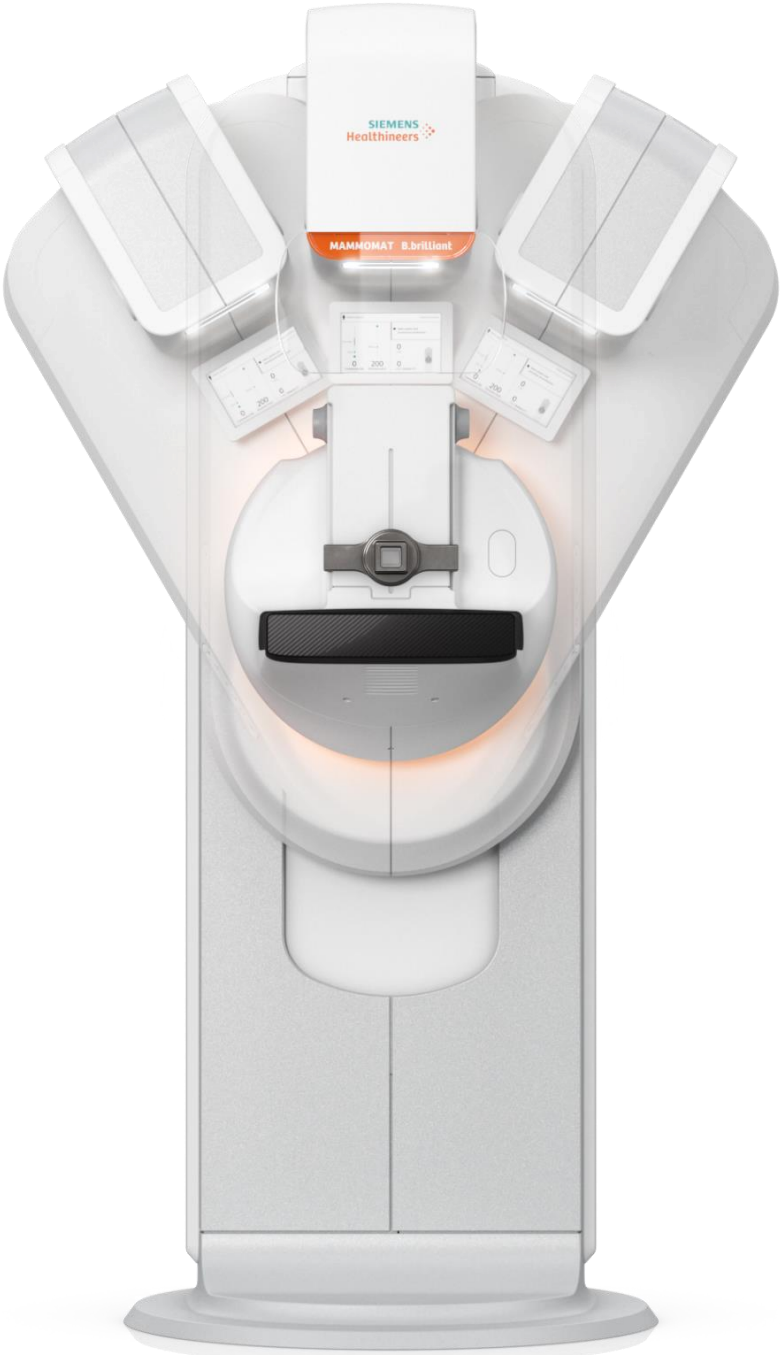
DICOM Conformance Statement

MAMMOMAT B.brilliant VA10

WHAWS VF10B



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SIEMENS Healthineers

DICOM Conformance Statement Overview

Table 1: Network Services

SOP Classes	SOP Class UID	User of Service (SCU)		Provider of Service (SCP)	
Verification					
Verification	1.2.840.10008.1.1	Yes		Yes	
		Create	**Send**	**Store**	**Display**
SOP Classes created by MAMMOMAT B.brilliant					
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	Yes	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	Yes	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes	Yes	Yes
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes	Yes	No
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	Yes	Yes
SOP Classes managed by MAMMOMAT B.brilliant					
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes	Yes	Yes
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes	Yes	Yes
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes	Yes	Yes

SOP Classes	SOP Class UID	User of Service (SCU)		Provider of Service (SCP)	
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes	Yes	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes	Yes	Yes
		User of Service (SCU)		**Provider of Service (SCP)**	
Storage Commitment					
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes		Yes	
Worklist Management					
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes		No	
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes		No	
Query/Retrieve					
Patient Root Q/R Information Model – FIND	1.2.840.10008.3.1.2.3.3	Yes		Yes	
Patient Root Q/R – Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes		Yes	
Study Root Q/R – Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes		Yes	
Study Root Q/R – Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.1	Yes		Yes	
Patient/Study Only Q/R – Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	No		No	
Patient/Study Only Q/R – Information Model MOVE	1.2.840.10008.5.1.4.1.2.3.2	No		No	
Print Management					
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes		No	

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disk – Recordable		
STD-GEN-CD	Yes	Yes
AUG-GEN-CD	Yes	Yes
DVD		
AUG-GEN-DVD	Yes	Yes
AUG- GEN-DVD-J2K	Yes	Yes
STD-GEN-DVD	Yes	Yes
STD-GEN-DVD-J2K	Yes	Yes
USB		
AUG- GEN-USB-J2K	Yes	Yes
STD-GEN-USB-J2K	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-AWS<*version*>"
File Meta Information Version	1

1 Introduction

1.1 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.

1.2 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between MAMMOMAT B.brilliant 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 interconnectivity and interoperability between MAMMOMAT B.brilliant and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.
- Siemens Healthineers reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens Healthineers representative for the most recent product information.

MAMMOMAT B.brilliant complies to DIN 6862-2:2019

1.3 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
BTO	Breast Tomosynthesis Object
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
IOD	DICOM Information Object Definition

ISO	International Standard Organization
n.a.	not applicable
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
SR	Structured Report
TFT	Thin Film Transistor (Display)
TiCEM	Titanium Contrast Enhanced Mammography
TID	Template ID
U	Unique Key Attribute
UID	Unique Identifier
UTF-8	Unicode Transformation Format-8
VR	Value Representation

1.4 References

[1] NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA
https://www.dicomstandard.org

[2] Integrating the Healthcare Enterprise – IHE Radiology Technical Framework
http://www.ihe.net

2 Networking

2.1 Implementation Model

The MAMMOMAT B.brilliant supports storing DICOM images to remote nodes like workstations or Archiving Systems. Using the Storage Commitment Service, it can request safe keeping of previously stored instances from an Archiving system. Additionally, the MAMMOMAT B.brilliant can query remote nodes, retrieve and store selected instances from that node. Using the Modality Worklist service, the MAMMOMAT B.brilliant can query a HIS/RIS for scheduled procedures. Performed procedure status and other procedure data can be returned to the HIS/RIS using the Modality Performed Procedure Step (MPPS) Service. Furthermore, printing of grayscale images is supported.

- Verification

  MAMMOMAT B.brilliant's DICOM Service Tool application requests Verification to test 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.

- Workflow

  MAMMOMAT B.brilliant 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.

- Storage

  MAMMOMAT B.brilliant's DICOM implementation can 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

  MAMMOMAT B.brilliant's DICOM implementation can initiate Storage Commitment requests to Remote AEs and is able to receive and respond to Storage Commitment requests from Remote AEs.

- Query/Retrieve

  MAMMOMAT B.brilliant's DICOM application supports the Query/Retrieve services in a SCP role. Via the user interface, MAMMOMAT B.brilliant supports Query/Retrieve as SCU to retrieve IODs to the local database.

- Print

  MAMMOMAT B.brilliant's DICOM implementation can initiate associations as Print Management SCU for printing of composed film-sheets with one or more DICOM Print AE.

2.1.1 Application Data Flow

The following figures provide a functional overview of the MAMMOMAT B.brilliant Application Entities (AE). Relationships are shown between user-invoked activities (in the circles at the left of the AEs) and the associated real-world activities provided by DICOM service providers (in the circles at the right of the AEs)

