*i*CAD, Inc.

Second Look® Digital DICOM Conformance Statement

DICOM MergeCOM3 Advanced Integrator's Tool Kit
by Merge Technologies, Inc.

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Introduction

1.1 Scope and Field of Application

Second Look® Digital is a system that receives digital mammographic images then runs algorithms on the images to provide computer aided detection (CAD) and creates a structured report detailing the results. Second Look® Digital will use the DICOM 3.0 protocol standard to support the connectivity. It is assumed that the reader is familiar with the terminology and concepts that are used in the DICOM 3.0 standard. Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement. Although the use of this conformance statement in conjunction with the DICOM 3.0 standard is intended to facilitate communication with other DICOM systems, it is not sufficient to guarantee, by itself, the inter-operation of the connection.

1.2 Acronyms

The following acronyms and abbreviations are used in this document.

- AE   Application Entity
- ACR   American College of Radiology
- ANSI   American National Standards Institute
- CAD   Computer Aided Detection
- DICOM   Digital Imaging and Communications in Medicine
- FSE   Field Service Engineer
- GUI   Graphical User Interface
- HIS   Hospital Information System
- IOD   Information Object Definition
- NEMA   National Electrical Manufacturers Association
- PACS   Picture Archiving and Communications System
- PDU   Protocol Data Unit
- RIS   Radiological Information System
- 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
- VR   Value Representation

Furthermore, all symbols, abbreviations, and definitions used herein are described in the Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 13 (NEMA PS 3.1-13).

1.3 Related Documentation

- American College of Radiology-National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications in Medicine (DICOM) v3.0, 2004.

1.4 Considerations

The following issues need to be considered:

- The integration of any device into a system of interconnected devices goes beyond the scope of the DICOM 3.0 standard and this conformance statement when interoperability is required. The responsibility for analyzing the systems requirements and developing a solution that integrates the Second Look® system with other vendors' systems is the user's responsibility and should not be underestimated.
- Testing the complete range of possibilities between the Second Look® Digital system and non- Second Look® devices, before the connection is declared operational, is considered to be a necessity. The user should ensure that any non-Second Look® equipment provider accepts full responsibility for all validation required for their connection with the Second Look® system. The accuracy of image data once it has crossed the interface between the Second Look® equipment and the non-Second Look® device as well as the stability of the image data for the intended applications is the responsibility of the non- Second Look® provider.
- As the DICOM 3.0 standard evolves to meet the user's growing requirements and to incorporate new features and technologies, Second Look® developers will follow the evolution of the standard. This evolution of the standard may require changes to devices that have implemented DICOM 3.0. The user should ensure that any non-Second Look® provider, who connects with Second Look® devices, also plans future evolution of the DICOM standard. A refusal to do so may reflect in the loss of functionality and/or connectivity between the different products.

2 Implementation Model

The Second Look® Digital system is a computer-aided detection (CAD) system for mammography designed to assist the radiologist in breast cancer detection. Using cognitive systems technology, the system detects potential microcalcifications and masses, literally providing the radiologist with a `second opinion.' The Second Look® Digital system's advanced pattern recognition and image analysis is intended to aid in early breast cancer detection. The Second Look® Digital system is designed for all primary communication to occur through DICOM. A remotely accessible GUI shall be provided to the Field Service / Administrator to assist in simple configuration and diagnostics.

A client wishing to initiate processing on an image shall send the Second Look® Digital system a CAD request via DICOM. After each image is received, CAD processing will be initiated. Once the end of a case is determined, the Second Look® Digital system will complete any remaining image-based processing for the case and perform case-based processing. Once the case-based processing is finished, the system will send the CAD results in a DICOM message to the designated recipient.

In clinical practice, the CAD results are only used by the radiologist after the completion of the initial review of the mammography images. The radiologist then views the CAD results and takes a `second look' at the image in the locations of any areas of potential concern detected by the Second Look® Digital system. Finally, the radiologist decides whether or not true areas of concern are present at these locations. If so, the radiologist guides any additional work-up that is indicated. Note that the CAD results are not to be used to override a decision by the radiologist

to further evaluate an area of concern initially detected without the assistance of the Second Look® Digital system. Therefore, the CAD results can assist a radiologist in detecting areas of concern that would have been missed without its use, but it cannot cause a radiologist to miss areas of concern that would have been detected without the Second Look® Digital system.

2.1 Application Data Flow Diagram

The Second Look® Digital system acts as a single Application Entity based on the DICOM protocol standard. The system can act as a DICOM Storage Service Class Providers (SCP) by receiving DICOM Digital Mammography X-Ray Images, DICOM Secondary Capture images, DICOM Basic Study Content Notification messages, and DICOM Verification messages. The Second Look® Digital system can also act as a DICOM Storage Service Class User (SCU) by initiating associations to send CAD results in the form of the DICOM Enhanced Structured Report, a DICOM Mammography CAD Structured Report, a Radiotherapy Structure Set (RTSS) object, a Grayscale Softcopy Presentation State (GSPS) object, or a Digital Mammography X-Ray "FOR PRESENTATION" image with the CAD detections applied to the overlay. Once the CAD output has been sent, the Second Look® Digital system can send a DICOM Storage Commitment message to mark the CAD output for long-term storage on the remove device. Furthermore, the Second Look® Digital system can also initiate DICOM Verification requests to DICOM Storage Service Class Providers (SCP) for testing communications between systems. The data flow diagram can be seen in Figure 2.1.
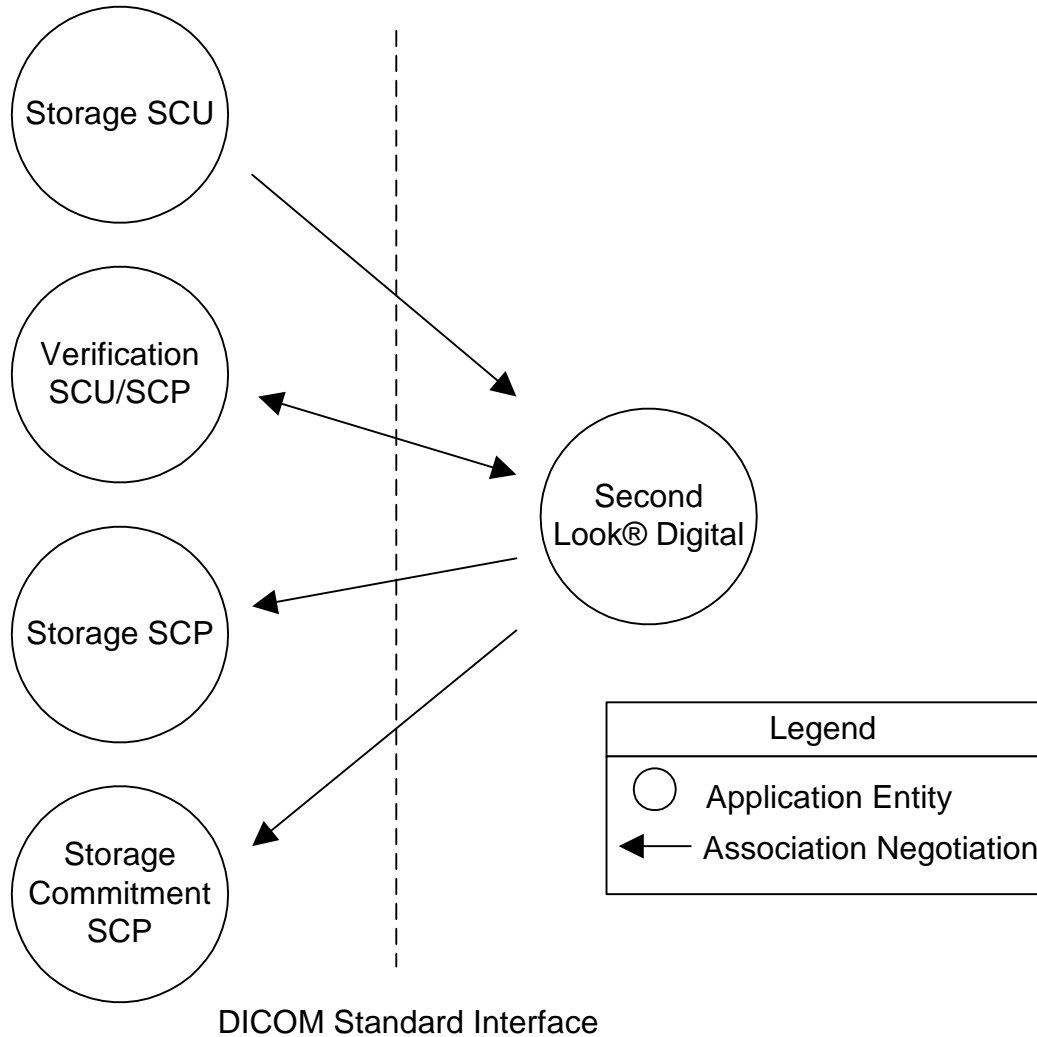
Figure 2.1 - Implementation Model

2.2 Functional Definition of Application Entities

Second Look® Digital acts as a Service Class Provider (SCP) for the purpose of receiving DICOM Digital Mammography X-Ray images, DICOM Secondary Capture images, DICOM Basic Study Content Notification messages, and DICOM Verification messages. The Second Look® Digital system acts as a Service Class User (SCU) by sending out the CAD results in the form of the DICOM Enhanced Structured Report , DICOM Mammography CAD Structured Report, a Radiotherapy Structure Set (RTSS) object, a Grayscale Softcopy Presentation State (GSPS) object, or a Digital Mammography X-Ray "FOR PRESENTATION" image with the CAD detections applied to the overlay, each of which can be followed by sending a DICOM Storage Commitment message to mark the CAD output on the remote device for long-term storage. Furthermore, the Second Look® Digital system acts as an SCU by initiating the DICOM Verification message for testing communications between devices.

3   AE Specifications

3.1   SCP Services

The following sections define the services used by Second Look® Digital as an SCP.

3.1.1   SCP Application Entity

Second Look® Digital provides SCP standard conformance to the DICOM 3.0 SOP Classes that are defined in Table 1.

Table 1 - SCP SOP Class Conformance

SOP Class	SOP Class UID
Digital Mammography X-Ray – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Mammography X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Basic Study Content Notification	1.2.840.10008.1.9
Verification	1.2.840.10008.1.1

3.2   SCU Services

The following sections define the services used by Second Look® Digital as an SCU.

3.2.1   SCU Application Entity

Second Look® Digital provides SCU standard conformance to the DICOM 3.0 SOP Classes that are defined in Table 2.

Table 2 - SCU SOP Class Conformance

SOP Class	SOP Class UID
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22
Mammography CAD Structured Report	1.2.840.10008.5.1.4.1.1.88.50
Radiotherapy Structure Set (RTSS)	1.2.840.10008.5.1.4.1.1.481.3
Grayscale Softcopy Presentation State (GSPS)	1.2.840.10008.5.1.4.1.1.11.1
Digital Mammography X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Storage Commitment	1.2.840.10008.1.20.1
Verification	1.2.840.10008.1.1

3.3   Association Establishment Policies

3.3.1   General

Second Look® Digital contains no limitations for maximum PDU size. Default maximum PDU size is set to 28672 bytes, but can be modified in a configuration file for each application.

3.3.2   Number of Associations

Second Look® Digital will issue only one association request at a time to a Remote AE and can support at least four associations at a time from a Remote AE.

3.3.3 Asynchronous Nature

Second Look® Digital allows a single outstanding operation on any association. Therefore, Second Look® Digital does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

3.3.4 Implementation Identifying Information

Second Look® Digital will respond with the following implementation identifying parameters by default:
- ❑ Implementation Class UID   **1.2.840.114191.2**
- ❑ Implementation Version Name   **SL_CAD_MGR**

The Implementation Class UID is derived from the DICOM Standard PS 3.5 -2004, Annex B & Annex C, where the number 114191 is the unique identifier given to iCAD, Inc. by ANSI. The implementation version name is an abbreviation for Second Look® CAD Manager.

3.3.5 Network Configuration

The Field Service Engineer sets the Application Entity title, IP Address, and port number for Second Look® Digital through the provided Graphical User Interface (GUI). The Field Service Engineer also sets the Application Entity title, IP Address, and port number for any remote devices that want to communicate with Second Look® Digital through the same GUI.

3.3.6 Association Initiation by Real World Activity

Second Look® Digital will issue a new association with a remote device when CAD results, storage commitment, and verification messages are to be transmitted.

3.3.6.1 Verify Communication with a Remote System

3.3.6.2 Associated Real World Activity - Verification

Second Look® Digital can issue a Verification request to any of the configured remote devices through the Field Service Engineer's Graphical User Interface. Second Look® Digital will respond to any Verification request as long as the Second Look® Digital's service is started.

3.3.6.3 Presentation Context Table - Verification

Second Look® Digital supports the transfer syntaxes listed in Table 3. For a Verification request, Second Look® Digital will propose the Presentation Contexts listed in Table 4.

Table 3 – Verification Transfer Syntaxes

Transfer Syntaxes	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

Table 4 – Verification SOP Class

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Verification	1.2.840.10008.1.1	Declared in Table 3	SCU/SCP	None

3.3.6.4 **SOP Specific Conformance – Verification**
The response codes for the DICOM Verification message are displayed in Table 5. If there was an error in creating the Verification response, no response shall be sent.

Table 5 - Verification Response Codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000	None	Operation performed properly

3.3.6.5 **Receive Images from a Remote System**

3.3.6.6 **Associated Real World Activity – Receive**
Second Look® Digital will receive images from remote devices that wish to have CAD process the patient case.

3.3.6.7 **Presentation Context Table – Receive**
Second Look® Digital supports the transfer syntaxes listed in Table 6. When sending CAD output, Second Look® Digital will propose the Presentation Contexts listed in Table 7.

Table 6 - Receive Image Transfer Syntaxes

Transfer Syntaxes	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit Little Endian	1.2.840.10008.1.2.1
DICOM Explicit Big Endian	1.2.840.10008.1.2.2

Table 7 – Presentation Contexts for Receive from Remote Systems

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Digital Mammography X-Ray – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Declared in Table 6	SCP	None
Digital Mammography X-Ray – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Declared in Table 6	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Declared in Table 6	SCP	None

3.3.6.8 **SOP Specific Conformance – Receive**
The Second Look® SCP conforms to the SOP's of the Storage Service Class at Level 2 (Full) as described in Section B.4.1 of PS 3.4 -2004 of the DICOM Standard. Second Look® Digital will receive Digital Mammography X-Ray – For Processing images, Digital Mammography X-Ray – For Presentation images, and Secondary Capture images. Note that Second Look® Digital has the ability to receive the Digital Mammography X-Ray – For Presentation images, but will not process these images with its CAD algorithms. If the corresponding "For Processing" images are sent with the "For Presentation" images, then a CAD overlay can be applied to the "For Presentation" image and be sent to any remote device. Also, Second Look® Digital will only

process Secondary Capture devices that were acquired from a Howtek 861 device. The status codes shown in Table 8 may be sent back to the Remote SCU after the SCU tries to open an association with the Second Look® Digital system.

