DICOM Conformance Statement

MAMMOMAT Revelation

VC10

SIEMENS
Healthineers

1   Conformance Statement Overview

The MAMMOMAT Revelation is a "*syngo*®-based[a]" Imaging Modality.
The MAMMOMAT Revelation is designed to be integrated into an environment of medical DICOM-based devices. The MAMMOMAT Revelation supports Storage and Transfer of images utilizing the DICOM "Storage Service Class", the display of data and retrieval of images from DICOM Archives utilizing the DICOM "Query/Retrieve Service Class". Workflow Management is supported by querying worklists from RIS and returning information about the procedure performed. Furthermore the Import from and Export to DICOM CD/DVD media is supported. Printing of viewing results is provided with Print Management Services.

Table 1 - Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Verification		
Verification	Yes	Yes
Transfer (main Image SOP Class)		
Digital **M**ammo**G**raphy Image Storage – for Processing	Yes	Yes
Digital **M**ammo**G**raphy Image Storage – for Presentation	Yes	Yes
Computed **T**omography Image Storage	Yes	Yes
Breast Tomosynthesis Image Storage	Yes	Yes
Transfer (Image SOP Class)		
Computed **R**adiography Image Storage	Yes	Yes
Digital **X**-Ray Image Storage – for Processing	Yes	Yes
Digital **X**-Ray Image Storage – for Presentation	Yes	Yes
Enhanced CT Image Storage	Yes	Yes
Magnetic **R**esonance Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
Nuclear **M**edicine Image Storage	Yes	Yes
PET Image Storage	Yes	Yes
Secondary **C**apture Image Storage	Yes	Yes
Ultra**S**ound Multi-Frame Image Storage	Yes	Yes
Transfer (Non-image SOP Class)		
Key Object Selection	Yes	Yes
Workflow Management		
Modality Performed Procedure Step SOP Class	Yes	No
Modality Worklist Information Model - FIND	Yes	No
Storage Commitment Push Model SOP Class	Yes	Yes
Query/Retrieve		
Patient Root Q/R - Information Model - FIND	Yes	Yes
Patient Root Q/R - Information Model - MOVE	Yes	Yes
Study Root Q/R - Information Model - FIND	Yes	Yes
Study Root Q/R - Information Model - MOVE	Yes	Yes
Patient/Study Only Q/R - Information Model - FIND	Yes	Yes
Patient/Study Only Q/R - Information Model - MOVE	Yes	Yes
Print Management		
Basic Grayscale Print Management Meta	Yes	No
Presentation LUT	Yes (for Grayscale)	No

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[a] *syngo* is a registered trademark of Siemens AG

Table 2 - Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disk - Recordable		
General Purpose on CD-R	Yes	Yes
DVD		
General Purpose on DVD with JPEG	Yes	Yes
USB		
General Purpose USB Media Interchange with JPEG	Yes	Yes

Table 3 - Implementation Identifying Information

Name	Value
Application Context Name	1.2.840.100008.3.1.1.1
Implementation Class UID	1.3.12.2.1107.5.12
Implementation Version Name	" SIEMENS_AWSVD10*"

2 Table of Contents

3   Introduction

3.1   Revision History

n.a.

3.2   Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.3   Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between MAMMOMAT Revelation and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. DICOM by itself does not guarantee interoperability.

The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of conformance statements is the first step towards assessing inter-connectivity and interoperability between MAMMOMAT Revelation and other DICOM conformant equipment.

- Test procedures should be defined and executed to validate the required level of inter-operability with specific compatible DICOM equipment, as established by the healthcare facility.

MAMMOMAT Revelation has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE) [2].
The IHE Integration Statement for MAMMOMAT Revelation, together with the IHE Technical Framework, may facilitate the process of validation testing.

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

3.4   Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Additional Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
BDI	Breast Density Index
CSE	Customer Service Engineer
DB	Database
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
FFDM	Full Field Digital Mammography

FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
GSDF	Grayscale Standard Display Function
IHE	Integrating the Healthcare Enterprise
INBD	Insight Breast Density
IOD	DICOM Information Object Definition
ISO	International Standard Organization
KOS	Key Object Selection
MAWF	Mammography Acquisition Workflow Profile
MPPS	Modality Performed Procedure Step
n. a.	not applicable
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM Server)
SOP	DICOM Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Report
TFT	Thin Film Transistor (Display)
TiCEM	Titanium Contrast Enhanced Mammography
TID	Template ID
TLS	Transport Layer Security
U	Unique Key Attribute
UID	Unique Identifier
USB	Universal Serial Bus
UTF-8	Unicode Transformation Format-8
VBD	Volumetric Breast Density
VR	Value Representation

3.5   References

[1] Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/, NEMA PS 3 Year 2016[b]

[2] IHE Radiology Technical Framework, Vol. I-IV, available free at http://www.ihe.net/Technical_Framework

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[b] The DICOM Standard is under continuous maintenance, the current official version is available at http://dicom.nema.org

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4 Networking

4.1 Implementation Model

- **Verification**
  TheMAMMOMAT Revelation DICOM Service Tool application requests Verification to proof the ability of a remote DICOM application to respond to DICOM messages. Responding to Verification requests from remote nodes is handled by the Storage SCP.

- **Storage**
  The MAMMOMAT Revelation DICOM implementation is able to initiate associations for Storage of DICOM Composite Information Objects to Remote AEs and to receive and respond to associations for Storage from Remote AEs.

- **Storage Commitment**
  The MAMMOMAT Revelation DICOM implementation is able to initiate requests for Storage Commitment Push (for previously sent DICOM Composite Information Objects) to Remote AEs and is able to receive and respond to Storage Commitment requests from Remote AEs.

- **Query/Retrieve**
  The MAMMOMAT Revelation DICOM application supports the Query/Retrieve services in a SCP role. Via the user interface, MAMMOMAT Revelation supports Query/Retrieve as SCU to retrieve IODs to the local database.

- **Print**
  The MAMMOMAT Revelation DICOM implementation is able to initiate associations as Print Management SCU for printing of composed film-sheets with one or more DICOM Print AE.

- **Workflow**
  The MAMMOMAT Revelation will issue automated "broad" worklist queries and inter-active "narrow" worklist queries as DICOM Modality Worklist SCU. The status of the procedure started and performed is communicated via MPPS, which is also supported in SCU role only. Radiation Dose information is also sent via MPPS.

4.1.1 Application Data Flow

The division of MAMMOMAT Revelation into the separate DICOM Application Entities represents a somewhat arbitrary partitioning of functionality. For the purpose of this document they are organized in this manner to detail their independent logical functionality.

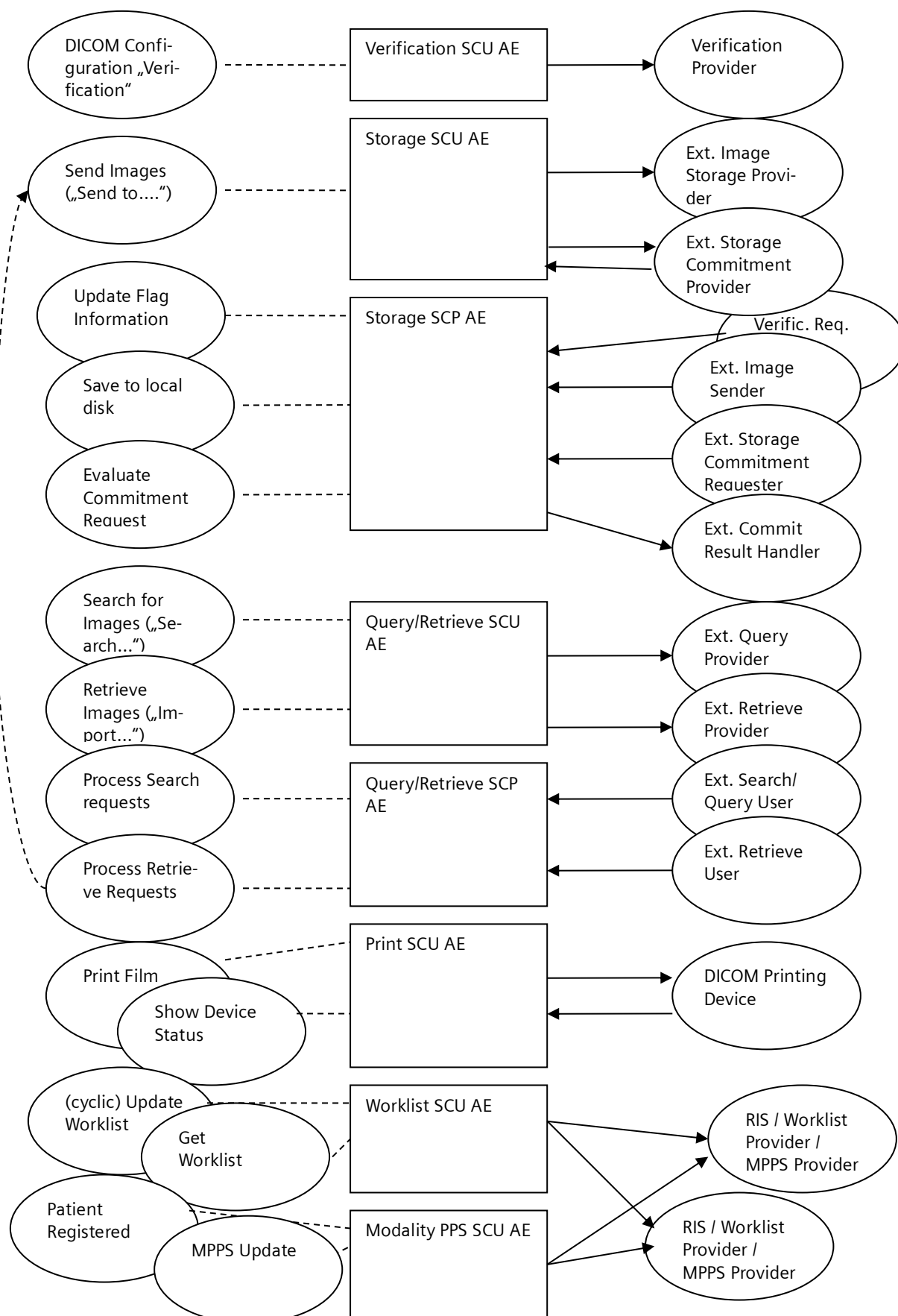|		
DICOM Configuration „Verification"	Verification SCU AE	Verification Provider
Send Images („Send to....")	Storage SCU AE	Ext. Image Storage Provider
		Ext. Storage Commitment Provider
Update Flag Information	Storage SCP AE	Verific. Req.
Save to local disk		Ext. Image Sender
Evaluate Commitment Request		Ext. Storage Commitment Requester
		Ext. Commit Result Handler
Search for Images („Search...")	Query/Retrieve SCU AE	Ext. Query Provider
Retrieve Images („Import...")		Ext. Retrieve Provider
Process Search requests	Query/Retrieve SCP AE	Ext. Search/ Query User
Process Retrieve Requests		Ext. Retrieve User
Print Film	Print SCU AE	DICOM Printing Device
Show Device Status		
(cyclic) Update Worklist	Worklist SCU AE	RIS / Worklist Provider / MPPS Provider
Get Worklist		
Patient Registered	Modality PPS SCU AE	RIS / Worklist Provider / MPPS Provider
MPPS Update		

Figure 1 MAMMOMAT Revelation DICOM Data Flow Diagram

- The MAMMOMAT Revelation DICOM Service Tool application opens an association when a "verification" of a remote application is requested during a configuration session. This can be done when entering new data to configure a remote application or to verify existing configuration data.

- The Storage SCU AE can send Composite SOP Instances and automatically request Storage Commitment for sent SOP Instances, if configured and handles incoming commitment status N-EVENT messages.

- The Storage SCP AE can receive incoming DICOM images and add them to the local database. It can respond to external Storage and Verification Requests as a Service Class Provider (SCP) for C-STORE and C-ECHO requests. The Storage SCP AE autonomously handles incoming Storage Commitment requests in SCP role and checks commitment status based on the local database and sends back the related commitment status in N-EVENT-REPORT messages.
  The Storage SCP AE supports Composite SOP Instances as indicated in chapter 1"Conformance Statement Overview".

- The Query part of the Query/Retrieve SCU AE uses C-FIND to search a DICOM Database for Patient Study and Series information.
  The Retrieve part of the Query/Retrieve SCU AE uses C-MOVE to initiate a DICOM transfer of composite objects to the local database.

- The Query SCP AE runs autonomously in the background and responds to incoming C-FIND requests based on the matches in the local database and supports retrieve of supported SOP Instances from the local database to a known retrieve destination.

- The Print SCU sends previously compiled, complete (virtual) film-sheets in 1:1 image mode (page mode) to the printer. The printer status is cyclically monitored by sending Status requests and/or awaiting asynchronous events.

- The Worklist SCU AE runs autonomously for cyclic "broad" query and issues C-FIND Worklist model requests. It can be manually triggered for most recent data. A "broad" query with user input can be triggered separately.

- The MPPS AE uses N-CREATE when registering an Acquisition patient and updates via N-SET with each run. The user can close MPPS interactively (triggers "final N-SET").

4.1.2 Functional Definitions of Application Entities

4.1.2.1 Functional Definition of Verification-SCU AE

The MAMMOMAT Revelation DICOM Service Tool application opens an association when a "verification" of a remote application is requested during a configuration session. This can be done when entering new data for remote application configuration or to verify existing configuration data.

4.1.2.2 Functional Definition of Storage-SCU AE

The MAMMOMAT Revelation Storage SCU is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the composite image objects selected for storage and the destination. An association is negotiated with the destination application entity and the image data is transferred using the C-STORE DIMSE-Service. Status of the transfer is reported to the job control interface.

With each successfully completed send job, the MAMMOMAT Revelation DICOM application will populate the Storage Commitment Push Model Action Information from the SOP Instances sent. Then a Storage Commit Request is triggered, if configured. Depending on configuration, the MAMMOMAT Revelation DICOM application will keep the association open for responses with a configurable time-out, or closes the association and expects responses on a different association that has to be established by the remote Storage Commitment SCP.

The commitment status derived from the related trigger response will be indicated in the related Status Flags of the related entity. It is possible to create triggers ("auto rules") from this event.

The Transaction UIDs of the pending commitment request are kept "open" (Job-status is "waiting") for a configurable time (default: 1h). If the "open time" for a pending commitment request has elapsed w/o a related response from the provider, the Transaction UID is removed and the related entities are indicated as "commit failed".

Open Transaction UIDs of pending commitment requests are discarded after a reboot of the system. The related entities are indicated as "commit failed".

4.1.2.3 Functional Definition of Storage-SCP AE

The Storage SCP component of the MAMMOMAT Revelation DICOM application is operating as background server process. The process starts when the machine is powered on and waits for Storage association requests. Upon accepting an association with a negotiated Presentation Context it starts to receive the Composite Image Objects and imports them to local database.

The Verification SCP is included in the Storage SCP.

The Storage Commitment SCP is running in background and is ready to receive requests when the system is started. Storage Commitment will be checked and returned against the SOP Classes received and kept in the local Storage of the MAMMOMAT Revelation. The response will either be sent "on same" (association not closed by requester) or "on separate" association (requester closed association consecutive to positive request status).

4.1.2.4 Functional Definition of Query/Retrieve-SCU AE

The MAMMOMAT Revelation DICOM Query/Retrieve SCU requests the remote Query/Retrieve SCP to perform a search and match to the keys specified in the request in order to display the results in the system's user interface. Depending on user action (Import) the

MAMMOMAT Revelation Query/Retrieve DICOM SCU sends a C-MOVE DIMSE service to initiate a C-STORE sub-operation on the SCP to start an image transfer from remote Storage SCU (running on Query/Retrieve SCP) to the system's Storage SCP.

4.1.2.5   Functional Definition of Query/Retrieve-SCP AE

The MAMMOMAT Revelation DICOM Query/Retrieve SCP responds to C-FIND DIMSE services from remote SCU applications. Depending on further remote request, a C-GET or a C-MOVE involves the system's DICOM Query/Retrieve SCP application to initiate a C-STORE association to send image objects to a remote Storage SCP.

All components of the DICOM Query/Retrieve SCP application are operating as background server processes. The processes start when the machine is powered on and then respond to queries based on the records stored in its database.

4.1.2.6   Functional Definition of Print SCU AE

The Print SCU is invoked by the user interface to setup film-sheet layout and whenever an image is ready to be printed on film. The Print SCU will hold and maintain all data needed to compile a complete film-sheet from the data (images, layout, configuration) received. Whenever a film-sheet is ready to print the related data is used to supply the Information to the SOP Classes of the Print Management Service Class. A queue is maintained, in order to intermediately store several film-sheets in case of resource problems on printer. The SCU will only supply and require the mandatory SOP Classes of the Print Management Service Class.

4.1.2.7   Functional Definition of Worklist SCU AE

The worklist SCU ("broad query") is invoked from the patient browser user interface or by timer to request the worklist from a remote Information System (Modality Worklist Class SCP). The worklist SCP responses to the C-FIND query and scheduled imaging service requests (scheduled procedure steps) and patient demographic information will be "pulled" from the information system to the MAMMOMAT Revelation modality. All information retrieved will be held in the scheduling database for usage during Patient Registration procedure.
Furthermore, the patient based Query dialog from the patient browser allows entering specific matching criteria ("narrow query") for the worklist query. With the response data the Patient Registration dialog can be populated according availability within the worklist response identifier.

4.1.2.8   Functional Definition of Modality PPS SCU AE

With registering a Patient (i.e. a Scheduled Procedure Step from Worklist), the MAMMOMAT Revelation DICOM application will create an MPPS Instance and communicate it to the MPPS Manager (SCP). It is configurable to set the states of all related MPPS to "Completed" when a patient is closed. Furthermore, a manual update can be performed with the MPPS user interface. From the user interface it is possible to set the state of the MPPS to "Completed" or "Discontinued". After that the DICOM application will no longer allow updates on the related MPPS Instance.
The MAMMOMAT Revelation will support creation of "unscheduled cases" by allowing MPPS Instances to be communicated for locally registered Patients.

4.1.3   Sequencing of Activities

4.1.3.1   Verification

Newly entered data have to be saved first, before a "verification" of these data is possible.

4.1.3.2   Storage

Prior to sending of SOP Instances the MAMMOMAT Revelation Storage application is capable of invoking postprocessing features.

The Storage Commitment trigger is automatically derived from the successful completion of a Send Job.

4.1.3.3   Query/Retrieve

Retrieve of images is only possible if a result from a previous "Search..." operation exists and those entities can be selected for "Import".

The Query application will not "per se" request information on IMAGE level. The user can select a series and request image level information with the "Image List" function.

4.1.3.4   Workflow

The "narrow" (interactive) Worklist Query requires that sufficient matching keys or a unique matching key are/is entered before the query is issued. Only then a single response can be expected to complete the registration dialog.

An MPPS N-CREATE message is sent when a patient is registered.

Closing a patient's examination triggers sending the MPPS N-SET message and auto transfer of images, if configured. If the IHE profile MAWF is activated, information about rejected or corrected images will be stored and transferred in KOS objects.

4.2 Application Entity Specification

4.2.1 Verification SCU AE Specification

4.2.1.1 SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section "Verification" in chapter 1 "Conformance Statement Overview".

4.2.1.2 Association Policies

4.2.1.2.1 General
The MAMMOMAT Revelation DICOM Service Tool application attempts to open an association for verification request whenever the "verification" function is activated during network configuration of a remote DICOM application.

4.2.1.2.2 Number of Associations
The MAMMOMAT Revelation DICOM Service Tool application initiates one association at a time to request verification.

4.2.1.2.3 Asynchronous Nature
The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.1.2.4 Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in chapter 1 "Conformance Statement Overview".

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – "Verification"
4.2.1.3.1.1 Description and Sequencing of Activity
The Verification SCU C-ECHO request is initiated by Service and Configuration SW whenever "Verification" is requested. If an association to a remote Application Entity is successfully established, Verification with the configured AET is requested via the open association. If the C-ECHO Response from the remote application contains a status other than "Success" this will be indicated in the service environment and the association is closed.

4.2.1.3.1.2 Proposed Presentation Contexts
The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in the following table:

Table 4 - Presentation Context Table "Verification"

Presentation Context Table – "Verification"					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None

4.2.1.3.1.3 SOP Specific Conformance – Verification SCU
n.a.

4.2.1.4 Association Acceptance Policy

The Verification SCP is part of the Storage SCP.

4.2.2 Storage SCU AE Specification

4.2.2.1 SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services", sections "Transfer" and "Workflow Management "in chapter 1. Only relevant SOP Classes are listed.

4.2.2.2 Association Policies

4.2.2.2.1 General

The DICOM Storage application will be triggered by the transfer job queue or by an external retrieve request. An association request is sent to the destination AE and, upon successful negotiation of a Presentation Context, the transfer is started.

With a Send Job successfully completed, the DICOM application will generate the Storage Commitment Action Information which references to all Instances of the processed job. The Commit Request is sent over a single opened association. The MAMMOMAT Revelation will wait for Status responses of the Storage Commitment Request. If the Provider accepts the Storage Commitment with Success Status, the generated Transaction UID, together with study identification data and a time-stamp, is kept. Depending on configuration, the association is closed or kept open for a configured time range. If the association is closed immediately, the response is expected on a different association which is the default setting. Multiple Storage Commitment Requests can be pending.

The default PDU size used will be 516KB.

4.2.2.2.2 Number of Associations

The MAMMOMAT Revelation DICOM application initiates several associations at a time, one for each destination to which a transfer request is being processed in the active job queue list.

The number of simultaneous DICOM associations can be configured via the Service-UI. The dialog can be found in "Configuration / DICOM / General".

4.2.2.2.3 Asynchronous Nature

The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.2.2.4 Implementation Identifying Information

For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in chapter 1 "Conformance Statement Overview".

4.2.2.3 Association Initiation Policy

If a job with network destination gets active in the job list or a retrieve sub-operation is processed, the MAMMOMAT Revelation DICOM application attempts to initiate a new association for

- DIMSE C-STORE to send images and with successful status and

- N-ACTION DIMSE for the Storage Commitment Push Model Service Class to request commitment.

4.2.2.3.1 Activity – "Send to …"
4.2.2.3.1.1 Description and Sequencing of Activity

The C-STORE request is triggered by a job with network destination or the processing of an external C-MOVE retrieve request. If the process successfully establishes an association to a remote Application Entity, it will transfer each image one after another via the open association. If the C-STORE Response from the remote application contains a status other than "Success" or "Warning", the association is aborted.

With success status for the previous transfer, the MAMMOMAT Revelation Storage Application sends the commit request (N-ACTION-RQ) message and waits for acceptance of this request (N-ACTION-RSP). After receiving this, the transaction is marked as "waiting".

Depending on a configuration value, the association will then be closed or kept open. In the first case, there is another configurable timeout giving the number of hours (h) and minutes (m) (by default 1h:0m) to wait for the corresponding commit response (N-EVENT-REPORT). In the second case, this time is the (also configurable) time-out for the association being kept open. In both cases, if the commit response (N-EVENT-REPORT) does not arrive within the configured time-out, the transaction will be marked as failed.

If the received commit response (N-EVENT-REPORT) has the status of "complete - failure exists", the transaction is marked as failed, else the transaction is marked as "completed". In both cases, a status message is shown to the user.

4.2.2.3.1.2 Proposed Presentation Contexts
The MAMMOMAT Revelation DICOM application will propose Storage SCU Presentation Contexts as shown in the following table:

Table 5 - Presentation Context Table "Send to ..."

Presentation Context Table – "Send to …"				
Abstract Syntax	**Transfer Syntax**		**Role**	**Ext. Neg.**
Description	**Name List**	**UID List**		
Any image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Image SOP Class) ".	JPEG Lossy Extended*1 JPEG Lossless, Process 14 (selection value 1) JPEG Lossy Baseline (Process 1) *1 Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Any Non-image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Non-image SOP Class) ".	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Storage Commitment SOP Class as detailed in "Table 1 - Network Services" section "Workflow Management".	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

*1: The Transfer Syntax used is strongly influenced by the fact of "how was the accepted Transfer Syntax at the time when the Instance was received". E.g. the Instances received with JPEG Lossy Transfer Syntaxes will not be converted and can only be sent out with the same Transfer Syntax. The compression is only supported for images with pixel representation (0028, 0103) equal to 0 (=unsigned).

Not all the listed transfer syntaxes will be proposed all the time. For some abstract syntax only a list of uncompressed (UC) transfer syntaxes (one or more) will be proposed, for other abstract syntaxes also JPEG Lossless (LL) syntax will be proposed and/or a list of JPEG Lossy (LY) transfer syntaxes. The contents of this lists is configurable.