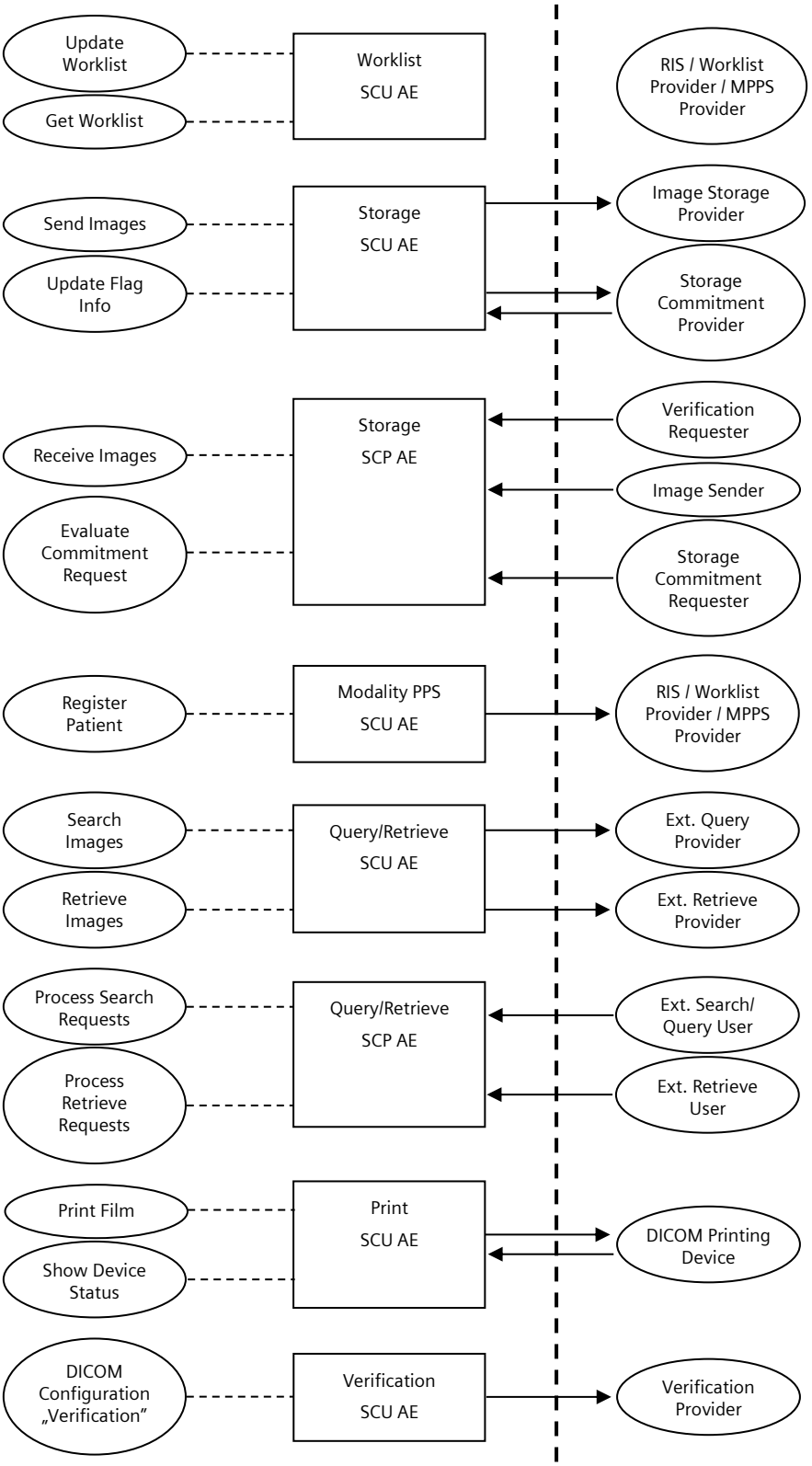

Figure 1:Functional Overview

2.1.2 Functional Definitions of AEs

2.1.2.1 Functional Definition of Worklist SCU AE

The Worklist SCU AE ("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 MAMMOMAT B.brilliant. 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 to the availability within the worklist response identifier.

2.1.2.2 Functional Definition of Modality PPS SCU AE

When registering a Patient (i.e. selecting a Scheduled Procedure Step from Worklist), MAMMOMAT B.brilliant's 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 which the DICOM application will no longer allow updates on the related MPPS Instance. MAMMOMAT B.brilliant will support creation of "unscheduled cases" by allowing MPPS Instances to be created for locally registered Patients.

2.1.2.3 Functional Definition of Storage-SCU AE

MAMMOMAT B.brilliant's Storage SCU AE 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, MAMMOMAT B.brilliant's DICOM application will populate the Storage Commitment Push Model Action Information from the SOP Instances sent, which triggers a Storage Commit Request, if configured. Depending on configuration, MAMMOMAT B.brilliant's 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".

2.1.2.4 Functional Definition of Storage-SCP AE

The Storage SCP component of MAMMOMAT B.brilliant's 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 MAMMOMAT B.brilliant. 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).

2.1.2.5 Functional Definition of Query/Retrieve-SCU AE

MAMMOMAT B.brilliant's 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) MAMMOMAT B.brilliant's 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.

2.1.2.6 Functional Definition of Query/Retrieve-SCP AE

MAMMOMAT B.brilliant's 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.

2.1.2.7 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.

2.1.2.8 Functional Definition of Verification-SCU AE

MAMMOMAT B.brilliant's 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.

2.1.3 Sequencing of Activities

2.1.3.1 Workflow

The “narrow” (interactive) Worklist Query requires that sufficient matching of 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 [2] profile Mammography Acquisition Workflow is activated, information about rejected or corrected images will be stored and transferred in KOS objects.

2.1.3.2 Verification

Newly entered data must be saved first, before a “verification” of these data is possible.

2.1.3.3 Storage

Prior to sending of SOP Instances MAMMOMAT B.brilliant’s Storage application is capable of invoking postprocessing features.

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

2.1.3.4 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 won’t request information on IMAGE level without user interaction. The user can select a series and request image level information with the “Image List” function.

2.2 AE Specifications

This section outlines the specifications for each of the Application Entities that are part of the MAMMOMAT B.brilliant.

2.2.1 Verification SCU AE Specification

2.2.1.1 SOP Classes

For SOP Classes supported, please refer to "Table 1: Network Services" section "Verification".

2.2.1.2 Association Policy

MAMMOMAT B.brilliant's 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.

2.2.1.2.1 Number of Associations

MAMMOMAT B.brilliant's DICOM Service Tool application initiates one association at a time to request verification.

2.2.1.2.2 Asynchronous Nature

MAMMOMAT B.brilliant's DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.1.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to "Table 3: Implementation Identifying Information".

2.2.1.3 Association Initiation Policy

2.2.1.3.1 Activity – "Verification"

2.2.1.3.1.1 Description and Sequencing of Activities

The Verification SCU C-ECHO request is initiated by Service and Configuration software 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.

2.2.1.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 4: Presentation Context "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

2.2.1.3.1.3 SOP specific Conformance for SOP Classes

N.A.

2.2.1.4 Association Acceptance Policy

The Verification SCP is part of the Storage SCP.

2.2.2 Storage SCU AE Specification

2.2.2.1 SOP Classes

For SOP Classes supported, please refer to "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed", as well as section "Workflow Management".

2.2.2.2 Association Policy

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, if configured. The Commit Request is sent over a single opened association. MAMMOMAT B.brilliant 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 timestamp, 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.

2.2.2.2.1 Number of Associations

MAMMOMAT B.brilliant's 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".

2.2.2.2.2 Asynchronous Nature

MAMMOMAT B.brilliant's DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.2.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to "Table 3: Implementation Identifying Information".

2.2.2.3 Association Initiation Policy

If a job with network destination gets active in the job list or a retrieve sub-operation is processed, MAMMOMAT B.brilliant's 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.

For association and DIMSE level time-outs, please refer to Table 54: General parameter settings and timeouts.

2.2.2.3.1 Activity – "Send to"

2.2.2.3.1.1 Description and Sequencing of Activities

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, MAMMOMAT B.brilliant's 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.

2.2.2.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Storage SCU Presentation Contexts as shown in the following table:

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

Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	**Name List**	**UID List**		
Any image SOP Class detailed in "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed"	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" sections "SOP Classes created" and "SOP Classes managed"	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 Push Model 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 are 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 requirements lossy compression may not be allowed for FFDM images.

2.2.2.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant allows configuration for which images (e.g. MG For Presentation only) shall be transferred automatically at a certain point in time (InExam / EndExam) to one or more destinations (e.g. reviewing workstation and archive).

Reconstructed Tomosynthesis slices as well as Insight 3D images are sent as native Breast Tomosynthesis objects.

The DICOM images sent by MAMMOMAT B.brilliant's DICOM application are conform to the DICOM IOD definitions (Standard extended IODs). They will contain additional private elements. Refer to chapter "8.5 Standard Extended / Specialized / Private SOP Classes " in the Annex for a list of possible private attributes.

The DICOM nodes are responsible for data consistency when modifying images.

2.2.2.3.1.4 SOP specific Conformance – Request Commitment

Storage Commitment is supported for all the SOP Classes detailed in "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.

2.2.2.4 Association Acceptance Policy

2.2.2.4.1 Activity – "Update Flag Information"

2.2.2.4.1.1 Description and Sequencing of Activity

After sending a Storage Commitment Request, MAMMOMAT B.brilliant 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 MAMMOMAT B.brilliant's 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 must repeat the transfer of images to the Archive destination. Another Storage Commitment will be performed after sending is completed successfully.

2.2.2.4.1.2 Accepted Presentation Context

MAMMOMAT B.brilliant's DICOM application will accept Storage Commitment Presentation Contexts as shown in the following table:

Table 6: Presentation Context "Update Flag Information"

Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	**Name List**	**UID List**		
Storage Commitment Push Model 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

2.2.2.4.1.3 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.

MAMMOMAT B.brilliant 's DICOM application will not support the Storage Media File Set ID attributes.

2.2.3 Storage SCP AE Specification

2.2.3.1 SOP Classes

For SOP Classes supported, please refer to "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed ", as well as section "Workflow Management".

2.2.3.1.1 Association Policy

MAMMOMAT B.brilliant's 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. If the Siemens DICOM application runs out of resources, it will reject the association request.

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

The default PDU size used will be 516KB.

2.2.3.1.2 Number of Associations

MAMMOMAT B.brilliant's DICOM application accepts one association at a time.

2.2.3.1.3 Asynchronous Nature

MAMMOMAT B.brilliant's DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.3.1.4 Implementation Identifying Information

For Implementation Identifying Information, please refer to "Table 3: Implementation Identifying Information".

2.2.3.2 Association Initiation Policy

If the result from a previously accepted Storage Commitment request is evaluated, MAMMOMAT B.brilliant's DICOM application attempts to initiate a new association for

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

2.2.3.2.1 Activity – "Return Commitment Result"

2.2.3.2.1.1 Description and Sequencing of Activity

When MAMMOMAT B.brilliant's 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 another association to send the Storage Commitment response (N-EVENT-REPORT) to the SCU.

2.2.3.2.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Storage SCP Presentation Contexts for returning Storage Commitment results as shown in the following table:

Table 7: Presentation Context "Return Commitment Result"

Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	**Name List**	**UID List**		
Storage Commitment Push Model 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

2.2.3.2.1.3 SOP specific Conformance for SOP Classes

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

2.2.3.3 Association Acceptance Policy

MAMMOMAT B.brilliant's 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

2.2.3.3.1 Activity – "Save to local disk"

2.2.3.3.1.1 Description and Sequencing of Activities

MAMMOMAT B.brilliant's 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.

2.2.3.3.1.2 Accepted Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will accept Presentation Contexts as shown in the following table:

Table 8: Presentation Context "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"	JPEG Lossy Extended	1.2.840.10008.1.2.4.51	SCP	None

Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	Name List	UID List		
sections "SOP Classes created" and "SOP Classes managed"	JPEG Lossless, Process 14 (selection value 1) JPEG Lossy Baseline (Process 1) Explicit VR Little Endian Explicit VR Big Endian Implicit VR Little Endian	1.2.840.10008.1.2.4.70 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		
Any non-image SOP Class detailed in "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed"	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

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

Table 9: 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

2.2.3.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's application conforms to the Base Storage Service Class at Level 1.

Upon successfully receiving a C-STORE-RQ, MAMMOMAT B.brilliant's 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 10: 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 MAMMOMAT B.brilliant.
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.

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.

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

With Implicit VR Little Endian Transfer Syntax, the MAMMOMAT B.brilliant DICOM application will remove any Private Attributes not known to the application. Decision on removal of a Private Element is done if there is NO entry in the attribute-dictionary of the MAMMOMAT B.brilliant DICOM application.

Therefore, any Explicit VR Transfer Syntax shall preferably be used by the Storage SCU when sending Composite Image Instances to this DICOM AE.