Table 8 – C-Store Response Status Codes

Status Code	Service Status	Meaning	Explanation
A900	Refused	Invalid Dataset	The image data that was received was invalid.
0110	Error	Processing Failure	An internal system error occurred when receiving the image and storing it to disk.
0000	Success	Success	Indicates that an association was successfully established and an image was successfully stored and queued for processing.

The status codes shown in Table 9 may be sent back to the Remote SCU after the SCU tries to open an association with the Second Look® Digital system and the association gets rejected.

Table 9 - Reject Association Response Status Codes

Description of Rejection	PDU Byte 8 - Result	PDU Byte 9 - Source	PDU Byte 10 - Reason
Not enough disk space	2 - Transient Rejection	3 - UL service provider	2 - Local limit exceeded
Not a configured remote device	1 – Permanent Rejection	1 - UL service user	3 - Unacceptable Calling AP
Exceeded allowed simultaneous connections	2 - Transient Rejection	3 - UL service provider	1 - Temporary congestion
Unknown error in handling association	2 - Transient Rejection	1 - UL service user	1 - Temporary congestion

The Digital Mammography X-Ray Information Object Definition (IOD) modules are defined in Table 10.

Table 10 – Digital Mammography X-Ray Image IOD Modules

IE	Module	DICOM Reference	Document Reference	Usage
Patient	Patient	PS 3.3 –2004 C.7.1.1	Table 11	M
	Specimen Identification	PS 3.3 –2004 C.7.1.2	Not used	U
	Clinical Trial Subject	PS 3.3 –2004 C.7.1.3	Not used	U
Study	General Study	PS 3.3 – 2004 C.7.2.1	Table 12	M
	Patient Study	PS 3.3 – 2004 C.7.2.2	Not used	U
	Clinical Trial Study	PS 3.3 – 2004 C.7.2.3	Not used	U
Series	General Series	PS 3.3 – 2004 C.7.3.1	Table 13	M
	Clinical Trial Series	PS 3.3 – 2004 C.7.3.2	Not used	U
	DX Series	PS 3.3 – 2004 C.8.11.1	Table 14	M

	Mammography Series	PS 3.3 – 2004 C.8.11.6	Table 15	M
	Frame of Reference	PS 3.3 – 2004 C.7.4.1	Not Used	C
Equipment	General Equipment	PS 3.3 – 2004 C.7.5.1	Table 16	M
Image	General Image	PS 3.3 – 2004 C.7.6.1	Table 17	M
	Image Pixel	PS 3.3 – 2004 C.7.6.3	Table 18	M
	Contrast/Bolus	PS 3.3 – 2004 C.7.6.4	Not used	U
	Display Shutter	PS 3.3 – 2004 C.7.6.11	Not used	U
	Device	PS 3.3 – 2004 C.7.6.12	Not used	U
	Intervention	PS 3.3 – 2004 C.7.6.13	Not used	U
	DX Anatomy Imaged	PS 3.3 – 2004 C.8.11.2	Table 19	M
	DX Image	PS 3.3 – 2004 C.8.11.3	Table 20	M
	DX Detector	PS 3.3 – 2004 C.8.11.4	Table 21	M
	X-Ray Collimator	PS 3.3 – 2004 C.8.7.3	Not used	U
	DX Positioning	PS 3.3 – 2004 C.8.11.5	Not used	U
	X-Ray Tomo Acquisition	PS 3.3 – 2004 C.8.7.7	Not used	U
	X-Ray Acquisition Dose	PS 3.3 – 2004 C.8.7.8	Not used	U
	X-Ray Generation	PS 3.3 – 2004 C.8.7.9	Not used	U
	X-Ray Filtration	PS 3.3 – 2004 C.8.7.10	Not used	U
	X-Ray Grid	PS 3.3 – 2004 C.8.7.11	Not used	U
	Mammography Image	PS 3.3 – 2004 C.8.11.7	Table 22	M
	Overlay Plane	PS 3.3 – 2004 C.9.2	Not used	C
	Curve	PS 3.3 – 2004 C.10.2	Not used	U
	VOI LUT	PS 3.3 – 2004 C.11.2	Not used because Second Look® does not process FOR PRESENTATION images.	
	Image Histogram	PS 3.3 – 2004 C.11.5	Not used	U
	Acquisition Context	PS 3.3 – 2004 C.7.6.14	Table 25	M
	SOP Common	PS 3.3 – 2004 C.12.1	Table 26	M

Table 11 - Patient Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.1.1

Group and Element	VR	Type	Description	Value
(0010,0010)	PN	2	Patient's Name	Patient's full name obtained from the image header.
(0010,0020)	LO	2	Patient ID	Primary hospital identification number or code for the patient obtained from the image header.
(0010,0030)	DA	2	Patient's Birth Date	Birth date of the patient obtained from the image header.
(0010,0040)	CS	2	Patient's Sex	Sex of the named patient obtained from the image header.

Group and Element	VR	Type	Description	Value
				Enumerated Values: M = male F = female O = other
(0008,1120)	SQ	3	Referenced Patient Sequence	Not used
>(0008,1150)	UI	1C	Referenced SOP Class UID	Not used
>(0008,1155)	UI	1C	Referenced SOP Instance UID	Not used
(0010,0032)	TM	3	Patient Birth Time	Not used
(0010,1000)	LO	3	Other Patient ID	Not used
(0010,1001)	PN	3	Other Patient Names	Not used
(0010,2160)	SH	3	Ethnic Group	Not used
(0010,4000)	LT	3	Patient Comments	Not used

Table 12 - General Study Module Attributes – Mandatory - ref. PS 3.3 - 2004 C.7.2.1

Group and Element	VR	Type	Description	Value
(0020,000D)	UI	1	Study Instance UID	Unique identifier for the Study obtained from the image header.
(0008,0020)	DA	2	Study Date	The current date of the CAD processing
(0008,0030)	TM	2	Study Time	The current time of the CAD processing.
(0008,0090)	PN	2	Referring Physician's Name	Not used
(0008,0096)	SQ	3	Referring Physician Identification Sequence	Not used
(0020,0010)	SH	2	Study ID	User or equipment generated Study identifier obtained from the image header.
(0008,0050)	SH	2	Accession Number	A RIS generated number, which identifies the order for the Study obtained from the image header.
(0008,1030)	LO	3	Study Description	Institution-generated description or classification of the Study (component) performed.
(0008,1048)	PN	3	Physicians Of Record	Not used
(0008,1049)	SQ	3	Physician(s) of Record Identification Sequence	Not used
(0008,1060)	PN	3	Name Of Physicians Reading Study	Not used
(0008,1062)	SQ	3	Physician(s) Reading Study Identification Sequence	Not used
(0008,1110)	SQ	3	Referenced Study Sequence	Not used
(0008,1032)	SQ	3	Procedure Code Sequence	Not used

Table 13 - General Series Module Attributes– Mandatory - ref. PS 3.3 - 2004 C.7.3.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	MG
(0020,000E)	UI	1	Series Instance UID	Unique identifier of the Series.
(0020,0011)	IS	2	Series Number	A number that identifies this Series.
(0020,0060)	CS	2C	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) is not sent. Enumerated Values: R = right L = left
(0008,0021)	DA	3	Series Date	Date the Series started.
(0008,0031)	TM	3	Series Time	Time the Series started.
(0008,1050)	PN	3	Performing Physician's Name	Name of the physician(s) administering the Series.
(0008,1052)	SQ	3	Performing Physician Identification Sequence	Not used
(0018,1030)	LO	3	Protocol Name	Not used
(0008,103E)	LO	3	Series Description	Not used
(0008,1070)	PN	3	Operators' Name	Name(s) of the operator(s) supporting the Series.
(0008,1072)	SQ	3	Operator Identification Sequence	Not used
(0008,1111)	SQ	3	Referenced Performed Procedure Step Sequence	Not used
(0018,0015)	CS	3	Body Part Examined	BREAST
(0018,5100)	CS	2C	Patient Position	Not used
(0028,0108)	US or SS	3	Smallest Pixel Value in Series	Not used
(0028,0109)	US or SS	3	Largest Pixel Value in Series	Not used
(0040,0275)	SQ	3	Request Attributes Sequence	Not used
(0040,0253)	SH	3	Performed Procedure Step ID	Not used
(0040,0244)	DA	3	Performed Procedure Step Start Date	Not used
(0040,0245)	TM	3	Performed Procedure Step Start Time	Not used
(0040,0254)	LO	3	Performed Procedure Step Description	Not used
(0040,0260)	SQ	3	Performed Protocol Code Sequence	Not used
(0040,0280)	ST	3	Comments on the Performed Procedure Step	Not used

Table 14 – DX Series Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	MG
(0008,1111)	SQ	1C	Referenced Performed Procedure Step Sequence	Not used
(0008,0068)	CS	1	Presentation Intent Type	Identifies the intent of the images that are contained within this Series. Enumerated Values: FOR PRESENTATION FOR PROCESSING

Table 15 – Mammography Series Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.6

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	MG

Table 16 - General Equipment Module Attributes - Mandatory – ref. PS 3.3 - 2004 C.7.5.1

Group and Element	VR	Type	Description	Value
(0008,0070)	LO	2	Manufacturer	Manufacturer of the equipment that produced the composite instances.
(0008,0080)	LO	3	Institution Name	Not used
(0008,0081)	ST	3	Institution Address	Not used
(0008,1010)	SH	3	Station Name	Not used
(0008,1040)	LO	3	Institutional Department Name	Not used
(0008,1090)	LO	3	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances.
(0018,1000)	LO	3	Device Serial Number	Not used
(0018,1020)	LO	3	Software Version	Not used
(0018,1050)	DS	3	Spatial Resolution	Not used
(0018,1200)	DA	3	Date of Last Calibration	Not used
(0018,1201)	TM	3	Time of Last Calibration	Not used
(0028,0120)	US	3	Pixel Padding Value	Not used

Table 17 – General Image Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.6.1

Group and Element	VR	Type	Description	Value
(0020,0013)	IS	2	Instance Number	A number that identifies this image.
(0020,0020)	CS	2C	Patient Orientation	Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (Patient) (0020,0037) and Image Position (Patient) (0020,0032).
(0008,0023)	DA	2C	Content Date	The date the image pixel data creation started. Required if image is part of a series in which the images are temporally related.
(0008,0033)	TM	2C	Content Time	The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related.
(0008,0008)	CS	3	Image Type	Not used
(0020,0012)	IS	3	Acquisition Number	Not used
(0008,0022)	DA	3	Acquisition Date	The date the acquisition of data that resulted in this image started.
(0008,0032)	TM	3	Acquisition Time	The time the acquisition of data that resulted in this image started
(0008,002A)	DT	3	Acquisition Datetime	Not used
(0008,1140)	SQ	3	Referenced Image Sequence	Not used
(0008,2111)	ST	3	Derivation Description	Not used
(0008,9215)	SQ	3	Derivation Code Sequence	Not used
(0008,2112)	SQ	3	Source Image Sequence	Not used
(0008,113A)	SQ	3	Referenced Waveform Sequence	Not used
(0020,1002)	IS	3	Images in Acquisition	Not used
(0020,4000)	LT	3	Image Comments	Not used
(0028,0300)	CS	3	Quality Control Image	Not used
(0028,0301)	CS	3	Burned In Annotation	Not used
(0028,2110)	CS	3	Lossy Image Compression	Not used
(0028,2112)	DS	3	Lossy Image Compression Ratio	Not used
(0088,0200)	SQ	3	Icon Image Sequence	Not used
(2050,0020)	CS	3	Presentation LUT Shape	Not used

Table 18 – Image Pixel Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.6.3

Group and Element	VR	Type	Description	Value
(0028,0002)	US	1	Samples per Pixel	Number of samples (planes) in this image.
(0028,0004)	CS	1	Photometric Interpretation	Specifies the intended interpretation of the pixel data: MOMOCHROME2
(0028,0010)	US	1	Rows	Number of rows in the image.
(0028,0011)	US	1	Columns	Number of columns in the image.
(0028,0100)	US	1	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated.
(0028,0101)	US	1	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored.
(0028,0102)	US	1	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit.
(0028,0103)	US	1	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Value: 0000H = unsigned integer.
(7FE0,0010)	OW or OB	1	Pixel Data	A data stream of the pixel samples that comprise the Image.
(0028,0006)	US	1C	Planar Configuration	Not used
(0028,0034)	IS	1C	Pixel Aspect Ratio	Not used
(0028,0106)	US or SS	3	Smallest Image Pixel Value	Not used
(0028,0107)	US or SS	3	Largest Image Pixel Value	Not used
(0028,1101)	US or SS	1C	Red Palette Color Lookup Table Descriptor	Not used
(0028,1102)	US or SS	1C	Green Palette Color Lookup Table Descriptor	Not used
(0028,1103)	US or SS	1C	Blue Palette Color Lookup Table Descriptor	Not used
(0028,1201)	OW	1C	Red Palette Color Lookup Table Data	Not used
(0028,1202)	OW	1C	Green Palette Color Lookup Table Data	Not used
(0028,1203)	OW	1C	Blue Palette Color Lookup Table Data	Not used

Table 19 – DX Anatomy Imaged Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.2

Group and Element	VR	Type	Description	Value
(0020,0062)	CS	1	Image Laterality	Laterality of (possibly paired) body part (as described in Anatomic Region Sequence (0008,2218)) examined. Enumerated Values: R = right L = left
(0008,2218)	SQ	2	Anatomic Region Sequence	Sequence that identifies the anatomic region of interest in this image (i.e. external anatomy, surface anatomy, or general region of the body). This anatomic region is placed on the table or bucky for examination.
>(0008,0100)	SH	1C	Code Value	T-04000
>(0008,0102)	SH	1C	Coding Scheme Designator	SNM3
>(0008,0104)	LO	1C	Code Meaning	BREAST
>(0008,2220)	SQ	3	Anatomic Region Modifier Sequence	Not used
(0008,2228)	SQ	3	Primary Anatomic Structure Sequence	Not used

Table 20 – DX Image Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.3

Group and Element	VR	Type	Description	Value
(0008,0008)	CS	1	Image Type	Image identification characteristics.
(0028,0002)	US	1	Samples per Pixel	Number of samples in this image. Shall have an Enumerated Value of 1.
(0028,0004)	CS	1	Photometric Interpretation	Specifies the intended interpretation of the pixel data: MOMOCHROME2
(0028,0100)	US	1	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated.
(0028,0101)	US	1	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored.
(0028,0102)	US	1	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit.
(0028,0103)	US	1	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated

