-DELETE response is summarized in the Table below.

Table 3.2.1-8
FILM SESSION SOP CLASS RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The remote Print AE has completed the operation successfully. Proceed to next step.
Warning	Any	Any	If relaxed error handling is enabled, proceed to next step as if successful. If not, the SCU AE releases the association and the error is reported to the user.
Failure	Any	Any	The SCU AE releases the association, and the error is reported to the user.

3.2.1.3.1.3.2 Specific Conformance to Basic Film Box SOP Class

Table 3.2.1-9 - Basic Film Box SOP Class: Supported DIMSE operations

Name	Description
N-CREATE	Creates the film box
N-ACTION	Prints the film box

Table 3.2.1-10 - Basic Film Box SOP Class: Supported Attributes

Attribute Name	Tag	Supported Values	Default Value
Image Display Format	(2010,0010)	STANDARD\1,1	STANDARD\1,1
Film Orientation	(2010,0040)	PORTRAIT LANDSCAPE	
Film Size ID	(2010,0050)	8INX10IN 10INX12IN 10INX10IN 11INX14IN (Configurable per printer)	Configured per each printer's requirements with image matrix size, or set to calculate automatically for true size printing
Magnification Type	(2010,0060)	CUBIC	CUBIC
Border Density	(2010,0100)	BLACK	BLACK
Empty Image Density	(2010,0110)	BLACK	BLACK
Min Density	(2010,0120)	Configurable per printer	Predefined per Printer
Max Density	(2010,0130)	Configurable per printer	Predefined per Printer
Trim	(2010,0140)	NO	NO
Configuration Information	(2010,0150)	Configurable per printer	Predefined per Printer
Referenced Film Session Sequence	(2010,0500)	One sequence Item identifies the film session for this film box	
Referenced Image Box Sequence	(2010,0510)	Returned by the printer	

The behavior of the SCU AE when encountering status codes in a N-CREATE or N-ACTION response is summarized in the Table below.

Table 3.2.1-11
FILM BOX SOP CLASS RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The remote Print AE has completed the operation successfully. Proceed to next step.
Warning	Any	Any	If relaxed error handling is enabled, proceed to next step as if successful. If not, the SCU AE releases the association and the error is reported to the user.
Failure	Any	Any	The SCU AE releases the association, and the error is reported to the user.

3.2.1.3.1.3.3 Specific Conformance to Basic Grayscale Image Box SOP Class

Table 3.2.1-12 – Basic Grayscale Image Box SOP Class: Supported DIMSE operations

Name	Description
N-SET	Updates an image box in a previously created film box.

Table 3.2.1-13 – Basic Grayscale Image Box SOP Class: Supported Attributes

Attribute Name	Tag	Supported Values	Default Value
Image Position	(2020,0010)	1	1
Preformatted Grayscale Image Sequence	(2020,0110)		
> Samples Per Pixel	(0028,0002)	1	1
> Photometric Interpretation	(0028,0004)	MONOCHROME2	MONOCHROME2
> Rows	(0028,0010)	Per printed image	
> Columns	(0028,0011)	Per printed image	
> Pixel Aspect Ratio	(0028,0034)	1\1	1\1
> Bits Allocated	(0028,0100)	8 or 16	
> Bits Stored	(0028,0101)	8 or 12	
> High Bit	(0028,0102)	7 or 11	
> Pixel Representation	(0028,0103)	0	0
> Pixel Data	(7FE0,0010)	Per printed image	
Magnification Type	(2010,0060)	CUBIC	CUBIC
Requested Image Size	(2020,0030)	For diagnostic print, set to desired width per printer	Predefined per Printer

The behavior of the SCU AE when encountering status codes in a N-SET response is summarized in the Table below:

Table 3.2.1-14
IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The remote Print AE has completed the operation successfully. Proceed to next step.
Warning	Any	Any	If relaxed error handling is enabled, proceed to next step as if successful. If not, the SCU AE releases the association and the error is reported to the user.
Failure	Any	Any	The SCU AE releases the association, and the error is reported to the user.

3.2.1.3.1.3.4 Specific Conformance to Printer SOP Class

Table 3.2.1-15 - Printer SOP Class: Supported DIMSE operations

Name	Description
N-EVENT-REPORT	Receives status notification.
N-GET	Retrieves an instance of a physical printer.

N-EVENT-REPORT requests are accepted up until the Film Session N-DELETE response is received.

In the N-GET request, the SCU AE requests Printer Status, Printer Status Info, Printer Name, Manufacturer and Manufacturer's Model Name.