Private attributes in sequence items will be removed during import into MAMMOMAT B.brilliant.

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

2.2.3.3.1.3.1 Image Pixel Attribute Acceptance Criterion for Grayscale Images – Viewing

MAMMOMAT B.brilliant's 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

- (0028, 0002) Samples Per Pixel 1
- (0028,0004) Photometric Interpretation "MONOCHROME1"
- (0028,0004) Photometric Interpretation "MONOCHROME2"
- (0028, 0103) Pixel Representation 0
- (0028, 0100) Bits Allocated 8, 16
- (0028,0101) Bits Stored 8, 10, 12, 14, 15, 16
- (0028,0102) High Bit 7, 9, 11

Only aspect ratio 1:1 is supported

Overlay plane "embedded"

- (60xx, 0040) Overlay Type "G"
- (60xx, 0100) Bits Allocated 16
- (60xx, 0102) Bit Position 12, 13, 14, 15

Graphic Overlay will be shifted to fill Overlay Planes from Bit 12 and consecutive.

Overlay plane "explicit"

- (60xx, 0040) Overlay Type "G"
- (60xx, 0100) Bits Allocated 1
- (60xx, 0102) Bit Position 0
- (60xx, 3000) Overlay Data supported

MAMMOMAT B.brilliant's 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

- (0028, 0002) Samples Per Pixel 1
- (0028,0004) Photometric Interpretation "MONOCHROME1"
- (0028,0004) Photometric Interpretation "MONOCHROME2"
- (0028, 0103) Pixel Representation 1 (signed)
- (0028, 0100) Bits Allocated 16
- (0028,0101) Bits Stored 16
- (0028,0102) High Bit 15

Only aspect ratio 1:1 is supported

Overlay plane

- (60xx, 0040) Overlay Type "G"
- (60xx, 0100) Bits Allocated 1
- (60xx, 0102) Bit Position 0
- (60xx, 3000) Overlay Data supported

For Modality 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 Modality LUT Sequence 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.

2.2.3.3.1.3.2 Image Pixel Attribute Acceptance Criterion for Color Images – Viewing

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

- (0028, 0002) Samples Per Pixel 3
- (0028,0004) Photometric Interpretation "RGB"
- (0028, 0103) Pixel Representation 0
- (0028, 0100) Bits Allocated 8
- (0028,0101) Bits Stored 8
- (0028,0102) High Bit 7
- (0028,0006) Planar Configuration 0 (pixel interleave)
1 (plane interleave)

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

- (0028, 0002) Samples Per Pixel 1
- (0028,0004) Photometric Interpretation "PALETTE COLOR"
- (0028, 0103) Pixel Representation 0
- (0028, 0100) Bits Allocated 8, 16
- (0028,0101) Bits Stored 8, 16
- (0028,0102) High Bit 7, 15

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

MAMMOMAT B.brilliant's Multi-modality Viewing application supports the YBR color image description with the unsigned integer pixel format. Accepted values:

- (0028, 0002) Samples Per Pixel 3
- (0028,0004) Photometric Interpretation "YBR_FULL" or "YBR_FULL_422"
- (0028, 0103) Pixel Representation 0
- (0028, 0100) Bits Allocated 8
- (0028,0101) Bits Stored 8
- (0028,0102) High Bit 7

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

2.2.3.3.2 Activity – Evaluate Commit Request

2.2.3.3.2.1 Description and Sequencing of Activity

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

2.2.3.3.2.2 Accepted Presentation Context

MAMMOMAT B.brilliant's DICOM application will accept Storage Commitment Presentation Contexts as shown in the following table:

Table 11: Presentation Context "Evaluate Commit Request"

Abstract Syntax	Transfer Syntax		Role	Ext. Neg.
Description	**Name List**	**UID List**		
Storage Commitment Push 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

2.2.3.3.2.3 SOP specific Conformance

MAMMOMAT B.brilliant's 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 MAMMOMAT B.brilliant 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.

2.2.4 Query/Retrieve SCU AE Specification

2.2.4.1 SOP Classes

For SOP Classes supported, please refer to "Table 1: Network Services" section "Query/Retrieve".

2.2.4.2 Association Policy

With the "Search..." function the query keys 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.

2.2.4.2.1 Number of Associations

MAMMOMAT B.brilliant's 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. MAMMOMAT B.brilliant 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.

2.2.4.2.2 Asynchronous Nature

MAMMOMAT B.brilliant's DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.4.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to "Table 3: Implementation Identifying Information".

2.2.4.3 Association Initiation Policy

MAMMOMAT B.brilliant's DICOM application will request associations for the following DIMSE-C operations as SCU:

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

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

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

2.2.4.3.1 Activity – "Search for images (Search...)"

2.2.4.3.1.1 Description and Sequencing of Activities

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.

2.2.4.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 13: Presentation Context "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 MAMMOMAT B.brilliant's DICOM Query SCU application for each node. If both query models are configured, the Find SCU will use the Patient Root Model only for C-FIND requests on PATIENT level. For all other levels it will use the Study Root model.

2.2.4.3.1.3 SOP Specific Conformance

MAMMOMAT B.brilliant's 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[1]					
Patient Name	(0010,0010)	R	Wildcard[2]	Enter value	yes
Patient ID	(0010,0020)	U / R	Wildcard[2]	Enter value	yes
Patient's Birth Date	(0010,0030)	O	Single value	Enter value	yes
Patient's Sex	(0010,0040)	O	Single value	Enter value	yes
Number of Patient related Studies	(0020,1200)	O	Universal (Null)	--	yes[3]
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[4]	(0010,0010)	R	Wildcard[2]	Enter value	yes
Patient ID	(0010,0020)	U / R	Wildcard[2]	Enter value	yes
Patient's Birth Date[4]	(0010,0030)	O	Single value	Enter value	yes
Patient's Sex[4]	(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[2]	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[2]	Enter value	yes
Referring Physician's Name	(0008,0090)	O	Wildcard[2]	Enter value	yes
Name of Physician Reading Study	(0008,1060)	O	Wildcard[2]	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[5]
Number of Study related Instances	(0020,1208)	O	Universal (Null)	--	no

[1] Patient Root Information Model only
[2] Always a "*" is appended to the user-supplied string
[3] Implicitly visualized in the UI if no study and series search attributes have been entered
[4] Study Root Information Model only
[5] Implicitly if no series search attributes have been entered

Attribute Name	Tag	Type	Matching	User Input	Return Value Display
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
Series Date	(0008,0021)	O	Universal (Null)	--	yes
Series Time	(0008,0031)	O	Universal (Null)	--	yes
Series Description	(0008,103E)	O	Wildcard[2]	Enter value	yes
Body Part Examined	(0018,0015)	O	Single Value	Enter value	yes
Performing Physician's Name	(0008,1050)	O	Wildcard[2]	Enter value	yes
Request Attributes Sequence	(0040,0275)	O	--	--	yes
> Requested Procedure ID	(0040,1001)	O	Wildcard[2]	Enter value	yes
> Scheduled Procedure Step ID	(0040,0009)	O	Wildcard[2]	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 not applicable

MAMMOMAT B.brilliant's Search application supports a

- DIMSE C-FIND-CANCEL

if the user wishes to cancel a running Query request via MAMMOMAT B.brilliant's 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

2.2.4.3.2 Activity – Retrieve Images (Import...)

2.2.4.3.2.1 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 MAMMOMAT B.brilliant's 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.

MAMMOMAT B.brilliant's DICOM application will always insert the own Storage SCP AE as "Move Destination".

2.2.4.3.2.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's Server DICOM application will propose Presentation Contexts as shown in the following table:

Table 16: Presentation Context "Import..."

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

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
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.

2.2.4.3.2.3 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)
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)

2.2.5 Query/Retrieve SCP AE Specification

2.2.5.1 SOP Classes

For SOP Classes supported, please refer to “Table 1: Network Services“ section “Query/Retrieve”.

2.2.5.2 Association Policy

When “trusted host” functionality is enabled, MAMMOMAT B.brilliant will only accept Associations from known hosts with a known AET. Hosts and AETs must be entered in “Local Service” by a Siemens CSE.

The default PDU size used will be 516KB.

2.2.5.2.1 Number of Associations

MAMMOMAT B.brilliant’s DICOM application can accept and 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”.

2.2.5.2.2 Asynchronous Nature

MAMMOMAT B.brilliant’s DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.5.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to “Table 3: Implementation Identifying Information“.

2.2.5.3 Association Acceptance Policy

MAMMOMAT B.brilliant’s DICOM application will accept associations for the following DIMSE-C operations as SCP:

Table 18: Supported DIMSE-C Operations – Query/Retrieve SCP

Supported DIMSE operation	Cancel Request supported
C-FIND	yes
C-MOVE	yes
C-GET	yes

Extended negotiation – which is relational query or retrieve – is not supported for the above listed services. MAMMOMAT B.brilliant’s DICOM application does support multiple C-FIND requests over the same association, while multiple C-MOVE or C-GET operations are not supported over the same association.

2.2.5.3.1 Activity – “Process Search Requests”

2.2.5.3.1.1 Description and Sequencing of Activities

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.

2.2.5.3.1.2 Accepted Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will accept Presentation Contexts as shown in the following table:

Table 19: Presentation Context "Process Search Requests"

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 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	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.

2.2.5.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's 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 [1], Part 5, Table 6.2-1, 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 20: 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
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

Attribute Name	Tag	PR	SR	PSo	Matching
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
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
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

Attribute Name	Tag	PR	SR	PSo	Matching
> 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 21: 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

2.2.5.3.2 Activity – "Process Retrieve Requests"

2.2.5.3.2.1 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.

2.2.5.3.2.2 Accepted Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will accept Presentation Contexts as shown in the following table:

Table 22: Presentation Context "Process Retrieve Requests"

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.

2.2.5.3.2.3 SOP Specific Conformance

Relational retrieve operation is not supported.

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

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 23: 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)

2.2.6 Print SCU AE Specification

2.2.6.1 SOP Classes

For SOP Classes supported, please refer to “Table 1: Network Services“ section “Print Management”.

2.2.6.2 Association Policy

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 executed 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.

2.2.6.2.1 Number of Associations

MAMMOMAT B.brilliant’s DICOM application initiates one association at a time for each different print device configured.

2.2.6.2.2 Asynchronous Nature

MAMMOMAT B.brilliant’s DICOM print application does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.6.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to “Table 3: Implementation Identifying Information“.