The compression types JPEG lossy and JPEG lossless are parameters, which are part of the Application Entity Properties configuration (storage checked). It can be reached via the Service-UI: Configuration / DICOM / Network nodes.

Due to local regulatory lossy compression might not be allowed for FFDM images.

4.2.2.3.1.3 SOP specific Conformance - "Send to …"

The MAMMOMAT Revelation allows configuration for which images (e.g. MG For Presentation only) should be transferred when (e.g. completed after End Examination) automatically to one or more destinations (e.g. reviewing workstation and archive).Reconstructed Tomosynthesis slices as well as Insight 3D images can be either sent in CT or Breast Tomosynthesis format.

For association and DIMSE level time-outs, please refer to section Configuration.

4.2.2.3.1.3.1 Optional Attributes

Please refer to the related Image Object definition tables in the Annex (section "Created SOP Instances") for a list of all DICOM IOD attributes of type 2 and 3, which are encoded by the MAMMOMAT Revelation applications.

4.2.2.3.1.3.2 Specialized Information Object Definitions

The DICOM images sent by MAMMOMAT Revelation DICOM application conform to the DICOM IOD definitions (Standard extended IODs). But they will contain additional private elements, which have to be discarded by a DICOM system when modifying the image.

The DICOM nodes are responsible for data consistency when modifying images. All unknown private attributes have to be removed upon modification!

4.2.2.3.1.3.3 Data Dictionary of applied private IOD Attributes

Please refer to "Standard Extended/Specialized/Private SOP Classes" in the Annex for a list of possible private IOD attributes.

4.2.2.3.1.4 SOP specific Conformance - Request Commitment

Storage Commitment is supported for all the SOP Classes detailed in chapter 1 "Table 1 - Network Services".The Referenced Study Component Sequence is not supported.

Storage Media File-Set ID and UID Attributes will not be supported in the commitment request (N-ACTION primitive) invoked by the Storage Commitment SCU.

4.2.2.4   Association Acceptance Policy

4.2.2.4.1   Activity – Update Flag Information

4.2.2.4.1.1 Description and Sequencing of Activity

After sending a Storage Commitment Request the MAMMOMAT Revelation either waits on the same association or, being configured to receive response on a separate association, closes the association and waits for an association request from the Storage Commitment SCP that wants to send the results.

Any incoming Notification will be checked for validity, that is, if the related Transaction UID is still part of the Pending Request Queue.

If the Notification is valid the related Instances are marked with the reported status. The over-all Commit Status of the higher Information Entities in the MAMMOMAT Revelation database is derived from propagation of the States of all sub-ordinate Image entities included in a study.

The Status Flags directly affected by Storage Commitment results and indicated in the different entities of the Patient Browser list can be one of

- "AC" or "SC" - Successful Commitment, "A" means archived to configured Archive destination, whereas "S" means sent to any other destination.

- "Af" of "Sf" - Commitment failed.

- "A?" or "S?" - Commitment request is sent, response is pending.

In case of failure the user has to repeat the transfer of images to the Archive destination. Another Storage Commitment will be performed after sending is completed successfully.

4.2.2.4.1.2 Accepted Presentation Context

The MAMMOMAT Revelation DICOM application will accept Storage Commitment Presentation Contexts as shown in the following table:

Table 6 - Presentation Context Table "Update Flag Information"

Presentation Context Table – "Update Flag Information"				
Abstract Syntax	**Transfer Syntax**		**Role**	**Ext. Neg.**
Description	**Name List**	**UID List**		
1.2.840.10008.1.20.1 Storage Commitment Push Model	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

4.2.2.4.1.3 SOP specific Conformance

If the Commitment response (N-EVENT-REPORT) received has the status of "complete - failure exists", the transaction is marked as failed, else the transaction is marked as "completed". In both cases, a message is shown to the user.

The related status flags are set for the committed images in the local database.

The MAMMOMAT Revelation DICOM application will not support the Storage Media File Set ID attributes.

4.2.3   Storage SCP AE Specification

4.2.3.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" Sections "Transfer" in chapter 1.

4.2.3.2   Association Policies

4.2.3.2.1 General
The MAMMOMAT Revelation DICOM application will accept any number of verification or storage SOP classes that are referred to above. There is no limit on the number of presentation contexts accepted except for the DICOM limit. In the event that the Siemens DICOM application runs out of resources, it will reject the association request.

If "trusted host functionality" is enabled MAMMOMAT Revelation will only accept Associations from known hosts with a known AET. Hosts and AETs have to be entered in "Local Service" by a Siemens CSE.

The default PDU size used will be 516KB.

4.2.3.2.2 Number of Associations
The Siemens MAMMOMAT Revelation DICOM application accepts one association at a time.

4.2.3.2.3 Asynchronous Nature
The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.3.2.4 Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.3.3   Association Initiation Policy

If the result from a previously accepted Storage Commitment request is evaluated, the MAMMOMAT Revelation DICOM application attempts to initiate a new association for

- DIMSE N-EVENT-REPORT for sending commitment result from a previous request.

4.2.3.3.1 Activity - Return Commitment Result
When MAMMOMAT Revelation Storage SCP AE received a Storage Commitment request it tries to send the response back on the same association. When the association is not open anymore it will initiate an association to send the Storage Commitment response (N-EVENT-REPORT) to the SCU.

4.2.3.3.1.1 Proposed Presentation Context

The MAMMOMAT Revelation DICOM application will propose Storage SCP Presentation Contexts for returning Storage Commitment results as shown in the following table:

Table 7 - Presentation Context Table "Return Commitment Result"

Presentation Context Table – "Return Commitment Result"				
Abstract Syntax	**Transfer Syntax**		**Role**	**Ext. Neg.**
Description	**Name List**	**UID List**		
Storage Commitment SOP Class as detailed in "Table 1 - Network Services" section "Workflow Management".	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

4.2.3.3.1.2 SOP Specific Conformance

Storage Media File-Set ID and UID Attributes will not be supported in the N-EVENT-REPORT primitive invoked by the Storage SCP.

4.2.3.4   Association Acceptance Policy

The MAMMOMAT Revelation DICOM application attempts to accept a new association for

- DIMSE C-ECHO for incoming Verification requests

- DIMSE C-STORE for external image senders request storage of instances

- DIMSE N-ACTION for external systems requesting Storage Commitment

- DIMSE N-EVENT-REPORT for receiving commitment result from a previous request

4.2.3.4.1 Activity – Save to local disk
4.2.3.4.1.1 Description and Sequencing of Activity

The MAMMOMAT Revelation DICOM application will accept an association and will receive SOP Instances according to the listed presentation contexts on that association and will store the images to the local hard disk if the conformance check is performed successfully.

Upon successful receiving a C-STORE-RQ, the MAMMOMAT Revelation DICOM receiver performs a plausibility test on the received image and available system resources.
If this test succeeds, it returns the Status SUCCESS, otherwise one of the following status codes is returned and the association is aborted:

Table 8 - Status codes "Save to local disk"

Code	Meaning
A700	Refused: This error status indicates a lack of Resources (e.g. not enough disk space) on the MAMMOMAT Revelation modality.
A900	Invalid Dataset: An error occurred while processing the image, which makes it impossible to proceed. The image will not be stored and the association is aborted.
0110	Processing Error: An error occurred while processing the image, which makes it impossible to proceed. Association is aborted.

Note: The image will be saved after sending the response. If during this operation an error occurs, the association will be aborted. This implies that a C-STORE-RSP with status SUCCESS does not mean that the image was successfully stored into the database.

4.2.3.4.1.2 Accepted Presentation Context

The MAMMOMAT Revelation DICOM application will accept Presentation Contexts as shown in the following table:

Table 9 - Presentation Context Table "Save to local disk"

Presentation Context Table – "Save to local disk"				
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	Name List	UID List		
Any image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Image SOP Class) ".	JPEG Lossy Extended JPEG Lossless, Process 14 (selection value 1) JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None
Any non-image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Non-image SOP Class) ".	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

4.2.3.4.1.3 SOP specific Conformance

The MAMMOMAT Revelation application conforms to the Full Storage Service Class at Level 2.

Any Explicit VR Transfer Syntax is preferred to be used by the Storage SCU when sending Composite Image Instances to the MAMMOMAT Revelation DICOM application.

If an image instance is received that is identified by a SOP Instance UID which is already used by an Instance stored in database then the actual received image will be discarded. The existing Instance is not superseded.

The order of preference in accepting Transfer Syntaxes within Presentation Contexts or Presentation Contexts with single Transfer Syntaxes is:

Table 10 - Order of Preference Transfer Syntax

Order	DICOM Transfer Syntax
1	JPEG Lossy Extended
2	JPEG Lossless Non-hierarchical
3	JPEG Lossy Baseline
4	RLE Lossless
5	Explicit VR Little Endian
6	Implicit VR Little Endian

MAMMOMAT Revelation DICOM application will decompress the image before storing it into the database, if configured and images are not received with JPEG Lossy Transfer Syntaxes.

The following sections will differentiate the attribute contents required for Image Viewing. The MAMMOMAT Revelation DICOM application supports more formats for Storage of Images than for Viewing.

4.2.3.4.1.3.1 Image Pixel Attribute Acceptance Criterion for Grayscale Images - Viewing

The MAMMOMAT Revelation Multi-Modality Viewing application accepts the MONOCHROME1 and MONOCHROME2 photometric interpretation pixel format and graphic overlay with unsigned integer and 8 or 16 bits allocated. Accepted values:

Pixel plane

- samples per pixel (attribute 0028, 0002) = 1
- photometric interpretation (attribute 0028,0004) = "MONOCHROME1"
- photometric interpretation (attribute 0028,0004) = "MONOCHROME2"
- pixel representation (attribute 0028, 0103) = 0
- bits allocated (attribute 0028, 0100) = 8, 16
- bits stored (attribute 0028,0101) = 8, 10, 12, 14, 15, 16
- high bit (attribute 0028,0102) = 7, 9, 11
- only aspect ratio 1:1 is supported

Overlay plane "embedded"

- overlay type (attribute 60xx, 0040) = "G"
- bits allocated (attribute 60xx, 0100) = 16
- bit position (attribute 60xx, 0102) = 12, 13, 14, 15 (only bits above high bit permitted)
- Graphic Overlay will be shifted to fill Overlay Planes from Bit 12 and consecutive.

Overlay plane "explicit"

- overlay type (attribute 60xx, 0040) = "G"
- bits allocated (attribute 60xx, 0100) = 1
- bit position (attribute 60xx, 0102) = 0
- overlay data (attribute 60xx, 3000) = supported

The MAMMOMAT Revelation Multi-Modality Viewing application accepts also the MONOCHROME1 and MONOCHROME2 photometric interpretation pixel format with binary 2's complement integer and 16 bits allocated. Accepted values:

Pixel plane

- samples per pixel (attribute 0028, 0002) = 1
- photometric interpretation (attribute 0028,0004) = "MONOCHROME1"
- photometric interpretation (attribute 0028,0004) = "MONOCHROME2"
- pixel representation (attribute 0028, 0103) = 1 (signed)
- bits allocated (attribute 0028, 0100) = 16
- bits stored (attribute 0028,0101) = 16
- high bit (attribute 0028,0102) = 15
- only aspect ratio 1:1 is supported

Overlay plane

- overlay type (attribute 60xx, 0040) = "G"

- bits allocated (attribute 60xx, 0100) = 1

- bit position (attribute 60xx, 0102) = 0

- overlay data (attribute 60xx, 3000) = supported

For MOD LUT, both the linear LUT (Rescale Slope/Intercept) and the MOD LUT SQ are supported and considered when pixel data is displayed. However there are two limitations. The MOD LUT SQ will be ignored in the following cases:

- 8-Bit signed pixels

- the pixel format is changed by the MOD LUT (e.g. 8bit -> 16bit)

If the MOD LUT SQ contains multiple LUTs, then only the first one is used.

For VOI LUT, both the linear LUT (Window Center/Width) and the VOI LUT SQ are supported (VOI LUT SQ with 8 or 16 bit LUT data)

But if both, a VOI LUT SQ and a linear MOD LUT, are specified within one image, then the value for Rescale Slope is restricted to 1.

If the VOI LUT SQ contains multiple LUTs, then only the first one is used by default. The other VOI LUTs are selectable.

Only Rectangular and Circular Shutter Shape is supported in this version. Images containing other Shutter Shapes will be displayed w/o shutter.

4.2.3.4.1.3.2   *Image Pixel Attribute Acceptance Criterion for Color Images - Viewing*

The MAMMOMAT Revelation Multi-Modality Viewing application supports the RGB color image description with the unsigned integer 24-bit color image plane pixel format. Accepted values:

- samples per pixel (attribute 0028, 0002) = 3

- photometric interpretation (attribute 0028,0004) = "RGB"

- pixel representation (attribute 0028, 0103) = 0

- bits allocated (attribute 0028, 0100) = 8

- bits stored (attribute 0028,0101) = 8

- high bit (attribute 0028,0102) = 7

- planar configuration (attribute 0028,0006) = 0 (pixel interleave) or 1 (plane interleave).

The MAMMOMAT Revelation Multi-modality Viewing application supports the "Palette Color" color image description with the unsigned integer and 2's complement pixel format. Accepted values:

- samples per pixel (attribute 0028, 0002) = 1

- photometric interpretation (attribute 0028,0004) = "PALETTE COLOR"

- pixel representation (attribute 0028, 0103) = 0

- bits allocated (attribute 0028, 0100) = 8 and bits stored (attribute 0028,0101) = 8

- bits allocated (attribute 0028, 0100) = 16 and bits stored (attribute 0028,0101) = 16

- high bit (attribute 0028,0102) = 7, 15

Both 8-bit and 16-bit palettes are supported, but NO Segmented Palette Color LUTs.

The MAMMOMAT Revelation Multi-modality Viewing application supports the YBR color image description with the unsigned integer pixel format. Accepted values:

- samples per pixel (attribute 0028, 0002) = 3

- photometric interpretation (attribute 0028,0004) = "YBR_FULL" or "YBR_FULL_422"

- pixel representation (attribute 0028, 0103) = 0

- bits allocated (attribute 0028, 0100) = 8 and bits stored (attribute 0028,0101) = 8

- high bit (attribute 0028,0102) = 7

If MAMMOMAT Revelation software is making any persistent changes on an YBR image, the resulting new image will be saved with Photometric Interpretation = "RGB".

4.2.3.4.2 Activity – Evaluate Commit Request
4.2.3.4.2.1 Description and Sequencing of Activity

When receiving a Storage Commitment request the MAMMOMAT Revelation DICOM application will perform the necessary steps to check the received list Instances against the local database.

4.2.3.4.2.2 Accepted Presentation Context
The MAMMOMAT Revelation DICOM application will accept Storage Commitment Presentation Contexts as shown in the following table:

Table 11 - Presentation Context Table "Evaluate Commit Request"

Presentation Context Table – "Evaluate Commit Request"				
Abstract Syntax	**Transfer Syntax**		**Role**	**Ext. Neg.**
Description	**Name List**	**UID List**		
Storage Commitment SOP Class detailed in "Table 1 - Network Services" section "Workflow Management".	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCP	None

4.2.3.4.2.3 SOP specific Conformance
The MAMMOMAT Revelation Storage SCP AE will return success for images that are stored in the local database and failure for images that are not. However, the committed images can later be deleted by the user at the MAMMOMAT Revelation without notice!

Note: Storage Media File-Set ID and UID Attributes will not be supported in the N-EVENT-REPORT primitive invoked by the Storage Commitment SCP.

4.2.4   Query/Retrieve SCU Specification

4.2.4.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section „Query/Retrieve" in the "Conformance Statement Overview".

4.2.4.2   Association Policies

4.2.4.2.1   General
With the "Search..." function the query data can be entered and the DICOM Query/Retrieve application is initiated. An initial query request will be sent out to one remote node that can be selected from a list of configured Query Providers. Depending on the replies to the initial request, sub-sequent query requests are issued to gather further data for lower information level entities. The results compiled from the response data will be displayed to the user. Upon request (Import), the retrieval of selected items is initiated.

The default PDU size used will be 516KB.

4.2.4.2.2   Number of Associations
The MAMMOMAT Revelation DICOM application initiates several associations at a time.

For Query it initiates a new association to the remote node and issues the C-FIND request to retrieve all the requested patient and study information matching the search criteria. The MAMMOMAT Revelation initiates in parallel a second association to the destination node to query for all the series information for each study's information returned on the first association.

For the Retrieve request (C-MOVE) only one association is initiated per destination.

4.2.4.2.3   Asynchronous Nature
The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.4.2.4   Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.4.3   Association Initiation Policy

The MAMMOMAT Revelation DICOM application will request associations for the following DIMSE-C operations as SCU:

Table 12 - Supported DIMSE-C Operations - Query/Retrieve SCU

Supported DIMSE operations	Cancel Request supported
C-FIND	yes
C-MOVE	n. a.

Extended negotiation (relational query) is not supported for the above listed services.

4.2.4.3.1   Activity – Search for images (Search…)
4.2.4.3.1.1 Description and Sequencing of Activity
The associated activity is to fill out a query form with search data and pass it as query to the network application which issues a C-FIND over a previously built association. The remote SCP will respond with related data-entries that will be passed to a browser application. If needed,

further associations are opened for querying data from sub-sequent entities. When data transfer is finished, each association is closed.

If the C-FIND Response from the remote application contains an error status, the association is aborted.

4.2.4.3.1.2 Proposed Presentation Contexts

The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in the following table:

Table 13 - Presentation Context Table "Search..."

Presentation Context Table - "Search…"					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Patient/Study Only Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Within the DICOM network configuration it is configurable which of the query models are to be used by the MAMMOMAT Revelation DICOM Query SCU application for each node.

4.2.4.3.1.3 SOP Specific Conformance

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

Table 14 - C-FIND RQ Search Keys

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Patient Level[c]					
Patient Name	(0010,0010)	R	Wildcard[d]	Enter value	yes
Patient ID	(0010,0020)	U / R	Wildcard[d]	Enter value	yes
Patient's Birth Date	(0010,0030)	O	Single value	Enter value	yes
Patient's Sex	(0010,0040)	O	Single value	Enter	yes

---

[c] Patient Root Information Model only
[d] Always a "*" is appended to the user-supplied string

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
				value	
Number of Patient related Studies	(0020,1200)	O	Universal(Null)	--	yes[e]
Number of Patient related Series	(0020,1202)	O	Universal(Null)	--	no
Number of Patient related Instances	(0020,1204)	O	Universal(Null)	--	no
Study Level					
Patient Name[f]	(0010,0010)	R	Wildcard[d]	Enter value	yes
Patient ID	(0010,0020)	U / R	Wildcard[d]	Enter value	yes
Patient's Birth Date[f]	(0010,0030)	O	Single value	Enter value	yes
Patient's Sex[f]	(0010,0040)	O	Single value	Enter value	yes
Study Instance UID	(0020,000D)	U	Single value	Enter value	yes
Study ID	(0020,0010)	R	Wildcard[d]	Enter value	yes
Study Date	(0008,0020)	R	Range	Enter value	yes
Study Time	(0008,0030)	R	Range	Enter value	yes
Accession Number	(0008,0050)	R	Wildcard	Enter value	yes
Study Description	(0008,1030)	O	Wildcard[d]	Enter value	yes
Referring Physician's Name	(0008,0090)	O	Wildcard[d]	Enter value	yes
Name of Physician Reading Study	(0008,1060)	O	Wildcard[d]	Enter value	yes
Modalities in Study	(0008,0061)	O	Single Value	Enter value	yes
Number of Patient related Studies	(0020,1200)	O	Universal(Null)	--	no
Number of Patient related Series	(0020,1202)	O	Universal(Null)	--	no
Number of Patient related Instances	(0020,1204)	O	Universal(Null)	--	no
Number of Study related Series	(0020,1206)	O	Universal(Null)	--	yes[g]
Number of Study related Instances	(0020,1208)	O	Universal(Null)	--	no
Series Level					
Series Instance UID	(0020,000E)	U	Single Value	Enter value	yes
Series Number	(0020,0011)	R	Single Value	Enter value	yes
Modality	(0008,0060)	R	Single Value	Enter value	yes

[e] Implicitly visualized in the UI if no study and series search attributes have been entered
[f] Study Root Information Model only
[g] Implicitly if no series search attributes have been entered

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
Series Date	(0008,0021)	O	Universal(Null)	--	yes
Series Time	(0008,0031)	O	Universal(Null)	--	yes
Series Description	(0008,103E)	O	Wildcard[d]	Enter value	yes
Body Part Examined	(0018,0015)	O	Single Value	Enter value	yes
Performing Physician's Name	(0008,1050)	O	Wildcard[d]	Enter value	yes
Request Attributes Sequence	(0040,0275)	O	--	--	yes
>Requested Procedure ID	(0040,1001)	O	Wildcard[d]	Enter value	yes
>Scheduled Procedure Step ID	(0040,0009)	O	Wildcard[d]	Enter value	yes
Performed Procedure Step Start Date	(0040,0244)	O	Range	Enter value	yes
Performed Procedure Step Start Time	(0040,0245)	O	Range	Enter value	yes
Number of Series related Instances	(0020,1209)	O	Universal(Null)	--	yes
Instance Availability	(0008,0056)	O	Universal(Null)		
Image Level					
SOP Instance UID	(0008,0018)	U	Single Value	--	no
Instance Number	(0020,0013)	R	Universal(Null)	--	yes
SOP Class UID	(0008,0016)	O	Universal(Null)	--	no
Image Comments	(0020,4000)	O	Universal(Null)	--	yes
Number of Frames	(0028,0008)	O	Universal(Null)	--	yes
Content Date	(0008,0023)	O	Universal(Null)	--	yes
Content Time	(0008,0033)	O	Universal(Null)	--	yes

U = Unique Key, **R** = Required Key, **O** = Optional Key, **-** = not supported or applicable

The MAMMOMAT Revelation Search application supports a

- DIMSE C-FIND-CANCEL

If the user wishes to cancel a running Query request via the MAMMOMAT Revelation user interface ("Cancel" button while a "Search…" is active).

The Find SCU interprets following status codes:

Table 15 - Status Codes "Search..."

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Identifier

4.2.4.3.2 Activity – Retrieve Images (Import…)
4.2.4.3.2.1 Description and Sequencing of Activity

When selecting a data entry in the Query UI and activating the "Import" function, a retrieval request is passed to the MAMMOMAT Revelation DICOM application which issues a C-MOVE service according to the Patient Root or Study Root query model.
(The Storage Service Class Conformance Statement describes the C-STORE service, which is generated by processing the C-MOVE service.)

The received image data is processed as described in the Storage class SCP descriptions.

The MAMMOMAT Revelation DICOM application will always insert the own Storage SCP AE as "Move Destination".

4.2.4.3.2.2 Proposed Presentation Contexts

The MAMMOMAT Revelation Server DICOM application will propose Presentation Contexts as shown in the following table:

Table 16 - Presentation Context Table "Import..."

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Query/Retrieve Model Patient Root – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Query/Retrieve Model Study Root – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None
Query/Retrieve Model Patient/Study Only – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

Note: C-MOVE Extended Negotiation will not be supported by the SCU.

4.2.4.3.2.3 SOP Specific Conformance
All required keys will be provided in the retrieve request identifier, as defined in DICOM Standard.The Move SCU interprets following status codes:

Table 17 - C-MOVE RSP Status Codes

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)
	Out of Resources - Unable to perform sub operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
	Move destination unknown	A801	(0000,0902)

Service Status	Meaning	Error Codes	Related Fields
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete - One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete - No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

4.2.5   Query/Retrieve SCP Specification

4.2.5.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section „Query/Retrieve" in the "Conformance Statement Overview".

4.2.5.2   Association Policies

4.2.5.2.1   General

When "trusted host" functionality is enabled MAMMOMAT Revelation will only accept Associations from known hosts with a known AET. Hosts and AETs have to be entered in "Local Service" by a Siemens CSE.

The default PDU size used will be 516KB.

4.2.5.2.2   Number of Associations

The Siemens MAMMOMAT Revelation DICOM application is able to accept multiple associations at a time. It can handle up to 10 associations in parallel.

The number of simultaneous DICOM associations can be configured via the Service-UI. The dialog can be found in "Configuration / DICOM / General".

4.2.5.2.3   Asynchronous Nature

The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.5.2.4   Implementation Identifying Information

For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information".

4.2.5.3   Association Initiation Policy

See previous section "Query/Retrieve SCU AE Specification".

4.2.5.4   Association Acceptance Policy

The MAMMOMAT Revelation DICOM application will accept associations for the following DIMSE-C operations as SCP:

- C-FIND
- C-GET
- C-MOVE
- C-FIND-CANCEL
- C-GET-CANCEL
- C-MOVE-CANCEL

Extended negotiation - which is relational query or retrieve - is not supported for the above listed services. The MAMMOMAT Revelation DICOM application does support multiple C-FIND rquests over the same association, while multiple C-MOVE or C-GET operations are not supported over the same association.