The behavior of the SCU AE when encountering status codes in a N-GET response is summarized in the Table below:

Table 3.2.1-16
PRINTER SOP CLASS N-GET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	If Printer Status returned is NORMAL, proceed to next step. If not, the SCU AE releases the association and the error is reported to the user.
Warning	Any	Any	If relaxed error handling is enabled and Printer Status is NORMAL, proceed to next step as if successful. If not, the SCU AE releases the association and the error is reported to the user.
Failure	Any	Any	The SCU AE releases the association, and the error is reported to the user.

3.2.1.3.2 Send Notice

3.2.1.3.2.1 Description and Sequencing of Activities

Send Notice is triggered when a radiologic technologist user creates markings and/or annotations on one image and requests Send Notice to one selected remote AE. The SCU AE negotiates an association with the selected remote Store AE to send one Notice. The SCU AE releases the association upon completion of the storage request.

3.2.1.3.2.2 Proposed Presentation Contexts

The SCU AE attempts to establish associations using the following presentation contexts:

Table 3.2.1-17
PROPOSED PRESENTATION CONTEXTS FOR CLOSE STUDY

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None

3.2.1.3.2.3 SOP Specific Conformance for Storage

The behavior of the SCU AE when encountering status codes in a C-STORE response is summarized in the Table below.

Table 3.2.1-18
C-STORE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The remote Store SCP has successfully stored the SOP Instance. Job complete.
Warning or Failure	Any	Any	The SCU AE releases the association, and the error is reported to the user.

The behavior of the SCU AE during communication failure is summarized in the Table below. A failed store request is automatically retried a configurable number of times before reporting failure.

Table 3.2.1-19
STORAGE COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The SCU AE releases the association, and the error is reported to the user.
Association rejected or aborted by SCP	The error is reported to the user.

Instance UIDs are globally unique for all SOP instances generated by the SCU AE. The UID root is "1.2.276.0.28.3".

The SCU AE provides standard conformance to the Grayscale Softcopy Presentation State Storage SOP Class. However, the GSPS content is intended for interpretation and display only by SecurView$_{DX}$ workstations.

3.2.1.3.3 Echo Request

3.2.1.3.3.1 Description and Sequencing of Activities

From the DICOM configuration dialog, the service user requests an Echo to test DICOM communication with a configured remote AE. The SCU AE issues a C-ECHO request to the remote AE, and provides the response to the user interface.

3.2.1.3.3.2 Proposed Presentation Contexts

The SCU AE attempts to establish associations using the following presentation contexts:

Table 3.2.1-20
PROPOSED PRESENTATION CONTEXTS FOR ECHO REQUEST

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

3.2.1.3.3.3 SOP Specific Conformance for Verification

The SCU AE provides baseline conformance. The behavior of the SCU AE when encountering status codes in a C-ECHO response is summarized in the Table below.

Table 3.2.1-21
VERIFICATION C-ECHO RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	Success is reported to the user.

The behavior of the SCU AE during communication failure is summarized in the Table below.

Table 3.2.1-22
VERIFICATION COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The SCU AE releases the association, and the error is reported to the user.
Association rejected or aborted by remote AE	The error is reported to the user.

3.2.1.3.4 Search on PACS / Auto-Fetch Notice Images

3.2.1.3.4.1 Description and Sequencing of Activities

Search on PACS is triggered by user interaction. The user may enter matching keys that the SCU AE uses to query a selected remote Query/Retrieve AE using the C-FIND operation. The SCU AE then displays a list of patient series returned in the C-FIND responses. The user may select one or more patient series from the list to retrieve, which signals the SCU AE to generate a C-MOVE request to the remote Query/Retrieve AE, specifying the SCP AE as the move destination. The instances received are made available for the user to view on the SecurView$_{RT}$ or TechMate Workstation.

The default Search on PACS behavior is for the SCU AE to send an initial Study Root, Study Level hierarchical query, followed by Study Root, Series Level hierarchical queries for each study returned. Matching responses are displayed to the user at the series level. The default retrieve behavior is to send a Study Root, Series Level hierarchical move request for each selected patient series. Alternate behavior can be configured such that only Study Level hierarchical queries and retrieves are performed.

When configured as enabled, Auto-Fetch Notice Images is triggered when a Notice for a patient is received. If the image referenced in the Notice is not already on the SecurView$_{RT}$ or TechMate Workstation, the SCU AE performs C-FIND and C-MOVE operations in the background with a predefined remote Query/Retrieve AE. The default behavior is to send a Study Root, Study Level hierarchical query to find the study of the received Notice. The SCU AE sends follow-up Study Root, Series Level and Study Root, Image Level hierarchical queries to the remote Query/Retrieve AE to find the referenced image. Images are retrieved one at a time via Study Root, Image Level hierarchical move request. If a remote Query/Retrieve AE does not support Image Level C-FIND or C-MOVE, Auto-Fetch Notice Images cannot be used.