2.2.6.3 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 sheet from the queue has been printed, the Print application will leave the association for open for another 60 seconds. If a new film job is ready for printing within this time limit, the job will be immediately processed. If there is no new job, the association is closed.

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.

2.2.6.3.1 Activity – ”Print Film”

2.2.6.3.1.1 Description and Sequencing of Activities

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.

2.2.6.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 24: Presentation Context "Print Film"

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic Grayscale Print Management 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 Session 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

2.2.6.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's 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.

2.2.6.3.1.3.1 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.

MAMMOMAT B.brilliant's 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 25: 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	MAMMO BLUE FILM 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:

Table 26: SOP Instance UID of Film Session

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 27: 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

Service Status	Meaning	Error Codes
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

2.2.6.3.1.3.2 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 MAMMOMAT B.brilliant's DICOM Print management SCU):

Table 28: 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	UID
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.

Attribute Name	Tag	Usage SCU	Supported Values
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:

Table 29: SOP Instance UID of Film Box

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 30: 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

2.2.6.3.1.3.3 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 31: 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.

Attribute Name	Tag	Usage SCU	Supported Values
> 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 32: 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	Image Box Accepted for printing	0000

2.2.6.3.1.3.4 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 33: 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:

Table 34: SOP Instance UID of Presentation LUT

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 35: Presentation LUT Status Codes

Service Status	Meaning	Code
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

2.2.6.3.1.3.5 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 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 0 for details.

M = Mandatory

2.2.6.3.1.3.6 Printer Job SOP Class

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

MAMMOMAT B.brilliant's 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 38: Used Print Job N-EVENT Report attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1	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
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

2.2.6.3.2 Activity – Show Device Status

2.2.6.3.2.1 Description and Sequencing of Activity

With no printing activity ongoing (“idle time”), MAMMOMAT B.brilliant’s DICOM Print SCU application will cyclically request the printer status to update the related printer state in the Printing UI.

2.2.6.3.2.2 Proposed Presentation Context

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 39: Presentation Context "Show Device Status"

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	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.2.6.3.2.3 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 40: 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 41: 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 0 for details.

M = Mandatory

2.2.6.4 Association Acceptance Policy

N.A.

2.2.7 Worklist SCU AE Specification

2.2.7.1 SOP Classes

For SOP Classes supported, please refer to “Table 1: Network Services“ section “Workflow Management”.

2.2.7.2 Association Policy

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.

2.2.7.2.1 Number of Associations

MAMMOMAT B.brilliant’s DICOM application initiates one association at a time to query worklist entry data.

2.2.7.2.2 Asynchronous Nature

MAMMOMAT B.brilliant’s DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.7.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to “Table 3: Implementation Identifying Information“.

2.2.7.3 Association Initiation Policy

MAMMOMAT B.brilliant’s 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.

2.2.7.3.1 Activity – “(cyclic) Update Worklist”

2.2.7.3.1.1 Description and Sequencing of Activities

A network application will perform worklist queries with the C-FIND request at regular intervals. In addition, it can be triggered by an immediate request.

All worklist data from previous queries will be deleted when new data is received. The scheduled procedure for which the Examination is in progress will remain, however.

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

2.2.7.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 42: Presentation Context "Update Worklist"

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

2.2.7.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's 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 43: 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

MAMMOMAT B.brilliant's 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 Table 48: Performed Procedure Step N-CREATE Attributes and Table 50: Performed Procedure Step N-SET Attributes)

Table 44: 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		

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
> 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	-		
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	-		
Requested Procedure Comments	(0040,1400)	3	x		

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
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)	
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	-		
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	-		

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
> 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)	

Attribute Name	Tag	Return Key Type	UI	IOD	MPPS
Patient's Religious Preference	(0010,21F0)	3	-	(0010,21F0)	
Patient Comments	(0010,4000)	3	x	(0010,4000)	
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)	
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 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 45: 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

Service Status	Meaning	Error Codes	Related Fields
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

2.2.7.3.2 Activity – "Get Worklist"

2.2.7.3.2.1 Description and Sequencing of Activities

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.

2.2.7.3.2.2 Proposed Presentation Contexts

This Activity will propose the same Presentation Context as with "Update Worklist". Please refer to Table 42: Presentation Context "Update Worklist".

2.2.7.3.2.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's 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 46: 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			

Attribute Name	Tag	Matching Key Type	Query Value
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 refer to chapter 2.2.7.3.1.3 for details.

2.2.7.4 Association Acceptance Policy

N.A.

2.2.8 Modality PPS SCU AE Specification

2.2.8.1 SOP Classes

For SOP Classes supported, please refer to "Table 1: Network Services" section "Workflow Management".

2.2.8.2 Association Policy

The creation of MPPS Instance is done automatically by MAMMOMAT B.brilliant 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.

2.2.8.2.1 Number of Associations

MAMMOMAT B.brilliant's DICOM application initiates one association at a time to create or set the MPPS instance.

2.2.8.2.2 Asynchronous Nature

MAMMOMAT B.brilliant's DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.2.8.2.3 Implementation Identifying Information

For Implementation Identifying Information, please refer to "Table 3: Implementation Identifying Information".

2.2.8.3 Association Initiation Policy

MAMMOMAT B.brilliant's 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.

2.2.8.3.1 Activity – "Patient registered"

2.2.8.3.1.1 Description and Sequencing of Activities

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.

2.2.8.3.1.2 Proposed Presentation Contexts

MAMMOMAT B.brilliant's DICOM application will propose Presentation Contexts as shown in the following table:

Table 47: Presentation Context "Patient Registered"

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

2.2.8.3.1.3 SOP specific Conformance for SOP Classes

MAMMOMAT B.brilliant's 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 48: 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>

Attribute Name	Tag	Type	Value
> 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 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
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

Attribute Name	Tag	Type	Value
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>
Billing and Material Management Code			
Billing Procedure Step Sequence	(0040,0320)	3	<zero length>
Film Consumption Sequence	(0040,0321)	3	
> Number of Films	(2100,0170)	3	<zero length>
> Medium Type	(2000,0030)	3	<zero length>
> Film Size ID	(2010,0050)	3	<zero length>
Billing Supplies and Devices Sequence	(0040,0324)	3	
> Billing Item Sequence	(0040,0296)	3	<zero length>
> Quantity Sequence	(0040,0293)	3	
>> 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 49: Status Codes "Patient Registered"

Service Status	Meaning	Error Codes
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

Service Status	Meaning	Error Codes
Success	MPPS Instance created	0000

2.2.8.3.2 Activity – MPPS Update

2.2.8.3.2.1 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".

2.2.8.3.2.2 Proposed Presentation Context

For "MPPS Update" the same Presentation Contexts as with "Patient registered" are proposed. Please refer to Table 47: Presentation Context "Patient Registered".

2.2.8.3.2.3 SOP Specific Conformance

Attributes for the Performed procedure Step N-SET

MAMMOMAT B.brilliant's 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 50: 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	"
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	automatic dose summary and/or user input
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	3	user input CID 9301 "Modality PPS Discontinuation Reason"
Image Acquisition Results			
Performed Protocol Code Sequence	(0040,0260)	3	from Scheduled Protocol Code Sequence

Attribute Name	Tag	Type	Value
> Code Value	(0008,0100)	1C	"
> Coding Scheme Designator	(0008,0102)	1C	"
> Coding Scheme Version	(0008,0103)	3	"
> 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>
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 51: Status Codes "MPPS Update"

Service Status	Meaning	Error Codes
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

Service Status	Meaning	Error Codes
	Resource limitation	0213
Success	MPPS Instance set	0000

Performed Procedure Step ID without MPPS – If either the optional MPPS license is not available – or in case MPPS is not configured or if an Unscheduled case is performed, then the following behavior applies:

The attribute “Performed Procedure Step ID” (0040,0235) will be encoded based on “YYYYMMDDHHMMSS”. This date and time are based on the time when the first image was acquired. The “Performed Procedure Step ID” stays the same for all acquired or derived images if 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”.

2.2.8.4 Association Acceptance Policy

N.A.

2.3 Network Interfaces

2.3.1 Physical Network Interface

The DICOM Interface of MAMMOMAT B.brilliant 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.

2.3.2 Additional Protocols

N.A.

2.3.3 IPv4 and IPv6 Support

MAMMOMAT B.brilliant supports the transfer of the DICOM images over the network to nodes and workstations using IPv4 or optionally IPv6 protocol with the Transfer/Send features.

Exporting of the images to a network shared folder using Export to offline feature is using IPv4 or optionally IPv6 protocol.

2.4 Configuration

2.4.1 AE Title/Presentation Address Mapping

2.4.1.1 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: Spaces and special characters (like &<> ") are not supported 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 52: Default AET Characteristics

Application Entity	Default AE Title	TCP/IP Port
Verification SCU	STU_<hostname>_SEC	-
Verification SCP	STU_<hostname>	2762 (fixed) 104 (fixed)
Storage SCU		-
Storage SCP		2762 (fixed) 104 (fixed)
Query/Retrieve SCU		-
Query/Retrieve SCP		2762 (fixed) 104 (fixed)
Print SCU	PRI_<hostname>	-
Worklist SCU	HRI_<hostname>	-
MPPS SCU		-

Port 2762 is used for Secure DICOM communication and Port 104 is used for Unsecure DICOM communication. There are two local AETs for Storage SCP, Verification SCP and Query/Retrieve SCP.

2.4.1.2 Remote AE Titles

When "trusted host functionality" is enabled, all external AE Titles must be configured to be able to communicate with MAMMOMAT B.brilliant.

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

Table 53: Remote AE Configuration Items

Remote AE configuration item	Comment
Host Name	As defined in the network domain. This must be configured also for any DICOM AE that wishes to connect to SCP services of MAMMOMAT B.brilliant.
TCP/IP address	As defined in the network domain. This must be configured also for any DICOM AE that wishes to connect to SCP services of MAMMOMAT B.brilliant.
Logical Name	Name for the AE used in the user interfaces of MAMMOMAT B.brilliant's applications.
AE Title	AET, as provided by network administration
Port Number	Port Number, as provided by network administration

Remote AE configuration item	Comment
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 MAMMOMAT B.brilliant's 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.

2.4.2 Parameters

System parameters can be changed in the Service UI under “Configuration / DICOM / General” item – second page.

Table 54: General parameter settings and timeouts

Parameter	Default Value	Min	Max	Comment
Time-out Values [sec]				
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	516 KB	4 KB	1 MB	Proposed PDU size, each selectable value is doubled from previous, starting with 4kB. Additionally, for optimization for some networks 28kByte are provided.