				Value: 0000H = unsigned integer.
(0028,1040)	CS	1	Pixel Intensity Relationship	The relationship between the Pixel sample values and the X-Ray beam intensity. Enumerated Values: LIN, LOG
(0028,1041)	SS	1	Pixel Intensity Relationship Sign	The sign of the relationship between the Pixel sample values stored in Pixel Data (7FE0,0010) and the X-Ray beam intensity. Enumerated Values; 1, -1
(0028,1052)	DS	1	Rescale Intercept	The value b in the relationship between stored values (SV) in Pixel Data (7FE0,0010) and the output units specified in Rescale Type (0028,1054). Output units = m*SV + b. Enumerated Value: 0
(0028,1053)	DS	1	Rescale Slope	m in the equation specified by Rescale Intercept (0028,1052). Enumerated Value: 1
(0028,1054)	LO	1	Rescale Type	Specifies the output units of Rescale Slope (0028,1053) and Rescale Intercept (0028,1052). Enumerated Value: US = Unspecified
(2050,0020)	CS	1	Presentation LUT Shape	Specifies an identity transformation for the Presentation LUT, other than to account for the value of Photometric Interpretation (0028,0004), such that the output of all grayscale transformations defined in the IOD containing this Module are defined to be P-Values. Enumerated Values: IDENTITY - output is in P-Values - shall be used if Photometric Interpretation (0028,0004) is MONOCHROME2. INVERSE - output after inversion is in PValues- shall be used if Photometric Interpretation (0028,0004) is MONOCHROME1.
(0028,2110)	CS	1	Lossy Image Compression	Specifies whether an Image has undergone lossy compression. Enumerated Value: 00 = Image has NOT been subjected to

				lossy compression.
(0028,2112)	DS	1	Lossy Image Compression Ratio	Not used
(0008,2111)	ST	3	Derivation Description	Not used
(0018,1400)	LO	3	Acquisition Device Processing Description	Not used
(0018,1401)	LO	3	Acquisition Device Processing Code	Not used
(0020,0020)	CS	1	Patient Orientation	Patient direction of the rows and columns of the image.
(0050,0004)	CS	3	Calibration Image	Not used
(0028,0301)	CS	1	Burned In Annotation	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. Enumerated Value: NO
(0028,3010)	SQ	1C	VOI LUT Sequence	Not used because Second Look does not process FOR PRESENTATION images.
(0028,1050)	DS	1C	Window Center	Not used
(0028,1051)	DS	1C	Window Width	Not used
(0028,1055)	LO	3	Window Center & Width Explanation	Not used

Table 21 – DX Detector Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.4

Group and Element	VR	Type	Description	Value
(0018,7004)	CS	2	Detector Type	The type of detector used to acquire this image. Defined Terms: SCINTILLATOR = Phosphor used
(0018,7005)	CS	3	Detector Configuration	Not used
(0018,7006)	LT	3	Detector Description	Not used
(0018,7008)	LT	3	Detector Mode	Not used
(0018,700A)	SH	3	Detector ID	The ID or serial number of the detector used to acquire this image.
(0018,700C)	DA	3	Date of Last Detector Calibration	Not used
(0018,700E)	TM	3	Time of Last Detector Calibration	Not used
(0018,7010)	IS	3	Exposures on Detector Since Last Calibration	Not used
(0018,7011)	IS	3	Exposures on Detector Since Manufactured	Not used
(0018,7012)	DS	3	Detector Time Since Last Exposure	Not used
(0018,7014)	DS	3	Detector Active Time	Not used

(0018,7016)	DS	3	Detector Activation Offset From Exposure	Not used
(0018,701A)	DS	3	Detector Binning	Not used
(0018,7000)	CS	3	Detector Conditions Nominal Flag	Not used
(0018,7001)	DS	3	Detector Temperature	Not used
(0018,6000)	DS	3	Sensitivity	Not used
(0018,1147)	CS	3	Field of View Shape	Not used
(0018,1149)	IS	3	Field of View Dimension(s)	Not used
(0018,7030)	DS	1C	Field of View Origin	Not used
(0018,7032)	DS	1C	Field of View Rotation	Not used
(0018,7034)	CS	1C	Field of View Horizontal Flip	Not used
(0018,1164)	DS	1	Imager Pixel Spacing	Physical distance measured at the front plane of the detector housing between the center of each image pixel specified by a numeric pair - row spacing value (delimiter) column spacing value in mm.
(0018,7020)	DS	3	Detector Element Physical Size	Not used
(0018,7022)	DS	3	Detector Element Spacing	Not used
(0018,7024)	CS	3	Detector Active Shape	Not used
(0018,7026)	DS	3	Detector Active Dimension(s)	Not used
(0018,7028)	DS	3	Detector Active Origin	Not used

Table 22 – Mammography Image Module Attributes – mandatory – ref. PS 3.3 - 2004 C.8.11.7

Group and Element	VR	Type	Description	Value
(0018,1508)	CS	1	Positioner Type	MAMMOGRAPHIC
(0018,1510)	DS	3	Positioner Primary Angle	Not used
(0018,1511)	DS	3	Positioner Secondary Angle	Not used
(0020,0062)	CS	1	Image Laterality	Laterality of the region examined. Enumerated Values: R = right L = left B = both (e.g. cleavage)
(0040,0318)	CS	1	Organ Exposed	BREAST
(0028,1300)	CS	3	Implant Present	Whether or not an implant is present. Enumerated Values: YES NO
(0028,1350)	CS	3	Partial View	Indicates whether this image is a partial view, that is a subset of a single view of

				the breast. Enumerated Values: YES, NO
(0028,1351)	ST	3	Partial View Description	Not used
(0008,2218)	SQ	1	Anatomic Region Sequence	Sequence that identifies the anatomic region of interest in this image.
>(0008,0100)	SH	1C	Code Value	T-04000
>(0008,0102)	SH	1C	Coding Scheme Designator	SNM3
>(0008,0104)	LO	1C	Code Meaning	BREAST
(0054,0220)	SQ	1	View Code Sequence	Sequence that describes the projection of the anatomic region of interest on the image receptor. Only a single Item shall be permitted in this sequence.
>(0008,0100)	SH	1C	Code Value	See Table 23
>(0008,0102)	SH	1C	Coding Scheme Designator	See Table 23
>(0008,0104)	LO	1C	Code Meaning	See Table 23
>(0054,0222)	SQ	2	View Modifier Code Sequence	View Modifier Zero or more Items may be included in this Sequence.
>>(0008,0100)	SH	1C	Code Value	See Table 24
>>(0008,0102)	SH	1C	Coding Scheme Designator	See Table 24
>>(0008,0104)	LO	1C	Code Meaning	See Table 24

Table 23 - View for Mammography – ref. PS 3.16 –2004 CID 4014

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SNM3	R-10224	medio-lateral
SNM3	R-10226	medio-lateral oblique
SNM3	R-10228	latero-medial
SNM3	R-10230	latero-medial oblique
SNM3	R-10242	cranio-caudal
SNM3	R-10244	caudo-cranial (from below)
SNM3	R-102D0	superolateral to inferomedial oblique
SNM3	R-102CF	exaggerated cranio-caudal
SNM3	Y-X1770	cranio-caudal exaggerated laterally
SNM3	Y-X1771	cranio-caudal exaggerated medially

Table 24 - View Modifier for Mammography – ref. PS 3.16 – 2004 CID 4015

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SNM3	R-102D2	Cleavage
SNM3	R-102D1	Axillary Tail
SNM3	R-102D3	Rolled Lateral
SNM3	R-102D4	Rolled Medial
SNM3	R-102D5	Implant Displaced
SNM3	R-102D6	Magnification
SNM3	R-102D7	Spot Compression
SNM3	R-102C2	Tangential

Table 25 – Acquisition Context Module Attributes – ref. PS 3.3 - 2004 C.7.6.14

Group and Element	VR	Type	Description	Value
(0040,0555)	SQ	2	Acquisition Context Sequence	Zero items in this sequence
(0040,0556)	ST	3	Acquisition Context Description	Not used

Table 26 - SOP Common Module Attributes – ref. PS 3.3 - 2004 C.12.1

Group and Element	VR	Type	Description	Value
(0008,0016)	UI	1	SOP Class UID	"1.2.840.10008.5.1.4.1.1.1.2.1", which represents FOR PROCESSING or "1.2.840.10008.5.1.4.1.1.1.2", which represents FOR PRESENTATION
(0008,0018)	UI	1	SOP Instance UID	Uniquely identifies the SOP Instance.
(0008,0005)	CS	1C	Specific Character Set	ISO_IR 100
(0008,0012)	DA	3	Instance Creation Date	Not used
(0008,0013)	TM	3	Instance Creation Time	Not used
(0008,0014)	UI	3	Instance Creator UID	Not used
(0008,0110)	SQ	3	Coding Scheme Identification Sequence	Not used
(0008,0201)	SH	3	Timezone Offset From UTC	Not used
(0018,A001)	SQ	3	Contributing Equipment Sequence	Not used
(0020,0013)	IS	3	Instance Number	A number that identifies this Composite object instance.
(0100,0410)	CS	3	SOP Instance Status	Not used
(0100,0420)	DT	3	SOP Authorization Date and Time	Not used
(0100,0424)	LT	3	SOP Authorization Comment	Not used
(0100,0426)	LO	3	Authorization Equipment Certification Number	Not used
(4FFE,0001)	SQ	3	MAC Parameters Sequence	Not used
(FFFA,FFFA)	SQ	1	Digital Signatures Sequence	Not used
(0400,0500)	SQ	1C	Encrypted Attributes Sequence	Not used

The Secondary Capture Image Information Object Definition (IOD) modules are defined in Table 27.

Table 27 – Secondary Capture Image IOD Modules

IE	Module	DICOM Reference	Document Reference	Usage
Patient	Patient	PS 3.3 –2004 C.7.1.1	Table 28	M
	Clinical Trial Subject	PS 3.3 –2004 C.7.1.3	Not used	U
Study	General Study	PS 3.3 – 2004 C.7.2.1	Table 29	M
	Patient Study	PS 3.3 – 2004 C.7.2.2	Not used	U
	Clinical Trial Study	PS 3.3 – 2004 C.7.2.3	Not used	U
Series	General Series	PS 3.3 – 2004 C.7.3.1	Table 30	M
	Clinical Trial Series	PS 3.3 – 2004 C.7.3.2	Not used	U
Equipment	General Equipment	PS 3.3 – 2004 C.7.5.1	Table 31	U
	SC Equipment	PS 3.3 – 2004 C.8.6.1	Table 32	M
Image	General Image	PS 3.3 – 2004 C.7.6.1	Table 33	M
	Image Pixel	PS 3.3 – 2004 C.7.6.3	Table 34	M
	SC Image	PS 3.3 – 2004 C.8.6.2	Table 35	M
	Overlay Plane	PS 3.3 – 2004 C.9.2	Not used	U
	Modality LUT	PS 3.3 – 2004 C.11.1	Not used	U
	VOI LUT	PS 3.3 – 2004 C.11.2	Not used	U
	SOP Common	PS 3.3 – 2004 C.12.1	Table 36	M

Table 28 - Patient Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.1.1

Group and Element	VR	Type	Description	Value
(0010,0010)	PN	2	Patient's Name	Patient's full name obtained from the image header.
(0010,0020)	LO	2	Patient ID	Primary hospital identification number or code for the patient obtained from the image header.
(0010,0030)	DA	2	Patient's Birth Date	Birth date of the patient obtained from the image header.
(0010,0040)	CS	2	Patient's Sex	Sex of the named patient obtained from the image header. Enumerated Values: M = male F = female O = other
(0008,1120)	SQ	3	Referenced Patient Sequence	Not used
(0010,0032)	TM	3	Patient Birth Time	Not used
(0010,1000)	LO	3	Other Patient ID	Not used
(0010,1001)	PN	3	Other Patient Names	Not used
(0010,2160)	SH	3	Ethnic Group	Not used
(0010,4000)	LT	3	Patient Comments	Not used

Table 29 - General Study Module Attributes – Mandatory - ref. PS 3.3 - 2004 C.7.2.1

Group and Element	VR	Type	Description	Value
(0020,000D)	UI	1	Study Instance UID	Unique identifier for the Study obtained from the image header.
(0008,0020)	DA	2	Study Date	The current date of the CAD processing
(0008,0030)	TM	2	Study Time	The current time of the CAD processing.
(0008,0090)	PN	2	Referring Physician's Name	Not used
(0008,0096)	SQ	3	Referring Physician Identification Sequence	Not used
(0020,0010)	SH	2	Study ID	User or equipment generated Study identifier obtained from the image header.
(0008,0050)	SH	2	Accession Number	A RIS generated number, which identifies the order for the Study obtained from the image header.
(0008,1030)	LO	3	Study Description	Institution-generated description or classification of the Study (component) performed.
(0008,1048)	PN	3	Physicians Of Record	Not used
(0008,1049)	SQ	3	Physician(s) of Record Identification Sequence	Not used
(0008,1060)	PN	3	Name Of Physicians Reading Study	Not used
(0008,1062)	SQ	3	Physician(s) Reading Study Identification Sequence	Not used
(0008,1110)	SQ	3	Referenced Study Sequence	Not used
(0008,1032)	UI	3	Procedure Code Sequence	Not used

Table 30 - General Series Module Attributes – Mandatory - ref. PS 3.3 - 2004 C.7.3.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	MG
(0020,000E)	UI	1	Series Instance UID	Unique identifier of the Series.
(0020,0011)	IS	2	Series Number	A number that identifies this Series.
(0020,0060)	CS	2C	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) is not sent. Enumerated Values: R = right L = left
(0008,0021)	DA	3	Series Date	Date the Series started.
(0008,0031)	TM	3	Series Time	Time the Series started.
(0008,1050)	PN	3	Performing Physician's Name	Name of the physician(s) administering the Series.
(0008,1052)	SQ	3	Performing Physician Identification Sequence	Not used
(0018,1030)	LO	3	Protocol Name	Not used
(0008,103E)	LO	3	Series Description	Not used
(0008,1070)	PN	3	Operators' Name	Name(s) of the operator(s) supporting the Series.
(0008,1072)	SQ	3	Operator Identification Sequence	Not used
(0008,1111)	SQ	3	Referenced Performed Procedure Step Sequence	Not used
(0018,0015)	CS	3	Body Part Examined	BREAST
(0018,5100)	CS	2C	Patient Position	Not used
(0028,0108)	US or SS	3	Smallest Pixel Value in Series	Not used
(0028,0109)	US or SS	3	Largest Pixel Value in Series	Not used
(0040,0275)	SQ	3	Request Attributes Sequence	Not used
(0040,0253)	SH	3	Performed Procedure Step ID	Not used
(0040,0244)	DA	3	Performed Procedure Step Start Date	Not used
(0040,0245)	TM	3	Performed Procedure Step Start Time	Not used
(0040,0254)	LO	3	Performed Procedure Step Description	Not used
(0040,0260)	SQ	3	Performed Protocol Code Sequence	Not used
(0040,0280)	ST	3	Comments on the Performed Procedure Step	Not used