For each Search on PACS or Auto-Fetch Notice Images occurrence, the SCU AE negotiates a separate consecutive association for each C-FIND and C-MOVE request.

3.2.1.3.4.2 Proposed Presentation Contexts

The SCU AE attempts to establish associations using the following presentation contexts:

Table 3.2.1-23
PROPOSED PRESENTATION CONTEXTS FOR SEARCH ON PACS

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	1.2.840.10008.1.2	SCU	None
		Explicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None

3.2.1.3.4.3 SOP Specific Conformance for Query/Retrieve

The behavior of the SCU AE when encountering status codes in a C-FIND or C-MOVE response is summarized in the Table below.

Table 3.2.1-24
C-FIND AND C-MOVE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Error Code	Behavior
Success	Matching or sub-operations are complete	0000	The remote SCP has successfully returned all matching information, or all sub-operations are complete. For C-FIND, perform follow-up query or move, or display results to the user. For C-MOVE, success is reported to the user either in the Search on PACS dialog or the patient list.
Pending	Matches or sub-operations are continuing	FF00	For C-FIND, the matching query result contained in the Identifier is collected for display or automated follow-up. For C-MOVE, the SCU AE continues to wait for additional messages.
Warning or Failure	Any	Any	The SCU AE releases the association. For Search on PACS C-FIND, failure is reported to the user in a status bar in the Search on PACS dialog. For Auto-Fetch Priors C-FIND, failure is reported to the user in the patient list. For C-MOVE, failure is reported to the user either in the Search on PACS dialog or the patient list.

The behavior of the SCU AE during communication failure is summarized in the Table below. For Auto-Fetch Notice Images, a failed request is automatically retried a configurable number of times before reporting failure.

Table 3.2.1-25
C-FIND AND C-MOVE COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The SCU AE releases the association. For Search on PACS C-FIND, failure is reported to the user in a status bar in the Search on PACS dialog. For Auto-Fetch Priors C-FIND, failure is reported to the user in the patient list. For C-MOVE, failure is reported to the user either in the Search on PACS dialog or the patient list.
Association rejected or aborted by SCP	For Search on PACS C-FIND, failure is reported to the user in a status bar in the Search on PACS dialog. For Auto-Fetch Priors C-FIND, failure is reported to the user in the patient list. For C-MOVE, failure is reported to the user either in the Search on PACS dialog or the patient list.

The SCU AE provides standard conformance to the Study Root Information Model, hierarchical method only. The Relational method is not supported.

For Search on PACS, by default the SCU AE performs Study Level queries with follow-up Series Level queries as needed, and Series Level retrieves. It is possible to configure Study Level only queries and retrieves.

For Auto-Fetch Notice Images, the SCU AE performs Study Level, Series Level and Image Level queries, and Image Level retrieves.

For Search on PACS, the SCU AE supports query Matching Key Attributes as defined in the following table. The user supplies Matching Key Attribute values, either by manual entry, drop list selection, or date range selection. Wild Card matching is requested only if the user specifies a wild card character during manual entry.

Table 3.2.1-26 - Supported C-FIND Matching Key Attributes (Search on PACS)

Matching Key Attribute	Tag	Matching Type
Study Level		
Patient's Name	(0010,0010)	Wild Card or Universal Matching
Patient ID	(0010,0020)	Single Value, Wild Card or Universal Matching
Study Date	(0008,0020)	Single Value, Range or Universal Matching
Study Time	(0008,0030)	Universal Matching
Accession Number	(0008,0050)	Single Value, Wild Card or Universal Matching
Modalities in Study	(0008,0061)	Single Value or Universal Matching; only used if alternate Study Level only query is configured
Study ID	(0020,0010)	Single Value or Wild Card Matching
Study Instance UID	(0020,000D)	Universal Matching
Series Level		
Study Instance UID	(0020,000D)	Single Value Matching (from Study level result)
Series Instance UID	(0020,000E)	Universal Matching
Modality	(0008,0060)	Single Value or Universal Matching
Body Part Examined	(0018,0015)	Single Value or Universal Matching
Request Attributes Sequence	(0040,0275)	Universal Matching
>Scheduled Procedure Step ID	(0040,0009)	Universal Matching
>Requested Procedure ID	(0040,1001)	Single Value, Wild Card or Universal Matching
Current Patient Location	(0038,0300)	Single Value or Wild Card Matching [Standard Extended]

For Auto-Fetch Notice Images, the SCU AE requires the remote Query/Retrieve SCP to support query Matching Key Attributes as defined in the following table.