3 Media Interchange

3.1 Implementation Model

3.1.1 Application Data Flow Diagram

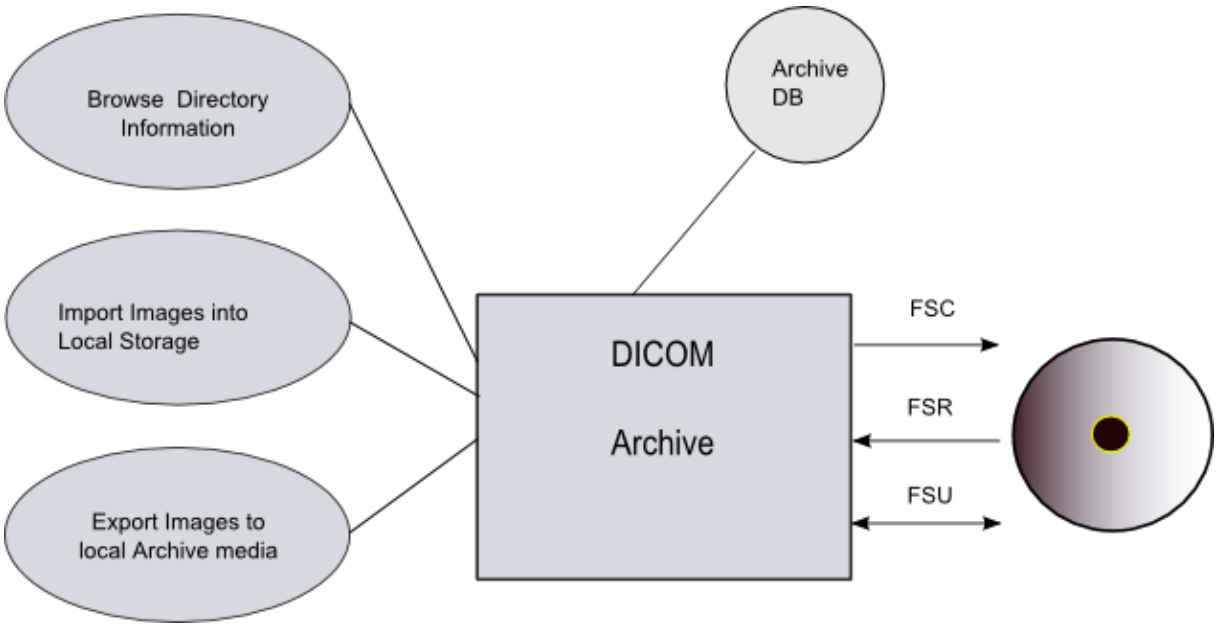

Figure 2 Application Data Flow DICOM Archive

The DICOM Archive application will serve as an interface to the CD-R/DVD offline media device.

The DICOM Archive application will support the 120mm CD-R and DVD media.

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.

3.1.2 Functional Definitions of Application Entities

3.1.2.1 Functional Definition of DICOM Archive AE

MAMMOMAT B.brilliant's 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 media (Export to...).
- updating an existing File-set by writing new SOP Instances onto the media (Export to...).
- importing SOP Instances from the media onto local storage
- reading the File-sets DICOMDIR information into temporary database and pass it to display applications.

3.1.3 Sequencing of Real-World Activities

The DICOM Archive application will not perform transfers from the offline media into the system until the Directory information of the DICOMDIR is completely read in and displayed in the Browser.

3.2 Application Entity Specifications

3.2.1 DICOM Archive AE – Specification

The DICOM Archive AE provides Standard conformance to the Media Storage Service Class.

Details are listed in following Table:

Table 55: 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

These Application Profiles are supported in every activity.

3.2.1.1 File Meta Information for Implementation Class and Version

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

For Implementation Identifying Information, refer to "Table 3: Implementation Identifying Information".

3.2.1.2 Real-World Activities

3.2.1.2.1 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.

3.2.1.2.2 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 media 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 56: STD-GEN-xxx profile supported SOP Classes and Transfer Syntaxes – Import

Information Object Definition	Transfer Syntax UID
Any image SOP Class detailed in "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed"	Explicit VR Little Endian 1.2.840.10008.1.2.1

3.2.1.2.3 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 Media.

The DICOM Archive application will receive a list of SOP Instances to be copied to the local archive media. According to the state of the media inserted (new media, Media 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/FSU:

Table 57: STD-GEN-xxx profile supported SOP Classes and Transfer Syntaxes – Export

Information Object Definition	Transfer Syntax UID
Any image SOP Class detailed in "Table 1: Network Services" sections "SOP Classes created" and "SOP Classes managed"	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

3.3 Augmented and Private Application Profiles

N.A.

3.4 Media Configuration

3.4.1 Single- / Multi-Session CD burning

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

3.4.2 "Viewer on CD"

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

3.4.3 Auto Labeling

Please refer to most recent Service / Configuration documentation of MAMMOMAT B.brilliant 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.

4 Transformations of DICOM to CDA

N/A

5 Support of Extended Character Sets

MAMMOMAT B.brilliant's DICOM application supports the following character sets as defined in the four tables below:

Table 58: 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 59: 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
	ISO 2022 IR 100	ISO 2022	ESC 02/13 04/01	ISO-IR 100	Supplementary set

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Latin alphabet No.1		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 127	ISO 2022	ESC 02/13 04/07	ISO-IR 127	Supplementary set
		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 60: 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 61: 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[6]	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 must 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

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.

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

6 Attribute confidentiality profiles

6.1 Application Level Confidentiality Profile

Application Level Confidentiality Profiles address the following aspects of security:

Data Confidentiality at the application layer.

These Profiles are targeted toward creating a special purpose, de-identified version of an already existing Data Set. It is not intended to replace the original SOP Instance from which the de-identified SOP Instance is created. The de-identified SOP Instances are useful, for example, in creating teaching or research files, performing clinical trials, or submission to registries where the identity of the patient and other individuals is required to be protected.

6.2 De-identification

MAMMOMAT B.brilliant provides a functionality to export the DICOM data to configured offline directories (Local Path / Network path / USB). The data exported can be exported anonymous where the Patient Identification parameters like Patient Name, Patient ID etc., are removed or replaced as per Table below.

The MAMMOMAT B.brilliant application can de-identify attributes using three different levels. During export to file system, it is the user's responsibility to select the appropriate anonymization level. For full and reduced anonymization, private attributes are not included in anonymized Studies. For service anonymization all private attributes are included in anonymized Studies.

In Default anonymization, the data integrity and consistency are maintained for the new value generated for the DICOM attribute of VR type UI. For example, if the new value is set for the Study Instance UID and if the value is referred in Frame of Reference UID the value must be reused. This ensures the consistency of the data.

In Service anonymization, the data integrity is not maintained.

Note: Default anonymization is preferred.

Table 62: DICOM Attributes behavior in case of export to offline anonymously

Attribute Name	Tag	VR	Type	Value
Patient's Name	(0010,0010)	PN	2	Dummy Name – User specific
Patient ID	(0010,0020)	LO	2	"Anonymous"
Patient's Birth Date	(0010,0030)	DA	2	empty
Patient's Birth Time	(0010,0032)	TM	2	remove
Patient's Sex	(0010,0040)	CS	3	Other (O)
Other Patient IDs	(0010,1000)	LO	3	removed
Other Patient Names	(0010,1001)	PN	3	remove
Patient's Birth Name	(0010,1005)	PN	3	remove
Patient's Age	(0010,1010)	AS	3	remove
Patient's Size	(0010,1020)	DS	3	remove
Patient's Weight	(0010,1030)	DS	3	remove
Patient's Address	(0010,1040)	LO	3	remove
Patient's Mother's Birth Name	(0010,1060)	PN	3	remove

Attribute Name	Tag	VR	Type	Value
Medical Record Locator	(0010,1090)	LO	3	remove
Patient's Telephone Numbers	(0010,2154)	SH	3	remove
Ethnic Group	(0010,2160)	SH	3	remove
Occupation	(0010,2180)	SH	3	remove
Additional Patient's History	(0010,21B0)	LT	3	remove
Patient Comments	(0010,4000)	LT	3	remove
Instance Creator UID	(0008,0014)	UI	3	removed
SOP Instance UID	(0008,0018)	UI	1	new value generated
Accession Number	(0008,0050)	SH	2	empty
Institution Name	(0008,0080)	LO	3	remove
Institution Address	(0008,0081)	ST	3	remove
Referring Physician's Name	(0008,0090)	PN	2	empty
Referring Physician's Address	(0008,0092)	ST	3	remove
Referring Physician's Telephone Numbers	(0008,0094)	SH	3	remove
Station Name	(0008,1010)	SH	3	remove
Study Description	(0008,1030)	LO	3	remove
Series Description	(0008,103E)	LO	3	remove
Institutional Department Name	(0008,1040)	LO	3	remove
Physician(s) of Record	(0008,1048)	PN	3	remove
Performing Physician(s) Name	(0008,1050)	PN	3	removed
Name of Physician(s) Reading Study	(0008,1060)	PN	3	remove
Operator's Name	(0008,0170)	PN	3	remove
Admitting Diagnosis Description	(0008,1080)	LO	3	remove
Referenced Patient SQ	(0008,1120)	SQ	3	remove
Referenced SOP Instance UID	(0008,1155)	UI	1C	new value generated
Related Series SQ	(0008,1250)	SQ	3	new value generated
Derivation Description	(0008,2111)	ST	3	new value generated
Device Serial Number	(0018,1000)	LO	3	remove
Protocol Name	(0018,1030)	LO	3	remove
Study Instance UID	(0020,000D)	UI	1	new value generated
Series Instance UID	(0020,000E)	UI	1	new value generated
Study ID	(0020,0010)	SH	2	empty
Frame of Reference UID	(0020,0052)	UI	1	new value generated

Attribute Name	Tag	VR	Type	Value
Synchronization Frame of Reference UID	(0020,0200)	UI	1	new value generated
Image Comments	(0020,4000)	LT	3	remove
Request Attributes SQ	(0040,0275)	SQ	3	remove
UID	(0040,A124)	UI	1C	new value generated
Content SQ	(0040,A730)	SQ	1C	new value generated
Storage Media File-set UID	(0088,0140)	UI	1	new value generated
Referenced Frame of Reference UID	(3006,0024)	UI	1C	new value generated
Related Frame of Reference UID	(3006,00C2)	UI	1C	new value generated
3D registration Matrix Data Info	(0029,xx10)	OB	n/a	new value generated for contained UID

7 Security

7.1 Security Profiles

7.1.1 Secure Transport Connection Profiles

MAMMOMAT B.brilliant conforms to the Basic TLS Transport Connection Profile.