Table 31 - General Equipment Module Attributes - Mandatory - ref. PS 3.3 - 2004 C.7.5.1

Group and Element	Value Rep.	Req. Type	Description	Value
(0008,0070)	LO	2	Manufacturer	Manufacturer of the equipment that produced the composite instances.
(0008,0080)	LO	3	Institution Name	Not used
(0008,0081)	ST	3	Institution Address	Not used
(0008,1010)	SH	3	Station Name	Not used
(0008,1040)	LO	3	Institutional Department Name	Not used
(0008,1090)	LO	3	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances.
(0018,1000)	LO	3	Device Serial Number	Not used
(0018,1020)	LO	3	Software Version	Not used
(0018,1050)	DS	3	Spatial Resolution	Not used
(0018,1200)	DA	3	Date of Last Calibration	Not used
(0018,1201)	TM	3	Time of Last Calibration	Not used
(0028,0120)	US	3	Pixel Padding Value	Not used

Table 32 – Secondary Capture Image Equipment Module Attributes – Mandatory - ref. PS 3.3 - 2004 C.8.6.1

Group and Element	VR	Type	Description	Value
(0008,0064)	CS	1	Conversion Type	DF
(0008,0060)	CS	3	Modality	RG
(0018,1010)	LO	3	Secondary Capture Device ID	User defined identification of the device that converted the image
(0018,1016)	LO	3	Secondary Capture Device Manufacturer	HOWTEK
(0018,1018)	LO	3	Secondary Capture Device Manufacturer's Model Name	HTK-861
(0018,1019)	LO	3	Secondary Capture Device Software Version	Manufacturer's designation of software version of the Secondary Capture Device.
(0018,1022)	SH	3	Video Image Format Acquired	Not used
(0018,1023)	LO	3	Digital Image Format Acquired	Not used

Table 33 – General Image Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.6.1

Group and Element	VR	Type	Description	Value
(0020,0013)	IS	2	Instance Number	A number that identifies this image.
(0020,0020)	CS	2C	Patient Orientation	Not Available – incorrect order of film scanning could make this invalid
(0008,0023)	DA	2C	Content Date	The date the image pixel data creation started. Required if image is part of a series in which the images are temporally related.
(0008,0033)	TM	2C	Content Time	The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related.
(0008,0008)	CS	3	Image Type	ORIGINAL
(0020,0012)	IS	3	Acquisition Number	Not used
(0008,0022)	DA	3	Acquisition Date	The date the acquisition of data that resulted in this image started.
(0008,0032)	TM	3	Acquisition Time	The time the acquisition of data that resulted in this image started
(0008,002A)	DT	3	Acquisition Datetime	Not used
(0008,1140)	SQ	3	Referenced Image Sequence	Not used
(0008,2111)	ST	3	Derivation Description	Not used
(0008,9215)	SQ	3	Derivation Code Sequence	Not used
(0008,2112)	SQ	3	Source Image Sequence	Not used
(0008,113A)	SQ	3	Referenced Waveform Sequence	Not used
(0020,1002)	IS	3	Images in Acquisition	Not used
(0020,4000)	LT	3	Image Comments	Not used
(0028,0300)	CS	3	Quality Control Image	Not used
(0028,0301)	CS	3	Burned In Annotation	Not used
(0028,2110)	CS	3	Lossy Image Compression	Not used
(0028,2112)	DS	3	Lossy Image Compression Ratio	Not used
(0088,0200)	SQ	3	Icon Image Sequence	Not used
(2050,0020)	CS	3	Presentation LUT Shape	Not used

Table 34 – Image Pixel Module – mandatory – ref. PS 3.3 - 2004 C.7.6.3

Group and Element	VR	Type	Description	Value
(0028,0002)	US	1	Samples per Pixel	Number of samples (planes) in this image.
(0028,0004)	CS	1	Photometric Interpretation	Specifies the intended interpretation of the pixel data: MOMOCHROME2
(0028,0010)	US	1	Rows	Number of rows in the image.
(0028,0011)	US	1	Columns	Number of columns in the image.
(0028,0100)	US	1	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated.
(0028,0101)	US	1	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored.
(0028,0102)	US	1	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit.
(0028,0103)	US	1	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Value: 0000H = unsigned integer.
(7FE0,0010)	OW or OB	1	Pixel Data	A data stream of the pixel samples that comprise the Image.
(0028,0006)	US	1C	Planar Configuration	Not used
(0028,0034)	IS	1C	Pixel Aspect Ratio	Not used
(0028,0106)	US or SS	3	Smallest Image Pixel Value	Not used
(0028,0107)	US or SS	3	Largest Image Pixel Value	Not used
(0028,1101)	US or SS	1C	Red Palette Color Lookup Table Descriptor	Not used
(0028,1102)	US or SS	1C	Green Palette Color Lookup Table Descriptor	Not used
(0028,1103)	US or SS	1C	Blue Palette Color Lookup Table Descriptor	Not used
(0028,1201)	OW	1C	Red Palette Color Lookup Table Data	Not used
(0028,1202)	OW	1C	Green Palette Color Lookup Table Data	Not used
(0028,1203)	OW	1C	Blue Palette Color Lookup Table Data	Not used

Table 35 - Secondary Capture Image Module Attributes – mandatory - ref. PS 3.3 - 2004 C.8.6.2

Group and Element	VR	Type	Description	Value
(0018,1012)	DA	3	Date Of Secondary Capture	Current date
(0018,1014)	TM	3	Time Of Secondary Capture	Current time

Table 36 - SOP Common Module Attributes – mandatory – ref. PS 3.3 - 2004 C.12.1

Group and Element	VR	Type	Description	Value
(0008,0016)	UI	1	SOP Class UID	"1.2.840.10008.5.1.4.1.1.7"
(0008,0018)	UI	1	SOP Instance UID	Uniquely identifies the SOP Instance.
(0008,0005)	CS	1C	Specific Character Set	Not used
(0008,0012)	DA	3	Instance Creation Date	Not used
(0008,0013)	TM	3	Instance Creation Time	Not used
(0008,0014)	UI	3	Instance Creator UID	Not used
(0008,0110)	SQ	3	Coding Scheme Identification Sequence	Not used
(0008,0201)	SH	3	Timezone Offset From UTC	Not used
(0018,A001)	SQ	3	Contributing Equipment Sequence	Not used
(0020,0013)	IS	3	Instance Number	A number that identifies this Composite object instance.
(0100,0410)	CS	3	SOP Instance Status	Not used
(0100,0420)	DT	3	SOP Authorization Date and Time	Not used
(0100,0424)	LT	3	SOP Authorization Comment	Not used
(0100,0426)	LO	3	Authorization Equipment Certification Number	Not used
(4FFE,0001)	SQ	3	MAC Parameters Sequence	Not used
(FFFA,FFFA)	SQ	3	Digital Signatures Sequence	Not used
(0400,0500)	SQ	1C	Encrypted Attributes Sequence	Not used

3.3.6.9   Receive End of Case Message from a Remote System

3.3.6.10 Associated Real World Activity – Receive End of Case
Second Look® Digital can receive a DICOM Basic Study Content Notification message from remote devices that indicates the entire case has been sent and the Second Look® Digital systems can begin case-based processing.

3.3.6.11 Presentation Context Table – Receive End of Case
Second Look® Digital supports the transfer syntaxes listed in Table 37. For receiving CAD output, Second Look® Digital will propose the Presentation Contexts listed in Table 38.

Table 37 - Receive End of Case Transfer Syntaxes

Transfer Syntaxes	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit Little Endian	1.2.840.10008.1.2.1
DICOM Explicit Big Endian	1.2.840.10008.1.2.2

Table 38 – Presentation Contexts for Receive of End of Case from Remote Systems

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Basic Study Content Notification	1.2.840.10008.1.9	Declared in Table 37	SCP	None

3.3.6.12 SOP Specific Conformance – Receive End of Case

The Second Look® SCP conforms to the SOP's of the Storage Service Class at Level 2 (Full) as described in Section B.4.1 of PS 3.4 – 2004 of the DICOM Standard. The status codes shown in Table 39 may be sent back to the Remote SCU after the SCU tries to open an association and send a DICOM Basic Study Content Notification to the Second Look® Digital system.

Table 39 - End of Case Response Status Codes

Status Code	Service Status	Explanation
A900	Refused	The image data that was received was invalid.
0110	Error	An internal system error occurred when receiving the image and storing it to disk.
C002	Error	Failed C-Store operation
0002	Success	None of the study content exists on the system.
0001	Success	Partial study content exists.
0000	Success	Indicates that an association was successfully established and an image was successfully stored and queued for processing.

The Basic Study Descriptor Object Definition (IOD) modules are defined in Table 40.

Table 40 – Basic Study Descriptor IOD Modules

Module	DICOM Reference	Document Reference	Usage
Patient Summary	PS 3.3 –2004 C.7.7	Table 40	M
Study Content	PS 3.3 –2004 C.7.8	Table 41	M
SOP Common	PS 3.3 –2004 C.12.1	Table 42	M

Table 41 – Patient Summary Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.7

Group and Element	VR	Type	Description	Value
(0010,0010)	PN	2	Patient's Name	Patient's full name
(0010,0020)	LO	2	Patient ID	Primary hospital identification number or code for the patient.

Table 42 – Study Content Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.8

Group and Element	VR	Type	Description	Value
(0020,0010)	SH	2	Study ID	User or equipment generated Study identifier
(0020,000D)	UI	2	Study Instance UID	Unique identifier for the Study
(0008,1115)	SQ	1	Referenced Series Sequence	Sequence of Repeating Items where each Item includes the Attributes of a Series. Zero or more Items may be included in this Sequence.
>(0020,000E)	UI	1	Series Instance UID	Unique identifier of the Series.
>(0008,0054)	AE	2C	Retrieve AE Title	Not used
>(0088,0130)	SH	2C	Storage Media File-Set ID	Not used
>(0088,0140)	UI	2C	Storage Media File-Set UID	Not used
>(0088,1140)	SQ	1	Referenced Image Sequence	Sequence of Repeating Items where each Item provides reference to a set of Image SOP Class/SOP Instance pairs that are contained in the Series identified by the Series Instance UID (0020,000E).
>>(0008,1150)	UI	2	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. This Attribute is used only if Images may be retrieved as Single Image SOP Classes.
>>(0008,1155)	UI	2	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance. This Attribute is used only if Images may be retrieved as Single Image SOP Classes.
>>(0008,0054)	AE	2C	Retrieve AE	Not used
>>(0088,0130)	SH	2C	Storage Media File-Set ID	Not used
>>(0088,0140)	UI	2C	Storage Media File-Set UID	Not used

Table 43 - SOP Common Module Attributes – mandatory – ref. PS 3.3 - 2004 C.12.1

Group and Element	VR	Type	Description	Value
(0008,0016)	UI	1	SOP Class UID	"1.2.840.10008.1.9"
(0008,0018)	UI	1	SOP Instance UID	Uniquely identifies the SOP Instance.
(0008,0005)	CS	1C	Specific Character Set	Not used
(0008,0012)	DA	3	Instance Creation Date	Not used
(0008,0013)	TM	3	Instance Creation Time	Not used
(0008,0014)	UI	3	Instance Creator UID	Not used
(0008,0110)	SQ	3	Coding Scheme Identification Sequence	Not used
(0008,0201)	SH	3	Timezone Offset From UTC	Not used
(0018,A001)	SQ	3	Contributing Equipment Sequence	Not used
(0020,0013)	IS	3	Instance Number	A number that identifies this Composite object instance.
(0100,0410)	CS	3	SOP Instance Status	Not used
(0100,0420)	DT	3	SOP Authorization Date and Time	Not used
(0100,0424)	LT	3	SOP Authorization Comment	Not used
(0100,0426)	LO	3	Authorization Equipment Certification Number	Not used
(4FFE,0001)	SQ	3	MAC parameters Sequence	Not used
(FFFA,FFFA)	SQ	3	Digital Signatures Sequence	Not used
(0400,0500)	SQ	1C	Encrypted Attributes Sequence	Not used

3.3.6.13 Output of CAD Results to a Remote System

3.3.6.14 Associated Real World Activity – CAD Output

Second Look® Digital will issue a storage request (DICOM C-STORE) when it is done processing the images for the patient case. The CAD results will be sent over a single association to the configured remote device. Only one DICOM structured report will be sent per case.

3.3.6.15 Presentation Context Table – CAD Output

Second Look® Digital supports the transfer syntaxes listed in Table 44. When sending CAD output, Second Look® Digital will propose the Presentation Contexts listed in Table 45.

Table 44 – CAD Output Transfer Syntaxes

Transfer Syntaxes	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit Little Endian	1.2.840.10008.1.2.1
DICOM Explicit Big Endian	1.2.840.10008.1.2.2

Table 45 – Presentation Contexts for CAD Output to Remote Device

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	**SOP Class UID**			
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Declared in Table 44	SCU	None
Mammography CAD Structured Report	1.2.840.10008.5.1.4.1.1.88.50	Declared in Table 44	SCU	None
Radiotherapy Structure Set (RTSS)	1.2.840.10008.5.1.4.1.1.481.3	Declared in Table 44	SCU	None
Grayscale Softcopy Presentation State (GSPS)	1.2.840.10008.5.1.4.1.1.11.1	Declared in Table 44	SCU	None
Digital Mammography X-Ray – For Presentation with overlay	1.2.840.10008.5.1.4.1.1.1.2	Declared in Table 44	SCU	None

3.3.6.16 SOP Specific Conformance – CAD Output

Second Look® Digital will process each image to determine the existence of any suspicious regions. The results of this processing will be combined into a single DICOM Enhanced Structured Report, a DICOM Mammography CAD Structured Report, a Radiotherapy Structure Set (RTSS) object, a Grayscale Softcopy Presentation State (GSPS) object, or a Digital Mammography X-Ray "FOR PRESENTATION" image with the CAD detections applied to the overlay that will be sent to the remote system.

Second Look® Digital performs a C-STORE request of the DICOM Structured Report to the configured remote device(s) and processes the C-STORE response message according to Table 46. Note that failure to open an association to a remote device will cause the patient case to be marked as failed in the Second Look® database.

Table 46 – Structured Report C-STORE Response Codes

Service Status	Further Meaning	Protocol Codes	Description
Success	Success	0x0000	Operation performed properly. Patient case is marked as completed in the Second Look® database.
Non-Success	Any message that was not successful, such as a Refusal, Error, Failure, or Warning.	Non-Zero	Patient case is marked as failed to send Structured Report in the Second Look® database.