Table 3.2.1-27 - Supported C-FIND Matching Key Attributes (Auto-Fetch Priors)

Matching Key Attribute	Tag	Matching Type
Study Level		
Patient ID	(0010,0020)	Single Value Matching
Study Date	(0008,0020)	Universal Matching
Study Instance UID	(0020,000D)	Universal Matching
Series Level		
Study Instance UID	(0020,000D)	Single Value Matching (from Study level result)
Series Instance UID	(0020,000E)	Universal Matching
Modality	(0008,0060)	Universal Matching
Image Level		
Study Instance UID	(0020,000D)	Single Value Matching (from Study level result)
Series Instance UID	(0020,000E)	Single Value Matching (from Series level result)
SOP Instance UID	(0008,0018)	Universal Matching

3.2.1.4 Association Acceptance Policy

The SCU AE does not accept associations.

3.2.2 SCP AE

3.2.2.1 SOP Classes

The SCP AE provides Standard Conformance to the following SOP Classes:

Table 3.2.2-1
SOP CLASSES FOR SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	No	Yes
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	No	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Verification SOP Class	1.2.840.10008.1.1	No	Yes

3.2.2.2 Association Policies

3.2.2.2.1 General

The DICOM standard Application context shall be specified.

Table 3.2.2-2
DICOM APPLICATION CONTEXT

Application Context Name	1.2.840.10008.3.1.1.1

3.2.2.2.2 Number of Associations

The SCP AE supports multiple associations. There are no enforced limits for the number of open associations.

3.2.2.2.3 Asynchronous Nature

The SecurView$_{RT}$ and TechMate Workstations do not support asynchronous operations (multiple outstanding transactions over a single Association).

3.2.2.2.4 Implementation Identifying Information

Table 3.2.2-3
DICOM IMPLEMENTATION CLASS AND VERSION FOR SCP AE

Implementation Class UID	1.2.276.0.28.3.0.12.200000
Implementation Version Name	MBC_SCR_0200000

3.2.2.3 Association Initiation Policy

The SCP AE does not initiate associations.

3.2.2.4 Association Acceptance Policy

When the SCP AE accepts an association, it will respond to storage and echo requests.

3.2.2.4.1 Activity – Store Instances

3.2.2.4.1.1 Description and Sequencing of Activities

The SCP AE is always running. Store Instances is triggered when a remote Application Entity requests to store instances to the SCP AE. Expected instances include images of the accepted modalities, Mammography CAD SR, and Grayscale Softcopy Presentation State. The SCP AE stores the instances received so that they can be made available to the user. If a received instance is a duplicate of an existing stored instance it is ignored. Instances remain on the SecurView$_{RT}$ or TechMate Workstation until a configurable study age is reached if automatic deletion is enabled, or until they are manually deleted.

3.2.2.4.1.2 Accepted Presentation Contexts

The SCP AE accepts associations using the following presentation contexts:

Table 3.2.2-4
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORE INSTANCES

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See Table 3.2.2-5		SCP	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	See Table 3.2.2-5		SCP	None
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See Table 3.2.2-5		SCP	None
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	See Table 3.2.2-5		SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See Table 3.2.2-5		SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Table 3.2.2-5		SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Table 3.2.2-5		SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	See Table 3.2.2-5		SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See Table 3.2.2-5		SCP	None
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	See Table 3.2.2-5		SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See Table 3.2.2-5		SCP	None

The SCP AE accepts presentation contexts using the following transfer syntaxes:

Table 3.2.2-5
ACCEPTABLE TRANSFER SYNTAXES FOR
STORE INSTANCES

Transfer Syntax Table	
Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1

3.2.2.4.1.3 SOP Specific Conformance for Storage SOP Classes

The SCP AE provides Level 2 (full) conformance to all of the accepted Storage SOP Classes. All received attributes of Type 1, 2, 3, and Private Attributes are stored without modification, and may be used by the SecurView$_{RT}$ or TechMate Workstation. Instances that are stored successfully are not accessible by remote systems.

The SCP AE does not preserve or replace digital signatures.

The SecurView$_{RT}$ and TechMate Workstations display only Mammography CAD SR instances produced by R2 Technology, Inc. or iCAD, Inc. All others are ignored.