MAMMOMAT B.brilliant initiates and accepts TLS connections. MAMMOMAT B.brilliant provides a configuration panel by which local systems can configure the certificate that needs to bind for DICOM communication. Secure communication is a “mode of operation” of MAMMOMAT B.brilliant supported by the implementation of the DICOM Basic TLS Secure Transport Connection Profile. This functionality will be used by the nodes that can authenticate each other before they exchange DICOM information. For secure communication, the TLS protocol is used which provides message authentication, integrity, and confidentiality. MAMMOMAT B.brilliant supports TLS Protocol v1.2 by default and TLS Protocol v1.1 and TLS Protocol v1.0 are disabled by default. By enabling the service configuration, disabled protocols TLS Protocol v1.1 and TLS Protocol v1.0 are enabled and used for secure DICOM communication.

MAMMOMAT B.brilliant supports X.509 certificates. The type of X.509 certificates that are supported in MAMMOMAT B.brilliant are:

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

The following TLS certification checks will be done (TLS Handshake). The machine (either server or client) that will send its certificate will:

choose the certificate according to Common Name (CN), if the syngo self-signed is used. If customer specific certificate needs to be used, then Serial Number of the certificate is used for choosing the certificate.

The server verifies:

- that the client certificate is X.509 certificate which in not tampered with
- that the client certificate is in the list of trusted certificates (Trust Chain Building)
- that the client certificate is not in the revoked list.
- that the client certificate is not expired (present time is between “Valid From” and “Valid To” fields of X.509 certificate)
- that the client certificate has the correct purpose (at least the client authentication purpose).

The client verifies:

- that the server certificate is a X.509 certificate which is not tampered with
- that the server certificate is in the list of trusted certificates (Trust Chain Building)
- that the server certificate is not in the revoked list.
- that the server certificate is not expired (present time is between “Valid From” and “Valid To” fields of X.509 certificate)
- that the server certificate has the correct purpose (at least the server authentication purpose).

In addition, the following validation is done at MAMMOMAT B.brilliant side:

- ‘Direct certificate validation’ for self-signed certificate, i.e the self-signed certificate of the remote node must be present in the ‘Trusted Root Certificate’ Store. Certificate received from peer may have multiple X.509 certificates within the TLS Handshake.
- MAMMOMAT B.brilliant can receive X.509 certificate chain (Full certificate chain, Partial certificate chain or only End certificate) in the TLS handshake from peer. For all the cases for successful Trust chain building, all certificates shall be installed in the Windows certificate Store of the Local Machine.
  For example, all intermediate certificates must be imported to Intermediate Certificate Authorities → Certificates and the root certificate must be imported to the Trusted Root Certificates → Certificates.

The X.509 certificate imported and used for DICOM communication:

- must have purpose set for Client and Server Authentication.
- 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.

By default, MAMMOMAT B.brilliant communicates with either of the following cipher suites for encrypting the data sent across the network.

TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384

TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256

TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384

TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

TLS_DHE_RSA_WITH_AES_256_GCM_SHA384

TLS_DHE_RSA_WITH_AES_128_GCM_SHA256

TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384

TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256

TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384

TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256

By enabling the service configuration, disabled protocols TLS Protocol v1.1 and TLS Protocol v1.0 are enabled and used for secure DICOM communication.

By enabling the service configuration, the following ciphers suites for encrypting the data sent across the network is used for secure communication. By default, these ciphers suites are not used as it is disabled.

TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA

TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA

TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA

TLS_ECDHE_RSA_WITH_AES_128_CBC_SHANOTE: Support for NULL Cipher (TLS_RSA_WITH_NULL_SHA) is not there. The secure communication is FIPS mode enabled

The port in which MAMMOMAT B.brilliant acts as SCP for secure DICOM communication is 2762 (fixed). The port in which MAMMOMAT B.brilliant acts as SCP for unsecure DICOM communication is 104 (fixed). By default, unsecure mode is not available.

The following features of the security profile are supported using TLS:

- Secure authentication of node
- Integrity and confidentiality of transmitted data
- Generation of audit trail, recording access control and user authentication

7.2 Association Level Security

When “trusted host functionality” is enabled, MAMMOMAT B.brilliant only accepts DICOM communication from another AE if that System is configured with its hostname, port and AET.

MAMMOMAT B.brilliant supports security through the firewall of the underlying operating system.

7.3 Application Level Security

MAMMOMAT B.brilliant supports user authentication for the application logon. Advanced user management can be enabled through the service configuration for HIPAA.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

The following Tables use a number of abbreviations. The abbreviations used in the “Presence” column are

- VNAP: Value is Not Always Present. Attribute is sent zero length if no value is present.
- ANAP: Attribute Not Always Present.
- ALWAYS: Attribute and Value are always present.
- EMPTY: Attribute is sent zero length.
- NEVER: Attribute never present / Condition not fulfilled

The abbreviations used in the “Source” Column are

- MWL: The attribute value is copied from Modality Worklist.
- USER: The attribute value is entered by the user.
- AUTO: The attribute value is generated by the system.
- CONFIG: The attribute value is obtained by configuration.

8.1.1.1 Digital Mammography X-Ray Image

MAMMOMAT B.brilliant 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 63 defines the structure of Digital Mammography X-Ray Images.

Table 63: Digital Mammography X-Ray Image IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	General Series	Table 67: General Series Module	ALWAYS
	DX Series	Table 68: DX Series Module	ALWAYS
	Mammography Series	Table 69: Mammography Series Module	ALWAYS
Frame of Reference	Frame of Reference	Table 70: Frame of Reference Module	ANAP
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS

IE	Module	Reference	Presence of Module
Image	General Image	Table 72: General Image Module	ALWAYS
	General Reference	Table 73: General Reference Module	ALWAYS
	Image Pixel	Table 74: Image Pixel Module	ALWAYS
	Contrast/Bolus	Table 75: Contrast/ Bolus Module	ANAP
	DX Anatomy Image	Table 76: DX Anatomy Imaged Module	ALWAYS
	DX Image	Table 77: DX Image Module	ALWAYS
	DX Detector	Table 78: DX Detector Module	ALWAYS
	DX Positioning	Table 79: DX Positioning Module	ALWAYS
	X-Ray Acquisition Dose	Table 80 X-Ray Acquisition Dose Module	ALWAYS
	X-Ray Generation	Table 81: X-Ray Generation Module	ALWAYS
	X-Ray Filtration	Table 82: X-Ray Filtration Module	ALWAYS
	X-Ray Grid	Table 83: X-Ray Grid Module	ALWAYS
	Mammography Image	Table 84: Mammography Image Module	ALWAYS
	Overlay Plane	Table 85: Overlay Plane	ANAP
	VOI LUT	Table 86: VOI LUT	ANAP
	Acquisition Context	Table 87: Acquisition Context Module	ALWAYS
	SOP Common	Table 88: SOP Common Module	ALWAYS
Extended Attributes	Extended Attributes	Table 89: Extended Attributes	ALWAYS
Private Tags	Private Tags	Table 156: Data Dictionary of Private Attributes	ALWAYS

Table 64: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Value from MWL cannot be edited	ALWAYS	MWL | USER
Patient ID	(0010,0020)	LO	Value from MWL cannot be edited	ALWAYS	MWL | USER
Patient's Birth Date	(0010,0030)	DA	Value from MWL cannot be edited	ALWAYS	MWL | USER
Patient's Sex	(0010,0040)	CS	Value from MWL cannot be edited	ALWAYS	MWL | USER
Other Patient IDs	(0010,1000)	LO	Only present if value is provided	ANAP	MWL | USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
			Value from MWL cannot be edited		
Other Patient Names	(0010,1001)	PN	Only present if value is provided Value from MWL cannot be edited User input only allows a single other patient name, and only the last name component of the alphabetic group	ANAP	MWL | USER
Other Patient IDs Sequence	(0010,1002)	SQ	Only present if value is provided Value from MWL cannot be edited User input only allows a single other patient id	ANAP	MWL | USER
> Patient ID	(0010,0020)	LO		ANAP	MWL | USER
> Issuer of Patient ID	(0010,0021)	LO		ANAP	MWL | USER
> Type of Patient ID	(0010,0022)	CS		ANAP	MWL | USER
Military Rank	(0010,1080)	LO	Only present if value is provided Value from MWL cannot be edited	ANAP	MWL | USER
Ethnic Group	(0010,2160)	SH	Only present if value is provided Value from MWL cannot be edited	ANAP	MWL | USER
Patient Comments	(0010,4000)	LT	Only present if value is provided Value from MWL cannot be edited User input from field “Additional Info”	ANAP	MWL | USER

Table 65: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Date	(0008,0020)	DA	<date of registration>	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<time of registration>	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	Value from MWL cannot be edited	VNAP	MWL | USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referring Physician's Name	(0008,0090)	PN		VNAP	MWL | USER
Study Description	(0008,1030)	LO	Requested Procedure Description (0032,1060) from RIS, or procedure name from configuration	ALWAYS	MWL | CONFIG
Procedure Code Sequence	(0008,1032)	SQ	Only present if value is provided Requested Procedure Code SQ (0032,1064) from RIS, or configured code	ANAP	MWL | CONFIG
> Code Value	(0008,0100)	SH		ANAP	MWL | CONFIG
> Coding Scheme Designator	(0008,0102)	SH		ANAP	MWL | CONFIG
> Coding Scheme Version	(0008,0103)	SH	Absent if configured code is used	ANAP	MWL
> Code Meaning	(0008,0104)	SH		ANAP	MWL | CONFIG
Study Instance UID	(0020,000D)	UI		ALWAYS	MWL | AUTO
Study ID	(0020,0010)	SH	Requested Procedure ID (0040,1001) from RIS, or system generated	ALWAYS	MWL | AUTO
Referenced Study Sequence	(0008,1110)	SQ		ANAP	MWL
> Referenced SOP Class UID	(0008,1150)	UI		ANAP	MWL
> Referenced SOP Instance UID	(0008,1155)	UI		ANAP	MWL
Reason for Performed Procedure Code Sequence	(0040,1012)	SQ	Reason for Requested Procedure Code Sequence (0040,100A) from RIS, or examination purpose of procedure from configuration	ALWAYS	MWL | CONFIG
> Code Value	(0008,0100)	SH	Screening: "R-42453" Diagnostic: "R-408C3" Phantom: "113680" Calibration: "W-0001"	ALWAYS	MWL | AUTO
> Coding Scheme Designator	(0008,0102)	SH	Screening: "SRT" Diagnostic: "SRT" Phantom: "DCM" Calibration: "99SMS_SPWH"	ALWAYS	MWL | AUTO
> Coding Scheme Version	(0008,0103)	SH	Calibration: "1.0" Otherwise: From RIS or absent	ANAP	MWL | AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Code Meaning	(0008,0104)	SH	Screening: "Screening" Diagnostic: "Diagnostic" Phantom: "Phantom" Calibration: "Calibration"	ALWAYS	MWL | AUTO