The type of output that is produced and the recipients of the output is configurable from the Second Look® graphical user interface. Table 47 shows the DICOM information object definition (IOD) modules that are necessary to create the DICOM Mammography CAD Structured Report and the DICOM Enhanced Structured Report. The major difference between the two reports is the SR Document Content module, where the Mammography CAD Structured Report utilizes templates.

Table 47 - Structured Report IOD Modules

IE	Module	DICOM Reference	Document Reference	Usage
Patient	Patient Module	PS 3.3 – 2004 C.7.1.1	Table 48	M
Study	General Study	PS 3.3 – 2004 C.7.2.1	Table 49	M
	Patient Study	PS 3.3 – 2004 C.7.2.2	Table 50	U
Series	SR Document Series	PS 3.3 – 2004 C.17.1	Table 51	M
Equipment	General Equipment	PS 3.3 – 2004 C.7.5.1	Table 52	M
Document	SR Document General	PS 3.3 – 2004 C.17.2	Table 53	M
	SR Document Content	PS 3.3 – 2004 C.17.3	Table 54 for the Enhanced SR, Table 56 for the Mammo CAD SR.	M
	SOP Common	PS 3.3 – 2004 C.12.1	Table 55	M

3.3.6.16.1.1Storage of CAD Results – Enhanced Structured Report

Second Look® Digital will process each image to determine the existence of any suspicious regions. The results of this processing will be combined into a single DICOM Enhanced Structured Reporting message that will be sent to the remote system (that is if the remote device was configured to receive this output). Table 47 defines the DICOM modules that are used to create the Enhanced Structured Report. A high-level overview of the structure of the DICOM Enhanced Structured Report is shown in Figure 3.1. This figure shows that there can be any number of images for the study existing under the root node. Underneath each image contains information from the CAD processing, whether a mass was found, a calc was found, or if CAD failed. If a detection was found, then the coordinates for the detection shall be provided. If no information exists after the image node, then the CAD processing found no detections.
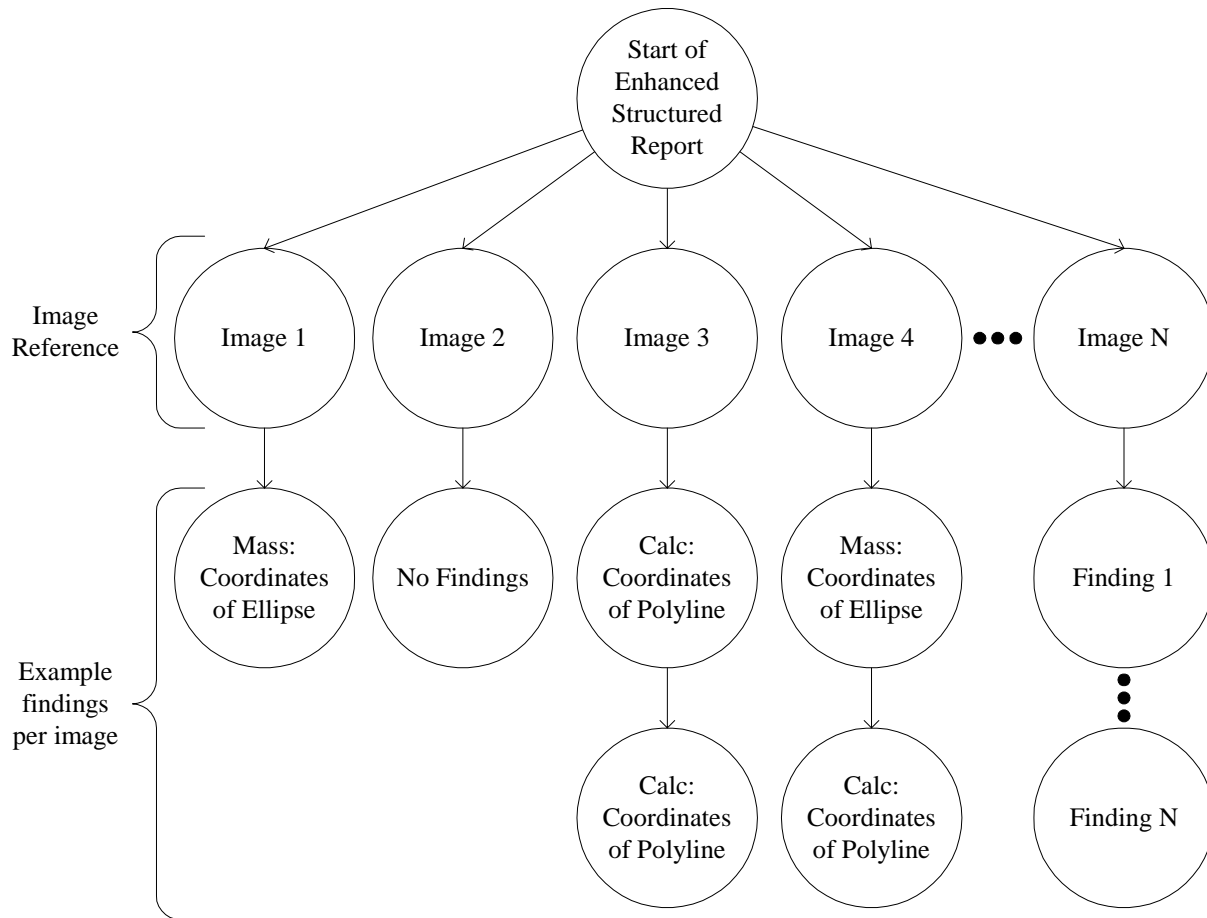
Figure 3.1 - Enhanced Structured Report Overview

Table 48 - Patient Module Attributes – mandatory – ref. PS 3.3 - 2004 C.7.1.1

Group and Element	VR	Type	Description	Value
(0010,0010)	PN	2	Patient's Name	Patient's full name obtained from the image header.
(0010,0020)	LO	2	Patient ID	Primary hospital identification number or code for the patient obtained from the image header.
(0010,0030)	DA	2	Patient's Birth Date	Birth date of the patient obtained from the image header.
(0010,0040)	CS	2	Patient's Sex	Sex of the named patient obtained from the image header. Enumerated Values: M = male F = female O = other

(0008,1120)	SQ	3	Referenced Patient Sequence	Not used
>(0008,1150)	UI	1C	Referenced SOP Class UID	Not used
>(0008,1155)	UI	1C	Referenced SOP Instance UID	Not used
(0010,0032)	TM	3	Patient Birth Time	Not used
(0010,1000)	LO	3	Other Patient ID	Not used
(0010,1001)	PN	3	Other Patient Names	Not used
(0010,2160)	SH	3	Ethnic Group	Not used
(0010,4000)	LT	3	Patient Comments	Not used

Table 49 - General Study Module Attributes – Mandatory - ref. PS 3.3 - 2004 C.7.2.1

Group and Element	VR	Type	Description	Value
(0020,000D)	UI	1	Study Instance UID	Unique identifier for the Study obtained from the image header.
(0008,0020)	DA	2	Study Date	The current date of the CAD processing
(0008,0030)	TM	2	Study Time	The current time of the CAD processing.
(0008,0090)	PN	2	Referring Physician's Name	Not used
(0020,0010)	SH	2	Study ID	User or equipment generated Study identifier obtained from the image header.
(0008,0050)	SH	2	Accession Number	A RIS generated number, which identifies the order for the Study obtained from the image header.
(0008,1030)	LO	3	Study Description	Institution-generated description or classification of the Study (component) performed.
(0008,1048)	PN	3	Physicians Of Record	Not used
(0008,1049)	SQ	3	Physician(s) of Record Identification Sequence	Not used
(0008,1060)	PN	3	Name Of Physicians Reading Study	Not used
(0008,1062)	SQ	3	Physician(s) Reading Study Identification Sequence	Not used
(0008,1110)	SQ	3	Referenced Study Sequence	Not used
(0008,1032)	SQ	3	Procedure Code Sequence	Not used

Table 50 - Patient Study Module Attributes – Optional - ref. PS 3.3 - 2004 C.7.2.2

Group and Element	VR.	Type	Description	Value
(0008,1080)	LO	3	Admitting Diagnosis Description	Not used
(0010,1010)	AS	3	Patient's Age	Not used
(0010,1020)	DS	3	Patient Size	Not used
(0010,1030)	DS	3	Patient Weight	Not used
(0010,2180)	SH	3	Occupation	Not used
(0010,21B0)	LT	3	Additional Patient History	Not used

Table 51 - SR Document Series Module Attributes - Mandatory - ref. PS 3.3 - 2004 C.17.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality Type	"SR"
(0020,000E)	UI	1	Series Instance UID	1.2.840.114191.1XXXX.1.2.0.YYYY, where XXXX = machine unique identifier and YYYY = timestamp
(0020,0011)	IS	1	Series Number	1
(0008,1111)	SQ	2	Referenced Study Component Sequence	Not used

Table 52 - General Equipment Module Attributes - Mandatory - ref. PS 3.3 - 2004 C.7.5.1

Group and Element	VR	Type	Description	Value
(0008,0070)	LO	2	Manufacturer	"iCAD, Inc."
(0008,0080)	LO	3	Institution Name	Not used
(0008,0081)	ST	3	Institution Address	Not used
(0008,1010)	SH	3	Station Name Unit #	Not used
(0008,1040)	LO	3	Institutional Department Name	Not used
(0008,1090)	LO	3	Manufacturer's Model Name	"CAD Manager"
(0018,1000)	LO	3	Device Serial Number	Not used
(0018,1020)	LO	3	Software Version	Not used
(0018,1050)	DS	3	Spatial Resolution mm	Not used
(0018,1200)	DA	3	Date of Last Calibration	Not used
(0018,1201)	TM	3	Time of Last Calibration	Not used
(0028,0120)	US	3	Pixel Padding Value	Not used

Table 53 - SR Document General Module Attributes – ref. PS 3.3 - 2004 C.17.2 – Table C.17-2

Group and Element	VR	Type	Description	Value
(0020,0013)	SH	1	Instance Number	"1"
(0040,A491)	CS	1	Completion Flag	"COMPLETE"
(0040,A492)	LO	3	Completion Flag Description	Not used
(0040,A493)	CS	1	Verification Flag	"UNVERIFIED"
(0008,0023)	DA	1	Content Date	The current date of the CAD processing.
(0008,0033)	TM	1C	Content Time	The current time of the CAD processing.
(0040,A073)	SQ	1	Verifying Observer Sequence	1
>(0040,A075)	PN	1	Verifying Observer Name	"Second Look CAD"
>(0040,A088)	SQ	2	Verifying Observer Identification Code Sequence	Not used
>(0040,A027)	LO	1	Verifying Organization	Not used
>(0040,A030)	DT	1	Verification DateTime	The current date and time of the CAD processing.
(0040,A360)	SQ	1C	Predecessor Documents Sequence	Not used
(0040,A525)	SQ	1C	Identical Documents Sequence	Not used
(0040,A370)	SQ	1C	Referenced Request Sequence	Not used
(0040,A372)	SQ	2	Performed Procedure Code Sequence	Not used
(0040,A375)	SQ	1C	Current Requested Procedure Evidence Sequence	A single sequence that contains the Study Instance UID, Series Instance UID, Referenced SOP Class UID, and Referenced SOP Instance UID for each image in the study. This sequence is described in the DICOM standard PS 3.3 – 2004 in Table C.17-3
>(0020,000D)	UI	1	Study Instance UID	Unique identifier for the Study obtained from the image header.
>(0008,1115)	SQ	1	Referenced Series Sequence	Sequence repeats for each image that exists in the study. The sequence contains the Attributes of a Series containing Composite Objects.
>>(0020,000E)	UI	1	Series Instance UID	Unique identifier of a Series obtained from the image header that is part of this Study and contains referenced Composite Objects.
>>(0008,0054)	AE	3	Retrieve AE Title	Not used
>>(0068,0130)	SH	3	Storage Media File-Set	Not used

Group and Element	VR	Type	Description	Value
			ID	
>>(0068,0140)	UI	3	Storage Media File-Set UID	Not used
>>(0008,1199)	SQ	1	Referenced SOP Sequence	References to Composite Object SOP Class/SOP Instance pairs that are part of the Study defined by Study Instance UID and the Series defined by Series Instance UID (0020,000E) and are obtained from the image header.
>>>(0008,1150)	UI	1	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class that is obtained from the image header.
>>>(0008,1155)	UI	1	Referenced SOP Instance UID	Uniquely identifies the referenced SOP instance that is obtained from the image header.

Table 54 - SR Document Content Module Attributes – Ref. PS 3.3 - 2004 C.17-3 – Table C.17.3-3

Group and Element	VR	Type	Description	Value
(0040,A032)	DT	1C	Observation Date Time	Not used
(0040,A504)	SQ	1C	Content Template Sequence	Not used
(0040,A040)	CS	1	Value Type	"CONTAINER"
(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>(0008,0100)	SH	1C	Code Value	111036
>(0008,0102)	SH	1C	Coding Scheme Designator	DCM
>(0008,0104)	LO	1C	Code Meaning	"Mammography CAD Report"
(0040,A050)	CS	1	Continuity of Content	"SEPARATE"
(0040,A730)	SQ	1C	Content Sequence	Repeat this sequence for number of films
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>(0040,DB73)	UL	1C	Referenced Content Item Identifier	Not used
>(0040,A040)	CS	1	Value Type	"CONTAINER"
>(0040,A050)	CS	1	Continuity of Content	"SEPARATE"
>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	T-04000
>>(0008,0102)	SH	1C	Coding Scheme Designator	SNM3
>>(0008,0104)	LO	1C	Code Meaning	Breast
>(0008,1199)	SQ	2	Referenced SOP Sequence	1
>(0008,1150)	UI	1C	Referenced SOP Class UID	The referenced SOP class UID for the current image in this sequence.

>(0008,1155)	UI	1C	Referenced SOP Instance UID	The referenced SOP Instance UID for the current image in this sequence.
>(0040,A730)	SQ	1C	Content Sequence	This sequence is repeated for each detection that is found in for the current image in the sequence.
>(0040,A040)	CS	1C	Value Type	"SCOORD"
>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	F-01796 if the detection is a density. F-01776 if the detection is a calcification. 111224 if there was a CAD failure
>>(0008,0102)	SH	1C	Coding Scheme Designator	SRT
>>(0008,0104)	LO	1C	Code Meaning	"Mammographic breast density", "Individual Calcification", or "Failed"
>(0070,0022)	FL	1C	Graphic Data	The coordinates that define the outline of the detection. If Graphic Type (0070,0023) is "ELLIPSE" then there shall exist four pixel (column,row) pairs, the first two points specifying the endpoints of the major axis and the second two points specifying the endpoints of the minor axis. If Graphic Type (0070,0023) is "POLYLINE", then a list of five points (column, row pairs) will be given where straight lines are to be drawn from each point and the first and last vertices are equal to enclose the rectangle. This will not exist if there is a CAD failure.
>(0070,0023)	CS	1C	Graphic Type	"ELLIPSE" for a density. "POLYLINE" for a calcification. This will not exist if there is a CAD failure.