The SecurView$_{RT}$ and TechMate Workstations display only Grayscale Softcopy Presentation State instances produced by a SecurView$_{DX}$ Workstation. All others are ignored. The SecurView$_{RT}$ and TechMate Workstations provide limited display conformance to Grayscale Softcopy Presentation State instances. The Softcopy VOI LUT module attributes are ignored.

The SCP AE will behave as described in the Table below when generating the C-STORE response.

Table 3.2.2-6
STORAGE C-STORE RESPONSE STATUS

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	Image is stored locally and made available to the user.
Failure	Refused: Out of Resources	A700	There is not enough local storage capacity to store the instance.

3.2.2.4.2 Activity – Receive Echo Request

3.2.2.4.2.1 Description and Sequencing of Activities

The SCP AE is always available to respond to echo requests from any remote Application Entity.

3.2.2.4.2.2 Accepted Presentation Contexts

The SCP AE accepts associations using the following presentation contexts:

Table 3.2.2-6
ACCEPTABLE PRESENTATION CONTEXTS FOR
RECEIVE ECHO REQUEST

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

3.2.2.4.2.3 SOP Specific Conformance for Verification SOP Class

The SCP AE provides standard conformance to the Verification Service Class.

3.3.   Network Interfaces

3.3.1 Physical Network Interface

The SecurView$_{RT}$ and TechMate Workstations are tested and support using 10-BaseT and 100-BaseT Ethernet media.

3.3.2 Additional Protocols

None.

3.4.   Configuration

3.4.1 AE Title/Presentation Address Mapping

A service user configures the SecurView$_{RT}$ or TechMate Workstation's SCU AE and SCP AE, and remote SCP AEs during site installation, by entering the AE Title, IP Address, and TCP/IP port number for each. When configuring a remote Print AE, a predefined printer specific configuration is also selected. There are no dedicated ports associated with dedicated services.

3.4.2 Configuration Parameters

The following are some of the relevant configurable items for the local and remote AEs:

Table 3.4-7 – CONFIGURATION PARAMETERS

Parameter	Configurable (Yes/No)	Default Value
Remote Print AE		
Printer name (manufacturer, model, default film size)	Yes	Per known printer
Configuration info	Yes	Per known printer
Dmin	Yes	Per known printer
Dmax	Yes	Per known printer
Portrait matrix (n x m)	Yes	Per known printer
Landscape matrix (n x m)	Yes	Per known printer
Portrait pixel spacing (n x m)	Yes	Per known printer
Landscape pixel spacing (n x m)	Yes	Per known printer
Bit depth (12 or 8)	Yes	Per known printer
Medium Type (blue film, clear film, mammo blue film, paper)	Yes	Per known printer
Medium Size (10inx10in, 10inx12in, 11inx14in, 8inx10in)	Yes	Per known printer
General Parameters		
Number of seconds to wait for association request or release	Yes	30
Number of seconds to wait for reply to association request	Yes	15
Number of seconds to wait for reply to association release	Yes	15
Maximum PDU size the local AE can receive	Yes	28K
Modules that invoke SCU AE		
Font size for patient info in diagnostic printing	Yes	12
Font size for all other text in diagnostic printing	Yes	8
Font size for annotations in screen capture printing	Yes	14
Print timeout waiting for response (minutes)	Yes	10
Relaxed error handling (for print)	Yes	On
Destination(s) for GSPS Notices	Yes	None
Number of automatic retries on store before reporting failure	Yes	5
Number of automatic retries on Auto-fetch before reporting failure	Yes	5
Search on PACS uses only Study Root Study Level Q/R (On/Off)	Yes	Off
SCP AE		
Received GSPS triggers Auto-fetch (On/Off)	Yes	Off

4.0   Media Interchange

Not Supported.

5.0   Support of Character Sets

The SecurView$_{RT}$ and TechMate Workstations support the following character sets:

* Default: ISO-IR 6

* Latin Alphabet No. 1:   ISO-IR 100

6.0 Security

The SecurView_{RT} and TechMate Workstations do not support any specific DICOM security measures.

It is assumed that the SecurView_{RT} and TechMate Workstations are used within a secured environment. For additional information about Hologic security policies, see Hologic's Cyber-security Best Practices for SecurView products.

7.0 Annexes

7.1. IOD Contents

7.1.1 Created SOP Instance(s)

Abbreviations for Presence of Value:

ALWAYS	Attribute always present with a value
ANAP	Attribute not always present
EMPTY	Attribute is sent without a value (zero length)
VNAP	Attribute value not always present (zero length if no value is present)

Abbreviations for Source:

AUTO	Attribute value is generated automatically
CONFIG	Attribute value source is a configurable parameter
MWL	Attribute value is the same as the value received using Modality Worklist
USER	Attribute value source is from User input

7.1.1.1 Grayscale Softcopy Presentation State IOD

The attributes that are contained in created GSPS Instances are listed in the following tables.