4.2.5.4.1 Activity - Process Search Requests

4.2.5.4.1.1 Description and Sequencing of Activity

The Query SCP AE will respond to incoming query requests from a SCU with the query model Patient Root, Study Root and Patient/Study Only. Relational retrieve operation is not supported. The content records of the local database are used to match the incoming query keys and fill the related return keys. With a C-FIND-CANCEL request the running query can be canceled at any time.

Multiple C-FIND requests over the same association are supported.

4.2.5.4.1.2 Accepted Presentation Contexts

The MAMMOMAT Revelation DICOM application will accept Presentation Contexts as shown in the following table:

Table 18 - Presentation Context Table "Process Search Requests"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Que-ry/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

Note: C-FIND Extended Negotiation will not be supported.

The order of preference for accepting Transfer Syntaxes is: 1. Explicit VR Little Endian, 2. Explicit VR Big Endian, 3. Implicit VR Little Endian.

4.2.5.4.1.3 SOP Specific Conformance

The MAMMOMAT Revelation DICOM Query/Retrieve SCP supports hierarchical queries for all mandatory and optional search keys.

The syntactical component structure of the attribute (0010,0010) Patients Name is defined as follows (see [DICOM], Part 5, Definition of PN, Person Name):

<single byte group> =<ideographic group>=<phonetic group>

The Query/Retrieve SCP replies to queries for "Patient Name" as follows:

1. Matching of Patients Name attribute (0010, 0010) is done case-insensitive.

2. If a search string matches the complete value of a Patient's Name in the database, a match will be returned.

3. If a search string matches an individual group (single byte, ideographic or phonetic) of a Patient's Name in the database, a match will be returned.

4. If a search string matches two consecutive groups of a data base object's Patients Name, a match will be returned.

5. Redundant group separators "=" or component separators "^" are treated as insignificant for matching.

6. Leading and trailing blanks within a component or a group of Patient's Name are treated as insignificant for matching.

Except for attribute Patient's Name (0010,0010) any queries for text string attributes will be treated case-sensitive.

The Find SCP will not differentiate "?" and "*", thus "?abc*" will be treated as "*abc*".

If the value for the patient-level unique key "Patient ID" is not known, it will be returned with zero length. The attribute "Image Comments" will not be included in the C-FIND-RSP, if it is not set in the DB, even if it was requested as return key in the related C-FIND-RQ.

Usage of Storage Media File-Set ID, Retrieve AE Title with C-FIND-RSP message:

- The Storage Media File-Set ID - if available - can be returned at Study/Series/Image Level. Only on Image Level, the values of ONLINE, NEARLINE or OFFLINE are returned to indicate the Storage Location of the related Instance.

- The Retrieve AE Title - if available - can only be returned at Image Level (for Patient Root and Study Root models) or Study Level (for Patient/Study Only model).

Relational Queries are not supported.

A remote DICOM AE can cancel the running query by sending a C-FIND-CANCEL. Matches are possibly continuing (more C-FIND response with status PENDING) until the cancel operation takes effect and query matching has completed.

The supported attributes on the various query levels of the three supported information models are listed in the following table.

Table 19 - Query/Retrieve SCP supported attributes

Attribute Name	Tag	PR	SR	PSo	Matching
Patient Level (PR or PSo) or Study Level (SR)					
Patient Name	(0010,0010)	R	R	R	Single value, Wildcard, universal
Patient ID	(0010,0020)	U	R	U	Single Value, Wildcard, universal
Patient's Birth Date	(0010,0030)	O	O	O	Single Value, Range, universal
Patient's Birth Time	(0010,0032)	O	O	O	Single Value, Range, universal
Patient's Sex	(0010,0040)	O	O	O	Single Value, Wildcard, universal
Ethnic Group	(0010,2160)	O	-	O	Single Value, Wildcard, universal
Patient Comments	(0010,4000)	O	O	O	Wildcard, universal
Number of Patient related Studies	(0020,1200)	O	O	O	universal
Number of Patient related Series	(0020,1202)	O	O	O	universal

Attribute Name	Tag	PR	SR	PSo	Matching
Number of Patient related Instances	(0020,1204)	O	O	O	universal
Study Level					
Study Instance UID	(0020,000D)	U	U	U	Single Value, List of UIDs
Study ID	(0020,0010)	R	R	R	Single Value, Wildcard, universal
Study Date	(0008,0020)	R	R	R	Single Value, Range, universal
Study Time	(0008,0030)	R	R	R	Single Value, Range, universal
Accession Number	(0008,0050)	R	R	R	Single Value, Wildcard, universal
Referring Physician's Name	(0008,0090)	O	O	O	Single Value, Wildcard, universal
Study Description	(0008,1030)	O	O	O	Single Value, Wildcard, universal
Admitting Diagnosis Description	(0008,1080)	O	O	O	Single Value, Wildcard, universal
Patient's Age	(0010,1010)	O	O	O	Single Value, Wildcard, universal
Patient's Size	(0010,1020)	O	O	O	Single Value, universal
Patient's Weight	(0010,1030)	O	O	O	Single Value, universal
Occupation	(0010,2180)	O	O	O	Single Value, Wildcard, universal
Additional Patient History	(0010,21B0)	O	O	O	Wildcard, universal
Name of Physician reading the Study	(0008,1060)	O	O	O	Single Value, Wildcard, universal
Modalities in Study	(0008,0061)	O	O	O	Multiple values, universal
Number of Study Related Series	(0020,1206)	O	O	O	universal
Number of Study Related Instances	(0020,1208)	O	O	O	universal
Series Level					
Series Instance UID	(0020,000E)	U	U	-	Single Value, List of UIDs
Series Number	(0020,0011)	R	R	-	Single Value, universal
Modality	(0008,0060)	R	R	-	Single Value, Wildcard, universal
Laterality	(0020,0060)	O	O	-	Single Value, Wildcard, universal
Body Part Examined	(0018,0015)	O	O	-	Single Value, Wildcard, universal
Patient Position	(0018,5100)	O	O	-	Single Value, Wildcard, universal
Smallest Pixel Value in Series	(0028,0108)	O	O	-	Single Value, universal
Largest Pixel Value in Series	(0028,0109)	O	O	-	Single Value, universal
Protocol Name	(0018,1030)	O	O	-	Single Value, Wildcard, universal
Series Date	(0008,0021)	O	O	-	Single Value, Range, universal
Series Time	(0008,0031)	O	O	-	Single Value, Range, universal
Series Description	(0008,103E)	O	O	-	Single Value, Wildcard, universal
Operator's Name	(0008,1070)	O	O	-	Single Value, Wildcard, universal

Attribute Name	Tag	PR	SR	PSo	Matching
Performing Physician's name	(0008,1050)	O	O	-	Single Value, Wildcard, universal
Performed Procedure Step Start Date	(0040,0244)	O	O	-	universal
Performed Procedure Step Start Time	(0040,0245)	O	O	-	universal
Number of Series related Instances	(0020,1209)	O	O	-	universal
Image or SR Document Level					
SOP Instance UID	(0008,0018)	U	U	-	Single Value, List of UIDs
Image Number	(0020,0013)	R	R	-	Single Value, universal
Content Date	(0008,0023)	O	O	-	Single Value, Range, universal
Content Time	(0008,0033)	O	O	-	Single Value, Range, universal
Modality	(0008,0060)	O	O	-	Single Value, Wildcard, universal
Image Comments	(0020,4000)	O	O	-	universal
Referenced Request Sequence	(0040,A370)	O	O	-	Sequence matching
>Accession Number	((0008,0050)	O	O	-	Single value, universal
>Requested Procedure ID	(0040,1000)	O	O	-	Single value, universal
Concept Name Code Sequence	(0040,A043)	O	O	-	Sequence matching
>Code Value	(0008,0100)	O	O	-	Single Value, Wildcard, universal
>Coding Scheme Designator	(0008,0102)	O	O	-	Single Value, Wildcard, universal
>Coding Scheme Version	(0008,0103)	O	O	-	Single Value, Wildcard, universal
>Code Meaning	(0008,0104)	O	O	-	Single Value, Wildcard, universal
Template Identifier	(0040,DB00)	O	O	-	Single Value, Wildcard, universal
Completion Flag	(0040,A491)	O	O	-	Single Value, Wildcard, universal
Verification Flag	(0040,A493)	O	O	-	Single Value, Wildcard, universal
Verifying Observer Sequence	(0040,A073)	O	O	-	Sequence matching
>Verifying Organization	(0040,A027)	O	O	-	Single Value, Wildcard, universal
>Verifying Date Time	(0040,A030)	O	O	-	Single Value, Range, universal
>Verifying Observer Name	(0040,A075)	O	O	-	Single Value, Wildcard, universal
>Verifying Observer Identification Code Sequence	(0040,A088)	O	O	-	Sequence matching
>>Code Value	(0008,0100)	O	O	-	Single Value, Wildcard, universal
>>Coding Scheme Designator	(0008,0102)	O	O	-	Single Value, Wildcard, universal
>>Coding Scheme Version	(0008,0103)	O	O	-	Single Value, Wildcard, universal
>>Code Meaning	(0008,0104)	O	O	-	Single Value, Wildcard, universal

PR = Patient Root Model, **SR** = Study Root Model, **PSo** = Patient/Study Only Model
U = Unique Key, **R** = Required Key, **O** = Optional Key, **-** = not supported or applicable

The "Process Search Requests" activity can return the following status codes:

Table 20 - Status Codes Process Search Request

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	C001	(0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Identifier

4.2.5.4.2 Activity - Process Retrieve Requests

4.2.5.4.2.1 Description and Sequencing of Activity

The associated activity is to respond to retrieve requests initiated from a foreign SCU. Relational retrieve operation is not supported.

Multiple C-GET or C-MOVE requests over the same association are not supported.

4.2.5.4.2.1 Accepted Presentation Contexts

The MAMMOMAT Revelation DICOM application will accept Presentation Contexts as shown in the following table:

Table 21 - Presentation Context Table "Process Retrieve Requests"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Model - GET	1.2.840.10008.5.1.4.1.2.1.3	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Model - GET	1.2.840.10008.5.1.4.1.2.2.3	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Query/Retrieve Model - GET	1.2.840.10008.5.1.4.1.2.3.3	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

Note: C-FIND Extended Negotiation will not be supported.

The order of preference for accepting Transfer Syntaxes is: 1. Explicit VR Little Endian, 2. Explicit VR Big Endian, 3. Implicit VR Little Endian.

4.2.5.4.2.2 SOP Specific Conformance
Relational retrieve operation is not supported.

All unique keys have to be supplied according to the selected Query/Retrieve Level. The related tables in the C-FIND SCP section will give information about "U" marked key attributes.

The C-STORE can only be performed to AEs that are configured in the system.

The "Process Retrieve Requests" activity can return the following status codes:

Table 22 - Status Codes "Process Retrieve Requests"

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)
	Out of Resources - Unable to perform sub operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	C001	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete - One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete - No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

4.2.6   Print SCU Specification

4.2.6.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section
"Print Management" in the "Conformance Statement Overview".

4.2.6.2   Association Policies

4.2.6.2.1 General
Whenever a film-sheet is completely set up and printed by command or automated rule, the job is
prepared for processing. As soon as the queue is ready to process the job, it is activated and
worked according to the processing data. The Print application will initiate an association to the
print destination and process the printing.

The default PDU size used will be 516KB.

4.2.6.2.2 Number of Associations
The MAMMOMAT Revelation DICOM application initiates one association at a time for each
different print device configured.

4.2.6.2.3 Asynchronous Nature
The MAMMOMAT Revelation DICOM print application does not support asynchronous
communication (multiple outstanding transactions over a single association).

4.2.6.2.4 Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying
Information" in the "Conformance Statement Overview".

4.2.6.3   Association Initiation Policy

Triggered by the Print job queue the Print Management SCU establishes an association by using
the DICOM association services. An N-GET request determines the printer status prior to printing.
If the printer status is "normal", the print job is started.

After the last film is printed from queue, the Print application will leave open the association for
another 60 seconds. If a new film job is ready for printing within this time-limit, the job will be
immediately processed over the still open association. If there is no new job, the association is
closed.

During the "idle-time" (no open association to printer) the Print application will issue a cyclic
camera status request (using N-GET of the Printer SOP Class) every 5 minutes.

4.2.6.3.1 Activity - Print Film
4.2.6.3.1.1 Description and Sequencing of Activity
The film sheet is internally processed, converted to a Standard/1-1 page and then the page
image is sent. Status is controlled by awaiting any N-EVENT message through the transfer until
the last image or film-sheet is sent.

If the response from the remote application contains a status other than Success or Warning the
association is aborted.

4.2.6.3.1.2 Proposed Presentation Context
The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in
the following table:

Table 23 - Presentation Context Table "Print Film"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Basic Grayscale Print Manage-ment Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Film Ses-sion SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

4.2.6.3.1.3 SOP Specific Conformance

The MAMMOMAT Revelation DICOM print management SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class.

The application uses a setting platform to define the properties of the connected DICOM SCP, e.g.:

- maximum number of print jobs in the queue

- maximum number of print copies

- supported film sizes of the connected DICOM SCP

- supported film formats of the DICOM SCP

- lookup table definition.

The printing is only suspended in the case of a failure return status of the SCP.

4.2.6.3.1.4 Basic Film Session SOP Class

The Basic Film Session information object definition describes all the user-defined parameters, which are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes that are printed on one hardcopy printer.

The MAMMOMAT Revelation DICOM print management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE

- N-DELETE

The Basic Film Session SOP Class N-CREATE-RQ (SCU) uses the following attributes:

Table 24 - Basic Film Session N-CREATE attributes

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	"1"
Medium Type	(2000,0030)	U	BLUE FILM CLEAR FILM PAPER
Film Destination	(2000,0040)	U	MAGAZINE PROCESSOR

U = User Option

The number of copies sent to the DICOM Printer is always 1, the job is sent n times for n copies.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Session – see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) →(0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Session

The N-DELETE-RQ on the Basic Film Session SOP Class is used to remove the complete Basic Film Session SOP Instance hierarchy.

The Basic Film Session SOP Class interprets the following status codes (from N-CREATE-RSP, N-DELETE-RSP messages):

Table 25 - Basic Film Session Status Codes

Service Status	Meaning	Error Codes
Failure	Film session SOP instances hierarchy does not contain film box SOP instances	C600
	Unable to create print job, print queue is full	C601
	Image size is larger than images box size	C603
Warning	Memory allocation not supported	B600
	Film session printing is not supported	B601
	Film box does not contain image box (empty page)	B602
Success	Film belonging to the film session are accepted for printing	0000

4.2.6.3.1.5 Basic Film Box SOP Class

The Basic Film Box information object definition describes all the user-defined parameter of one film of the film session. The Basic Film Box information description defines the presentation parameters, which are common for all images on a given sheet of film.

The Basic Film Box refers to one or more Image Boxes.

Supported Service Elements as SCU are:

- N-CREATE

- N-ACTION

- N-DELETE

The Basic Film Box SOP Class N-CREATE-RQ message uses the following attributes (the actual values for each attribute depend on DICOM printer configuration within the MAMMOMAT Revelation DICOM print management SCU):

Table 26 - Basic Film Box N-CREATE attributes

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	STANDARD\1,1
Referenced Film Session Sequence	(2010,0500)	M	n. a.
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT
Film Size ID	(2010,0050)	M	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN,, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR, CUBIC, NONE, REPLICATE
Max Density	(2010,0130)	U	> 0
Min Density	(2010,0120)	U	50 > value > 0
Illumination	(2010,015E)	U	> 0 Required if Presentation LUT is present.
Reflective Ambient Light	(2010,0160)	U	> 0 Required if Presentation LUT is present.
Referenced Presentation LUT Sequence	(2050,0500)	U	

M = Mandatory, **U** = User Option

The N-CREATE-RSP message from the Print SCP includes the Referenced Image Box Sequence with SOP Class/Instance UID pairs which will be kept internally and used for the subsequent Basic Image Box SOP Class N-SET-RQ messages.

When all Image Boxes (including parameters) for the film-sheet have been set, the DICOM print manager will issue an N-ACTION-RQ message with the SOP Instance UID of the Basic Film Box and the Action Type ID of 1.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Box - see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) →(0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Box

The Basic Film Box SOP Class interprets the following status codes:

Table 27 - Basic Film Box Status Codes

Service Status	Meaning	Error Codes
Failure	Unable to create print job, print queue is full	C601
	Image size is larger than images box size	C603
Warning	Film box does not contain image box (empty page)	B603
	Requested MinDensity or MaxDensity outside of Printer's operating range	B605
Success	Film accepted for printing	0000

4.2.6.3.1.6 Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Grayscale Image Box information

describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Grayscale Image Box SOP Class uses only the N-SET-RQ with the following attributes:

Table 28 - Basic Grayscale Image Box N-SET attributes

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Grayscale Image Sequence	(2020,0110)	M	n.a.
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME2
> Rows	(0028,0010)	M	\<Printer/Film config\>
> Columns	(0028,0011)	M	\<Printer/Film config\>
> Pixel Aspect Ratio	(0028,0034)	M	(1:1)
> Bits Allocated	(0028,0100)	M	8, 16
> Bits Stored	(0028,0101)	M	8, 12
> High Bit	(0028,0102)	M	7, 11
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

M = Mandatory

The Grayscale Image Box SOP Class interprets the following status codes:

Table 29 - Basic Grayscale Image Box Status Codes

Service Status	Meaning	Error Codes
Failure	Image contains more pixel than printer can print in Image Box	C603
	Insufficient memory in printer to store the image	C605
Warning	Requested MinDensity or MaxDensity outside of Printer's operating range	B605
Success		0000

4.2.6.3.1.7 Presentation LUT SOP Class

The Presentation LUT tailors image hardcopy printing for specific modalities, applications and user preferences.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for hardcopy. P-Values are intended to be independent of the specific class or characteristics of the hardcopy device.
The Presentation LUT SOP Class uses only the N-CREATE-RQ with the following attributes:

Table 30 - Presentation LUT N-CREATE attribute

Attribute Name	Tag	Usage SCU	Supported Values
Presentation LUT Shape	(2050,0020)	U	IDENTITY

U = User Option

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and is used for later requests on the Basic Film Box (N-CREATE-RQ) and on the Presentation LUT (N-DELETE-RQ) - see below:

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) →(0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Presentation LUT

The Presentation LUT SOP Class interprets the following status codes:

Table 31 - Presentation LUT Status Codes

Service Status	Meaning	Codes
Success	Presentation LUT successfully created	0000
Warning	Requested MinDensity or MaxDensity outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605

4.2.6.3.1.8 Printer SOP Class

The Printer SOP Class allows monitoring the status of the hardcopy printer in a synchronous and an asynchronous way.

The SCU uses the mandatory N-EVENT Report DIMSE service to monitor the changes of the printer status in an asynchronous way.

The following returned information is supported:

Table 32 - Used Printer N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1			
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

U = User Option

Table 33 - Mandatory Printer N-GET-RSP, N-EVENT-REPORT-RQ attributes

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See tables in Annex for details.

M = Mandatory

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4.2.6.3.1.9 Printer Job SOP Class

The Print Job SOP Class allows monitoring the execution of the print process.

The MAMMOMAT Revelation DICOM Print Management application supports the optional N-EVENT-REPORT DIMSE Service to receive the changes of the Print Job Status in an asynchronous way.

It can receive Events from the Print SCP asynchronously:

- N-EVENT-REPORT

Note: The underlying *syngo* DICOM Print AE does not support receiving of N-EVENT-REPORT messages from camera during open print sessions. This is typically configurable in the camera setup.

The following information is supported:

Table 34 - Used Print Job N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1	Execution Status Info	(2100,0030)	U

Event-type Name	Event	Attributes	Tag	Usage SCU
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Printing	2	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Done	3	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Failure	4	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U

U = User Option

4.2.6.3.2 Activity - Show Device Status
4.2.6.3.2.1 Description and Sequencing of Activity

With no printing activity ongoing ("idle time"), the MAMMOMAT Revelation DICOM Print SCU application will cyclically request the printer status to update the related printer state in the Printing UI.

4.2.6.3.2.2 Proposed Presentation Context

The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in the following table:

Table 35 - Presentation Context Table "Show Device Status"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

4.2.6.3.2.3 SOP Specific Conformance

The Printer SOP Class allows monitoring the status of the hardcopy printer in a synchronous and an asynchronous way.

The Print SCU AE application will cyclically "ask" the Printer (SCP) for its status synchronously:

- N-GET as SCU

The following information is supported:

Table 36 - Used Printer N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1			
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

U = User Option

Table 37 - Mandatory Printer N-GET-RSP, N-EVENT-REPORT-RQ attributes

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See tables in Annex for details.

M = Mandatory

4.2.6.4   Association Acceptance Policy

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4.2.7   Worklist SCU AE

4.2.7.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section „Workflow Management" in the "Conformance Statement Overview".

4.2.7.2   Association Policies

4.2.7.2.1   General
It is possible to configure a cyclic update of the modality worklist through a background worklist request with date/time and modality information.

In addition, the user can request worklist update with "Update Worklist". No duplicate entries will be added in the Worklist. Entries are uniquely identified by the Study Instance UID (0020,000D) for the Requested Procedure.
An interactive worklist query can be issued with search criteria entered in the patient based Query dialog from the patient browser.

The default PDU size used will be 516KB.

4.2.7.2.2   Number of Associations
The MAMMOMAT Revelation DICOM application initiates one association at a time to query worklist entry data.

4.2.7.2.3   Asynchronous Nature
The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.7.2.4   Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.7.3   Association Initiation Policy

The MAMMOMAT Revelation DICOM application will cyclically query the worklist provider and by request from the patient registration interface. It establishes an association by using the

- C-FIND with Worklist information model

It is possible to configure multiple worklist providers but only one can be active at a time. The active worklist provider can be selected in the service.

4.2.7.3.1   Activity - (cyclic) Update Worklist
4.2.7.3.1.1 Description and Sequencing of Activity
A network application will perform worklist queries with the C-FIND request at regular intervals. In addition it can be triggered by immediate request. All worklist data from previous queries will be deleted when new data is received.

No automatic clean-up of the Worklist is performed after a Patient-based Query since the worklist received - due to restricted search criteria - does not correspond to the list of all currently scheduled procedures for the modality.

4.2.7.3.1.2 Proposed Presentation Context

The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in the following table:

Table 38 - Presentation Context "Update Worklist"

Presentation Context Table – "Update Flag Information"					
Abstract Syntax	Transfer Syntax		Role	Ext. Neg.	
Description	Name List	UID List			
1.2.840.10008.5.1.4.31 Modality Worklist Information Model - FIND	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None	

4.2.7.3.1.3 SOP Specific Conformance

The MAMMOMAT Revelation DICOM worklist SCU supports "broad worklist queries" with all required search keys.
The following table describes the "broad query" search keys that the SCU supports.

Table 39 - Supported Broad Worklist Query Search Key Attributes

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Scheduled Station AE Title *(It depends on user configuration (Options->Configuration-> Patient Registration) if the "own AET" is provided or not. Use the "HIS/RIS" tab card for configuration.)*	(0040,0001)	R	<own AET> or <zero length>
>Schedule Procedure Step Start Date *(It depends on user configuration (Options->Configuration-> Patient Registration) if the actual Date with a full time range or an interactive input dialog for date/time specification is used.)*	(0040,0002)	R	<act. Date>-<act. Date> or range from UI
>Schedule Procedure Step Start Time *(It depends on user configuration (Options->Configuration-> Patient Registration) if the actual Date with a full time range or an interactive input dialog for date/time specification is used.)*	(0040,0003)	R	00.00-235959.00 or range from UI
>Modality *(It depends on user configuration (Options->Configuration-> Patient Registration) if the "own Modality" is provided or not. Use the "HIS/RIS" tab card for configuration.)*	(0008,0060)	R	<zero length> or <own Modality>

R = Required

- Return Key Attributes of the Worklist C-FIND

The MAMMOMAT Revelation DICOM Worklist SCU supports worklist queries with return key attributes of all types. The following table describes the return keys that the SCU supports.

The return key type describes the expected behavior of the worklist SCP to return a value.

An "x" in the **UI** column will indicate the attribute is displayed in the user interface. The display is influenced by the related configuration.

A tag in the **IOD** column will indicate that the related attribute is included into the SOP Instances of the IODs created during processing of this worklist request.

A tag in the **MPPS** column will indicate that the related attribute is included into the SOP Instances of the MPPS objects created during processing of this worklist request. (See also the tables "Attributes used for the Performed Procedure Step N-CREATE" and "Attributes used for the Performed Procedure Step N-SET".)