**Table 55 - SOP Common Module Attributes – Mandatory – ref. PS 3.3 - 2004 C.12.1 –
Table C.12-1**

Group and Element	VR	Type	Description	Value
(0008,0016)	UI	1	SOP Class UID	"1.2.840.10008.5.1.4.1.1.88.22", which represents Enhanced Structured Report.
(0008,0018)	UI	1	SOP Instance UID	Instance UID for the Structured Report. It will have the format of: 1.2.840.114191.2.XXXX.1.2.Y.ZZZZ, where XXXX is a number unique to the Second Look® system, Y is the number of images in the study, and Z is a timestamp.
(0008,0005)	CS	1C	Specific Character Set	Not used
(0008,0012)	DA	3	Instance Creation Date	Current date of the CAD processing.
(0008,0013)	TM	3	Instance Creation Time	Current time of the CAD processing.
(0008,0014)	UI	3	Instance Creator UID	Implementation UID of the Second Look® system in the format of 1.2.840.114191.2.XXXXX, where XXXXX is a number unique to each Second Look® system.
(0008,0110)	SQ	3	Coding Scheme Identification Sequence	Not used
(0008,0201)	SH	3	Timezone Offset From UTC	Not used
(0018,A001)	SQ	3	Contributing Equipment Sequence	Not used
(0020,0013)	IS	3	Instance Number	"1"
(0100,0410)	CS	3	SOP Instance Status	Not used
(0100,0420)	DT	3	SOP Authorization Date and Time	Not used
(0100,0424)	LT	3	SOP Authorization Comment	Not used
(0100,0426)	LO	3	Authorization Equipment Certification Number	Not used
(4FFE,0001)	SQ	3	MAC Parameters Sequence	Not used
(FFFA,FFFA)	SQ	3	Digital Signatures Sequence	Not used

3.3.6.16.1.2 Storage of CAD Results – Mammography CAD Structured Report

Second Look® Digital will process each image to determine the existence of any suspicious regions. The results of this processing will be combined into a single DICOM Mammography CAD Structured Reporting message that will be sent to the remote system (that is if the remote device was configured to receive this output). The Mammography CAD Structured Report is more comprehensive than the Enhanced Structured Report. Both reports contain the same modules, however the Structured Report Document Content Module contains much more detail. Table 47 defines the DICOM modules that are used to create the Mammography CAD Structured Report. The Mammography CAD Structured Report reuses the following tables from the Enhanced Structured Report: Table 48, Table 49, Table 50, Table 51, Table 52, Table 53, and Table 55. Table 56 defines the Mammography CAD Structured Report's Document Content Module, which utilizes the Mammography CAD SR templates.

A high-level overview of the structure of the DICOM Mammography CAD Structured Report is shown in Figure 3.2. This figure shows that there are five nodes that exist from the root node: the Language of Content Item and Descendents, the Image Library, the Mammography CAD Overall Impressions / Recommendations, the Summary of Detections, and the Summary of Analyses.

The Language of Content Item and Descendents indicates that the language of the report is English and the country of the language is the United States. The Image Library contains an entry for each image in the study. It contains the SOP Class UID and Instance UID and any of the following values if they are included in the image header: the Image Laterality, the Image View, the Image View Modifier, the Patient Orientation Row, the Patient Orientation Column, the Study Date, the Study Time, the Content Date, the Content Time, the Horizontal Imager Pixel Spacing, and the Vertical Imager Pixel Spacing. The node position of each image is significant, for it's the node position, not the Instance UID, which is used for reference by each CAD detection. The Mammography CAD Overall Impressions / Recommendations node contains an overall status summary of the CAD processing. The status values will be either "All algorithms succeeded; without findings", "All algorithms succeeded; with findings", or "no algorithms succeeded; without findings". The Mammography CAD Overall Impressions / Recommendations node will also contain a Single Image Finding for each detection found in the case and determines if the detection is a density or a calcification cluster. The Single Image Finding contains the CAD algorithm name and version information as well as the coordinates of the center point and outline of each detection. Next, the Summary of Detections branch contains information on the algorithms that were run successfully on the images. Finally, The Summary of Analyses container is not populated.
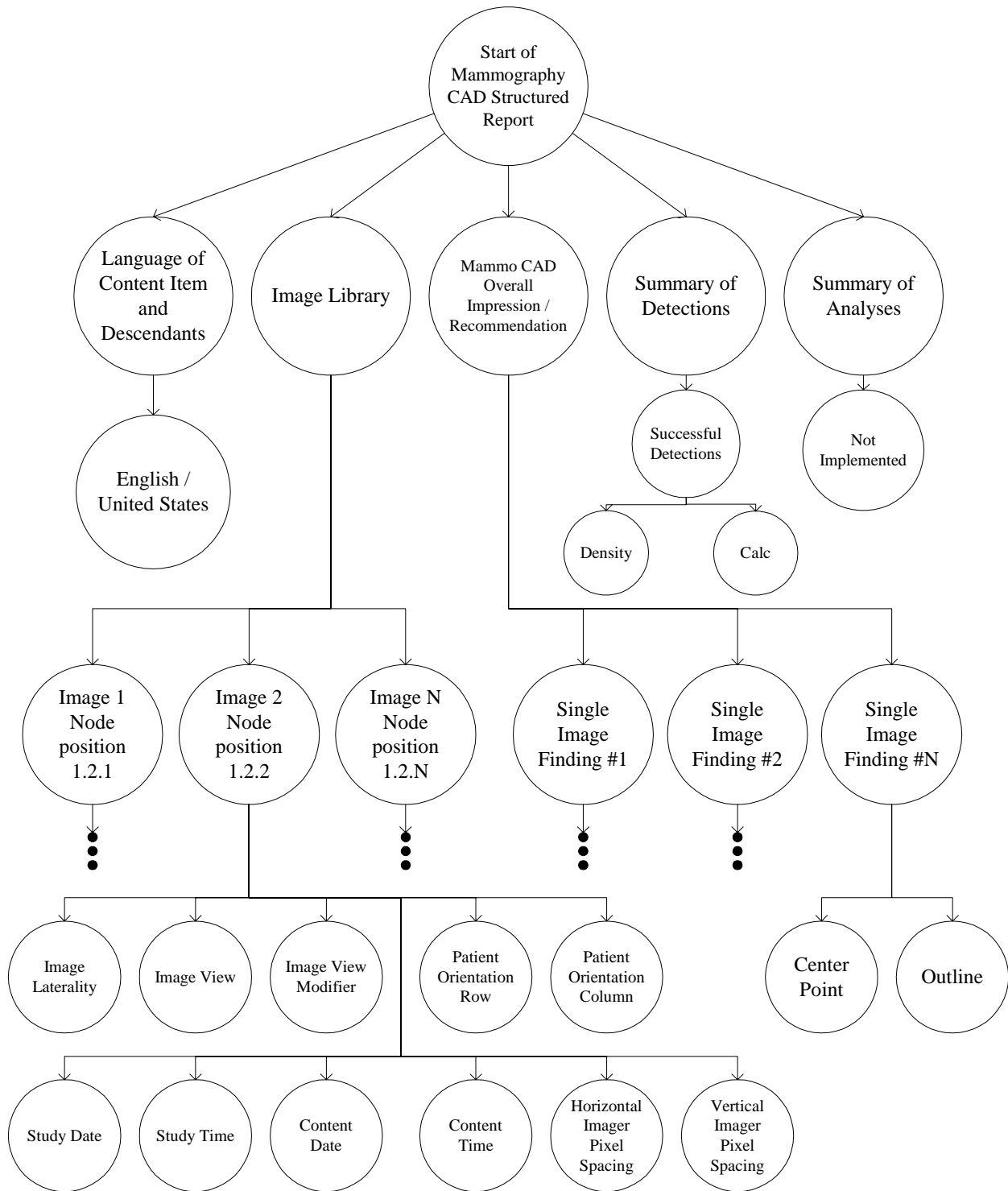
Figure 3.2 - Mammography CAD Structured Report Overview

Table 56 - SR Document Content – Ref. PS 3.3 - 2004 C.17-3 – Table C.17.3-3

Group and Element	VR	Type	Description	Value
(0040,A040)	CS	1	Value Type	"CONTAINER"
(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>(0008,0100)	SH	1C	Code Value	111036
>(0008,0102)	SH	1C	Coding Scheme Designator	DCM
>(0008,0104)	LO	1C	Code Meaning	"Mammography CAD Report"
(0040,A050)	CS	1	Continuity of Content	"SEPARATE"
(0040,A504)	SQ	1C	Content Template Sequence	1
>(0008,0105)	CS	1	Mapping Resource	"DCMR"
>(0040,DB00)	CS	1	Template Identifier	"TID 4000"
(0040,A730)	SQ	1	Content Sequence	Include sequence for "Language of Content Item and Descendants". See Table 57.
(0040,A730)	SQ	1	Content Sequence	Include "Image Library" container. See Table 58.
(0040,A730)	SQ	1	Content Sequence	Include "Mammography CAD Overall Impression / Recommendation" container. See Table 59.
(0040,A730)	SQ	1	Content Sequence	Include "Summary of Detections". See Table 60.
(0040,A730)	SQ	1	Content Sequence	Include "Summary of Analyses". See Table 61.

Table 57 - Language of Content Item and Descendants

Group and Element	VR	Type	Description	Value
>(0040,A010)	CS	1	Relationship Type	"HAS CONCEPT MOD"
>(0040,A040)	CS	1	Value Type	"CODE"
>(0040,A168)	SQ	1	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"ISO639_2"
>>(0008,0102)	SH	1C	Code Scheme Designator	"eng"
>>(0008,0104)	LO	1C	Code Meaning	"English"
>>(0040,A730)	SQ	1C	Content Sequence	1
>>>(0040,A010)	CS	1	Relationship Type	"HAS CONCEPT MOD"
>>>(0040,A040)	CS	1	Value Type	"CODE"
>>>>(0008,0100)	SH	1C	Code Value	"121046"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Country of Language"
>>>(0040,A168)	SQ	1	Concept Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"ISO3166_1"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"US"
>>>>(0008,0104)	LO	1C	Code Meaning	"UNITED STATES"

Table 58 - Image Library Container

Group and Element	VR	Type	Description	Value
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>(0040,A040)	CS	1	Value Type	"CONTAINER"
>(0040,A168)	SQ	1	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111028"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Image Library"
>(0040,A050)	CS	1	Continuity Of Content	"SEPARATE"
>(0040,A730)	SQ	1C	Content Sequence	"Mammography CAD Image Library Entry". Repeat this sequence for each image in the study.
>>(0008,1199)	SQ	1	Referenced SOP Sequence	1
>>>(0008,1150)	UI	1	Referenced SOP Class UID	The SOP Class UID of the image being processed.
>>>(0008,1155)	UI	1	Referenced SOP Instance UID	The SOP Instance UID of the image being processed.
>>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>>(0040,A040)	CS	1	Value Type	"IMAGE"
>>(0040,A730)	SQ	1C	Content Sequence	The "Image Laterality" sequence shall be present only if tag (0020,0062) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111027"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Image Laterality"
>>>(0040,A168)	SQ	1C	Concept Code Sequence	From Context ID 6023 in the DICOM Standard
>>>>(0008,0100)	SH	1C	Code Value	"T-04030" (Left breast), "T-04020" (Right breast), "T-04080" (Both breasts)
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"SNM3"
>>>>(0008,0104)	LO	1C	Code Meaning	"Left breast", "Right breast", or "Both breasts"
>>(0040,A730)	SQ	1C	Content Sequence	The "Image View" sequence shall be present only if tag (0054,0220) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111031"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"

>>>>(0008,0104)	LO	1C	Code Meaning	"Image View"
>>>(0040,A168)	SQ	1C	Concept Code Sequence	From Context ID 4014 in the DICOM Standard
>>>>(0008,0100)	SH	1C	Code Value	"R-10224" (medio-lateral), "R-10266" (medio-lateral oblique), "R-10228" (latero-medial), "R-10230" (latero-medial oblique), "R-10242" (cranio-caudal), "R-10244" (cranio-caudal from below), "R-102D0" (superolateral to inferomdial oblique), "R-102CF" (exaggerated cranio-caudal), "Y-X1770" (cranio-caudal exaggerated laterally), or "Y-X1771" (cranio-caudal exaggerated medially)
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"SNM3"
>>>>(0008,0104)	LO	1C	Code Meaning	"medio-lateral", "medio-lateral oblique", latero-medial", "latero-medial oblique", "cranio-caudal", "cranio-caudal from below", "superolateral to inferomdial oblique", "exaggerated cranio-caudal"," cranio-caudal exaggerated laterally", or "cranio-caudal exaggerated medially"
>>(0040,A730)	SQ	1C	Content Sequence	The "Image View Modifier" sequence shall be present only if tag (0054,0222) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS CONCEPT MOD"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111032"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Image View Modifier"
>>>(0040,A168)	SQ	1C	Concept Code Sequence	From Context ID 4015 in the DICOM Standard
>>>>(0008,0100)	SH	1C	Code Value	"R-102D2" (Cleavage), "R102D1" (Axillary Tail), "R-102D3" (Rolled lateral), "R-102D4" (Rolled Medial), "R-102D5" (Implant Displaced), "R-102D6" (Magnification), "R-102D7" (Spot Compression), "R-102C2" (Tangential)

>>>>(0008,0102)	SH	1C	Code Scheme Designator	"SNM3"
>>>>(0008,0104)	LO	1C	Code Meaning	Cleavage, Axillary Tail, Rolled lateral, Rolled Medial, Implant Displaced, Magnification, Spot Compression, Tangential
>>(0040,A730)	SQ	1C	Content Sequence	The "Patient Orientation Row" sequence shall be present only if tag (0054,0220) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111044"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Patient Orientation Row"
>>>(0040,A160)	UT	1C	Text Value	First value from tag (0020,0020) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Patient Orientation Column" sequence shall be present only if tag (0054,0220) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111043"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Patient Orientation Column"
>>>(0040,A160)	UT	1C	Text Value	Second value from tag (0020,0020) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Study Date" sequence shall be present only if tag (0008,0020) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"DATE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111060"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Study Date"
>>>(0040,A121)	DA	1C	Date	Value from tag (0008,0020) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Study Time" sequence shall be present only if tag (0008,0030) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"TIME"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111061"

>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Study Time"
>>>(0040,A122)	TM	1C	Time	Value from tag (0008,0030) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Content Date" sequence shall be present only if tag (0008,0023) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"DATE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111018"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Content Date"
>>>(0040,A121)	DA	1C	Date	Value from tag (0008,0023) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Content Time" sequence shall be present only if tag (0008,0023) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"TIME"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111019"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Content Time"
>>>(0040,A122)	TM	1C	Time	Value from tag (0008,0033) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Horizontal Imager Pixel Spacing" sequence shall be present only if tag (0018,1164) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"NUM"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111026"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Horizontal Imager Pixel Spacing"
>>>(0040,A300)	SQ	1C	Measured Value Sequence	1
>>>>(0040,08EA)	SQ	1C	Measured Units Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"um"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"UCUM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"micrometer"
>>>>>(0040,A30A)	DS	1C	Numeric Value	First value from tag (0018,1164) in image.
>>(0040,A730)	SQ	1C	Content Sequence	The "Vertical Imager Pixel Spacing" sequence shall be

Group and Element	VR	Type	Description	Value
				present only if tag (0018,1164) is present in the image.
>>>(0040,A010)	CS	1C	Relationship Type	"HAS ACQ CONTEXT"
>>>(0040,A040)	CS	1C	Value Type	"NUM"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111066"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Vertical Imager Pixel Spacing"
>>>(0040,A300)	SQ	1C	Measured Value Sequence	1
>>>>(0040,08EA)	SQ	1C	Measured Units Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"um"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"UCUM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"micrometer"
>>>>(0040,A30A)	DS	1C	Numeric Value	Second value from tag (0018,1164) in image.