Table 66: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Admitting Diagnosis Description	(0008,1080)	LO		ANAP	MWL | USER
Patient's Age	(0010,1010)	AS	Value from MWL cannot be edited If not provided from RIS then calculated from field "Date of Birth"	ALWAYS	MWL | AUTO | USER
Patient's Size	(0010,1020)	DS	(in meters) Only present if value is provided Value from MWL cannot be edited	ANAP	MWL | USER
Patient 's Weight	(0010,1030)	DS	(in kilograms) Only present if value is provided Value from MWL cannot be edited	ANAP	MWL | USER
Medical Alerts	(0010,2000)	LO		ANAP	MWL
Allergies	(0010,2110)	LO		ANAP	MWL
Smoking Status	(0010,21A0)	CS		ANAP	MWL
Additional Patient History	(0010,21B0)	LT		ANAP	MWL
Pregnancy Status	(0010,21C0)	US		ANAP	MWL
Last Menstrual Date	(0010,21D0)	DA		ANAP	MWL
Patient State	(0038,0500)	LO		ANAP	MWL

Table 67: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	Table 68: DX Series Module OR Table 91: Enhanced Mammography Series Module	..	..
Series Instance UID	(0020,000E)	UI	generated	ALWAYS	AUTO
Series Number	(0020,0011)	IS	generated	ALWAYS	AUTO
Laterality	*(0020,0060)*	*CS*		*NEVER*	
Series Date	(0008,0021)	DA	<date of creation>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<time of creation>	ALWAYS	AUTO
Performing Physician's Name	(0008,1050)	PN	Only present if value is provided	ANAP	MWL | USER
Protocol Name	(0018,1030)	LO	FFDM images: "MAMMOGRAM" Stereo images: "STEREO" Tomo projections: "TOMO_PROJ" BTO: "TOMO" Synthetic Mammogram: "INSIGHT_2D" Rotating Mammogram: "INSIGHT_3D" Insight CEM: "COMBINED"	ALWAYS	AUTO
Series Description	(0008,103E)	LO	See below default values Can be corrected if MPPS still In-Progress	ALWAYS	USER | AUTO
FFDM Images FOR PROCESSING: "MAMMOGRAM_raw, <purpose>" FFDM Images FOR PRESENTATION: "MAMMOGRAM, <purpose>" Tomosynthesis Projections FOR PROCESSING: "T_PR_raw <Laterality> + <Projection View> , <purpose>" Tomosynthesis Projections FOR PRESENTATION: "T_PR < Laterality> + <Projection View> , <purpose>" BTO Reconstructed slices: "BTO_TOMO <Laterality> + <Projection View> , < RPG Name> , <purpose>" Synthetic Mammogram:					

Attribute Name	Tag	VR	Value	Presence of Value	Source
"INSIGHT 2D <Laterality> + <Projection View> , <purpose>" Rotating Mammogram: "BTO_INSIGHT 3D < Laterality> + <Projection View> , <purpose>" TiCEM images FOR PROCESSING: "TiCEM_raw <Laterality> + <Projection View> , <purpose>" TiCEM images FOR PRESENTATION: "TiCEM <Laterality> + <Projection View> , <purpose>" Insight CEM images: "Insight CEM <Laterality> + <Projection View> , <purpose>" Tomosynthesis Biopsy Scout: "BTO_TOMO <Laterality> + <Projection View> SC, <RPG Name> , <purpose>" Where <purpose> is 'Screening' or 'Diagnostic'					
Operator's Name	(0008,1070)	PN	input fields "Operator 1" / " Operator 2"	ANAP	USER
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Table 68: DX Series Module	..	..
> Referenced SOP Class UID	(0008,1150)	UI	Table 68: DX Series Module	..	..
> Referenced SOP Instance UID	(0008,1155)	UI	Table 68: DX Series Module	..	..
Body Part examined	(0018,0015)	IS	"BREAST"	ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ	Only present if value is provided	ANAP	MWL
> Requested Procedure ID	(0040,1001)	SH	Only present if value is provided Value from MWL cannot be edited	ANAP	MWL | USER
Requested Procedure Description	(0032,1060)	LO		ANAP	MWL | AUTO
> Requested Procedure Code Sequence	(0032,1064)	SQ		ANAP	MWL
>> Code Value	(0008,0100)	SH		ANAP	MWL
>> Coding Scheme Designator	(0008,0102)	SH		ANAP	MWL
>> Coding Scheme Version	(0008,0103)	SH		ANAP	MWL
>> Code Meaning	(0008,0104)	LO		ANAP	MWL
> Reason for Requested Procedure Code Sequence	(0040,100A)	SQ		ANAP	MWL
>> Code Value	(0008,0100)	SH		ANAP	MWL
>> Coding Scheme Designator	(0008,0102)	SH		ANAP	MWL

Attribute Name	Tag	VR	Value	Presence of Value	Source
>> Coding Scheme Version	(0008,0103)	SH		ANAP	MWL
>> Code Meaning	(0008,0104)	LO		ANAP	MWL
> Scheduled Procedure Step ID	(0040,0009)	SH		ANAP	MWL
> Scheduled Procedure Step Description	(0040,0007)	LO		ANAP	MWL
> Scheduled Protocol Code Sequence	(0040,0008)	SQ		ANAP	MWL
>> Code Value	(0008,0100)	SH		ANAP	MWL
>> Coding Scheme Designator	(0008,0102	SH		ANAP	MWL
>> Coding Scheme Version	(0008,0103)	SH		ANAP	MWL
>> Coding Meaning	(0008,0104)	SH		ANAP	MWL
Performed Procedure Step ID	(0040,0253)	SH	<MGyyyymmddhhmmss>	ALWAYS	AUTO
Performed Procedure Step Start Date	(0040,0244)	DA	<date of registration>	ALWAYS	AUTO
Performed Procedure Step Start Time	(0040,0245)	TM	<time of registation>	ALWAYS	AUTO
Performed Procedure Step Description	(0040,0254)	LO	Value of Study Description	ALWAYS	AUTO
Performed Protocol Code Sequence	(0040,0260)	SQ	Scheduled Protocol Code Sequence (0040,0008) from MWL	ANAP	MWL
> Code Value	(0008,0100)	SH		ANAP	MWL
> Coding Scheme Designator	(0008,0102)	SH		ANAP	MWL
> Coding Scheme Version	(0008,0103)	SH		ANAP	MWL
> Code Meaning	(0008,0104)	LO		ANAP	MWL
Comments on the performed Procedure Step	(0040,0280)	ST		ANAP	MWL

Table 68: DX Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	Table 69: Mammography Series Module	..	..
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.3.1.2.3.3	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Referenced SOP Instance UID	(0008,1155)	UI	Copy from corresponding MPPS	ALWAYS	AUTO
Presentation Intent Type	(0008,0068)	CS	Original FFDM Image: "FOR PROCESSING" Derived FFDM Image: "FOR PRESENTATION" Synthetic Mammogram: "FOR PRESENTATION"	ALWAYS	AUTO

Table 69: Mammography Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"MG"	ALWAYS	AUTO

Table 70: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	UI	Only present in Stereo Biopsy: generated for each compression phase Insight 2D: from BTO	ANAP	AUTO
Positioner Reference Indicator	(0020,1040)	LO	Only present in Stereo Biopsy, Insight 2D: always empty	ANAP	Auto

Table 71: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	"SIEMENS"	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	Order of precedence: User input > RIS > Config	ALWAYS	MWL | USER | CONFIG
Institution address	(0008,0081)	ST		ALWAYS	CONGIG

Attribute Name	Tag	VR	Value	Presence of Value	Source
Station Name	(0008,1010)	SH	<hostname>	ALWAYS	CONFIG
Institutional Department Name	(0008,1040)	LO	<Department>	ALWAYS	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	“MAMMOMAT B.brilliant”	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	< serial number>	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	<system and component versions>	ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	US	“0” or <2^BitsStored - 1>	ALWAYS	AUTO

Table 72: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS		ALWAYS	AUTO
Content Date	(0008,0023)	DA	<date of creation>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<time of creation>	ALWAYS	AUTO
Image Type	(0008,0008)	CS	Refined by Table 77: DX Image Module Conclusion listed in Table 171: Image Types / Frame Types	..	..
Acquisition Number	(0020,0012)	IS		ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	<date of X-Ray event>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	<time of X-Ray event>	ALWAYS	AUTO
Image Laterality	(0020,0062)	CS	Table 84: Mammography Image Module	..	..
Images in Acquisition	(0020,1002)	IS	FFDM, Insight 2D: <number of images in the series> BTO: <number of slices> Tomo Projections: <number of projections in the series> Insight 3D: <number of images in the series>	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Comments	(0020,4000)	LT	Anytime: Entered in UI Insight 2D adds: "INSIGHT 2D" Insight Breast Density configured adds: <INBD grade> or <reject information> TiCEM adds: Time since Injection (if configured), <TsI:x:y min:sec> Biopsy adds: Spacer Plate (if configured)	VNAP	USER | AUTO
Quality Control Image	(0028,0300)	CS	Examination Purpose equals "Phantom": "YES" Otherwise: "NO"	ALWAYS	CONFIG
Burned In Annotation	(0028,0301)	CS	"NO"	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	If none or Lossless compression: "00" If USER configured Lossy: "01"	ALWAYS	AUTO
Lossy Image Compression Ratio	(0028,2112)	CS	calculated	ANAP	AUTO
Lossy Image Compression Method	(0028,2114)	CS	JPEG Lossy Compression	ANAP	AUTO
Irradiation Event UID	(0008,3010)	UI	generated	ALWAYS	AUTO