Table 40 - Basic Worklist C-FIND-RSP Return Key Attributes

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
SOP Common					
Specific Character Set	(0008,0005)	1C	-	(0008,0005)	(0008,0005)
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)	1			
>Modality	(0008,0060)	1	x	(0008,0060)	(0008,0060)
>Requested Contrast Agent	(0032,1070)	2C	x		
>Scheduled Station AE Title ("Scheduled Station AE Title" is taken as default for "Performed Station AE Title")	(0040,0001)	1	x		(0040,0241)
>Scheduled Procedure Step Start Date	(0040,0002)	1	x		
>Scheduled Procedure Step Start Time	(0040,0003)	1	x		
>Scheduled Procedure Step End Date	(0040,0004)	3	-		
>Scheduled Procedure Step End Time	(0040,0005)	3	-		
>Scheduled Performing Physician's Name ("Scheduled Performing Physician's Name" is taken as default for "Performing Physician's Name")	(0040,0006)	1	x	(0008,1050)	(0008,1050)
>Scheduled Procedure Step Description ("Scheduled Procedure Step Description" is taken as default for "Performed Procedure Step Description")	(0040,0007)	1C	x	(0040,0007) (0040,0254)	(0040,0007) (0040,0254)
>Scheduled Protocol Code Sequence (universal Sequence Match) ("Scheduled Protocol Code Sequence" is taken as default for "Performed Protocol Code Sequence")	(0040,0008)	1C	-	(0040,0008) (0040,0260)	(0040,0008) (0040,0260)
>>Code Value	(0008,0100)	1C	x		
>>Coding Scheme Designator	(0008,0102)	1C	x		
>>Coding Scheme Version	(0008,0103)	3	x		
>>Code Meaning	(0008,0104)	3	x		
>Scheduled Procedure Step ID ("Scheduled Procedure Step ID" is taken as default for "Performed Procedure Step ID")	(0040,0009)	1	x	(0040,0009) (0040,0253)	(0040,0009) (0040,0253)
>Scheduled Station Name	(0040,0010)	2	x		
>Scheduled Procedure Step Location ("Scheduled Procedure Step Location" is taken as default for "Performed Location")	(0040,0011)	2	x		(0040,0243)
>Pre-Medication	(0040,0012)	2C	x		
>Scheduled Procedure Step Status	(0040,0020)	3	x		
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-		
Requested Procedure					
Referenced Study Sequence (universal Sequence Match)	(0008,1110)	2	-	(0008,1110)	(0008,1110)
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Study Instance UID	(0020,000D)	1	-	(0020,000D)	(0020,000D)
Requested Procedure Description	(0032,1060)	1C	x	(0032,1060)	(0032,1060)
Requested Procedure Code Sequence *(universal Sequence Match)* *("Requested Procedure Code Sequence" is taken as default for "Procedure Code Sequence")*	(0032,1064)	1C	-	(0008,1032) (0032,1064)	(0008,1032)
>Code Value	(0008,0100)	1C	x		
>Coding Scheme Designator	(0008,0102)	1C	x		
>Coding Scheme Version	(0008,0103)	3	x		
>Code Meaning	(0008,0104)	3	x		
Requested Procedure ID *("Requested Procedure ID" is taken as default for "Study ID")*	(0040,1001)	1	x	(0040,1001) (0020,0010)	(0040,1001) (0020,0010)
Reason for the Requested Procedure	(0040,1002)	3	-	(0040,1002)	
Requested Procedure Priority	(0040,1003)	2	x		
Patient Transport Arrangements	(0040,1004)	2	-		
Requested Procedure Location	(0040,1005)	3	-		
Confidentiality Code	(0040,1008)	3	-		
Reporting Priority	(0040,1009)	3	-		
Names of intended Recipients of Results	(0040,1010)	3	-	(0008,1048)	
Requested Procedure Comments	(0040,1400)	3	x		
Imaging Service Request					
Accession Number	(0008,0050)	2	x	(0008,0050)	(0008,0050)
Referring Physician's Name	(0008,0090)	2	x	(0008,0090)	
Requesting Physician	(0032,1032)	2	x	(0032,1032) (0008,1048)	
Requesting Service	(0032,1033)	3	x	(0032,1033)	
Issuing Date of Imaging Service Request	(0040,2004)	3	-		
Issuing Time of Imaging Service Request	(0040,2005)	3	-		
Placer Order Number / Imaging Service Request *(Old tag (0040,2006) is retired and not used.)*	(0040,2016)	3	-		(0040,2016)
Filler Order Number / Imaging Service Request *(Old tag (0040,2007) is retired and not used.)*	(0040,2017)	3	-		(0040,2017)
Order entered by …	(0040,2008)	3	-		
Order Enterer's location	(0040,2009)	3	-		
Order Callback Phone Number	(0040,2010)	3	-		
Imaging Service Request Comments	(0040,2400)	3	x		
Visit Identification					
Institution Name	(0008,0080)	3	x	(0008,0080)	
Institution Address	(0008,0081)	3	-		
Institution Code Sequence *(universal Sequence Match)*	(0008,0082)	3	-		
>Code Value	(0008,0100)	1C	-		
>Coding Scheme Designator	(0008,0102)	1C	-		
>Coding Scheme Version	(0008,0103)	3	-		
>Code Meaning	(0008,0104)	3	-		

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Admission ID	(0038,0010)	2	x		
Issuer of Admission ID	(0038,0011)	3	-		
Visit Status					
Visit Status ID	(0038,0008)	3	-		
Current Patient Location	(0038,0300)	2	x		
Patient's Institution Residence	(0038,0400)	3	-		
Visit Comments	(0038,4000)	3	-		
Visit Relationship					
Referenced Study Sequence *(universal Sequence Match)*	(0008,1110)	3	-		
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Referenced Patient Sequence *(universal Sequence Match)*	(0008,1120)	2	-		(0008,1120)
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Visit Admission					
Referring Physician's Name	(0008,0090)	2	x	(0008,0090)	
Admitting Diagnosis Description	(0008,1080)	3	x	(0008,1080)	
Patient Identification					
Patient's Name	(0010,0010)	1	x	(0010,0010)	(0010,0010)
Patient ID	(0010,0020)	1	x	(0010,0020)	(0010,0020)
Issuer of Patient ID	(0010,0021)	3	-	(0010,0021)	
Other Patient IDs	(0010,1000)	3	x	(0010,1000)	
Other Patient Names	(0010,1001)	3	x	(0010,1001)	
Patient's Birth Name	(0010,1005)	3	-	(0010,1005)	
Patient's Mother's Birth Name	(0010,1060)	3	-	(0010,1060)	
Medical Record Locator	(0010,1090)	3	-	(0010,1090)	
Patient Demographic					
Patient's Birth Date	(0010,0030)	2	x	(0010,0030)	(0010,0030)
Patient's Birth Time	(0010,0032)	3	-	(0010,0032)	
Patient's Sex	(0010,0040)	2	x	(0010,0040)	(0010,0040)
Patient's Insurance Plan Code Sequence *(universal Sequence Match)*	(0010,0050)	3	-	(0010,0050)	
>Code Value	(0008,0100)	1C	-		
>Coding Scheme Designator	(0008,0102)	1C	-		
>Coding Scheme Version	(0008,0103)	3	-		
>Code Meaning	(0008,0104)	3	-		
Patient's Age	(0010,1010)	3	x	(0010,1010)	
Patient's Size	(0010,1020)	3	x	(0010,1020)	
Patient's Weight	(0010,1030)	2	x	(0010,1030)	
Patient's Address	(0010,1040)	3	x	(0010,1040)	
Military Rank	(0010,1080)	3	x	(0010,1080)	
Branch of Service	(0010,1081)	3	-	(0010,1081)	
Country of Residence	(0010,2150)	3	-	(0010,2150)	
Region of Residence	(0010,2152)	3	-	(0010,2152)	
Patient's Telephone Numbers	(0010,2154)	3	-	(0010,2154)	
Ethnic Group	(0010,2160)	3	x	(0010,2160)	
Occupation	(0010,2180)	3	-	(0010,2180)	
Patient's Religious Preference	(0010,21F0)	3	-	(0010,21F0)	
Patient Comments	(0010,4000)	3	x	(0010,4000)	

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Patient Data Confidentiality Constraint Description	(0040,3001)	2	x	(0040,3001)	
Patient Medical					
Medical Alerts	(0010,2000)	2	x	(0010,2000)	
Contrast Allergies	(0010,2110)	2	x	(0010,2110)	
Pregnancy Status	(0010,21C0)	2	x	(0010,21C0)	
Smoking Status	(0010,21A0)	3	x	(0010,21A0)	
Last Menstrual Date	(0010,21D0)	3	x	(0010,21D0)	
Additional Patient History	(0010,21B0)	3	x	(0010,21B0)	
Special Needs	(0038,0050)	2	x	(0038,0050)	
Patient State	(0038,0500)	2	x	(0038,0500)	
Patient Relationship					
Referenced Study Sequence *(universal Sequence Match)*	(0008,1110)	3	-		
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Referenced Visit Sequence *(universal Sequence Match)*	(0008,1125)	3	-		
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		
Referenced Patient Alias Sequence *(universal Sequence Match)*	(0038,0004)	3	-		
>Referenced SOP Class UID	(0008,1150)	1C	-		
>Referenced SOP Instance UID	(0008,1155)	1C	-		

- The Worklist SCU interprets the following status codes:

Table 41 - Status Codes "Update Worklist"

Service Status	Meaning	Error Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Identifier

4.2.7.3.2 Activity - Get Worklist
4.2.7.3.2.1 Description and Sequencing of Activity
With "Get Worklist" in the patient based Worklist Query dialog, the entered attributes are used to form a worklist request identifier. The response data is used to fill the Patient Registration dialog. The response data and only the response data is placed in the Worklist.

4.2.7.3.2.2 Proposed Presentation Context
This Activity will propose the same Presentation Context as with "Update Worklist". Please see related table in section 4.2.7.3.1.2.

4.2.7.3.2.3 SOP Specific Conformance

The MAMMOMAT Revelation DICOM worklist SCU supports "narrow worklist queries" with all required search keys. The following tables describe the "narrow query" search keys that the SCU supports.

Table 42 - Patient based "narrow query" Search Key Attributes

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Modality	(0008,0060)	R	Input from UI or <zero length>
>Scheduled Start Date	(0008,0002)	R	Input from UI or <zero length>
>Scheduled Performing Physician's Name	(0040,0006)	R	Input from UI or <zero length>
Requested Procedure			
Requested Procedure ID	(0040,1001)	R	Input from UI or <zero length>
Imaging Service Request			
Accession Number	(0008,0050)	R	Input from UI or <zero length>
Referring Physician's Name	(0008,0090)	R	Input from UI or <zero length>
Patient Identification			
Patient's Name	(0010,0010)	R	Input from UI or <zero length>
Patient ID	(0010,0020)	R	Input from UI or <zero length>

R = Required Key, **O** = Optional Key

The Return Key Attribute handling and supported Status Codes are identical to the "Update Worklist" activity. Please see 4.2.7.3.1.3 for details.

4.2.7.4   Association Acceptance Policy

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4.2.8   Modality PPS SCU AE

4.2.8.1   SOP Classes

For SOP Classes supported, please refer to "Table 1 - Network Services" section „Workflow Management" in the "Conformance Statement Overview".

4.2.8.2   Association Policies

4.2.8.2.1   General
The creation of MPPS Instance is done automatically by MAMMOMAT Revelation whenever a patient is registered for image acquisition through the Patient Registration dialog.

Further updates on the MPPS data can be done interactively from the related MPPS user interface. The MPPS "Complete" or "Discontinued" states can be set from user interface.

The default PDU size used will be 516KB.

4.2.8.2.2   Number of Associations
The MAMMOMAT Revelation DICOM application initiates one association at a time to create or set the MPPS instance.

4.2.8.2.3   Asynchronous Nature
The MAMMOMAT Revelation DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.8.2.4   Implementation Identifying Information
For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

4.2.8.3   Association Initiation Policy

The MAMMOMAT Revelation DICOM application will notify a RIS (MPPS Manager) about the status of a procedure while it is performed. It establishes an association by using the

- N-CREATE DIMSE according to the CREATE Modality Performed Procedure Step SOP Instance operation or a

- N-SET DIMSE to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

It is possible to configure multiple MPPS providers but only one can be active at a time. The active MPPS provider can be configured via Service-UI.

4.2.8.3.1   Activity - Patient registered
4.2.8.3.1.1 Description and Sequencing of Activity
A patient is registered by the Patient Registration "Exam" action. From this event the trigger to create a MPPS Instance is derived. The related Instance is then immediately communicated to the configured RIS system. An association is established and the MPPS Instance is sent.

4.2.8.3.1.2 Proposed Presentation Context

The MAMMOMAT Revelation DICOM application will propose Presentation Contexts as shown in the following table:

Table 43 - Presentation Context "Patient Registered"

Presentation Context Table – "Update Flag Information"				
Abstract Syntax	**Transfer Syntax**		**Role**	**Ext. Neg.**
Description	**Name List**	**UID List**		
1.2.840.10008.3.1.2.3.3 Modality Performed Procedure Step	Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

4.2.8.3.1.3 SOP Specific Conformance

- Attributes for the Performed procedure Step N-CREATE

The Siemens MAMMOMAT Revelation DICOM Modality Performed Procedure Step SCU informs the remote SCP when the examination of a scheduled procedure step will be performed (i.e. the patient is registered). The N-CREATE message is sent when the examination is started with successful registration of the patient data. The following table describes the supported attributes of an N-CREATE message.

Table 44 - Performed Procedure Step N-CREATE Attributes

Attribute Name	Tag	Type	Value
SOP Common			
Specific Character Set	(0008,0005)	1C	from MWL or created
Performed Procedure Step Relationship			
Scheduled Step Attribute Sequence	(0040,0270)	1	
>Study Instance UID	(0020,000D)	1	from MWL or created
>Referenced Study Sequence	(0008,1110)	2	from MWL or <zero length>
>>Referenced SOP Class UID	(0008,1150)	1C	"
>>Referenced SOP Instance UID	(0008,1155)	1C	"
>Accession Number	(0008,0050)	2	from MWL or user input
>Placer Order Number/Imaging Service Request	(0040,2016)	3	from MWL or <zero length>
>Filler Order Number/Imaging Service Request	(0040,2017)	3	from MWL or <zero length>
>Requested Procedure ID	(0040,0001)	2	from MWL or user input
>Requested Procedure Description	(0032,1060)	2	from MWL or <zero length>
>Scheduled Procedure Step ID	(0040,0009)	2	from MWL or <zero length>
>Scheduled Procedure Step Description	(0040,0007)	2	from MWL or <zero length>
>Scheduled Protocol Code Sequence	(0040,0008)	2	from MWL or <zero length>
>>Code Value	(0008,0100)	1C	"
>>Coding Scheme Designator	(0008,0102)	1C	"
>>Coding Scheme Version	(0008,0103)	3	" or omitted
>>Code Meaning	(0008,0104)	3	"
Patient's Name	(0010,0010)	2	from MWL or user input
Patient ID	(0010,0020)	2	from MWL or user input
Patient's Birth Date	(0010,0030)	2	from MWL or user input
Patient's Sex	(0010,0040)	2	from MWL or user input
Referenced Patient Sequence	(0008,1120)	2	from MWL or <zero length>
>Referenced SOP Class UID	(0008,1150)	1C	"
>Referenced SOP Instance UID	(0008,1155)	1C	"
Performed Procedure Step Information			
Performed Procedure Step ID	(0040,0253)	1	From SPS ID or created

Attribute Name	Tag	Type	Value
Performed Station AE Title	(0040,0241)	1	own AE Title
Performed Station Name	(0040,0242)	2	own hostname
Performed Location	(0040,0243)	2	from SPS location or <zero length>
Performed Procedure Step Start Date	(0040,0244)	1	created
Performed Procedure Step Start Time	(0040,0245)	1	created
Performed Procedure Step End Date	(0040,0250)	3	<zero length>
Performed Procedure Step End Time	(0040,0251)	3	<zero length>
Performed Procedure Step Status	(0040,0252)	1	"IN PROGRESS"
Performed Procedure Step Description	(0040,0254)	2	from SPS Description or <zero length>
Performed Procedure Type Description	(0040,0255)	2	<zero length>
Performed Protocol Code Sequence	(0040,0260)	3	From MWL or configuration
Procedure Code Sequence	(0008,1032)	2	from Requested Procedure Code or <zero length>
>Code Value	(0008,0100)	1C	"
>Coding Scheme Designator	(0008,0102)	1C	"
>Coding Scheme Version	(0008,0103)	3	" or UNKNOWN
>Code Meaning	(0008,0104)	3	"
Comments on the Performed Procedure Steps	(0040,0280)	3	<zero length>
Image Acquisition Results			
Modality	(0008,0060)	1	MG
Study ID	(0020,0010)	2	from Requested Procedure ID or created
Performed Series Sequence	(0040,0340)	2	"
>Performing Physician's Name	(0008,1050)	2C	from MWL or user input
>Operator's Name	(0008,1070)	2C	User input
>Series Instance UID	(0020,000E)	1C	created
>Series Description	(0008,103E)	2C	<zero length>
>Retrieve AE Title	(0008,0054)	2C	<zero length>
>Protocol Name	(0018,1030)	1C	from organ program
>Referenced Image Sequence	(0008,1140)	2C	<zero length>
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2C	<zero length>
Radiation Dose			
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	<zero length>
Total Time of Fluoroscopy	(0040,0300)	3	<zero length>
Total Number of Exposures	(0040,0301)	3	<zero length>
Distance Source to Detector	(0018,1110)	3	<zero length>
Distance Source to Entrance	(0040,0306)	3	<zero length>
Entrance Dose	(0040,0302)	3	<zero length>
Entrance Dose in mGy	(0040,8302)	3	<zero length>
Exposed Area	(0040,0303)	3	<zero length>
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	<zero length>
Comments on Radiation Dose	(0040,0310)	3	<zero length>
Exposure Dose Sequence	(0040,030E)	3	<zero length>
Billing and Material Management Code			
Billing Procedure Step Sequence	(0040,0320)	3	<zero length>
Film Consumption Sequence	(0040,0321)	3	Sequence with
>Number of Films	(2100,0170)	3	<zero length>
>Medium Type	(2000,0030)	3	<zero length>

Attribute Name	Tag	Type	Value
>Film Size ID	(2010,0050)	3	<zero length>
Billing Supplies and Devices Sequence	(0040,0324)	3	Sequence with
>Billing Item Sequence	(0040,0296)	3	<zero length>
>Quantity Sequence	(0040,0293)	3	Sequence with
>>Quantity	(0040,0294)	3	<zero length>
>>Measuring Units Sequence	(0040,0295)	3	<zero length>

- The Performed Procedure Step SCU interprets the following N-CREATE status codes:

Table 45 - Status Codes "Patient Registered"

Service Status	Meaning	Error Codes (0000.0900)
Failure	Processing Failure	0110
	No such attribute	0105
	Invalid attribute value	0106
	Duplicate SOP Instance	0111
	No such SOP Instance	0112
	No such SOP Class	0118
	Class Instance conflict	0119
	Missing attribute	0120
	Missing attribute value	0121
	Resource limitation	0213
Success	MPPS Instance created	0000

4.2.8.3.2 Activity - MPPS Update

4.2.8.3.2.1 Description and Sequencing of Activity

With the MPPS UI the status of the MPPS Instance can be set to "COMPLETED" or "DISCONTINUED". During performance of the procedure the status will remain "IN PROGRESS".

4.2.8.3.2.2 Proposed Presentation Context

For "MPPS Update" the same Presentation Contexts as with "Patient registered" are proposed. Please see related table in section 0.

4.2.8.3.2.3 SOP Specific Conformance

- Attributes for the Performed procedure Step N-SET

The Siemens MAMMOMAT Revelation DICOM Modality Performed Procedure Step SCU informs the remote SCP about the performed examination and its status. The N-SET message is sent after each acquisition (status "IN PROGRESS") and per finished examination (finished status "COMPLETED" or incomplete status "DISCONTINUED"). The following table describes the supported attributes of an N-SET message.

Table 46 - Performed Procedure Step N-SET Attributes

Attribute Name	Tag	Type	Value
Performed Procedure Step Information			
Performed Procedure Step Status	(0040,0252)	3	"IN PROGRESS" during procedure, "COMPLETED" or "DISCONTINUED" for final N-SET
Performed Procedure Step Description	(0040,0254)	3	from SPS Description or user input
Procedure Code Sequence	(0008,1032)	3	from Requested Procedure
>Code Value	(0008,0100)	1C	"
>Coding Scheme Designator	(0008,0102)	1C	"
>Coding Scheme Version	(0008,0103)	3	"
>Code Meaning	(0008,0104)	3	"

Attribute Name	Tag	Type	Value
Performed Procedure Step End Date	(0040,0250)	1	created
Performed Procedure Step End Time	(0040,0251)	1	created
Comments on the Performed Procedure Steps	(0040,0280)	3	user input
Image Acquisition Results			
Performed Protocol Code Sequence	(0040,0260)	3	from Scheduled Protocol Code Sequence
>Code Value	(0008,0100)	1C	"
>Coding Scheme Designator	(0008,0102)	1C	"
>Coding Scheme Version	(0008,0103)	3	" UNKOWN, if not provided
>Code Meaning	(0008,0104)	3	"
Performed Series Sequence	(0040,0340)	1	"
>Performing Physician's Name	(0008,1050)	2C	from MWL or user input
>Protocol Name	(0018,1030)	1C	from related SOP Instance
>Operator's Name	(0008,1070)	2C	user input
>Series Instance UID	(0020,000E)	1C	from related SOP Instance
>Series Description	(0008,103E)	2C	from related SOP Instance
>Retrieve AE Title	(0008,0054)	2C	<zero length>
>Referenced Image Sequence	(0008,1140)	2C	Series related SOP Instances as items
>>Referenced SOP Class UID	(0008,1150)	1C	From related SOP Instance
>>Referenced SOP Instance UID	(0008,1155)	1C	"
>Referenced Non-image Composite SOP Instance Sequence	(0040,0220)	2C	<zero length>
Radiation Dose			
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	T-0400,SNM3,Breast
Total Time of Fluoroscopy	(0040,0300)	3	Accumulated Exposure Time (0018,1150) divided by 1000 (msecs -> secs)
Total Number of Exposures	(0040,0301)	3	Number of exposures in this Performed Procedure Step
Entrance Dose in mGy	(0040,8302)	3	accumulated over complete procedure step
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	Zero length
Exposure Dose Sequence	(0040,030E)	3	on item for each irradiation event (acquisition or fluoro)
>KVP	(0018,0060)	3	peak KV used for this event (KV)
>Exposure Time	(0018,1150)	3	time of x-ray in ms for this event
>Radiation Mode	(0018,115A)	3	"CONTINUOUS"
>Filter Type	(0018,1160)	3	Used value
>Filter Material	(0018,7050)	3	Used value
>X-ray Tube Current in µA	(0018,8151)	3	tube current used for this event
>Comments on Radiation Dose	(0040,0310)	3	additional acquisition specific information (Organ dose,Insight Breast Density values) as text: <laterality>-<View> mGy BDI V_b:valuecm3 V_fg:valuecm3 VBD:value% Grade:value
>Organ dose	(0040,0316)	3	Organ dose for this view
Comments on Radiation Dose	(0040,0310)	3	additional acquisition specific information (accumulated organ dose and Insight Breast

Attribute Name	Tag	Type	Value
			Density grade) as text: R: <> mGy, L: <> mGy, B: <> mGy BDI Grade:value Left:value Right:value or user Input
Billing and Material Management Code			
Film Consumption Sequence	(0040,0321)	3	In case film was used
>Number of Films	(2100,0170)	3	User Input
>Medium Type	(2000,0030)	3	User Input
>Film Size ID	(2010,0050)	3	User Input

- The Performed Procedure Step SCU interprets the following N-SET status codes:

Table 47 - Status Codes "MPPS Update"

Service Status	Meaning	Error Codes (0000.0900)
Failure	Processing Failure: Performed Procedure Step Object may no longer be updated.	0110
	No such attribute	0105
	Invalid attribute value	0106
	No such SOP Instance	0112
	Invalid Object instance	0117
	No such SOP Class	0118
	Class Instance conflict	0119
	Missing attribute value	0121
	Resource limitation	0213
Success	MPPS Instance set	0000

- Performed Procedure Step ID without MPPS option - Handling of Performed Procedure Step ID in case MPPS is not configured or Unscheduled case

The attribute "Performed Procedure Step ID" (0040,0235) will be encoded based on "YYYYMMDDHHMMSS". This date and time is based on the time when the first image is aquired. The "Performed Procedure Step ID" stays the same for all acquired or derived images as long as the patient is re-registered. A re-registered patient with a new study or new series within the existing study will get a newly assigned "Performed Procedure Step ID".