Table 59 - Mammography CAD Overall Impression / Recommendation

Group and Element	VR	Type	Description	Value
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>(0040,A040)	CS	1	Value Type	"CODE"
>(0040,A043)	SQ	1	Concept-name Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111017"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"CAD Processing and Findings Summary"
>(0040,A168)	SQ	1	Concept Code Sequence	From Context ID 4015 in the DICOM Standard
>>(0008,0100)	SH	1C	Code Value	"111241" (All algorithms succeeded; without findings), "111242" (All algorithms succeeded; with findings), or "111245" (no algorithms succeeded; without findings).
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	All algorithms succeeded; without findings, All algorithms succeeded; with findings, or no algorithms succeeded; without findings.
>>(0040,A730)	SQ	1C	Content Sequence	Shall be present for each detection found.
>>>(0040,A010)	CS	1C	Relationship Type	"INFERRED FROM"
>>>(0040,A040)	CS	1C	Value Type	"CONTAINER"
>>>(0040,A050)	CS	1C	Continuity of Content	"SEPARATE"
>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1

>>>>(0008,0100)	SH	1C	Code Value	"111034"
>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Individual Impression/Recommendation"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS CONCEPT MOD"
>>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111056"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Rendering Intent"
>(0040,A168)	SQ	1C	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111150"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Presentation Required: Rendering device is expected to present"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"CONTAINS"
>>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111059"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Single Image Finding"
>>>>(0040,A168)	SQ	1C	Concept Code Sequence	From Context ID 6014
>>>>>(0008,0100)	SH	1C	Code Value	"F-01796" (Mammography breast density) or "F-01775" (Calcification Cluster).
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"SRT"
>>>>>(0008,0104)	LO	1C	Code Meaning	Mammography breast density or Calcification Cluster.
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS CONCEPT MOD"
>>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111056"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Rendering Intent"
>(0040,A168)	SQ	1C	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111150"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Presentation Required: Rendering device is expected to present"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111001"

>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Name"
>>>>(0040,a160)	UT	1C	Text Value	"Second Look CAD"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111003"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Version"
>>>>(0040,A160)	UT	1C	Text Value	"X.Y", where X.Y equals the current CAD version.
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"SCOORD"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111010"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Center"
>>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>>(0040,A010)	CS	1C	Relationship Type	"SELECTED FROM"
>>>>>(0040,DB73)	UL	1C	Referenced Content Item Identifier	Reference to image based on node position in the image library. See DICOM PS 3.3 – 2004 Figure C.17.3-3 for an example.
>>>>(0070,0022)	FL	1C	Graphic Data	The coordinates (Column, Row) of the center point of the detection.
>>>>(0070,0023)	CS	1C	Graphic Type	"POINT"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"SCOORD"
>>>>(0040,A043)	SQ	1C	Concept-name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111041"
>>>>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Outline"
>>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>>(0040,A010)	CS	1C	Relationship Type	"SELECTED FROM"
>>>>>(0040,DB73)	UL	1C	Referenced Content Item Identifier	Reference to image based on node position in the image library. See DICOM PS 3.3 – 2004 Figure C.17.3-3 for an example.
>>>>(0070,0022)	FL	1C	Graphic Data	The coordinates that define the outline of the detection. If Graphic Type (0070,0023) is "ELLIPSE" then there shall exist four pixel (column,row)

				pairs, the first two points specifying the endpoints of the major axis and the second two points specifying the endpoints of the minor axis. If Graphic Type (0070,0023) is "POLYLINE", then a list of five points (column, row pairs) will be given where straight lines are to be drawn from each point and the first and last vertices are equal to enclose the rectangle.
>>>>(0070,0023)	CS	1C	Graphic Type	"ELLIPSE" if detection is a density. "POLYLINE" if detection is a calc cluster.

Table 60 - Summary of Detections

Group and Element	VR	Type	Description	Value
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>(0040,A040)	CS	1	Value Type	"CODE"
>(0040,A043)	SQ	1	Concept-name Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111064"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Summary of Detections"
>(0040,A168)	SQ	1	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111222" if successful. "111225" if failed.
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Succeeded" or "Not Attempted"
>(0040,A730)	SQ	1C	Content Sequence	1
>>(0040,A010)	CS	1C	Relationship Type	"INFERRED FROM"
>>(0040,A040)	CS	1C	Value Type	"CONTAINER"
>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>(0008,0100)	SH	1C	Code Value	"111063"
>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>(0008,0104)	LO	1C	Code Meaning	"Successful Detections"
>>(0040,A050)	CS	1C	Continuity of Content	"SEPARATE"
>>(0040,A730)	SQ	1C	Content Sequence	2
>>>(0040,A010)	CS	1C	Relationship Type	"CONTAINS"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111022"
>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Detection Performed"

>>>(0040,A168)	SQ	1C	Concept Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"F-01796"
>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"SRT"
>>>>(0008,0104)	LO	1C	Code Meaning	"Mammography breast density"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"
>>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111001"
>>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Name"
>>>>(0040,A160)	UT	1C	Text Value	"Second Look CAD"
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"
>>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111003"
>>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Version"
>>>>(0040,A160)	UT	1C	Text Value	X.Y-Z, where X is the major revision, Y is the minor revision, and Z is the operating point, either "H" for high or "M" for medium.
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,DB73)	UL	1C	Referenced Content Item Identifier	X\Y\Z, which represents the reference node position of the image processed.
>>>(0040,A010)	CS	1C	Relationship Type	"CONTAINS"
>>>(0040,A040)	CS	1C	Value Type	"CODE"
>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"111022"
>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>(0008,0104)	LO	1C	Code Meaning	"Detection Performed"
>>>(0040,A168)	SQ	1C	Concept Code Sequence	1
>>>>(0008,0100)	SH	1C	Code Value	"F-01775"
>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"SRT"
>>>>(0008,0104)	LO	1C	Code Meaning	"Calcification Cluster"
>>>(0040,A730)	SQ	1C	Content Sequence	1
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"
>>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111001"
>>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Name"
>>>>(0040,A160)	UT	1C	Text Value	"Second Look CAD"
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,A040)	CS	1C	Value Type	"TEXT"

>>>>(0040,A043)	SQ	1C	Concept Name Code Sequence	1
>>>>>(0008,0100)	SH	1C	Code Value	"111003"
>>>>>(0008,0102)	SH	1C	Coding Scheme Designator	"DCM"
>>>>>(0008,0104)	LO	1C	Code Meaning	"Algorithm Version"
>>>>(0040,A160)	UT	1C	Text Value	X.Y-Z, where X is the major revision, Y is the minor revision, and Z is the operating point, either "H" for high or "M" for medium.
>>>>(0040,A010)	CS	1C	Relationship Type	"HAS PROPERTIES"
>>>>(0040,DB73)	UL	1C	Referenced Content Item Identifier	X\Y\Z, which represents the reference node position of the image processed.

Table 61 - Summary of Analyses

Group and Element	VR	Type	Description	Value
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"
>(0040,A040)	CS	1	Value Type	"CODE"
>(0040,A043)	SQ	1	Concept-name Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111065"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Summary of Analyses"
>(0040,A168)	SQ	1	Concept Code Sequence	1
>>(0008,0100)	SH	1C	Code Value	"111225"
>>(0008,0102)	SH	1C	Code Scheme Designator	"DCM"
>>(0008,0104)	LO	1C	Code Meaning	"Not Attempted"
>(0040,A010)	CS	1	Relationship Type	"CONTAINS"

3.3.6.16.1.3 Storage of CAD Results – Radiotherapy Structure Set (RTSS)

Second Look® will process each image to determine the existence of any suspicious regions. A RT Structure Set Storage (RTSS) object is created per image. The RTSS object gives locations of the suspicious findings where ellipses are used to identify densities and rectangles are used to identify calcification clusters. The RTSS object can be sent to any remote system that is configured to receive this output. The use of the RT Structure Set Storage (RTSS) SOP Class is proprietary between iCAD, Inc. and General Electric (GE) Medical Systems and will not be defined in this document. The Modality (0008,0060) attribute value is "MG", to avoid confusion with valid RT Structure Set (RTSS) instances, and it is not recommended that the proprietary instances be archived.

3.3.6.16.1.4 Storage of CAD Results – Grayscale Softcopy Presentation State (GSPS)

Second Look® will process each image to determine the existence of any suspicious regions. A single grayscale softcopy presentation state object is created per image. The presentation state gives locations of the suspicious findings where ellipses are used to identify densities and rectangles are used to identify calcification clusters. The presentation state object can be sent to any remote system that is configured to receive this output.

Table 62 – Grayscale Softcopy Presentation State (GSPS) IOD Modules

IE	Module	DICOM Reference	Document Reference	Usage
Patient	Patient	PS 3.3 –2004 C.7.1.1	Table 63	M
Study	General Study	PS 3.3 – 2004 C.7.2.1	Table 64	M
Series	General Series	PS 3.3 – 2004 C.7.3.1	Table 65	M
	Presentation Series	PS 3.3 – 2004 C.11.9	Table 66	M
Equipment	General Equipment	PS 3.3 – 2004 C.7.5.1	Table 67	U
Presentation State	Presentation State	PS 3.3 – 2004 C.11.10	Table 68	M
	Displayed Area	PS 3.3 – 2004 C.10.4	Table 69	M
	Graphic Annotation	PS 3.3 – 2004 C.10.5	Table 70	C
	Graphic Layer	PS 3.3 – 2004 C.10.7	Table 71	C
	Softcopy Presentation LUT	PS 3.3 – 2004 C.11.6	Table 72	M
	SOP Common	PS 3.3 – 2004 C.12.1	Table 73	M

Table 63 - Patient Module Attributes – ref. PS 3.3 - 2004 C.7.1.1

Group and Element	VR	Type	Description	Value
(0010,0010)	PN	2	Patient's Name	Patient's full name obtained from the image header.
(0010,0020)	LO	2	Patient ID	Primary hospital identification number or code for the patient obtained from the image header.
(0010,0030)	DA	2	Patient's Birth Date	Birth date of the patient obtained from the image header.
(0010,0040)	CS	2	Patient's Sex	Sex of the named patient obtained from the image header. Enumerated Values: M = male F = female O = other

Table 64 – General Study Attributes – ref. PS 3.3 - 2004 C.7.2.1

Group and Element	VR	Type	Description	Value
(0020,000D)	UI	1	Study Instance UID	Unique identifier for the study.
(0008,0020)	DA	2	Study Date	Date the CAD output was created.
(0008,0030)	TM	2	Study Time	Time the CAD output was created.
(0008,0090)	PN	2	Referring Physician's Name	Name of the patient's referring physician.
(0020,0010)	SH	2	Study ID	User or equipment generated study ID obtained from image header.
(0008,0050)	SH	2	Accession Number	A number that identifies the order for the study obtained from the image header.

Table 65 – General Series Attributes – ref. PS 3.3 - 2004 C.7.3.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	"PR"
(0020,000E)	UI	1	Series Instance UID	Unique identifier for the series.
(0020,0011)	IS	2	Series Number	A number that identifies the series: "1"
(0020,0060)	CS	2C	Laterality	Laterality of body part examined: "R" = right "L" = left
(0008,1070)	PN	3	Operator's Name	Operator name obtained from image header.

Table 66 – Presentation Series Attributes – ref. PS 3.3 - 2004 C.11.9

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	"PR"

Table 67 – General Equipment Attributes – ref. PS 3.3 - 2004 C.7.5.1

Group and Element	VR	Type	Description	Value
(0008,0060)	CS	1	Modality	"PR"

Table 68 – Presentation State Attributes – ref. PS 3.3 - 2004 C.11.10

Group and Element	VR	Type	Description	Value
(0020,0013)	1	IS	Instance Number	A number that identifies this presentation (SOP Instance) obtained from the image header.
(0070,0080)	1	VS	Presentation Label	A label that is used to identify this presentation. Combination of laterality and view.
(0070,0081)	2	LO	Presentation Description	A description of this presentation: ”Second Look CAD results”
(0070,0082)	1	DA	Presentation Creation Date	Date on which this presentation was created.
(0070,0083)	1	TM	Presentation Creation Time	Time at which this presentation was created.
(0070,0084)	2	PN	Presentation Creator's Name	Name of operator saving the presentation state ”Second Look Digital CAD”
(0008,1115)	1	SQ	Referenced Series Sequence	Sequence of Repeating Items where each Item includes the Attributes of one or more Series.
>(0020,000E)	1C	UI	Series Instance UID	Unique identifier of a Series that is part of this Study.
>(0008,1140)	1C	SQ	Referenced Image Sequence	Sequence of Repeating Items where each Item provides reference to a selected set of Image SOP Class/SOP Instance pairs that are part of this Study and the Series defined by Series Instance UID (0020,000E).
>>(0008,1150)	1C	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.
>>(0008,1155)	1C	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.