Table 7.1.1-1
IOD OF CREATED GSPS SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7.1.1-2	ALWAYS
Study	General Study	Table 7.1.1-3	ALWAYS
	Patient Study	Table 7.1.1-4	ALWAYS
Series	General Series	Table 7.1.1-5	ALWAYS
	Presentation Series	Table 7.1.1-5	ALWAYS
Equipment	General Equipment	Table 7.1.1-6	ALWAYS
Presentation State	Presentation State	Table 7.1.1-7	ALWAYS
	Displayed Area	Table 7.1.1-8	ALWAYS
	Graphic Annotation	Table 7.1.1-9	ANAP
	Graphic Layer	Table 7.1.1-10	ANAP
	Softcopy VOI LUT	Table 7.1.1-11	ALWAYS
	Softcopy Presentation LUT	Table 7.1.1-12	ALWAYS
	SOP Common	Table 7.1.1-13	ALWAYS

7.1.1.2 Grayscale Softcopy Presentation State Modules

Table 7.1.1-2 Patient Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Patient's Name	(0010,0010)	Copied from current patient	ALWAYS	AUTO
Patient ID	(0010,0020)	Copied from current patient	ALWAYS	AUTO

Attribute Name	Tag	Value	Presence of Value	Source
Patient Birth Date	(0010,0030)	Copied from current patient	VNAP	AUTO
Patient Sex	(0010,0040)	Copied from current patient	VNAP	AUTO
All other Patient Attributes		Copied from current patient	ANAP	AUTO

Table 7.1.1-3 General Study Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Study Date	(0008,0020)	Copied from current study	ALWAYS	AUTO
Study Time	(0008,0030)	Copied from current study	ALWAYS	AUTO
Accession Number	(0008,0050)	Copied from current study	VNAP	AUTO
Referring Physician's Name	(0008,0090)	Copied from current study	VNAP	AUTO
Study Description	(0008,1030)	Copied from current study	ANAP	AUTO
Study Instance UID	(0020,000D)	Copied from current study	ALWAYS	AUTO
Study ID	(0020,0010)	Copied from current study	VNAP	AUTO
All other Study Attributes		Copied from current study	ANAP	AUTO

Table 7.1.1-4 Patient Study Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Patient's Age	(0010,1010)	Copied from current patient	ANAP	AUTO
All other Patient Study Attributes		Copied from current patient or study	ANAP	AUTO

Table 7.1.1-5 General & Presentation Series Modules of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Modality	(0008,0060)	PR	ALWAYS	AUTO
Series Instance UID	(0020,000E)	Unique worldwide	ALWAYS	AUTO
Series Number	(0020,0011)	1	ALWAYS	AUTO

Table 7.1.1-6 General Equipment Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Manufacturer	(0008,0070)	HOLOGIC, INC.	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	SecurView	ALWAYS	AUTO
Software Versions	(0018,1020)	The current software version	ALWAYS	AUTO

Table 7.1.1-7 Presentation State Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Referenced Series Sequence	(0008,1115)	The image on which markings, annotations were made for the Notice	ALWAYS	AUTO
>Series Instance UID	(0020,000E)		ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)		ALWAYS	AUTO
Instance Number	(0020,0013)		ALWAYS	AUTO
Content Label	(0070,0080)	HOLOGIC NOTICE	ALWAYS	AUTO
Content Description	(0070,0081)	User name, Date, Time	ALWAYS	AUTO
Presentation Creation Date	(0070,0082)		ALWAYS	AUTO
Presentation Creation Time	(0070,0083)		ALWAYS	AUTO
Content Creator's Name	(0070,0084)	Current user name	ALWAYS	AUTO

Table 7.1.1-8 Displayed Area Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Displayed Area Selection Sequence	(0070,005A)	One Item per image in Referenced Series Seq	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	One Item	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)		ALWAYS	AUTO
>Displayed Area Top Left Hand Corner	(0070,0052)	0\0	ALWAYS	AUTO
>Displayed Area Bottom Right Hand Corner	(0070,0053)	Columns\Rows	ALWAYS	AUTO
>Presentation Size Mode	(0070,0100)	TRUE SIZE	ALWAYS	AUTO
>Presentation Pixel Spacing	(0070,0101)	1\1	ALWAYS	AUTO