4.2.8.4   Association Acceptance Policy

n. a.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The DICOM Interface of the MAMMOMAT Revelation provides DICOM TCP/IP Network Communication Support and uses the TCP/IP protocol stack from the operating system. It uses the MergeCOM subroutine library. All available Ethernet interfaces are supported.

4.3.2 Additional Protocols

n.a.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

Local AE Titles

According to the DICOM Standard, the AET string can be up to 16 characters long and must not contain any extended characters, only 7-bit ASCII characters (excluding Control Characters).

Note: The current implementation of *syngo* does not allow Spaces and special characters (like &<> ") in the AE title string.

Change of the default AE Titles chosen by the system can be performed in the Service UI under "Configuration / DICOM / General" item - first page.

Table 48 - Default AET Characteristics

Application Entity	Default AE Title	TCP/IP Port
Verification SCU		-
Verification SCP		104 (fixed)
Storage SCU	STU_<hostname>	-
Storage SCP		104 (fixed)
Query/Retrieve SCU		-
Query/Retrieve SCP		104 (fixed)
Print SCU	PRI_<hostname>	-
Worklist SCU	HRI_<hostname>	-
MPPS SCU		-

Remote AE Titles

When "trusted host functionality" is enabled all external AE Titles have to be configured to be able to communicate with MAMMOMAT Revelation.

For each remote AE the following data and capabilities can be configured:

Table 49 - Remote AE Configuration Items

Remote AE configuration item	Comment
Host Name	As defined in the network domain. This has to be configured also for any DICOM AE that wishes to connect to SCP services of MAMMOMAT Revelation.

TCP/IP address	As defined in the network domain. This has to be configured also for any DICOM AE that wishes to connect to SCP services of MAMMOMAT Revelation.
Logical Name	Name for the AE used in the user interfaces of the MAMMOMAT Revelation applications.
AE Title	AET, as provided by network administration
Port Number	Port Number, as provided by network administration
If **Storage** Service support is checked	
Transfer Syntax	Selection of uncompressed transfer Syntaxes supported by remote AE
Compression	Selection of additional compression Syntaxes supported for remote AE
Default Node	"first default"/"second default"/["no default"] - activating this feature will show "Send to <logical name>" in the Transfer tool menu for quick access.
Preference Node	When checked, the remote AE will be assigned to a keyboard shortcut key.
Archive Node	When checked, sending to remote AET will set status of **a**(rchived), else **s**(ent) is indicated.
Default Archive	When checked, the remote AE will be listed as default archive in User interfaces.
Graphics in Pixel Data	When checked, the DICOM overlay will not be encoded in attribute (60xx,3000) Overlay Data, but masked in the "unused bits" of the pixel data (only for uncompressed transfer syntaxes). For backwards compatibility with legacy AE.
Select SC node	Select a previously configured node as target for Storage Commitment when sending DICOM objects to the configured AE. Default is the same node as to which the Objects are sent.
Select SC AET	Select AET that corresponds to the above selected node that receives the Storage Commitment request. Default is the above specified "AE Title".
SC Result in same association	When checked the MAMMOMAT Revelation DICOM application will await the Storage Commitment N-EVENT-REPORT on the same association. Default is "not checked" (= different association).
SC result timeout	Timeout in hours and minutes to wait at the open association. Default: 01:00 (hour:minutes).
If **Storage Commitment** Service support is checked	
n. a.	The related Storage Commitment configuration is either in the Storage section of the same AET or different AET (in case the current AET is only Storage Commitment Provider).
If **Query** Service support is checked	
provides DICOM Query model	The Query models supported by this AET can be selected. When possible, the STUDY ROOT model should preferably be configured
If **Retrieve** Service support is checked	
n. a.	Checking Retrieve support for an AET is the only needed configuration item. This will allow access to the "Import" feature in the Query result browser.
If **Modality Worklist** Service support is checked	
Query Waiting time	The time to wait for the C-FIND-RSP after sending the C-FIND-RQ (default 20 sec.)
Max Query Match Number	The maximum number of entries accepted in one worklist (default is 200)
Query Interval	The time between two C-FIND-RQ to the Hospital Information system (default is 60 min, minimum is 3 min, maximum is 1440 min i.e. 24 hours)
Automatic removal of canceled/rescheduled Requests	Checking this item will remove all unused entries from the scheduler list prior to inserting the worklist responses with each query.

4.4.2 Parameters

System parameters can be changed in the Service UI under "Configuration / DICOM / General" item - second page.

Table 50 - General parameter settings and timeouts

Parameter	Default Value[sec]	Min [sec]	Max [sec]	Comment
Time-out Values				
Accepting/Rejecting an Association Request	60	15	600	Wait for an Association Request or wait for a Peer to shut down the Association
Association Open Request	60	15	600	Wait for a reply to an Association Accept Request
Association Close Request	60	15	600	Wait for a reply to an Association Release Request
Accepting a Message over Network	60	15	600	Wait for a Network Write to be accepted
Waiting for Data between TCP/IP Packets	60	15	600	Wait for Data between TCP/IP packets
Accept network connect	15	15	600	Wait for a Network Connect to be accepted
General Transfer Setting				
Simultaneous DICOM associations	10	1	10	Number of simultaneous associations running.
Maximum PDU Size	516KByte	4KByte	1MByte	Proposed PDU size, each selectable value is doubled from previous, starting with 4kB. Additionally for optimization for some networks 28kByte are provided.

5 Application Profile Conformance Statement

For "Offline Media Application Profiles" please refer to Table 2 - Media Services " in chapter 1.

Table 51 – Supported Application Profiles

Media Storage Application Profile
General Purpose on CD-R
General Purpose on DVD with JPEG
General Purpose USB Media Interchange with JPEG

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

Figure 2 Application Data Flow DICOM Archive
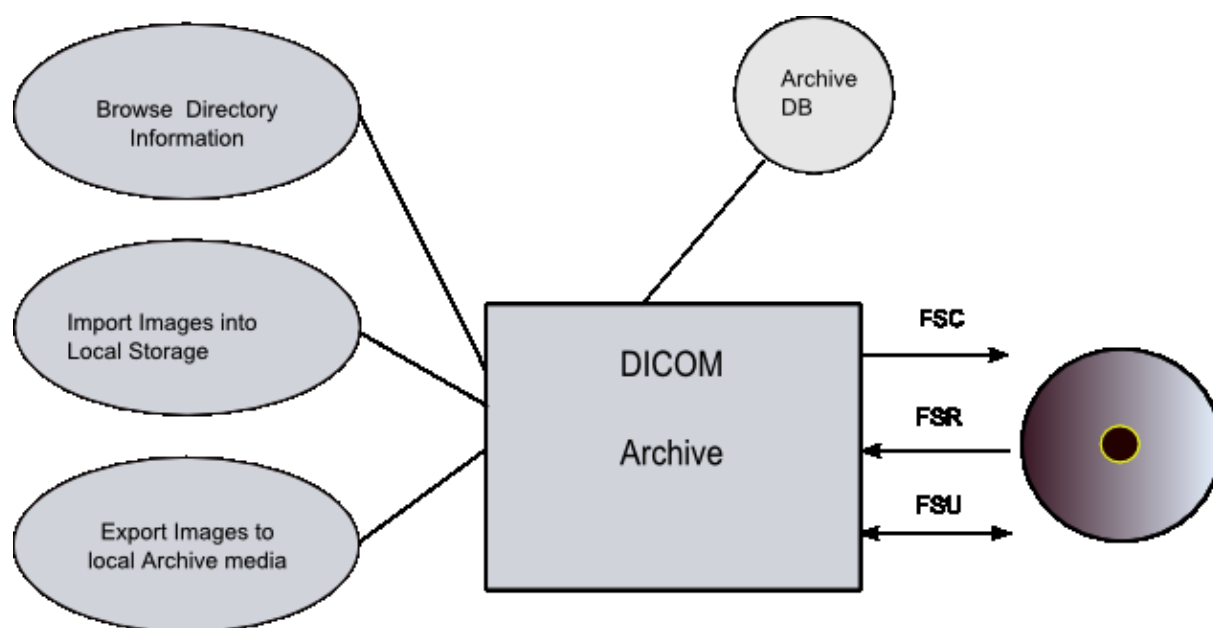
The DICOM Archive application will serve as an interface to the CD-R/DVD offline medium device.
The DICOM Archive application will support the 120mm CD-R and DVD medium.
The FSU role will update new SOP Instances only to media with pre-existing File-sets conforming to the Application Profiles supported.

The contents of the DICOMDIR will temporarily be stored in Archive-Database.

5.1.2 Functional Definitions of AEs

The MAMMOMAT Revelation DICOM Offline Media Storage application consists of the DICOM Archive application entity serving all interfaces to access offline media. The DICOM Archive application is capable of

- creating a new File-set onto an unwritten medium (Export to…).

- updating an existing File-set by writing new SOP Instances onto the medium (Export to...).

- importing SOP Instances from the medium onto local storage

- reading the File-sets DICOMDIR information into temporary database and pass it to display applications.

5.1.3 Activities

5.1.3.1 Description and Sequencing of Activity FSR

The DICOM Archive application will not perform transfers until the Directory information of the DICOMDIR is completely read in and displayed in the Browser. The user selects data to be imported.

5.1.4 Implementation Identifying Information

For Implementation Identifying Information please refer to "Table 3 - Implementation Identifying Information" in the "Conformance Statement Overview".

5.2 AE Specifications

5.2.1 DICOM Archive Specification

The DICOM Archive provides Standard conformance to Media Storage Service Class (Interchange Option).
Details are listed in following Table:

Table 52 - Mapping of Application Profiles Supported

Application Profiles Supported	Activity	Role	SC Option
STD-GEN-CD STD-GEN-DVD STD-GEN-DVD-JPEG STD-GEN-USB-JPEG	Browse Directory Information	FSR	Interchange
	Import into local Storage	FSR	Interchange
	Export to local Archive Media	FSC, FSU	Interchange

5.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title is set by configuration and is same as used for Storage provider.

5.2.1.2 Activities of DICOM Archive

5.2.1.2.1 Activity "Browse Directory Information"

The DICOM Archive application acts as FSR using the interchange option when requested to read the media directory.

The DICOM archive application will read the DICOMDIR and insert those directory entries that are valid for the application profiles supported, into a local database. The database can then be used for browsing media contents.

Note: Icon Image Sequence is also supported in DICOMDIR. But only those Icon Images with Bits Allocated (0028,0100) equal to 8 and size of 64x64 or 128x128 pixels are imported into the database and are visible in the Browser.

5.2.1.2.2 Activity "Import into Local Storage"

The DICOM Archive application acts as FSR using the interchange option when being requested to read SOP Instances from the medium into the local storage.

The SOP Instance(s) selected from the media directory will be copied into the local storage. Only SOP Instances, that are valid for the application profile, can be retrieved from Media Storage.

For media conforming to the STD-GEN-xxx Profile the following SOP Classes will be supported as FSR:

Table 53 - STD-GEN-xxx profile supported SOP Classes

Information Object Definition	Transfer Syntax UID
Any image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Image SOP Class)".	Explicit VR Little Endian 1.2.840.10008.1.2.1

5.2.1.2.3 Activity "Export to Local Archive Media"

The DICOM Archive application acts as FSU (for media with existing DICOM file-set) or FSC (media not initialized) using the interchange option when requested to copy SOP Instances from the local storage to local Archive Medium.

The DICOM Archive application will receive a list of SOP Instances to be copied to the local archive medium. According to the state of the medium inserted (new medium, Medium with DICOM file-set) the validity of the SOP Instances according to the applicable profile is checked. Only valid SOP Instances are accepted.

For media conforming to the STD-GEN-xxx Profile the following SOP Classes will be supported as FSC:

Table 54 - STD-GEN-xxx profile supported SOP Classes

Information Object Definition	Transfer Syntax UID
Any image SOP Class detailed in "Table 1 - Network Services" section „Transfer (Image SOP Class)".	Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70

5.3   Augmented and Private Application Profiles

n.a.

5.4　Media Configuration

5.4.1　Single- / Multi-Session CD burning

Please refer to most recent Service / Configuration documentation of
MAMMOMAT Revelation for changing between the single-session and multi-session
recording modes.

5.4.2　"Viewer on CD"

Syngo **FastView** as application that is included onto the medium as part of the "Viewer on CD"
feature.

5.4.3　Auto-Labeling

Please refer to most recent Service / Configuration documentation of
MAMMOMAT Revelation for activating the auto-labeling of CD media to avoid the label
inquiry dialog when using automatic media export. The auto-labeling can be activated with the
"Viewer on CD" feature being implicitly checked or not.

6 Support of Extended Character Sets

The MAMMOMAT Revelation DICOM application supports the following character sets as defined in the four tables below:

Table 55 - Supported Single-Byte Character Sets (w/o Code Ext.)

Character Set Description	Defined Term	ISO registration number	Character Set
Default repertoire	none	ISO_IR 6	ISO 646:
Latin alphabet No. 1	ISO_IR 100	ISO_IR 100	Supplementary set
		ISO_IR 6	ISO 646:
Latin alphabet No. 2	ISO_IR 101	ISO_IR 101	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 3	ISO_IR 109	ISO_IR 109	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 4	ISO_IR 110	ISO_IR 110	Supplementary set
		ISO_IR 6	ISO 646
Cyrillic	ISO_IR 144	ISO_IR 144	Supplementary set
		ISO_IR 6	ISO 646
Arabic	ISO_IR 127	ISO_IR 127	Supplementary set
		ISO_IR 6	ISO 646
Greek	ISO_IR 126	ISO_IR 126	Supplementary set
		ISO_IR 6	ISO 646
Hebrew	ISO_IR 138	ISO_IR 138	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 5	ISO_IR 148	ISO_IR 148	Supplementary set
		ISO_IR 6	ISO 646
Japanese	ISO_IR 13	ISO_IR 13	JIS X 0201: Katakana
		ISO_IR 14	JIS X 0201: Romaji

Table 56 - Supported Single-Byte Character Sets (with Code Ext.)

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Default repertoire	ISO 2022 IR 6	ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.1	ISO 2022 IR 100	ISO 2022	ESC 02/13 04/01	ISO-IR 100	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.2	ISO 2022 IR 101	ISO 2022	ESC 02/13 04/02	ISO-IR 101	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.3	ISO 2022 IR 109	ISO 2022	ESC 02/13 04/03	ISO-IR 109	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.4	ISO 2022 IR 110	ISO 2022	ESC 02/13 04/04	ISO-IR 110	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Cyrillic	ISO 2022 IR 144	ISO 2022	ESC 02/13 04/12	ISO-IR 144	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Arabic	ISO 2022 IR	ISO 2022	ESC 02/13	ISO-IR 127	Supplementary set

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
	127		04/07		
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Greek	ISO 2022 IR 126	ISO 2022	ESC 02/13 04/06	ISO-IR 126	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Hebrew	ISO 2022 IR 138	ISO 2022	ESC 02/13 04/08	ISO-IR 138	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.5	ISO 2022 IR 148	ISO 2022	ESC 02/13 04/13	ISO-IR 148	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Japanese	ISO 2022 IR 13	ISO 2022	ESC 02/09 04/09	ISO-IR 13	JIS X 0201: Katakana
		ISO 2022	ESC 02/08 04/10	ISO-IR 14	JIS X 0201-1976: Romaji

Table 57 - Supported Multi-Byte Character Sets (w/o Code Ext.)

Character Set Description	Defined Term	ISO registration number	Character Set
Unicode	ISO_IR 192	ISO 10646	Unicode in UTF-8
Chinese	GB18030	GB18030	GB 18030-2000 (China Association for Standardization)

Table 58 - Supported Multi-Byte Character Sets (with Code Ext.)

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Japanese	ISO 2022 IR 87	ISO 2022	ESC 02/04 04/02	ISO-IR 87	JIS X 0208: Kanji
	ISO 2022 IR 159	ISO 2022	ESC 02/04 02/08 04/04	ISO-IR 159	JIS X 0212: Supplementary Kanji set
Chinese[h]	ISO 2022 IR 58	ISO 2022	ESC 02/04 04/01	ISO-IR 58	GB2312-80 (China Association for Standardization)

When there is a mismatch between the Specific Character Set tag (0008,0005) and the characters in an IOD received by the system, then the following measures are taken to make the characters DICOM conform:

- Try to import with ISO_IR 100. If ISO_IR 100 fails, convert each illegal character to a '?'.

    There are now three categories of character sets which have to be differentiated because of their different encoding formats:
    - Conventional ISO character sets: ISO_IR 6, ISO 2022 IR 6, ISO_IR 100, etc.
      → encoded in ISO 2022
    - ISO IR_192 → encoded in UTF-8
    - GB18030 → encoded in GB18030

---

[h] Note: This Character Set is an extension of DICOM for the Chinese language.

It is not possible to recognize the following mismatches automatically on receiving or importing:

- An attribute value is encoded in ISO_IR 192 ← → (0008,0005) contains a conventional ISO character set as primary character set.

- An attribute value is encoded in GB18030 ← → (0008,0005) contains a conventional ISO character set as primary character set.

- An attribute value is encoded in ISO 2022 ← → (0008,0005) contains ISO_IR 192.

- An attribute value is encoded in ISO 2022 ← → (0008,0005) contains GB18030

An IOD that contains one of the above mentioned inconsistencies is not DICOM conform. As these kinds of inconsistencies cannot be recognized by the system, the IOD will not be rejected but the character data might not be displayed as intended.

Older versions of MAMMOMAT Revelation do not support the newly introduced character sets ISO_IR 192 and GB18030 and their special encodings. That means, an IOD which contains one of these new character sets in (0008,0005) will be rejected by an older MAMMOMAT Revelation.

7   Security

7.1   Security Profile

7.1.1   Security Transport Connection Profiles

The MAMMOMAT Revelation conforms to the Basic TLS Transport Connection Profile supporting TLS Protocol V1.0,V1.1 and V1.2(preferred) and following types of X.509 certificates:

- Self Signed certificate

- Certificate for which chain building (Trusted chain building, Trusted CA) is possible

The X.509 certificate imported and used for DICOM communication must have purpose set for Client and Server Authentication and must be exportable to generate the certificate file and private key file. If intermediate and root X.509 certificates are present then the intermediate certificate must be imported to Intermediate Certificate Authorities -> Certificates. The root certificate must be imported to the Trusted Root Certificates -> Certificates.

The MAMMOMAT Revelation offers following ciphersuite options:

- TLS_RSA_WITH_AES_128_CBC_SHA

- TLS_RSA_WITH_3DES_EDE_CBC_SHA

NOTE: NULL Cipher (TLS_RSA_WITH_NULL_SHA) is not supported.

7.2   Association Level Security

When "trusted host functionality" is enabled, the MAMMOMAT Revelation only accepts DICOM communication from other AE if the related System is configured with its hostname, port and AET.

7.3   Application Level Security

The MAMMOMAT Revelation is supporting security by having the firewall of the underlying operating system active. The port in which syngo acts as SCP for secure DICOM communication is 2762 (fixed). The port in which syngo acts as SCP for unsecure DICOM communication is 104 (fixed).

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and additional Private Attributes:

The following tables use a number of abbreviations. The abbreviations used in the "Presence of value column are:

> VNAP Value Not Always Present (attribute sent zero length if no value is present)
> ANAP Attribute Not Always Present
> ALWAYS Always Present
> EMPTY Attribute is sent without a value

The abbreviations used in the "Source" column:

> MWL the attribute value source Modality Worklist
> USER the attribute value source is from User input
> AUTO the attribute value is generated automatically
> MPPS the attribute value is the same as that use for Modality Performed Procedure Step
> CONFIG the attribute value source is a configurable parameter

8.1.1.1 MG Standard Extended SOP Classes

The MAMMOMAT Revelation system will create images during acquisition and with post processing applications. Those will be encoded as MG Standard Extended SOP Class.Synthetic Insight 2D images generated during a Tomosynthesis examination are also encoded as MG Standard Extended SOP Class. Insight CEM images are calculated 2D MG images created during Contrast Enhanced Mammography.