Table 69 – Displayed Area Attributes – ref. PS 3.3 - 2004 C.10.4

Group and Element	VR	Type	Description	Value
(0070,005A)	SQ	1	Displayed Area Selection Sequence	A sequence of Items each of which describes the displayed area selection for a group of images or frames.
>(0008,1140)	SQ	1C	Referenced Image Sequence	Sequence of Repeating Items where each Item provides reference to a selected set of Image SOP Class/SOP Instance pairs that are defined in the Presentation State Module.
>>(0008,1150)	UI	1C	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.
>>(0008,1155)	UI	1C	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.
>(0070,0052)	SL	1	Displayed Area Top Left Hand Corner	The top left pixel in the referenced image to be displayed, given as column\row. Column is the horizontal offset (X) and row is the vertical offset (Y) relative to the origin of the pixel data before spatial transformation, which is "1\1".
>(0070,0053)	SL	1	Displayed Area Bottom Right Hand Corner	The bottom right pixel in the referenced image to be displayed, given as column\row. Column is the horizontal offset (X) and row is the vertical offset (Y) relative to the origin of the pixel data before spatial transformation, which is "1\1".
>(0070,0100)	CS	1	Presentation Size Mode	Manner of selection of display size: "SCALE TO FIT"
>(0070,0101)	DS	1C	Presentation Pixel Spacing	Physical distance between the center of each pixel in the referenced image, specified by a numeric pair – adjacent row spacing adjacent column spacing in mm obtained from image header.

Table 70 – Graphic Annotation Attributes – ref. PS 3.3 - 2004 C.10.5

Group and Element	VR	Type	Description	Value
(0070,0001)	SQ	1	Graphic Annotation Sequence	A sequence of Items of which represents a group of annotations composed of graphics and text.
>(0008,1140)	SQ	1C	Referenced Image Sequence	Sequence of Repeating Items where each Item provides reference to a selected set of Image SOP Class/SOP Instance pairs that are defined in the Presentation State Module.
>>(0008,1150)	UI	1C	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.
>>(0008,1155)	UI	1C	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.
>(0070,0002)	CS	1	Graphic Layer	The layer defined in the Graphic Layer Module in which the graphics or text is to be rendered. ”SECOND LOOK CAD”
>(0070,0008)	SQ	1C	Text Object Sequence	Sequence that describes a text annotation.
>>(0070,0003)	CS	1C	Bounding Box Annotation Units	Units of measure for the axes of the text bounding box. ”PIXEL”
>>(0070,0006)	ST	1	Unformatted Text Value	A string of text containing the software version and the number of calcification clusters and densities found.
>>(0070,0010)	FL	1C	Bounding Box Top Left Hand Corner	Location of the Top Left Hand Corner (TLHC) of the bounding box in which Unformatted Text Value (0070,0006) is to be displayed, in Bounding Box Annotation Units (0070,0003), given as column\row. Column is the horizontal offset and row is the vertical offset. ”10.0\10.0”
>>(0070,0011)	FL	1C	Bounding Box Bottom Right Hand Corner	Location of the Bottom Right Hand Corner (BRHC) of the bounding box in which Unformatted Text Value (0070,0006) is to be displayed, in Bounding Box Annotation Units (0070,0003), given as column\row. Column is the horizontal offset and row is the vertical offset. ”100.0\100.0”
>>(0070,0012)	CS	1C	Bounding Box Text Horizontal Justification	Location of the text relative to the vertical edges of the bounding box: ”LEFT”
>(0070,0009)	SQ	1C	Graphic Object Sequence	Sequence that describes a graphic

				annotation.
>>(0070,0005)	CS	1	Graphic Annotation Units	Units of measure for the axes of the graphic annotation: "PIXEL"
>>(0070,0020)	US	1	Graphic Dimensions	"2"
>>(0070,0021)	US	1	Number of Graphic Points	Number of data points in this graphic. "4" for ELLIPSE and ""5 for POLYLINE.
>>(0070,0022)	FL	1	Graphic Data	Coordinates that specify this graphic annotation.
>>(0070,0023)	CS	1	Graphic Type	The shape of graphic that is to be drawn. "ELLIPSE" = Density "POLYLINE" = Calcification Cluster.
>>(0070,0024)	CS	1C	Graphic Filled	Whether or not the closed graphics element is displayed as filled or as an outline. "N" = No

Table 71 – Graphic Layer Attributes – ref. PS 3.3 - 2004 C.10.7

Group and Element	VR	Type	Description	Value
(0070,0060)	SQ	1	Graphic Layer Sequence	A sequence of Items each of which represents a single layer in which graphics are rendered.
>(0070,0002)	CS	1	Graphic Layer	A string which identifies the layer. "SECOND LOOK CAD"
>(0070,0062)	IS	1	Graphic Layer Order	An integer indicating the order in which it is recommended that the layer be rendered, if the display is capable of distinguishing. Lower numbered layers are to be rendered first. "1"
>(0070,0066)	US	3	Graphic Layer Recommended Display Grayscale Value	A default single gray unsigned value in which it is recommended that the layer be rendered on a monochrome display. The units are specified in P-Values from minimum of 0000H (black) up to a maximum of FFFFH (white). "32767"

Table 72 – Softcopy Presentation LUT Attributes – ref. PS 3.3 - 2004 C.11.6

Group and Element	VR	Type	Description	Value
(2050,0020)	CS	1C	Presentation LUT Shape	Specifies predefined Presentation LUT transformation. "IDENTITY" – no further transformation necessary, input values are P-Values.

Table 73 – SOP Common Attributes – ref. PS 3.3 - 2004 C.12.1

Group and Element	VR	Type	Description	Value
(0008,0016)	UI	1	SOP Class UID	Uniquely identifies the SOP Class: "1.2.840.10008.5.1.4.1.1.11.1"
(0008,0018)	UI	1	SOP Instance UID	Uniquely identifies the SOP instance.

3.3.6.16.1.5 Storage of CAD Results – Digital Mammography X-Ray – For Presentation with CAD overlay

Second Look® can be configured to populate the CAD detections into the overlay module of the Digital Mammography X-Ray – For Presentation image. In order for this to occur, Second Look® must receive both the Digital Mammography X-Ray – For Processing and the Digital Mammography X-Ray – For Presentation images for the patient case. Second Look® will perform it's algorithms on the Digital Mammography X-Ray – For Processing images and then populate the overlay module of the Digital Mammography X-Ray – For Presentation image, where ellipses are used to identify densities and rectangles are used to identify calcification clusters. The Digital Mammography X-Ray – For Presentation image with the CAD overlay can be sent to any number of remote devices. This object contains information identical to how it was received, except a new SOP Instance UID is created for the updated image and the overlay plane module had been applied as described in Table 74.

Table 74 – Digital Mammography X-Ray – For Presentation – Overlay Plane Module – ref. PS 3.3 - 2004 C.12.1

Group and Element	VR	Type	Description	Value
(6000,0010)	US	1	Overlay Rows	Number of rows in the overlay
(6000,0011)	US	1	Overlay Columns	Number of columns in the overlay
(6000,0022)	CS	1	Overlay Type	"G" = Graphics
(6000,0050)	SS	1	Overlay Origin	Location of first overlay point with respect to pixels in the image, given as row\column. The upper left pixel of the image has the

				coordinate "1\1".
(6000,0100)	US	1	Overlay Bits Allocated	The number of bits allocated in the overlay: "1"
(6000,0102)	US	1	Overlay Bit Position	Bit in which overlay is stored: "0"
(6000,3000)	OW	1C	Overlay Data	Overlay pixel data.
(6000,0022)	LO	3	Overlay Description	User defined comments about the overlay: "iCAD, Inc."
(6000,0045)	LO	3	Overlay Subtype	Defined term which identifies the intended purpose of the Overlay Type: "AUTOMATED"
(6000,1500)	LO	3	Overlay Label	A user defined text string which may be used to label or name this overlay: "Second Look"

3.3.6.17 Storage Commitment of CAD Output

3.3.6.18 Associated Real World Activity – Storage Commitment

Second Look® Digital can be configured to issue a storage commitment request (N-ACTION) to any of the configured remote devices through the Field Service Engineer's Graphical User Interface. Second Look® Digital will respond to any storage commitment response (N-EVENT-REPORT) as long as the Second Look® Digital's service is started. An overview of the storage commitment sequence is shown in Figure 3.3.
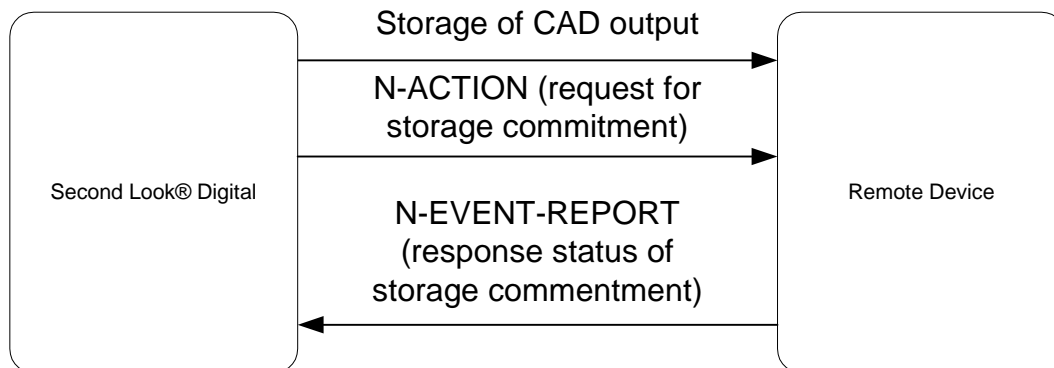

Figure 3.3 - Storage Commitment Overview

3.3.6.19 Presentation Context Table – Storage Commitment

Second Look® Digital supports the transfer syntaxes listed in Table 75. For a storage commitment request (N-ACTION), Second Look® Digital will propose the Presentation Contexts listed in Table 76.

Table 75 – Storage Commitment Transfer Syntaxes

Transfer Syntaxes	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

Table 76 – Storage Commitment SOP Class

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Storage Commitment	1.2.840.10008.1.20.1	Declared in Table 75	SCU/SCP	None

3.3.6.20 SOP Specific Conformance – Storage Commitment
The Storage Commitment request N-ACTION information is defined in Table 77.

Table 77 – Storage Commitment Request – Action Information

Action Type Name	Action Type ID	Tag	Attribute	Req. Type SCU	Description
Request Storage Commitment	1	(0008,1195)	Transaction UID	1	Uniquely identifies this Storage Commitment transaction.
		(0088,0130)	Storage Media File-Set ID	3	Not used
		(0088,0140)	Storage Media File-Set UID	3	Not used
		(0008,1199)	Referenced SOP Sequence	1	A sequence of repeating Items where each Item references a single SOP Instance for which storage commitment is requested / or has been provided.
		>(0008,1150)	Referenced SOP Class UID	1	Uniquely identifies the referenced SOP Class.
		>(0008,1155)	Referenced SOP Instance UID	1	Uniquely identifies the referenced SOP Instance.
		>(0088,0130)	Storage Media File-Set ID	3	Not used
		>(0088,0140)	Storage Media File-Set UID	3	Not Used

The handling of the N-ACTION response by Second Look® is listed in Table 78.

Table 78 – Storage Commitment Response (N-ACTION-RSP) Codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0x0000	None	Operation performed properly
Failure	Processing failure	0x0110	None	Second Look® records an N-ACTION processing failure to the event log.
Failure	No such SOP instance	0x0112	None	Second Look® records to the event log that there were invalid UIDs in the Storage Commitment message.

The Storage Commitment N-EVENT-REPORT information is defined in Table 79.

Table 79 – Storage Commitment Result – Event Information

Action Type Name	Action Type ID	Tag	Attribute	Req. Type SCP	Description
Storage Commitment Request Successful	1	(0008,1195)	Transaction UID	1	Uniquely identifies this Storage Commitment transaction.
		(0008,0054)	Retrieve AE Title	3	Not used
		(0088,0130)	Storage Media File-Set ID	3	Not used
		(0088,0140)	Storage Media File-Set UID	3	Not used
		(0008,1199)	Referenced SOP Sequence	1	A sequence of repeating Items where each Item references a single SOP Instance for which storage commitment is requested / or has been provided.
		>(0008,1150)	Referenced SOP Class UID	1	Uniquely identifies the referenced SOP Class.
		>(0008,1155)	Referenced SOP Instance UID	1	Uniquely identifies the referenced SOP Instance.
		>(0008,0054)	Retrieve AE Title	3	Not used
		>(0088,0130)	Storage Media File-Set ID	3	Not used
		>(0088,0140)	Storage Media File-Set UID	3	Not Used

Storage Commitment Request Complete – Failure Exists	2	(0008,1195)	Transaction UID	1	Uniquely identifies this Storage Commitment transaction.
		(0008,0054)	Retrieve AE Title	3	Not used
		(0088,0130)	Storage Media File-Set ID	3	Not used
		(0088,0140)	Storage Media File-Set UID	3	Not used
		(0008,1199)	Referenced SOP Sequence	1	A sequence of repeating Items where each Item references a single SOP Instance for which storage commitment is requested / or has been provided.
		>(0008,1150)	Referenced SOP Class UID	1	Uniquely identifies the referenced SOP Class.
		>(0008,1155)	Referenced SOP Instance UID	1	Uniquely identifies the referenced SOP Instance.
		>(0008,0054)	Retrieve AE Title	3	Not used
		>(0088,0130)	Storage Media File-Set ID	3	Not used
		>(0088,0140)	Storage Media File-Set UID	3	Not Used
		(0008,1198)	Failed SOP Sequence	1	A sequence of repeating Items where each Item references a single SOP Instance for which storage commitment could not be provided.
		>(0008,1150)	Referenced SOP Class UID	1	Uniquely identifies the referenced SOP Class.
		>(0008,1155)	Referenced SOP Instance UID	1	Uniquely identifies the referenced SOP Instance.
		>(0008,1197)	Failure Reason	1	The reason that storage commitment could not be provided for this SOP Instance.

The response codes for the DICOM Storage Commitment message (N-EVENT-REPORT-RSP) are displayed in Table 80. If there was an error in creating the Storage Commitment response, no response shall be sent.

Table 80 – Storage Commitment Response (N-EVENT-REPORT-RSP) Codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0x0000	None	Operation performed properly
Failure	Processing failure	0x0110	None	Error in parsing N-EVENT-REPORT-RQ from remote device.
Failure	Instance UID does not match	0x0119	None	The instance UID sent for storage commit does not match the instance UID that was returned.

4   Communication Profiles

Second Look® Digital provides DICOM V3.0 TCP/IP Network Communication support as defined in Part 8 of the DICOM Standard.

4.1   OSI Stack

Not Supported

4.2   TCP/IP Stack

Second Look® Digital inherits its TCP/IP stack from the Microsoft® Windows® operating system of the computer upon which it executes. Second Look® (SCP) listens by default to port number 104, unless this is configured differently.

4.2.1   Physical Media Support

The physical media supported by the TCP/IP Stack are 10/100/1000BaseT.

5   Extensions/Specializations/Privatizations

Second Look® Digital does not use any private group or element codes.

6   Configuration

Second Look® Digital configures the application entity, host name, and listen port for itself and remote devices through the web accessible field service engineering graphical user interface. The Second Look® Digital service must be stopped to change these parameters, and then restarted to have the new values take effect.

7   Support for Extended Character Sets

Second Look® Digital supports the default character set (ISO-IR 6 Basic G0 Set).

8   End of Document