Table 7.1.1-9 Graphic Annotation Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Graphic Annotation Sequence	(0070,0001)	Zero or more Items	ANAP	USER
>Referenced Image Sequence	(0008,1140)	One Item	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)		ALWAYS	AUTO
>Graphic Layer	(0070,0002)	LAYER0	ALWAYS	AUTO
>Text Object Sequence	(0070,0008)	Zero or more Items	ANAP	USER
>>Bounding Box Annotation Units	(0070,0003)	PIXEL	ALWAYS	AUTO
>>Unformatted Text Value	(0070,0006)		ALWAYS	USER
>>Bounding Box Top Left Hand Corner	(0070,0010)		ALWAYS	AUTO
>>Bounding Box Bottom Right Hand Corner	(0070,0011)		ALWAYS	AUTO
>>Bounding Box Text Horizontal Justification	(0070,0012)	LEFT	ALWAYS	AUTO
>Graphic Object Sequence	(0070,0009)	Zero or more Items	ANAP	USER
>>Graphic Annotation Units	(0070,0005)	PIXEL	ALWAYS	AUTO
>>Graphic Dimensions	(0070,0020)	2	ALWAYS	AUTO
>>Number of Graphic Points	(0070,0021)	Depends on Graphic Type	ALWAYS	AUTO
>>Graphic Data	(0070,0022)	Depends on Graphic Type	ALWAYS	USER
>>Graphic Type	(0070,0023)	ELLIPSE or POLYLINE	ALWAYS	USER
>>Graphic Filled	(0070,0024)	N	ALWAYS	AUTO

Table 7.1.1-10 Graphic Layer Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Graphic Layer Sequence	(0070,0060)	One Item, if Graphic Annotation Sequence is present	ANAP	AUTO
>Graphic Layer	(0070,0002)	LAYER0	ALWAYS	AUTO
>Graphic Layer Order	(0070,0062)	1	ALWAYS	AUTO
>Graphic Layer Recommended Display Grayscale Value	(0070,0066)	FFFFH	ALWAYS	AUTO

Table 7.1.1-11 Softcopy VOI LUT Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Softcopy VOI LUT Sequence	(0028,3110)	One Item per image in Referenced Series Seq	ANAP	AUTO
>Referenced Image Sequence	(0008,1140)	One Item	ALWAYS	AUTO

Attribute Name	Tag	Value	Presence of Value	Source
>>Referenced SOP Class UID	(0008,1150)		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)		ALWAYS	AUTO
>Window Center	(0028,1050)	Single value	ALWAYS	USER
>Window Width	(0028,1051)	Single value	ALWAYS	USER

Table 7.1.1-12 Softcopy Presentation LUT Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Presentation LUT Shape	(2050,0020)	IDENTITY	ALWAYS	AUTO

Table 7.1.1-13 SOP Common Module of Created GSPS Instances

Attribute Name	Tag	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	Current date	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	Current time	ALWAYS	AUTO
SOP Class UID	(0008,0016)	Grayscale Softcopy Presentation State Storage	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	Unique worldwide	ALWAYS	AUTO

7.1.2   Usage of Attributes from Received IODs

Attributes with incorrect values may cause undesirable behaviors, or disable certain SecurView_{RT} and TechMate Workstation functionality. In most instances, it is not possible for the SecurView_{RT} and TechMate Workstation software to detect incorrect attribute values.

The following attributes and values are expected for successful interpretation of received SOP Instances.

Table 7.1.2-1 Expected Attributes in all Received Instances

Attribute Name	Tag	Expected Value
SOP Class UID	(0008,0016)	Matches the Pixel Data
SOP Instance UID	(0008,0018)	Unique worldwide
Study Date	(0008,0020)	Non-zero length
Modality	(0008,0060)	Matches the SOP Class UID
Patient's Name	(0010,0010)	Non-zero length
Patient ID	(0010,0020)	Unique within institution
Study Instance UID	(0020,000D)	Unique worldwide
Series Instance UID	(0020,000E)	Unique worldwide

Table 7.1.2-2 Expected Attributes in all Received Image Instances

Attribute Name	Tag	Expected Value
Patient Orientation	(0020,0020)	Required for automatic hanging of Digital Mammography X-Ray Images or digitized film
Laterality	(0020,0060)	If the anatomy is a paired body part, required for automatic hanging:
Image Laterality	(0020,0062)	"L", "R", or "B"
Samples per Pixel	(0028,0002)	1 or 3
Photometric Interpretation	(0028,0004)	MONOCHROME1, MONOCHROME2, or RGB
Rows	(0028,0010)	Matches the Pixel data
Columns	(0028,0011)	Matches the pixel data
Bits Allocated	(0028,0100)	Up to 16, matches Pixel Data
Bits Stored	(0028,0101)	Up to 16, matches Pixel Data