Table 59 – Mammography Image

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	From Configuration / RIS	ALWAYS	MWL / CONFIG
Image Type	(0008,0008)	CS	See "8.5.1.6 SOP Common Module - Image Type Extensions"	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.1.2 or 1.2.840.10008.5.1.4.1.1.1.2.1	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Created	ALWAYS	AUTO
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	Date of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Date of Creation	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Time	(0008,0030)	TM	<hhmmss>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss.xxxxxx>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	Time of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time of Creation	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	RIS or "Accession No." input	VNAP	MWL / USER
Modality	(0008,0060)	CS	MG	ALWAYS	AUTO / MPPS
Presentation Intent Type	(0008,0068)	CS	FOR PROCESSING | FOR PRESENTATION	ALWAYS	AUTO
Manufacturer	(0008,0070)	LO	SIEMENS	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	RIS or "Institution Name" input	ALWAYS	MWL / USER / CONFIG
Institution address	(0008,0081)	ST	From configuration	ALWAYS	CONGIG
Referring Physician's Name	(0008,0090)	PN	RIS or input	VNAP	MWL / USER
Station Name	(0008,1010)	SH	from Configuration hostname	ALWAYS	CONFIG
Study Description	(0008,1030)	LO	Procedure name mapped from Requested Procedure Description (0032,1060) from Modality Worklist	ALWAYS	MWL / AUTO
Procedure Code Sequence	(0008,1032)	SQ	Requested Procedure Code Sequence (0032,1062) from Modality Worklist or configured Code	ANAP	MWL / AUTO / MPPS
Series Description	(0008,103E)	LO	See "Table 80 – Series Description"	ALWAYS	USER / AUTO
Institutional Department Name	(0008,1040)	LO	From configuration	ALWAYS	AUTO
Physician's of Record	(0008,1048)	PN	From RIS	ANAP	AUTO
Performing Physician's Name	(0008,1050)	PN	Performing Physician	ANAP	MWL / USER
Operator's Name	(0008,1070)	PN	"Operator 1"\"Operator 2" input	ANAP	USER
Admitting Diagnosis Description	(0008,1080)	LO	"Admitting Diagnosis"	ANAP	MWL
Manufacturer's Model Name	(0008,1090)	LO	MAMMOMAT Revelation	ALWAYS	AUTO
Referenced Study Sequence	(0008,1110)	SQ	From RIS	ANAP	MWL
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	related MPPS	ALWAYS	AUTO
Referenced Patient Sequence	(0008,1120)	SQ	From RIS	ANAP	MWL / MPPS
Derivation Description	(0008,2111)	ST	Image Processing Parameters	ALWAYS	AUTO
Source Image Sequence	(0008,2112)	SQ	Reference to FOR PROCESSING image in FOR PRESENTATION image, Insight 2D references all projection images of the Tomosynthesis Scan	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	SQ	Class UID	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Referenced SOP Instance UID	(0008,1155)	UI	Instance UID	ANAP	AUTO
>Spatial Locations Preserved	(0028,135A)	UI	"YES" for FOR PRESENTATION image	ANAP	AUTO
Anatomic Region Sequence	(0008,2218)	SQ	See content	ALWAYS	AUTO
> Code Value	(0008,0100)		T-0400	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)		SNM3		
> Code Meaning	(0008,0104)		Breast	ALWAYS	AUTO
Patient's Name	(0010,0010)	PN	RIS or "Patient Name" input	ALWAYS	MWL / USER / MPPS
Patient ID	(0010,0020)	LO	RIS or "Patient ID" input	ALWAYS	MWL / USER / MPPS
Patient's Birth Date	(0010,0030)	DA	RIS or checked "Date of Birth" input	ALWAYS	MWL / USER/ MPPS
Patient's Sex	(0010,0040)	CS	RIS or input (M or F or O/unknown)	ALWAYS	MWL / USER/ MPPS
Other Patient IDs	(0010,1000)	LO	From RIS / Social Security Number	ANAP	MWL / USER
Other Patient Names	(0010,1001)	PN	From RIS	ANAP	MWL
Other Patient Ids Sequence	(0010,1002)	SQ	RIS or Input	ANAP	MWL / USER
> Patient ID	(0010,0020)	LO	RIS or Input	ANAP	MWL / USER
> Issuer of Patient ID	(0010,0021)	LO	RIS or Input	ANAP	MWL / USER
Patient's Age	(0010,1010)	AS	Calculated from "Date of Birth" input	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	Patient's height in meters	ANAP	MWL / USER
Patient's Weight	(0010,1030)	DS	(in kilograms)	ANAP	MWL / USER
Military Rank	(0010,1080)	LO	From RIS or Input	ANAP	MWL
Ethnic Group	(0010,2160)	SH	From RIS or Input	ANAP	MWL
Additional Patient History	(0010,21B0)	LT	From RIS	ANAP	MWL
Pregnancy Status	(0010,21C0)	US	From RIS	ANAP	MWL
Patient Comments	(0010,4000)	LT	"Additional Info"	ANAP	MWL/USER
Contrast/Bolus Agent	(0018,0010)	LO	TiCEM:agent name Otherwise empty	VNAP	AUTO
Body Part examined	(0018,0015)	IS	BREAST	ALWAYS	AUTO
KVP	(0018,0060)	DS	KVP not available in Insight CEM Images	VNNAP	AUTO
Device Serial Number	(0018,1000)	LO	<modality serial number>	ALWAYS	AUTO
Software Version	(0018,1020)	LO	<version>	ALWAYS	AUTO
Protocol Name	(0018,1030)	LO	MAMMOGRAM | INSIGHT_2D	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
			| STEREO | TOMO_PROJ		
Contrast/Bolus Volume	(0018,1041)	DS	Only for TiCEM: Volume injected in milliliters of diluted contrast agent	ANAP	AUTO
Contrast/Bolus Start Time	(0018,1042)	TM	Only for TiCEM: Time of start of injection	ANAP	AUTO
Contrast Flow Rate	(0018,1046)	DS	Only for TiCEM:: Rate(s) of injection(s) in milliliters/sec	ANAP	AUTO
Contrast/Bolus Ingredient	(0018,1048)	CS	Only for TiCEM: Active ingredient of agent. Defined Terms: IODINE GADOLINIUM CARBON DIOXIDE BARIUM	ANAP	AUTO
Contrast/Bolus Ingredient: Concentration	(0018,1049)	DS	Only for TiCEM: Milligrams of active ingredient per milliliter of (diluted) agent	ANAP	AUTO
Distance Source to Detector	(0018,1110)	DS	(mm) SID	ALWAYS	AUTO / MPPS
Distance Source to Patient	(0018,1111)	DS	(mm) SOD	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	DS	<Ratio of SID/SOD>	ALWAYS	AUTO
Table Angle	(0018,1138)		0	ALWAYS	AUTO
Table Type	(0018,113A)		NONE	ALWAYS	AUTO
Field of View Shape	(0018,1147)		RECTANGLE	ALWAYS	AUTO
Field of View dimension(s)	(0018,1149)		mm\mm	ALWYAS	AUTO
Exposure Time	(0018,1150)	IS	<duration of x-Ray exposure>(msec)	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	(mA not available in Insight CEM Images)	VNAP	AUTO
Exposure	(0018,1152)	IS	(mAs not available Insight CEM Images)	VNAP	AUTO
Exposure in µAs	(0018,1153)	IS	(µAs) not available in Insight CEM Images	VNAP	AUTO
Rectification Type	(0018,1156)	CS	CONST POTENTIAL	ALWAYS	AUTO
Imager Pixel Spacing	(0018,1164)	DS	<row space, col space>(mm)	ALWAYS	AUTO
Grid	(0018,1166)	DS	NONE | NONE\PRIME| FOCUSSED\PARALLEL Note: In case grid is used for the first projection in 2D3D, all images have the value FOCUSSED\PARALLEL	ALWAYS	AUTO
Focal Spot	(0018,1190)	DS	0.1 | 0.3	ALWAYS	AUTO
Anode Target Material	(0018,1191)	CS	TUNGSTEN	ALWAYS	AUTO
Body Part Thickness	(0018,11A0)	DS	(mm)	ALWAYS	AUTO
Compression Force	(0018,11A2)	DS	(Newton)	ALWAYS	AUTO
Paddle Description	(0018,11A4)	LO	ID of Paddle Description	ALWAYS	AUTO
Acquisition Device	(0018,1400)	LO	Image Processing Parameters	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Processing Description			or empty		
Relative X-Ray Exposure	(0018,1405)	IS	Percentage value of maximum allowed dose or 0 for Insight_2D	ALWAYS	AUTO
Positioner Type	(0018,1508)	CS	MAMMOGRAPHIC	ANAP	AUTO
Positioner Primary Angle	(0018,1510)	DS	Sign of value: from vertical to patient's right is positive	ALWAYS	AUTO
Positioner Secondary Angle	(0018,1511)	DS	0	ALWAYS	AUTO
Detector Primary Angle	(0018,1530)	DS	Movement of the detector relative to X-Ray Source	ALWAYS	AUTO
Detector Secondary Angle	(0018,1531)	DS	0	ALWAYS	AUTO
Detector Conditions Nominal Flag	(0018,7000)	CS	YES NO, if user was notified	ALWAYS	AUTO
Detector Temperature	(0018,7001)	DS	<value>	ALWAYS	AUTO
Detector Type	(0018,7004)	CS	SCINTILLATOR | DIRECT	ALWAYS	AUTO
Detector Configuration	(0018,7005)	CS	AREA	ALWAYS	AUTO
Detector Description	(0018,7006)	LT	<descriptive text>	ALWAYS	AUTO
Detector Mode	(0018,7008)	LT	Mode description	ALWAYS	AUTO
Detector ID	(0018,700A)	SH	Factory Serial Number	ALWAYS	AUTO
Date of Last Detector Calibration	(0018,700C)	DA	<yyyymmdd>	ALWAYS	AUTO
Time of Last Detector Calibration	(0018,700E)	TM	<hhmmss>	ALWAYS	AUTO
Exposures on detector since last Calibration	(0018,7010)	IS	<number>	ALWAYS	AUTO
Exposures on Detector since manufactured	(0018,7011)	IS	<number>	ALWAYS	AUTO
Detector time since last Exposure	(0018,7012)	DS	<Time in seconds>	ALWAYS	AUTO
Detector Active Time	(0018,7014)	DS	< Time in msec>	ALWAYS	AUTO
Detector Activation Offset from Exposure	(0018,7016)	DS	0	ALWAYS	AUTO
Detector Binning	(0018,701A)	DS	1\1	ALWAYS	AUTO
Detector Element Physical Size	(0018,7020)	DS	0.085\0.085	ALWAYS	AUTO
Detector Element Spacing	(0018,7022)	DS	0.085\0.085	ALWAYS	AUTO
Detector Active Shape	(0018,7024)	CS	RECTANGLE	ALWAYS	AUTO
Detector Active Dimension(s)	(0018,7026)	DS	mm	ALWAYS	AUTO
Detector Active Origin	(0018,7028)	DS	0\0	ALWAYS	AUTO
Field of View Origin	(0018,7030)	DS	<actual value>	ALWAYS	AUTO
Field of View Rotation	(0018,7032)	DS	"0","90","180" or "270"	ALWAYS	AUTO
Field of View Horizontal Flip	(0018,7034)	CS	"YES" or "NO"	ALWAYS	AUTO
Filter Material	(0018,7050)	CS	TITANIUM or RHODIUM	ALWAYS	USER / AUTO
Filter Thickness Minimum	(0018,7052)	DS	mm	ALWAYS	AUTO
Filter Thickness	(0018,7054)	DS	mm	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Maximum					
Exposure Control Mode	(0018,7060)	CS	MANUAL or AUTOMATIC	ALWAYS	USER / AUTO
Exposure Control Mode Description	(0018,7062)	LT	Text description of the mechanism of exposure control.	ALWAYS	USER / AUTO
Exposure Status	(0018,7064)	CS	NORMAL or ABORTED	ALWAYS	AUTO
Exposure Time in µs	(0018,8150)	DS	<time>	ALWAYS	AUTO
X-Ray Tube Current in µA	(0018,8151)	DS	(µA) not available in Insight CEM Images	VNAP	AUTO
Study Instance UID	(0020,000D)	UI	From RIS or system generated	ALWAYS	MWL / AUTO
Series Instance UID	(0020,000E)	UI	generated	ALWAYS	AUTO
Study ID	(0020,0010)	SH	From RIS Requested Procedure ID or system created	ALWAYS	MWL / USER / AUTO / MPPS
Series Number	(0020,0011)	IS	generated	ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS	generated	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	generated	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	according to pixel data	ALWAYS	AUTO
Frame of Reference UID	(0020,0052)	UI	If Insight 2D	VNAP	AUTO
Image Laterality	(0020,0062)	CS	Zero length	ALWAYS	USER
Positioner Reference Indicator	(0020,1040)	LO	Empty, if Insight 2D	VNAP	Auto
Image Comments	(0020,4000)	LT	If entered in UI | INSIGHT 2D| Insight Breast Density values, if configured(INBD V_b:value cm3 V_fg:valuecm3 VBD:value Grade:value)| Time since Injection for TiCEM, if configured(Tsl:x:y min:sec)	VNAP	USER
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME1| MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Number of rows	ALWAYS	AUTO
Columns	(0028,0011)	US	Number of columns	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Default: not set Can be configured by Service	ANAP	AUTO
Pixel Aspect Ratio	(0028,0034)	IS	Default: not set 1|1 can be configured	ANAP	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	14 | 12	ALWAYS	AUTO
High Bit	(0028,0102)	US	13 | 11	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	US	0 or $2^{BitsStored} - 1$	ALWAYS	AUTO
Quality Control Image	(0028,0300)	CS	YES or NO	ALWAYS	USER / AUTO
Burned In Annotation	(0028,0301)	CS	"NO"	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	CS	LIN | LOG	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Intensity Relationship Sign	(0028,1041)	SS	1 | -1	ALWAYS	AUTO
Window Center	(0028,1050)	DS	Depending on Image processing	ALWAYS	AUTO / USER
Window Width	(0028,1051)	DS	Depending on Image processing	ALWAYS	AUTO / USER
Rescale Intercept	(0028,1052)	DS	0	ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	LO	US	ALWAYS	AUTO
Window Center and Width Explanation	(0028,1055)	LO	Linear LUT	ALWAYS	AUTO
Implant Present	(0028,1300)	CS	YES or NO	ALWAYS	AUTO
Partial View	(0028,1350)	CS	NO	ALWAYS	AUTO
Biopsy Target Sequence	(0018,2041)	SQ	Sequence that identifies the targets of a biopsy procedure. For each submitted target one item is stored	ANAP	AUTO
>Target UID	(0018,2042)	UI	Unique identifier for the target.	ANAP	AUTO
>Localizing Cursor Position	(0018,2043)	FL	Coordinates of localizing cursor position with respect to the pixel Equivilant to data stored in Overlay group	ANAP	AUTO
>Calculated Target Position	(0018,2044)	FL	The calculated target position (x, y, z) in mm in an equipment relative right-handed coordinate system where the origin is under the central X-Ray beam at the chest wall, and a z value of zero is located at the surface that the breast is in contact with that is closest to the detector. X is parallel to the chest wall, y is positive toward the patient's nipple, and z is positive toward the X-Ray source. Note: y-value is different to displayed y value during examination	ANAP	AUTO
>Target Label	(0018,2045)	SH	Target description: a number starting with 1 for the first target.	ANAP	AUTO
>Displayed Z Value	(0018,2046)	FL	The z value in mm displayed to the user at the time of biopsy. Note: This is the same as the z value of Calculated Target Position.	ANAP	AUTO
>Needle Info	(0023,xx01) See Table 75 - (Private) Acquisition Dataprivate	LO	Needle Type, Needle Gauge and Needle Length in mm,e.g. Type:Fine Gauge:0.7 Length: 100.0	ANAP	AUTO
Lossy Image Compression	(0028,2110)	CS	"00", "01" if image was sent lossy compressed by the USER	ALWAYS	AUTO
VOI LUT Sequence	(0028,3010)	SQ	0-10 VOI Luts depending on configuration	ANAP	AUTO

Attribute Name	Tag	VR	Value	Pres-ence of Value	Source
>LUT Descriptor	(0028,3002)	VR	<num of LUT entries>, <first pixel val mapped>, <Entry bits alloc>	ANAP	AUTO
>LUT Explanation	(0028,3003)	LO	<configured name>	ANAP	AUTO
>LUT data	(0028,3006)	US-OW	<array of data, accord. descriptor>	ANAP	AUTO
			Private 29 group		
Requesting Physician	(0032,1032)	PN	From RIS	ANAP	MWL
Requesting Service	(0032,1033)	LO	From RIS	ANAP	MWL
Requested Procedure Description	(0032,1060)	LO	From RIS	ANAP	MWL
Requested Procedure Code Sequence	(0032,1064)	SQ	From RIS	ANAP	MWL
>Code Value	(0008,0100)	SH	From RIS	ANAP	MWL
>Coding Scheme Designator	(0008,0102)	SH	From RIS	ANAP	MWL
>Coding Scheme Version	(0008,0103)	SH	From RIS	ANAP	MWL
>Code Meaning	(0008,0104)	LO	From RIS	ANAP	MWL
Study Comments	(0032,4000)	LT	Patient Registration input	ANAP	USER
Special Needs	(0038,0050)		From RIS	ANAP	MWL
Patient State	(0038,0500)		From RIS	ANAP	MWL
Performed Procedure Step Start Date	(0040,0244)	DA	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step Start Time	(0040,0245)	TM	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step ID	(0040,0253)	SH	supplied, even if MPPS SOP Class is not supported, "MGyyyymmddhhmmss" is set with 1st Image acquired	ALWAYS	AUTO/ MPPS
Performed Procedure Step Description	(0040,0254)	LO	Value of Study Description	ALWAYS	AUTO/ MPPS
Performed Protocol Code Sequence	(0040,0260)	SQ	Same as 0040,0275>0040,0008	ANAP	MWL/ MPPS
Request Attributes Sequence	(0040,0275)	SQ	From RIS	ANAP	MWL
>Scheduled Procedure Step Description	(0040,0007)	LO	From RIS	ANAP	MWL
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	From RIS	ANAP	MWL
>Scheduled Procedure Step ID	(0040,0009)	SH	From RIS	ANAP	MWL
>Requested Proce-dure ID	(0040,1001)	SH	From RIS or "Request ID" input	ANAP	MWL / USER
Entrance Dose in dGy	(0040,0302)	US	Current value|0 for Insight 2D	VNAP	AUTO/ MPPS
Distance Source to Entrance	(0040,0306)	DS	Current value	ALWAYS	AUTO/ MPPS
Organ Dose (dGy)	(0040,0316)	DS	Calculated according to Dance| 0 for Insight 2D	ALWAYS	AUTO
Organ Exposed	(0040,0318)	CS	BREAST	ALWAYS	AUTO
Acquisition Context Sequence	(0040,0555)	SQ	Empty	VNAP	AUTO
Acquisition Context	(0040,0556)	ST	Textdescription	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Pres-ence of Value	Source
Description					
Reason For Performed Procedure Step Sequence	(0040,1012)	SQ	RIS or Input	ALWAYS	MWL / USER
Confidentiality Constraint on Patient Data Description	(0040,3001)	LO	From RIS	ANAP	MWL
Entrance Dose in mGy	(0040,8302)	DS	Current value | 0 for Insight 2D	VNAP	AUTO / MPPS
			Group 41		
Calibration Image	(0050,0004)	CS	Yes or NO	ALWAYS	AUTO
View Code Sequence	(0054,0220)	SQ	CID 4014: Special encoding of XCCL / XCCM and SPEC can be configured	ALWAYS	AUTO / USER
>View Modifier Code Sequence	(0054,0222)	SQ	CID 4015	VNAP	AUTO / USER
			Group 51 and Group 55 seeTable 72 - Data Dictionary of Private Attributes		
Presentation LUT Shape	(2050,0020)	CS	INVERS or IDENTITY	ALWAYS	AUTO
Overlay Rows	(60xx,0010)	US	rows	ANAP	AUTO
Overlay Columns	(60xx,0011)	US	columns	ANAP	AUTO
Overlay Description	(60xx,0022)	LO	Siemens MedCom Object Graphics	ANAP	AUTO
Overlay Type	(60xx,0040)	CS	G	ANAP	AUTO
Overlay Origin	(60xx,0050)	SS	1\1	ANAP	AUTO
Overlay Bits Allocated	(60xx,0100)	US	1	ANAP	AUTO
Overlay Bit Position	(60xx,0102)	US	0	ANAP	AUTO
Overlay Data	(60xx,3000)	OB-OW	data	ANAP	AUTO
Pixel Data	(7FE0,0010)	OB-OW		ALWAYS	AUTO

8.1.1.2   CT Standard Extended SOP Classes

MAMMOMAT Revelation creates reconstructed Tomosynthesis slices and synthetic Insight 3D rotational images stored as single frame CT Image.

Table 60 – CT Image

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	From Configuration / RIS	ALWAYS	MWL / CONFIG
Image Type	(0008,0008)	CS	See Table 79 – Image Type	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.2	ALWAYS	AUTO
SOP Instance	(0008,0018)	UI	Created	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
UID					
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	Date of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Date of Creation	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<hhmmss.xxxxxx>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss.xxxxxx>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	Time of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time of Creation	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	RIS or "Accession No." input	VNAP	MWL / USER
Modality	(0008,0060)	CS	MG or configurable to CT	ALWAYS	AUTO / MPPS
Manufacturer	(0008,0070)	LO	SIEMENS	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	RIS or "Institution Name" input	ALWAYS	MWL / USER / CONFIG
Institution address	(0008,0081)	ST	From configuration	ALWAYS	CONGIG
Referring Physician's Name	(0008,0090)	PN	RIS or input	VNAP	MWL / USER
Station Name	(0008,1010)	SH	from Configuration hostname	ALWAYS	CONFIG
Study Description	(0008,1030)	LO	RIS Requested Procedure Description or mapped procedure	ALWAYS	MWL / AUTO
Procedure Code Sequence	(0008,1032)	SQ	Requested Procedure Code Sequence (0032,1062) from Modality Worklist or configured Code	ANAP	MWL / AUTO / MPPS
Series Description	(0008,103E)	LO	see Table 80 – Series Description	ALWAYS	USER / AUTO
Institutional Department Name	(0008,1040)	LO	From configuration	ALWAYS	AUTO
Physician's of Record	(0008,1048)	PN	From RIS	ANAP	AUTO
Performing Physician's Name	(0008,1050)	PN	Performing Physician	ANAP	MWL / USER
Operator's Name	(0008,1070)	PN	"Operator 1"\"Operator 2" input	ANAP	USER
Admitting Diagnosis Description	(0008,1080)	LO	"Admitting Diagnosis"	ANAP	MWL
Manufacturer's Model Name	(0008,1090)	LO	MAMMOMAT Revelation	ALWAYS	AUTO
Referenced Study Sequence	(0008,1110)	SQ	From RIS	ANAP	MWL
Referenced Performed	(0008,1111)	SQ	Set even ifMPPS is not configured	ALWAYS	MPPS

Attribute Name	Tag	VR	Value	Presence of Value	Source
Procedure Step Sequence					
Referenced Patient Sequence	(0008,1120)	SQ	From RIS	ANAP	MWL / MPPS
Derivation Description	(0008,2111)	ST	Image Processing Description	ALWAYS	AUTO
Source Image Sequence	(0008,2112)	SQ	Reference to FOR PROCESSING image projection images	ALWAYS	AUTO
Anatomic Region Sequence	(0008,2218)	SQ	See content	ALWAYS	AUTO
> Code Value	(0008,0100)		T-0400	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)		SNM3		
> Code Meaning	(0008,0104)		Breast	ALWAYS	AUTO
Irradiation Event UID	(0008,3010)	UI	from projections	ALWAYS	AUTO
Patient's Name	(0010,0010)	PN	RIS or "Patient Name" input	ALWAYS	MWL / USER / MPPS
Patient ID	(0010,0020)	LO	RIS or "Patient ID" input	ALWAYS	MWL / USER / MPPS
Patient's Birth Date	(0010,0030)	DA	RIS or checked "Date of Birth" input	ALWAYS	MWL / USER/ MPPS
Patient's Sex	(0010,0040)	CS	RIS or input (M or F or O/unknown)	ALWAYS	MWL / USER/ MPPS
Other Patient IDs	(0010,1000)	LO	From RIS / Social Security Number	ANAP	MWL / USER
Other Patient Names	(0010,1001)	PN	From RIS	ANAP	MWL
Other Patient Ids Sequence	(0010,1002)	SQ	RIS or Input	ANAP	MWL / USER
> Patient ID	(0010,0020)	LO	RIS or Input	ANAP	MWL / USER
> Issuer of Patient ID	(0010,0021)	LO	RIS or Input	ANAP	MWL / USER
Patient's Age	(0010,1010)	AS	Calculated from "Date of Birth" input	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	Patient's height in meters	ANAP	MWL / USER
Patient's Weight	(0010,1030)	DS	(in kilograms)	ANAP	MWL / USER
Military Rank	(0010,1080)	LO	From RIS	ANAP	MWL
Ethnic Group	(0010,2160)	SH	From RIS	ANAP	MWL
Additional Patient History	(0010,21B0)	LT	From RIS	ANAP	MWL

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pregnancy Status	(0010,21C0)	US	From RIS	ANAP	MWL
Patient Comments	(0010,4000)	LT	"Additional Info"	ANAP	MWL/USER
Body Part examined	(0018,0015)	IS	BREAST	ALWAYS	AUTO
Scan Options	(0018,0022)	CS	Number of Projections	ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS	Slice Thickness in mm	ALWAYS	AUTO
KVP	(0018,0060)	DS	KVP	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	<modality serial number>	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	<version>	ALWAYS	AUTO
Protocol Name	(0018,1030)	LO	TOMO | INSIGHT_3D	ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	DS	(mm) SID	ALWAYS	AUTO / MPPS
Distance Source to Patient	(0018,1111)	DS	(mm) SOD	ALWAYS	AUTO
Exposure Time	(0018,1150)	IS	<duration of X-Ray exposure>(msec)	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	(mA)	ALWAYS	AUTO
Exposure	(0018,1152)	IS	(mAs)	ALWAYS	AUTO
Exposure in µAs	(0018,1153)	IS	(µAs)	ALWAYS	AUTO
Filter Type	(0018,1160)	SH	Type of Filter	ALWAYS	AUTO
Focal Spot	(0018,1190)	DS	0.1 | 0.3	ALWAYS	AUTO
Anode Target Material	(0018,1191)	CS	TUNGSTEN	ALWAYS	AUTO
Body Part Thickness	(0018,11A0)	DS	(mm)	ALWAYS	AUTO
Compression Force	(0018,11A2)	DS	(Newton)	ALWAYS	AUTO
Convolution Kernel	(0018,1210)	SH	RPG	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS	Positioner Primary Angle	ALWAYS	AUTO
Patient Position	(0018,5100)	CS	empty	ALWAYS	AUTO
Detector ID	(0018,700A)	SH	Factory Serial Number	ALWAYS	AUTO
Filter Material	(0018,7050)	CS	TITANIUM or RHODIUM	ALWAYS	USER / AUTO
SISOD Distance to Isocenter	(0018,9402)	FL	AUTOMATIC	ALWAYS	AUTO
Private RPG	(0019,xx10)	ST	STD_SEG	ALWAYS	AUTO
Study Instance UID	(0020,000D)	UI	From RIS or system generated	ALWAYS	MWL / AUTO
Series Instance UID	(0020,000E)	UI	generated	ALWAYS	AUTO
Study ID	(0020,0010)	SH	From RIS Requested	ALWAYS	MWL /