Attribute Name	Tag	Expected Value
View Code Sequence	(0054,0220)	Required for automatic hanging of Digital Mammography X-Ray Images or digitized film
Pixel Data	(7FE0,0010)	Rows*Columns*Bits Allocated

Table 7.1.2-3 Expected Attributes in Digital Mammography X-Ray Images

Attribute Name	Tag	Expected Value
Presentation Intent Type	(0008,0068)	FOR PRESENTATION or FOR PROCESSING
Manufacturer	(0008,0070)	Manufacturer of the equipment used to create the image
Window Center	(0028,1050)	Valid values if present
Window Width	(0028,1051)	Valid values if present
Rescale Intercept	(0028,1052)	0
Rescale Slope	(0028,1053)	1
Rescale Type	(0028,1054)	US
VOI LUT Sequence	(0028,3010)	Valid values in Items if present

Table 7.1.2-4 Expected Attributes in Hologic Selenia Digital Mammography X-Ray Images

Attribute Name	Tag	Expected Value
Manufacturer	(0008,0070)	"LORAD" or "Hologic, Inc."
Source Image Sequence	(0008,2112)	FOR PRESENTATION images only
>Referenced SOP Class UID	(0008,1150)	Digital Mammography X-Ray Image – For Processing
>Referenced SOP Instance UID	(0008,1155)	SOP Instance UID
Private Attributes	(0019,xxxx)	Creator ID = LORAD Selenia

Table 7.1.2-5 Expected Attributes in Mammography CAD SR Instances

Attribute Name	Tag	Expected Value
Manufacturer	(0008,0070)	"R2 Technology, Inc.", "CADx" or "iCAD, Inc.": to display appropriate logo; instances with other values are ignored
Software Versions	(0018,1020)	Non-zero length value

Table 7.1.2-6 Supported Content Items in Mammography CAD SR Instances

Template	Rows	Expected Value
TID 4000, Mammography CAD Document Root	1-9	All mandatory content items
TID 4001, Mammography CAD Overall Impression/Recommendation	1, 3	All mandatory content items
TID 4003, Mammography CAD Individual Impression/Recommendation	1, 2, 5	All mandatory content items
TID 4006, Mammography CAD Single Image Finding	1-4, 6, 10, 11, 12, 20	
TID 4009, Mammography CAD Individual Calcification	2	Linear Measurement
TID 4010, Mammography CAD Calcification Cluster	3, 4	Number of calcifications, Linear Measurement
TID 4011, Mammography CAD Density	4	Linear Measurement
TID 4015, CAD Detections Performed	1-4	All mandatory content items
TID 4016, CAD Analyses Performed	1-4	All mandatory content items
TID 4017, CAD Detection Performed	1, 2, 4, 6, 8	
TID 4018, CAD Analysis Performed	1, 2, 4, 6, 8	
TID 4019, CAD Algorithm Performed	1-3	
TID 4020, CAD Image Library Entry	1-12	All mandatory content items
TID 4021, Mammography CAD Geometry	1-4	Row 3, Outline: POLYLINE, CIRCLE, ELLIPSE

7.1.3   Attribute Mapping

Not applicable.

7.1.4 Coerced/Modified Attributes

Regarding received Instances, the SecurView_{RT} and TechMate Workstations will attempt to fill in missing attributes and correct invalid attribute values that are required for internal use. All Patient and Study attributes and Referenced SOP Instance UIDs that are copied from received instances to create new instances use the unmodified values as they were received.

If the Referenced SOP Instance UID (0008,1155) within a Source Image Sequence (0008,2112) Item of a Hologic Selenia Digital Mammography – For Presentation image is detected to be incorrect, it is corrected for use within the SecurView_{RT} and TechMate Workstations.

7.2.   Data Dictionary of Private Attributes

Not applicable.

7.3.   Coded Terminology and Templates

Not applicable.

7.4.   Grayscale Image Consistency

Display calibrations are performed according to the DICOM Grayscale Standard Display Function.

7.5.   Standard Extended/Specialized/Private SOP Classes

When communicating with Siemens Magic-Store PACS as a remote Query/Retrieve AE, the SCU AE sends a non-conformant C-MOVE request at the Study Level prior to sending C-MOVE requests at the Series or Image Level. The non-conformant aspect is that (0000,0600) Move Destination is sent zero length. This behavior is expected by Siemens Magic-Store PACS.

7.6.   Private Transfer Syntaxes

None.