Attribute Name	Tag	VR	Value	Presence of Value	Source
			Procedure ID or system created		USER / AUTO / MPPS
Series Number	(0020,0011)	IS	generated	ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS	generated	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	generated	ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS	calculated	ALWAYS	AUTO
Image Orientation Position (Patient)	(0020,0037)	DS	calculated	ALWAYS	AUTO
Frame of Reference UID	(0020,0052)		generated	ALWAYS	AUTO
Image Laterality	(0020,0062)	CS	generated	ALWAYS	USER
Images in Acquisition	(0020,1002)	IS	Generated, number of images in this series	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO	empty	ALWAYS	AUTO
Slice Location	(0020,1041)		Generated|0 for Insight 3D	ALWAYS	AUTO
Image Comments	(0020,4000)	LT	If entered in UI or INSIGHT_3D or Insight Breast Density values, if configured (INBD V_b:value cm3 V_fg:value cm3 VBD:value % Grade:value), if configured	VNAP	USER/AUTO
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	rows	ALWAYS	AUTO
Columns	(0028,0011)	US	columns	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Depending on Configuration	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	14 | 12	ALWAYS	AUTO
High Bit	(0028,0102)	US	13 | 11	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	US	0 or 2BitsStored – 1	ALWAYS	AUTO
Quality Control Image	(0028,0300)	CS	YES or NO	ALWAYS	USER / AUTO
Burned In Annotation	(0028,0301)	CS	"NO"	ALWAYS	AUTO
Window Center	(0028,1050)	DS	Depending on Image processing	ALWAYS	AUTO / USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Width	(0028,1051)	DS	Depending on Image processing	ALWAYS	AUTO / USER
Rescale Intercept	(0028,1052)	DS	0	ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
Rescale Type	(0028,1054)	LO	US	ALWAYS	AUTO
Window Center and Width Explanation	(0028,1055)	LO	Linear LUT	ALWAYS	AUTO
Implant Present	(0028,1300)	CS	YES or NO	ALWAYS	AUTO
Partial View	(0028,1350)	CS	NO	ALWAYS	AUTO
Biopsy Target Sequence	(0018,2041)	SQ	Sequence that identifies the targets of a biopsy procedure. For each submitted target in this slice one item is stored	ANAP	AUTO
>Target UID	(0018,2042)	UI	Unique identifier for the target.	ANAP	AUTO
>Localizing Cursor Position	(0018,2043)	FL	Coordinates of localizing cursor position with respect to the pixel Equivilant to data stored in Overlay group	ANAP	AUTO
>Calculated Target Position	(0018,2044)	FL	The calculated target position (x, y, z) in mm in an equipment relative right-handed coordinate system where the origin is under the central X-Ray beam at the chest wall, and a z value of zero is located at the surface that the breast is in contact with that is closest to the detector. X is parallel to the chest wall, y is positive toward the patient's nipple, and z is positive toward the X-Ray source. Note: y-value is different to displayed y value during examination	ANAP	AUTO
>Target Label	(0018,2045)	SH	Target description: a number starting with 1 for the first target.	ANAP	AUTO
>Displayed Z Value	(0018,2046)	FL	The z value in mm displayed to the user at the time of biopsy. Note: This is the same as the z value of Calculated Target Position.	ANAP	AUTO
>Needle Info	(0023,xx01)See Table 75 - (Private) Acquisition Da-	LO	Needle Type, Needle Gauge and Needle Length in mm,e.g.	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
	taprivate		Type:Fine Gauge:0.7 Length: 100.0		
Requesting Physician	(0032,1032)	PN	From RIS	ANAP	MWL
Requesting Service	(0032,1033)	LO	From RIS	ANAP	MWL
Requested Procedure Description	(0032,1060)	LO	From RIS	ANAP	MWL
Requested Procedure Code Sequence	(0032,1064)	SQ	From RIS	ANAP	MWL
>Code Value	(0008,0100)	SH	From RIS	ANAP	MWL
>Coding Scheme Designator	(0008,0102)	SH	From RIS	ANAP	MWL
>Coding Scheme Version	(0008,0103)	SH	From RIS	ANAP	MWL
>Code Meaning	(0008,0104)	LO	From RIS	ANAP	MWL
Study Comments	(0032,4000)	LT	Patient Registration input	ANAP	USER
Special Needs	(0038,0050)		From RIS	ANAP	MWL
Patient State	(0038,0500)		From RIS	ANAP	MWL
Performed Procedure Step Start Date	(0040,0244)	DA	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step Start Time	(0040,0245)	TM	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step ID	(0040,0253)	SH	supplied, even if MPPS SOP Class is not supported, "MGyyyymmddhhmmss" is set with 1st Image acquired	ALWAYS	AUTO/ MPPS
Performed Procedure Step Description	(0040,0254)	LO	Value of Study Description	ALWAYS	AUTO/ MPPS
Performed Protocol Code Sequence	(0040,0260)	SQ	Same as 0040,0275>0040,0008	ANAP	MWL/ MPPS
Request Attributes Sequence	(0040,0275)	SQ	From RIS	ANAP	MWL
>Scheduled Procedure Step Description	(0040,0007)	LO	From RIS	ANAP	MWL
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	From RIS	ANAP	MWL

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Scheduled Procedure Step ID	(0040,0009)	SH	From RIS	ANAP	MWL
>Requested Procedure ID	(0040,1001)	SH	From RIS or "Request ID" input	ANAP	MWL / USER
Entrance Dose in dGy	(0040,0302)	US	Current value of corresponding scan |empty for Insight 3D	ALWAYS	AUTO/ MPPS
Organ Dose (dGy)	(0040,0316)	DS	Calculated according to Dance of corresponding scan | 0 for Insight 3D	ALWAYS	AUTO
Acquisition Context De-scription	(0040,0556)	ST	Textdescription	ALWAYS	AUTO
Reason For Performed Procedure Step Se-quence	(0040,1012)	SQ	RIS or Input	ALWAYS	MWL / USER
Confidentiality Constraint on Patient Data Description	(0040,3001)	LO	From RIS	ANAP	MWL
Entrance Dose in mGy	(0040,8302)	DS	Current value	ALWAYS	AUTO / MPPS
Private Shad-ow Owner	(0051,00xx)		SIEMENS MED SP DXMG WH AWS see Table 72 - Data Dictionary of Private Attributes	ALWAYS	AUTO
View Code Sequence	(0054,0220)	SQ	CID 4014: Special encoding of XCCL / XCCM and SPEC can be configured	ALWAYS	AUTO / USER
>View Modifier Code Se-quence	(0054,0222)	SQ	CID 4015	VNAP	AUTO / USER
Overlay Rows	(60xx,0010)	US	rows	ANAP	AUTO
Overlay Col-umns	(60xx,0011)	US	columns	ANAP	AUTO
Overlay Description	(60xx,0022)	LO	Siemens MedCom Object Graphics	ANAP	AUTO
Overlay Type	(60xx,0040)	CS	G	ANAP	AUTO
Overlay Origin	(60xx,0050)	SS	1\1	ANAP	AUTO
Overlay Bits Allocated	(60xx,0100)	US	1	ANAP	AUTO
Overlay Bit Position	(60xx,0102)	US	0	ANAP	AUTO
Overlay Data	(60xx,3000)	OW	data	ANAP	AUTO
Pixel Data	(7FE0,0010)	OW		ALWAYS	AUTO

8.1.1.3 Breast Tomosynthesis Standard Extended SOP Classes

MAMMOMAT Revelation creates reconstructed Tomosynthesis slices and synthetic Insight 3D rotational images. These images can be transferred utilizing Breast Tomosynthesis SOP class.

Table 61 – Breast Tomosynthesis Image

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Specific Character Set	(0008,0005)	CS	From Configuration / RIS	ALWAYS	MWL / CONFIG
Image Type	(0008,0008)	CS	See Table 79 – Image Type/ Frame Type	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.13.1.3	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Created	ALWAYS	AUTO
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	Date of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Date of Creation	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<hhmmss>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	Time of Original Acquisition (X-Ray event)	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time of Creation	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	RIS or "Accession No." input	VNAP	MWL / USER
Modality	(0008,0060)	CS	MG	ALWAYS	AUTO / MPPS
Manufacturer	(0008,0070)	LO	SIEMENS	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	RIS or "Institution Name" input	ALWAYS	MWL / USER / CONFIG
Institution address	(0008,0081)	ST	From configuration	ALWAYS	CONGIG
Referring Physician's Name	(0008,0090)	PN	RIS or input	VNAP	MWL / USER
Station Name	(0008,1010)	SH	from Configuration hostname	ALWAYS	CONFIG
Study Description	(0008,1030)	LO	RIS Requested Procedure Description or mapped procedure	ALWAYS	MWL / AUTO
Procedure Code Sequence	(0008,1032)	SQ	Requested Procedure Code Sequence (0032,1062) from Modality Worklist or configured Code	ANAP	MWL / AUTO / MPPS

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Series Description	(0008,103E)	LO	BTO_TOMO….. or BTO_Insight 3D	ALWAYS	USER / AUTO
Institutional Department Name	(0008,1040)	LO	From configuration	ALWAYS	AUTO
Physician's of Record	(0008,1048)	PN	From RIS	ANAP	AUTO
Performing Physician's Name	(0008,1050)	PN	Performing Physician	ANAP	MWL / USER
Operator's Name	(0008,1070)	PN	"Operator 1"\"Operator 2" input	ANAP	USER
Admitting Diagnosis Description	(0008,1080)	LO	"Admitting Diagnosis"	ANAP	MWL
Manufacturer's Model Name	(0008,1090)	LO	MAMMOMAT Revelation	ALWAYS	AUTO
Referenced Study Sequence	(0008,1110)	SQ	From RIS	ANAP	MWL
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Set even if MPPS is not configured	ALWAYS	MPPS
Referenced Patient Sequence	(0008,1120)	SQ	From RIS	ANAP	MWL / MPPS
Derivation Description	(0008,2111)	ST	Image Processing Parameters	ALWAYS	AUTO
Pixel Presentation	(0008,9205)	CS	MONOCHROME	ALWAYS	AUTO
Volumetric Properties	(0008,9206)	CS	VOLUME	ALWAYS	AUTO
Volumetric Based Calculation Technique	(0008,9207)	CS	TOMOSYNTHESIS	ALWAYS	AUTO
Patient's Name	(0010,0010)	PN	RIS or "Patient Name" input	ALWAYS	MWL / USER / MPPS
Patient ID	(0010,0020)	LO	RIS or "Patient ID" input	ALWAYS	MWL / USER / MPPS
Patient's Birth Date	(0010,0030)	DA	RIS or checked "Date of Birth" input	ALWAYS	MWL / USER/ MPPS
Patient's Birth Time	(0010,0032)	TM	RIS or checked "Date of Birth" input	ANAP	MWL / USER/ MPPS
Patient's Sex	(0010,0040)	CS	RIS or input (M or F or O/unknown)	ALWAYS	MWL / USER/ MPPS
Other Patient IDs	(0010,1000)	LO	From RIS / Social Security Number	ANAP	MWL / USER
Other Patient Names	(0010,1001)	PN	From RIS	ANAP	MWL

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Other Patient Ids Sequence	(0010,1002)	SQ	RIS or Input	ANAP	MWL / USER
Patient ID	(0010,0020)	LO	RIS or Input	ANAP	MWL / USER
Issuer of Patient ID	(0010,0021)	LO	RIS or Input	ANAP	MWL / USER
Patient's Age	(0010,1010)	AS	Calculated from "Date of Birth" input	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	Patient's height in meters	ANAP	MWL / USER
Patient's Weight	(0010,1030)	DS	(in kilograms)	ANAP	MWL / USER
Military Rank	(0010,1080)	LO	From RIS	ANAP	MWL
Ethnic Group	(0010,2160)	SH	From RIS	ANAP	MWL
Additional Patient History	(0010,21B0)	LT	From RIS	ANAP	MWL
Pregnancy Status	(0010,21C0)	US	From RIS	ANAP	MWL
Patient Comments	(0010,4000)	LT	"Additional Info"	ANAP	MWL/USER
Body Part examined	(0018,0015)	IS	BREAST	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	<modality serial number>	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	<version>	ALWAYS	AUTO
Protocol Name	(0018,1030)	LO	TOMO or INSIGHT_3D	ALWAYS	AUTO
Content Qualification	(0018,9004)	CS	PRODUCT	ALWAYS	AUTO
Contributing Sources Sequence	(0018,9506)	SQ	See Table 66 – Contributing Source Sequence	ALWAYS	AUTO
X-Ray 3D Acquisition Sequence	(0018,9507)	SQ	See Table 64 – X-Ray 3D Acquisition Sequence	ALWAYS	AUTO
Study Instance UID	(0020,000D)	UI	From RIS or system generated	ALWAYS	MWL / AUTO
Series Instance UID	(0020,000E)	UI	generated	ALWAYS	AUTO
Study ID	(0020,0010)	SH	From RIS Requested Procedure ID or system created	ALWAYS	MWL / USER / AUTO / MPPS
Series Number	(0020,0011)	IS	generated	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	generated	ALWAYS	AUTO
Frame of Reference UID	(0020,0052)		generated	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO	Empty	ALWAYS	AUTO

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Number of Frames	(0028,0008)	IS	Number of frames	ALWAYS	AUTO
Rows	(0028,0010)	US	rows	ALWAYS	AUTO
Columns	(0028,0011)	US	columns	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	12	ALWAYS	AUTO
High Bit	(0028,0102)	US	11	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	US	0	ALWAYS	AUTO
Quality Control Image	(0028,0300)	CS	YES or NO	ALWAYS	USER / AUTO
Burned In Annotation	(0028,0301)	CS	"NO"	ALWAYS	AUTO
Breast Implant Present	(0028,1300)	CS	YES or NO	ALWAYS	AUTO
Partial View	(0028,1350)	CS	NO	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	"00", "01" if image was sent lossy compressed by the USER	ALWAYS	AUTO
Requesting Physician	(0032,1032)	PN	From RIS	ANAP	MWL
Requesting Service	(0032,1033)	LO	From RIS	ANAP	MWL
Requested Procedure Description	(0032,1060)	LO	From RIS	ANAP	MWL
Requested Procedure Code Sequence	(0032,1064)	SQ	From RIS	ANAP	MWL
>Code Value	(0008,0100)	SH	From RIS	ANAP	MWL
>Coding Scheme Desig-nator	(0008,0102)	SH	From RIS	ANAP	MWL
>Coding Scheme Version	(0008,0103)	SH	From RIS	ANAP	MWL
>Code Meaning	(0008,0104)	LO	From RIS	ANAP	MWL
Study Com-ments	(0032,4000)	LT	Patient Registration input	ANAP	USER
Special Needs	(0038,0050)		From RIS	ANAP	MWL
Patient State	(0038,0500)		From RIS	ANAP	MWL

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Performed Procedure Step Start Date	(0040,0244)	DA	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step Start Time	(0040,0245)	TM	supplied, even if MPPS SOP Class is not supported	ALWAYS	AUTO/ MPPS
Performed Procedure Step ID	(0040,0253)	SH	supplied, even if MPPS SOP Class is not supported, "MGyyyymmddhhmmss" is set with 1st Image acquired	ALWAYS	AUTO/ MPPS
Performed Procedure Step Description	(0040,0254)	LO	Value of Study Description	ALWAYS	AUTO/ MPPS
Performed Protocol Code Sequence	(0040,0260)	SQ	Same as 0040,0275>0040,0008	ANAP	MWL/ MPPS
Request Attrib- utes Sequence	(0040,0275)	SQ	From RIS	ANAP	MWL
>Scheduled Procedure Step Description	(0040,0007)	LO	From RIS	ANAP	MWL
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	From RIS	ANAP	MWL
>Scheduled Procedure Step ID	(0040,0009)	SH	From RIS	ANAP	MWL
>Requested Procedure ID	(0040,1001)	SH	From RIS or "Request ID" input	ANAP	MWL / USER
Acquisition Con- text Sequence	(0040,0555)	SQ	<null>	ALWAYS	AUTO
Comments on Radiaton Dose	(0040,0310)	LT	calculated	VNAP	AUTO configuration possible for calculated density values
Confidentiality Constraint on Patient Data Description	(0040,3001)	LO	From RIS	ANAP	MWL
View Code Se- quence	(0054,0220)	SQ	CID 4014	ALWAYS	AUTO / USER
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO
Shared Functional Groups Sqeuence	(5200,9229)	SQ	See Table 62 – Shared Func- tional Group Sequence	ALWAYS	AUTO
Per Frame Functional Groups	(5200,9230)	SQ	See Table 63 – Per Frame Func- tional Group Sequence	ALWAYS	AUTO

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Sqeuence					
Pixel Data	(7FE0,0010)	OB - OW	Pixel frames	ALWAYS	AUTO

8.1.1.3.1 Shared Functional Groups Sequence

Table 62 – Shared Functional Group Sequence

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Frame Anatomy Sequence	(0020,9071)	SQ	n.a.-	ALWAYS	AUTO
>Anatomic Region Sequence	(0008,2218)	SQ	n.a.	ALWAYS	AUTO
>> Code Value	(0008,9205)	SH	T-0400	ALWAYS	AUTO
>> Coding Scheme Designator	(0008,9206)	SH	SRT	ALWAYS	AUTO
>> Code Meaning	(0008,9207)	LO	Breast	ALWAYS	AUTO
Frame Laterality	(0020,9072)	CS	<laterality>	ALWAYS	AUTO
Plane Orientation Sequence	(0020,9116)	SQ	n.a.	ALWAYS	AUTO
>Image Orientation (Patient)	(0020,0037)	DS	Calculated	ALWAYS	AUTO
Pixel Measures Sequence	(0028,9110)	SQ	n.a.	ALWAYS	AUTO
>Slice Thickness	(0018,0050)	DS	calculated	ALWAYS	AUTO
>Pixel Spacing	(0028,0030)	DS	calculated	ALWAYS	AUTO
Frame VOI LUT sequence	(0028,9132)	SQ	n.a.	ALWAYS	AUTO
>Window Center	(0028,1050)	DS	calculated	ALWAYS	AUTO
>Window Width	(0028,1051)	DS	calculated	ALWAYS	AUTO
>Window Center and Width Explanation	(0028,1055)	LO	linear LUT	ALWAYS	AUTO
Pixel Value Transformation Sequence	(0028,9145)	SQ	n.a.	ALWAYS	AUTO
>Rescale Intercept	(0028,1052)	DS	0	ALWAYS	AUTO
>Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
>Rescale Type	(0028,1054)	LO	US	ALWAYS	AUTO

8.1.1.3.2 Per Frame Functional Groups Sequence

Table 63 – Per Frame Functional Group Sequence

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
X-Ray 3D Frame Type Sequence	(0018,9504)	SQ	n.a.	ALWAYS	AUTO
> Frame Type	(0008,9007)	CS	DERIVED \PRIMARY\TOMOSYNTHESIS\ NONE	ALWAYS	AUTO
> Pixel Presentation	(0008,9205)	CS	MONOCHROME	ALWAYS	AUTO
>Volumetric Properties	(0008,9206)	CS	VOLUME	ALWAYS	AUTO
>Volumetric Based Calculation Technique	(0008,9207)	CS	TOMOSYNTHESIS	ALWAYS	AUTO
Frame Content Sequence Sequence	(0020,9111)	SQ	n.a.	ALWAYS	AUTO
>Frame Acquisition Date and Time	(0018,9074)	DT	Date and Time	ALWAYS	AUTO
>Frame Acquisition Number	(0020,9156)	UL	Acquisition Number	ALWAYS	AUTO
>Frame Comment	(0020,9158)	UL	User comment | Density values, if configured	ANAP	USER | AUTO
Plane Position Sequence	(0020,9113)	SQ	n.a.	ALWAYS	AUTO
> Image Position (Patient)	(0020,0032)	DS	calculated	ALWAYS	AUTO
Biopsy Target Sequence	(0018,2041)	SQ	For each submitted target in this frame one item is stored	ANAP	AUTO
>Target UID	(0018,2042)	UI	Unique identifier for the target.	ANAP	AUTO
>Localizing Cursor Position	(0018,2043)	FL	Coordinates of localizing cursor position with respect to the pixel in this frame	ANAP	USER
>Calculated Target Position	(0018,2044)	FL	The calculated target position (x, y, z) in mm in an equipment relative right-handed coordinate system where the origin is under the central X-Ray beam at the chest wall, and a z value of zero is located at the surface that the breast is in	ANAP	USER

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
			contact with that is closest to the detector. X is parallel to the chest wall, y is positive toward the patient's nipple, and z is positive toward the X-Ray source. Note: y-value is different to displayed y value during examination		
>Target Label	(0018,2045)	SH	Target description: a number starting with 1 for the first target.	ANAP	AUTO
>Displayed Z Value	(0018,2046)	FL	The z value in mm displayed to the user at the time of biopsy. Note: This is the same as the z value of Calculated Target Position.	ANAP	AUTO
>Needle Info	(0023,xx01)See Table 75 - (Private) Acquisition Data	LO	Needle Type, Needle Gauge and Needle Length in mm,e.g. Type:Fine Gauge:0.7 Length: 100.0	ANAP	USER

8.1.1.3.3 X-Ray 3D Acquisition Sequence
Table 64 – X-Ray 3D Acquisition Sequence

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
KVP	(0018,0060)	DS	value	ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	DS	(mm) SID	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	(mm) SOD	ALWAYS	AUTO
Estimated Radiographic Factor	(0018,1114)	DS	(mm) SID/SOD	ALWAYS	AUTO
Field of View Shape	(0018,1147)	CS	RECTANGLE	ALWAYS	AUTO
Filter Type	(0018,1160)	SH	STRIP	ALWAYS	AUTO
Grid	(0018,1166)	DS	NONE	ALWAYS	AUTO
Focal Spot	(0018,1190)	DS	0.1 | 0.3	ALWAYS	AUTO
Anode Target Material	(0018,1191)	CS	TUNGSTEN	ALWAYS	AUTO
Body Part Thickness	(0018,11A0)	DS	(mm)	ALWAYS	AUTO
Compression Force	(0018,11A2)	DS	(Newton)	ALWAYS	AUTO

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Paddel Description	(0018,11A4)	LO	TOMO	ALWAYS	AUTO
Detector Temperature	(0018,7001)	DS	<value>	ALWAYS	AUTO
Detector Binning	(0018,701A)	DS	1\1	ALWAYS	AUTO
Filter Material	(0018,7050)	CS	TITANIUM | RHODIUM	ALWAYS	AUTO
Filter Thickness Minimum	(0018,7052)	DS	0.05	ALWAYS	AUTO
Filter Thickness Maximum	(0018,7054)	DS	0.05	ALWAYS	AUTO
Exposure Control Mode	(0018,7060)	CS	AUTOMATIC	ALWAYS	AUTO
Exposure Control Mode Description	(0018,7062)	LT	Text description of the mechanism of exposure control	ALWAYS	AUTO
Exposure Time	(0018,9328)	FD	<duration of x-Ray exposure>(msec)	ALWAYS	AUTO
X-Ray Tube Current	(0018,9330)	FD	(mA)	ALWAYS	AUTO
Exposure in mAs	(0018,9332)	FD	(mAs)	ALWAYS	AUTO
Source Isocenter Distance	(0018,9402)	FL	Todo:missingvalue	ALWAYS	
X-Ray Receptor Type	(0018,9420)	CS	DIGITAL_DETECTOR	ALWAYS	AUTO
Field of View Dimension(s) in Float	(0018,9461)	FL		ALWAYS	AUTO
Primary Positioner Scan Arc	(0018,9508)	FL	48	ALWAYS	AUTO
Primary Positioner Scan Start Arc	(0018,9510)	FL	Current value	ALWAYS	AUTO
Primary Positioner Increment	(0018,9514)	FL	Current value	ALWAYS	AUTO
Start Acquisition Date Time	(0018,9516)	DT	Current value	ALWAYS	AUTO
Per Projection Acquisiion Sequence	(0018,9538)	SQ	See Table 65 – Per Projection Acquisition Sequence	ALWAYS	AUTO
Half Value Layer	(0040,0314)	DS	Current value	ALWAYS	AUTO
Organ dose	(0040,0316)	DS	For all projections	ALWAYS	AUTO
Entrance Dose in mGy	(0040,8302)	DS	Current value	ALWAYS	AUTO

8.1.1.3.4 Per Projection Acquisition Sequence

Table 65 – Per Projection Acquisition Sequence

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
KVP	(0018,0060)	DS	value	ALWAYS	AUTO
Relative X-Ray Exposure	(0018,1405)	IS	Percentage value of maximum allowed dose	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS	value	ALWAYS	AUTO
Exposure Time	(0018,9328)	FD	<duration of x-Ray exposure>(msec)	ALWAYS	AUTO
X-Ray Tube Current	(0018,9330)	FD	(mA)	ALWAYS	AUTO
Exposure in mAs	(0018,9332)	FD	(mAs)	ALWAYS	AUTO
Organ dose	(0040,0316)	DS	For this projections	ALWAYS	AUTO
Entrance Dose in mGy	(0040,8302)	DS	Current value	ALWAYS	AUTO

8.1.1.3.5 Contributing Sources Sequence

Table 66 – Contributing Source Sequence

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Acquisition Date Time	(0008,002A)	DT	value	ALWAYS	AUTO
Manufacturer	(0008,0070)	LO	SIEMENS	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	hostname	ALWAYS	CONFIG
Detector Type	(0018,7004)	CS	MAMMOMAT Revelation	ALWAYS	AUTO
Detector ID	(0018,700A)	SH	<modality serial number>	ALWAYS	AUTO
Date of Last Detector Calibration	(0018,700C)	DA	<versions	ALWAYS	AUTO
Time of Last Detector Calibration	(0018,700E)	TM	TOMO_PRO	ALWAYS	AUTO
Detector Element Spacing	(0018,7022)	DS	DIRECT	ALWAYS	AUTO
Contributing SOP Instances Reference Sequence	(0020,9529)	SQ	Serial number	ALWAYS	AUTO

NAME	TAG	VR	VALUE	PRESENCE OF VALUE	SOURCE
Manufacturer	(0008,0070)	LO	<yyyymmdd>	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	<hhmmss>	ALWAYS	AUTO
Rows	(0028,0010)	US	Current values	ALWAYS	AUTO
Columns	(0028,0011)	US	References to projection images	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	rows	ALWAYS	AUTO

8.1.1.4   X-Ray Radiation Dose SR IOD

MAMMOMAT Revelation automatically creates Projection X-Ray Radiation Dose Structured Reports using following tailored and extended Template TID 10001 Projection X-Ray Radiation Dose.

Figure 3 X-Ray Radiation Dose SR IOD Template Structure
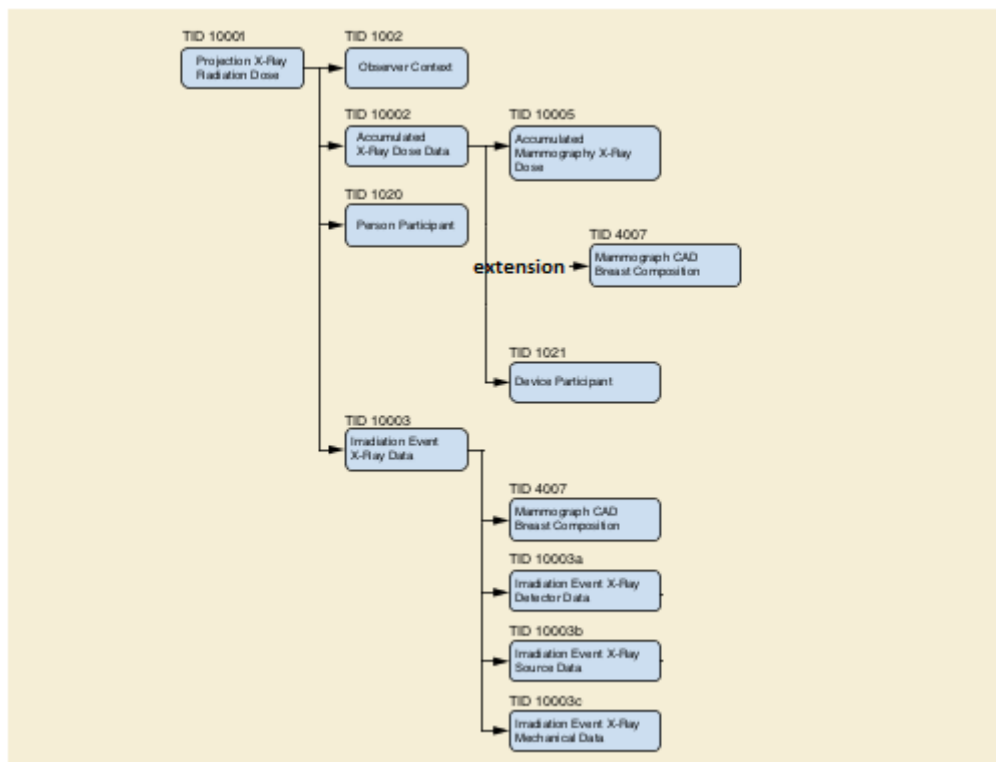
8.1.1.4.1   Projection X-Ray Radiation Dose

Table 67 – TID 10001 Projection X-Ray Radiation Dose

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
		CONTAINER	EV (113701, DCM, "X-Ray Radiation Dose Report")	Root node
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, "Procedure report-ed")	DT (P5-40010, SRT, "Mammogra-phy")
>>	HAS CONCEPT MOD	CODE	EV (G-C0E8, SRT, "Has Intent")	EV (R-408C3,SRT, "Diagnostic Intent")
DTID 1002 1004 "Observer Context"				
>	HAS OBS CON-TEXTS	CODE	EV (121005, DCM, "Observer Type")	EV (121007,DCM, "Device")

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
>	HAS OBS CON-TEXTS	UIDREF	EV (121012, DCM, "Device Observer UID")	1.3.12.2.1107.5.12.7
>	HAS OBS CON-TEXTS	CODE	EV (121005, DCM, "Observer Type")	EV (121006,DCM, "Person")
>	HAS OBS CON-TEXTS	PNAME	EV (121008, DCM, "Person Observer Name")	Performing physician| operator| unknown
>	HAS OBS CON-TEXTS	CODE	EV (121011, DCM, "Person Observer's Role in this procedure	EV(113851,DCM," Irraditaion Administering")
>	HAS OBS CON-TEXT	CODE	EV (113705, DCM, "Scope of Accumulation")	EV (113016, DCM, "Performed Procedure Step")
>>	HAS PROPER-TIES	UIDREF	EV (121126, DCM, "Performed Procedure Step SOP Instance UID")	MPPS UID
>	CONTAINS	CODE	EV (113945, DCM, "X-Ray Detector Data Available")	EV (R-0038D,SRT,"Yes")
>	CONTAINS	CODE	EV (113943, DCM, "X-Ray Source Data Available")	EV (R-0038D,SRT,"Yes")
>	CONTAINS	CODE	EV (113944, DCM, "X-Ray Mechanical Data Available")	EV (R-0038D,SRT,"Yes")
>	CONTAINS	INCLUDE	DTID 10002 "Accumulated X-Ray Dose"	See Table 68 – TID 10002 Accumulated X-Ray Dose
>	CONTAINS	INCLUDE	DTID 10003 "Irradiation Event X-Ray Data"	For each Irradiation Event See Table 69 – TID 10003 Irradiation Event X-Ray Data
>	CONTAINS	CODE	EV (113854, DCM, "Source of Dose Information")	EV(113856,DCM,"Automated Data Collection")

8.1.1.4.2 Accumulated X-Ray Dose

Table 68 – TID 10002 Accumulated X-Ray Dose

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
		CONTAINER	EV (113702, DCM, "Accumulated X-Ray Dose Data")	
>	HAS CON-CEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	113622, DCM, "Single Plane"

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
DTID 10005 "Accumulated Mammography X-Ray Dose"				
>	CONTAINS	NUM	EV (111637, DCM, "Accumulated Average Glandular Dose")	Per examination
>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	EV(SRT,T-04030,"Left Breast")
>	CONTAINS	NUM	EV (111637, DCM, "Accumulated Average Glandular Dose")	Per examination
>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	EV(T-04020, SRT, "Right Breast")
Bilateral density extension standard extended attributes TID 4007				
>	CONTAINS	CODE	EV (F-01710, SRT, "Breast composition")	Insight Breast Density Grade per examination, if Insight Breast Density is configured
>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	(T-04080, SRT, "Both breasts")

8.1.1.4.3 Irradiation Event X-Ray Data
Table 69 – TID 10003 Irradiation Event X-Ray Data

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
		CONTAINER	EV (113706, DCM, "Irradiation Event X-Ray Data")	
>	HAS CONCEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	EV (113622, DCM, "Single Plane")
>	CONTAINS	UIDREF	EV (113769, DCM, "Irradiation Event UID")	Fom image hint: One UID for one Tomosynthesis view only
>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	From image
>	CONTAINS	CODE	EV (113721, DCM, "Irradiation Event Type")	EV(113611, DCM, "Stationary Acquisition" for 2D images) or EV(113613, DCM, "Rotational Acquisition") for TOMO
>	CONTAINS	TEXT	EV (125203, DCM, "Acquisition Protocol")	MAMMOGRAM|STEREO|TOMO_PROJ

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
>	CONTAINS	CODE	EV (T-D0005, SRT, "Anatomical structure")	EV (T-04000,SRT,"Breast")
>	CONTAINS	NUM	EV (111634, DCM, "Half Value Layer")	UNITS = EV (mm, UCUM, "mm") , copy value from raw image
>	CONTAINS	NUM	EV (111638, DCM, "Patient Equivalent Thickness")	UNITS = EV (mm, UCUM, "mm"), body part thickness
>	CONTAINS	NUM	EV (111636, DCM, "Entrance Exposure at RP")	UNITS = EV (mGy, UCUM, "mGy"),
>	CONTAINS	CODE	EV (113780, DCM, "Reference Point Definition")	EV(113865,DCM,"Entrance exposure to a 4.2 cm breast thickness")
DTID 4007 "Mammography CAD Breast Composition"				
>	CONTAINS	CODE	EV (F-01710, SRT, "Breast composition")	Grade Per Image, if Insight Breast Density is configured: (F-01711,SRT, Almost entirely fat) (F-01712,SRT, Scattered fibroglandular densities) (F-01713,SRT, Heterogeneously dense) (F-01714,SRT, Extremely dense)
>	CONTAINS	NUM	EV (111046, DCM, "Percent Fibroglandular Tissue")	VBD Value Per Image, if Insight Breast Density is configured Value = 0 - 100
DTID 10003A "Irradiation Event X-Ray Detector Data"				
>	CONTAINS	IMAGE	EV (113795, DCM, "Acquired Image")	References to raw images. In case of TOMO all raw projection images are referenced. Row needs to be repeated for each image
>	CONTAINS	INCLUDE	DTID 10003B "Irradiation Event X-Ray Source Data"	See Table 70 – TID 10003B Irradiation Event X-Ray Source Data
>	CONTAINS	INCLUDE	DTID 10003C "Irradiation Event X-Ray Mechanical Data"	See Table 71 – TID 10003C Irradiation Event X-Ray Mechanical Data

8.1.1.4.4 Irradiation Event X-Ray Source Data

Table 70 – TID 10003B Irradiation Event X-Ray Source Data

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
		NUM	EV (111631, DCM, "Average Glandular Dose")	AGD from image, in case of Tomo from one projection only
		NUM	EV (113742, DCM, "Irradiation Duration")	Duration time taking this image
		NUM	EV (113733, DCM, "KVP")	KV from image
		NUM	EV (113767, DCM, "Average X-Ray Tube Current")	mA from image
		NUM	EV (113824, DCM, "Exposure Time")	Exposure time from image
		NUM	EV (113736, DCM, "Exposure")	Exposure from image
		NUM	EV (113766, DCM, "Focal Spot Size")	UNITS = EV (mm, UCUM, "mm")
		CODE	EV (111632, DCM, "Anode Target Material")	From image
		CONTAINER	EV (113771, DCM, "X-Ray Filters")	n.a.
>	CONTAINS	CODE	EV (113772, DCM, "X-Ray Filter Type")	From image
>	CONTAINS	CODE	EV (113757, DCM, "X-Ray Filter Material")	From image
>	CONTAINS	NUM	EV (113758, DCM, "X-Ray Filter Thickness Minimum")	From image
>	CONTAINS	NUM	EV (113773, DCM, "X-Ray Filter Thickness Maximum")	From image
		CODE	EV (111635, DCM, "X-Ray Grid")	One of: • EV(DCM,111646,No grid) • EV(DCM,111646,No grid) and EV(199SMS_SPWH, G_001, Prime) • EV(DCM,111642,Focused grid) and EV(DCM,111644,Parallel grid)

8.1.1.4.5 Irradiation Event X-Ray Mechanical Data
Table 71 – TID 10003C Irradiation Event X-Ray Mechanical Data

NL	REL WITH PARENT	VT	CONCEPT NAME	VALUE
		NUM	EV (112011, DCM, "Positioner Primary Angle")	From image
		NUM	EV (112012, DCM, "Positioner Secondary Angle")	From image
		NUM	EV (113739, DCM, "Positioner Primary End Angle")	From image - Set only if Tomo
		NUM	EV (113740, DCM, "Positioner Secondary End Angle")	From image - Set only if Tomo
		NUM	EV (111633, DCM, "Compression Thickness")	From image
		NUM	EV(113748,DCM,"Distance Source to Isocenter")	From image
		NUM	EV(113750,DCM,"Distance Source to Detector")	From image

8.1.1.5 Key Object Selection

Correction of images will be documented in Key Object Selections with Document Title valued (113037, DCM, "Rejected for Patient Safety Reasons).
Bad images will be documented with Key Object Selection with the Document Title valued (113001, DCM, "Rejected for Quality Reasons").

Both objects use the Template TID 2010. The creation of KOS objects is configurable.

8.1.2 Usage of attributes from received IODs

Please refer to the "SOP specific conformance…" sections in the DICOM networking part of this DCS for more details on attribute specific handling.

8.1.3 Attribute mapping

The MAMMOMAT Revelation implements an actor Acquisition Modality according to the IHE Scheduled Workflow (SWF) profile.
The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in Table 40 - Basic Worklist C-FIND-RSP Return Key Attributes

The MAMMOMAT Revelation DICOM application is not performing data coercion.

8.2 Data Dictionary of private Attributes

Table 72 - Data Dictionary of Private Attributes

Tag	Private Owner Code	Name	VR	VM
(0019,xx01)	SIEMENS MED SP DXMG WH AWS 1	AEC Coordinates	UL	n
(0019,xx02)	SIEMENS MED SP DXMG WH AWS 1	AEC Coordinates Size	US	2
(0019,xx05)	SIEMENS MED SP DXMG WH AWS 1	AEC Control Image Row	US	1
(0019,xx06)	SIEMENS MED SP DXMG WH AWS 1	AEC Control Image Column	US	1
(0019,xx07)	SIEMENS MED SP DXMG WH AWS 1	AEC Control Image Pixel	OB	1
(0019,xx10)	SIEMENS MED SP DXMG WH AWS 1	Derivation Description	ST	1
(0021,xx01)	SIEMENS MED SP DXMG WH AWS 1	Breast Density Algorithm	CS	1
(0021,xx02)	SIEMENS MED SP DXMG WH AWS 1	Breast Density Version	SH	1
(0021,xx05)	SIEMENS MED SP DXMG WH AWS 1	Breast Density ThresholdValues	SH	3
(0021,xx10)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density values per Image	LO	1
(0021,xx11)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density Grade per Image	SH	1
(0021,xx012)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density values per Breast	LO	1
(0021,xx13)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density Grade per Breast	SH	1
(0021,xx14)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density Uncertainty per Breast	DS	1
(0021,xx15)	SIEMENS MED SP DXMG WH AWS 1	Insight Breast Density Grade per Patient	SH	1
(0025,xx01)	SIEMENS MED SP DXMG WH AWS 1	Energy Weighting Factor	DS	1
(0029,xx08)	SIEMENS CSA HEADER	Modality Image Header Type	CS	1
(0029,xx09)	SIEMENS CSA HEADER	Modality Image Header Version	LO	1
(0029,xx10)	SIEMENS CSA HEADER	Modality Image Header Info	OB	1
(0029,xx18)	SIEMENS CSA HEADER	Modality Series Header Type	CS	1
(0029,xx19)	SIEMENS CSA HEADER	Modality Series Header Version	LO	1
(0029,xx20)	SIEMENS CSA HEADER	Modality Series Header Info	OB	1
(0041,xx02)	SIEMENS MED SP DXMG WH AWS 1	Reason of Requested Procedure	LO	1
(0051,xx10)	SIEMENS MED SP DXMG WH AWS 1	Reconstruction Center	DS	1
(0051,xx20)	SIEMENS MED SP DXMG WH AWS 1	Autowindow Percentile	ST	1
(0051,xx21)	SIEMENS MED SP DXMG WH AWS 1	SIEMENS_TOMO	LO	1
(0051,xx32)	SIEMENS MED SP DXMG WH AWS 1	Image Position (Tomo)	DS	3
(0051,xx37)	SIEMENS MED SP DXMG WH AWS 1	Image Orientation (Tomo)	DS	6
(0051,xx50)	SIEMENS MED SP DXMG WH AWS 1	Projection Series Instance UID	UI	1

Tag	Private Owner Code	Name	VR	VM
(0051,xx60)	SIEMENS MED SP DXMG WH AWS 1	Primary Positioner Scan Arc	DS	1
(0051,xx61)	SIEMENS MED SP DXMG WH AWS 1	Secondary Positioner Scan Angle	DS	1
(0051,xx62)	SIEMENS MED SP DXMG WH AWS 1	Primary Positioner Scan Start Angle	DS	1
(0051,xx63)	SIEMENS MED SP DXMG WH AWS 1	Secondary Positioner Scan Start Angle	DS	1
(0051,xx64)	SIEMENS MED SP DXMG WH AWS 1	Primary Positioner Increment	DS	1
(0051,xx65)	SIEMENS MED SP DXMG WH AWS 1	Secondary Positioner Increment	DS	1
(0055,xx01)	SIEMENS MED SP DXMG WH AWS 1	Display Name of Projection View	LO	1

8.3 Coded Terminology and Templates

n.a.

8.4 Grayscale Image Consistency

The high resolution TFT display monitor option of MAMMOMAT Revelation comes with a DICOM Grayscale Standard Display Function (GSDF) compliant factory pre-setting. A typical working environment setup is assumed for ambient light.

8.5 Standard Extended/Specialized/Private SOP Classes

8.5.1 Standard Extended SOP Classes

The SOP Instances created by MAMMOMAT Revelation are standard-extended by adding the following private modules. The used shadow owner code is "SIEMENS MED SP DXMG WH AWS 1".

Table 73 - Private Modules

IE	Module	Reference	Usage	Note
Image	AEC Information	8.5.1.1	U	private AEC Information
	Acquisition Data	8.5.1.2	U	additional private Information about image Acquisition
	TiCEM	8.5.1.3	U	TiCEM Data
	Breast Density	8.5.1.4	U	Breast Density Measurements

U = User Option

8.5.1.1 AEC Information Module

The table in this section contains private IOD Attributes that describe AEC control.

Table 74 - (Private) AEC Information

Attribute Name	Tag	VR	Description
AEC Coordinates	(0019,xx01)	UL	internal use only
AEC Coordinates Size	(0019,xx02)	US	internal use only

8.5.1.2 Acquisition Data Module

The table in this section contains private IOD Attributes that describe additional acquisition parameters.

Table 75 - (Private) Acquisition Data

Attribute Name	Tag	VR	Description
Projection View Display String	(0055,xx01)		internal use only
Reason for the Requested Procedure	(0041,xx02)		internal use only

8.5.1.3 TiCEM Module

The table in this section contains private IOD Attributes that describe additional dual energy parameters.

Table 76 - (Private) Acquisition Data

Attribute Name	Tag	VR	Description
Energy Weighting Factor	(0025,xx01)	DS	The parameter background used to generate the processed Insight CEM image of the dual energy sequence

8.5.1.4 Breast Density Module

Following table describes private attributes containing results of breast density measurements calculated during acquisition.

Table 77 - (Private) Acquisition Data

Attribute Name	Tag	VR	Format
Breast Density Algorithm	(0021,xx01)	CS	average or highest
Breast Density Version	(0021,xx02)	SH	<version>
Breast Density Thresh-oldValues	(0021,xx05)	SH	3 values
Insight Breast Density values per Image	(0021,xx10)	LO	V_b: <Breast Volume>cm3 V_fg :< Fibroglandular Volume>cm3 VBD:<Volumetric breast density>%
Insight Breast Density Grade per Image	(0021,xx11)	SH	Breast Density grade of image
Insight Breast Density values per Breast	(0021,xx012)	LO	V_b:<value>cm3, V_fg:<value>cm3, VBD:<value>3.5%"
Insight Breast Density Grade per Breast	(0021,xx13)	SH	Breast denstity grade per breast
Insight Breast Density Uncertainty per Breast	(0021,xx14)	DS	0 or 1, if this value is uncertain (e.g.corresponding image grade values differ to much)
Insight Breast Density Grade per Patient	(0021,xx15)	SH	Breast density grade per patient

8.5.1.5 Tomosynthesis Module

Following table describes additional data stored during a Tomosynthesis acquisition.

Table 78 - (Private) Acquisition Data

Attribute Name	Tag	VR	Format
Reconstruction Center	(0051,xx10)	ST	Reconstruction parameter: "ReconCenter: <>; FocalSpo-tOffset:<>; DetectorRadius:<>; FocusRadius:<>"
Autowindow Percentiles	(0051,xx20)	ST	Internal use only
Image Position (Tomo)	(0051,xx32)	DS	Center position of the first pixel in mm in the tomo equipment coordinate system (x, y, z). x/y plane = detector plane Right handed Cartesian. Origin in detector center
Image Orientation (Tomo)	(0051,xx37)	DS	In tomo equipement coordinate system
Projection Series	(0051,xx50)	UI	Instance UID of the projection series
Primary Positioner Scan Arc	(0051,xx60)	DS	CT Image only
Secondary Positioner Scan Arc	(0051,xx61)	DSO	CT Image only
Primary Positioner Scan Start Angle	(0051,xx62)	DS	CT Image only
Secondary Positioner Scan Start Angle	(0051,xx63)	DS	CT Image only
Primary Positioner Increment	(0051,xx64)	DS	CT Image only
Secondary Positioner Increment	(0051,xx65)	DS	CT Image only

8.5.1.6   SOP Common Module - Image Type Extensions

Additional values for the image type attribute are used to designate the purpose of the SOP instance created by the MAMMOMAT Revelation system. Please see the following table for details.

Table 79 – Image Type/ Frame Type

Value	Description
ORIGINAL | PRIMARY | | *xxxxx*	Raw Normal 2D images
DERIVED | PRIMARY | | *xxxxx*	Processed Normal 2D mages
2D Stereo	
ORIGINAL | PRIMARY | STEREO_SCOUT| *xxxxx* ORIGINAL | PRIMARY | STEREO_MINUS| *xxxxx* ORIGINAL | PRIMARY | STEREO_PLUS| *xxxxx*	Raw 2D Stereo images
DERIVED | PRIMARY | STEREO_SCOUT| *xxxxx* DERIVED | PRIMARY | STEREO_MINUS| *xxxxx* DERIVED | PRIMARY | STEREO_PLUS| *xxxxx*	Processed 2D Stereo images
Tomosynthesisi	
ORIGINAL | PRIMARY | TOMO_PROJ | *xxxxx*	Raw Tomo Projections
DERIVED | PRIMARY | TOMO_PROJ | *xxxxx*	Derived Tomo Projections
ORIGINAL | PRIMARY | TOMO_2D | *xxxxx*	Processed Tomo Projections from Combo Mode
DERIVED | PRIMARY | TOMO | \yyyyy	Tomo Slices in CT format
DERIVED | PRIMARY | TOMOSYNTHESIS | yyyyy	Tomo Slices in BTO format
Synthetic Images	
DERIVED | PRIMARY | TOMO | xxxxx | INSIGHT_3D	Insight 3D Mammograms in CT format
DERIVED | PRIMARY | TOMOSYNTHESIS | xxxxx | INSIGHT_3D	Insight 3D Mammograms in BTO format
TiCEM	
ORIGINAL | PRIMARY | LOW_ENERGY | *xxxxx* | LOW_ENERGY ORIGINAL | PRIMARY | HIGH_ENERGY | *xxxxx* | HIGH_ENERGY	Raw TiCEM images
DERIVED | PRIMARY | LOW_ENERGY | *xxxxx* | LOW_ENERGY	Processed TiCEM images
DERIVED | PRIMARY | RECOMBINED | SUBTRACTION | IN-SIGHT_CEM	Insight CEM images
2D Stereo	
DERIVED | PRIMARY | TOMO_SCOUT | NONE	Tomo Scout in CT and BTO format
ORIGINAL | PRIMARY | TOMO_PROJ_SCOUT | *xxxxx*	Raw Tomo Scout Projections
DERIVED | PRIMARY | TOMO_PROJ_SCOUT | *xxxxx*	Processed Scout Tomo Projections

8.5.1.7   Series Description

The series description helps the user to group and identify different kind of images created during a procedure.The view and laterality is part of the series description in cases where only images of one view are stored in that series.

Table 80 – Series Description

Value	Description
MAMMOGRAM_raw, <purpose>	Raw Normal 2D and Stereo images
MAMMOGRAM, <purpose>	Processed Normal 2D and Stereo images
T_PR_raw Laterality + Projection View, <purpose>	Raw Tomo Projections
T_PR Laterality + Projection View, <purpose>	Processed Tomo Projections
<BTO_>TOMO Laterality + Projection View, RPG Name, <purpose>	Tomo Slices
INSIGHT 2D Laterality + Projection View, <purpose>	Synthetic 2D

Value	Description
<BTO_>INSIGHT 3D Laterality + Projection View, <purpose>	Rotating Mammogram
TiCEM_raw Laterality + Projection View , <purpose>	Raw 2D TiCEM images
TiCEM Laterality + Projection View, <purpose>	Processed 2D TiCEM images
Insight CEM Laterality + Projection View, <purpose>	Insight CEM images
TOMO Laterality + Projection View SC, RPG Name, <purpose>	Tomo Scout
T_PR_raw Laterality + Projection View SC, <purpose>	Raw Tomo Scout Projections
T_PR Laterality + Projection View SC, <purpose>	Processed Scout Tomo Projections

8.6   Private Transfer Syntaxes

No private Transfer Syntaxes are defined for or requested by MAMMOMAT Revelation DICOM application.

Annex A: Index of Tables

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