Table 73: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Image Sequence	0008,1140	SQ	Only implemented in Stereo Pair: SOP Class / Instance UID of respective other stereo pair image	ANAP	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	<class uid>	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Referenced SOP Instance UID	(0008,1151)	UI	<instance uid>	ANAP	AUTO
Derivation Description	(0008,2111)	ST	Table 77: DX Image Module	..	..
Source Image Sequence	(0008,2112)	SQ	FOR PROCESSING image: not present FOR PRESENTATION image: Reference to FOR PROCESSING image Insight 2D: References all projection images (FOR_PROCESSING) Insight 3D: References all projection images (FOR_PROCESSING) BTO: References all projection images (FOR_PROCESSING)	ANAP	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	<class uid>	ANAP	AUTO
> Referenced SOP Instance UID	(0008,1155)	UI	<instance uid>	ANAP	AUTO
> Spatial Locations Preserved	(0028,135A)	UI	FOR_PRESENTATION image: "YES"	ANAP	AUTO

Table 74: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	"1"	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME1" | "MONOCHROME2"	ALWAYS	AUTO
Rows	(0028,0010)	US	Paddle and mode specific	ALWAYS	AUTO
Columns	(0028,0011)	US	Paddle and mode specific	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 Aspect Ratio	(0028,0034)	IS	Only present if 1:1 is explicitly configured	ANAP	AUTO
Pixel Data	(7FE0,0010)	OW		ALWAYS	AUTO

Table 75: Contrast/ Bolus Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO	Contrast Agent name	ALWAYS	AUTO
Contrast/Bolus Volume	(0018,1041)	DS	Volume injected in milliliters of diluted contrast agent	ALWAYS	AUTO
Contrast/Bolus Start Time	(0018,1042)	TM	Time of start of injection	ALWAYS	AUTO
Contrast Flow Rate	(0018,1046)	DS	Flow Rate(s) of injection(s) in milliliters/sec	ALWAYS	AUTO
Contrast/Bolus Ingredient	(0018,1048)	CS	Active ingredient of agent. Defined Terms: IODINE GADOLINIUM CARBON DIOXIDE BARIUM	ALWAYS	AUTO
Contrast/Bolus Ingredient: Concentration	(0018,1049)	DS	Milligrams of active ingredient per milliliter of (diluted) agent	ALWAYS	AUTO

Table 76: DX Anatomy Imaged Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Laterality	(0020,0062)	CS	Table 84: Mammography Image Module	..	..
Anatomic Region Sequence	(0008,2218)	SQ	Table 84: Mammography Image Module	..	..
> 'Code Sequence Macro' for Anatomic Region Sequence			Table 84: Mammography Image Module	..	..

Table 77: DX Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	Based on Table 72: General Image Module Refined by Table 84: Mammography Image Module Conclusion listed in Table 171: Image Types / Frame Types	..	..
Samples per Pixel	(0028,0002)	US	Table 74: Image Pixel Module	..	..
Photometric Interpretation	(0028,0004)	CS	Table 74: Image Pixel Module	..	..

Attribute Name	Tag	VR	Value	Presence of Value	Source
Bits Allocated	(0028,0100)	US	Table 74: Image Pixel Module	..	..
Bits Stored	(0028,0101)	US	Table 74: Image Pixel Module	..	..
High Bit	(0028,0102)	US	Table 74: Image Pixel Module	..	..
Pixel Representation	(0028,0103)	US	Table 74: Image Pixel Module	..	..
Pixel Data	(7FE0,0010)	OW	Table 74: Image Pixel Module	..	..
Pixel Intensity Relationship	(0028,1040)	CS	LIN | LOG	ALWAYS	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	SS	1 | -1	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
Presentation LUT Shape	(2050,0020)	CS	INVERSE or IDENTITY	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Table 72: General Image Module	..	..
Derivation Description	(0008,2111)	ST	Original Image: Empty Derived Image: IPPG name Synthetic Mammogram: RPG name with extension "(2D)" and IPPG name, Example: " RPG:Premia0 (2D),IPPG:F0_Gen1"	ALWAYS	AUTO
Acquisition Device Processing Description	(0018,1400)	LO	Empty	ALWAYS	AUTO
Acquisition Device Processing Code	(0018,1401)	LO	Empty	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	Table 72: General Image Module	..	..
Calibration Image	(0050,0004)	CS	Yes or NO	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Table 72: General Image Module	..	..
VOI LUT Sequence	(0028,3010)	SQ	Table 86: VOI LUT Module	..	..
> LUT Descriptor	(0028,3002)	US	Table 86: VOI LUT Module	..	..
> LUT Explanation	(0028,3003)	LO	Table 86: VOI LUT Module	..	..
> LUT data	(0028,3006)	US	Table 86: VOI LUT Module	..	..
Window Center	(0028,1050)	DS	Depending on Image processing	ALWAYS	AUTO | USER
Window Width	(0028,1051)	DS	Depending on Image processing	ALWAYS	AUTO | USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center and Width Explanation	(0028,1055)	LO	Linear LUT	ALWAYS	AUTO

Table 78: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Detector Type	(0018,7004)	CS	SCINTILLATOR | DIRECT	ALWAYS	AUTO
Detector Configuration	(0018,7005)	CS	AREA	ALWAYS	AUTO
Detector Description	(0018,7006)	LT	<detector mode>;<detector type>	ALWAYS	AUTO
Detector Mode	(0018,7008)	LT	Tomo: HIGH GAIN Otherwise: LOW GAIN	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 Binning	(0018,701A)	DS	1\1	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 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\mm	ALWAYS	AUTO
Detector Active Origin	(0018,7028)	DS	0\0	ALWAYS	AUTO
Field of View Shape	(0018,1147)	CS	RECTANGLE	ALWAYS	AUTO
Field of View dimension(s)	(0018,1149)	IS	mm\mm	ALWYAS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
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
Imager Pixel Spacing	(0018,1164)	DS	<row space, col space> (mm)	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Default: only used in Insight 2D Can be configured by Service to be used in other images	ANAP	AUTO

Table 79: DX Positioning Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
View Position	(0018,5101)	CS	Generated	ALWAYS	AUTO
View Code Sequence	(0054,0220)	SQ	Table 84: Mammography Image Module	..	..
Distance Source to Detector	(0018,1110)	DS	(mm) SID	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	DS	Mag-View: 1.5 or 1.8 according to mag table	ALWAYS	AUTO
Positioner Type	(0018,1508)	CS	Table 84: Mammography Image Module	..	..
Positioner Primary Angle	(0018,1510)	DS	Table 84: Mammography Image Module	..	..
Positioner Secondary Angle	(0018,1511)	DS	Table 84: Mammography Image Module	..	..
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
Table Type	(0018,113A)	CS	NONE	ALWAYS	AUTO
Table Angle	(0018,1138)	DS	0	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 and size of Compression Paddle	ALWAYS	AUTO

Table 80 X-Ray Acquisition Dose Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	KVP Insight CEM: Not available	ANAP	AUTO
X-Ray Tube Current	(0018,1151)	IS	mA Value of mainshot Insight CEM: Not available	VNAP	AUTO
X-Ray Tube Current in µA	(0018,8151)	DS	µA Value of mainshot Insight CEM: Not available	VNAP	AUTO
Exposure Time	(0018,1150)	IS	<duration of x-Ray exposure> (ms) Sum of preshot + mainshot Insight CEM: Sum of low + high energy images	ALWAYS	AUTO
Exposure Time in µs	(0018,8150)	DS	<time> Sum of preshot + mainshot Insight CEM: Sum of low + high energy images	ALWAYS	AUTO
Exposure	(0018,1152)	IS	mAs Sum of preshot + mainshot Insight CEM: 0	VNAP	AUTO
Exposure in µAs	(0018,1153)	IS	µAs Sum of preshot + mainshot Insight CEM: 0	VNAP	AUTO
Distance Source to Detector	(0018,1110)	DS	Table 79: DX Positioning Module	..	..

Attribute Name	Tag	VR	Value	Presence of Value	Source
Body Part Thickness	(0018,11A0)	DS	Table 79: DX Positioning Module	..	..
Relative X-Ray Exposure	(0018,1405)	IS	Percentage value of maximum allowed dose Insight 2D: 0	ALWAYS	AUTO
Entrance Dose in dGy	(0040,0302)	US	Current value Insight 2D: 0	VNAP	AUTO
Entrance Dose in mGy	(0040,8302)	DS	Current value Insight 2D: 0	VNAP	AUTO
Distance Source to Entrance	(0040,0306)	DS	Current value	ALWAYS	AUTO
Organ Dose (dGy)	(0040,0316)	DS	Calculated according to Dance / Boone Insight 2D: 0	ALWAYS	AUTO
Organ Exposed	(0040,0318)	CS	Table 84: Mammography Image Module	..	..
Anode Target Material	(0018,1191)	CS	TUNGSTEN	ALWAYS	AUTO
Filter Type	(0018,1160)	SH	STRIP	ALWAYS	AUTO
Filter Material	(0018,7050)	CS	ALUMINUM Insight CEM: TITANIUM and ALUMINUM	ALWAYS	USER | AUTO
Filter Thickness Minimum	(0018,7052)	DS	For Aluminum: 0.7 or 1.0 For Titanium: 1.3	ALWAYS	AUTO
Filter Thickness Maximum	(0018,7054)	DS	For Aluminum: 0.7 or 1.0 For Titanium: 1.3	ALWAYS	AUTO
Rectification Type	(0018,1156)	CS	CONST POTENTIAL	ALWAYS	AUTO

Table 81: X-Ray Generation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	Table 80 X-Ray Acquisition Dose Module	..	..
X-Ray Tube Current	(0018,1151)	IS	Table 80 X-Ray Acquisition Dose Module	..	..
X-Ray Tube Current in µA	(0018,8151)	DS	Table 80 X-Ray Acquisition Dose Module	..	..
Exposure Time	(0018,1150)	IS	Table 80 X-Ray Acquisition Dose Module	..	..
Exposure Time in µs	(0018,8150)	DS	Table 80 X-Ray Acquisition Dose Module	..	..
Exposure	(0018,1152)	IS	Table 80 X-Ray Acquisition Dose Module	..	..
Exposure in µAs	(0018,1153)	IS	Table 80 X-Ray Acquisition Dose Module	..	..
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
Focal Spot	(0018,1190)	DS	Table 80 X-Ray Acquisition Dose Module	..	..
Anode Target Material	(0018,1191)	CS	Table 80 X-Ray Acquisition Dose Module	..	..
Rectification Type	(0018,1156)	CS	Table 80 X-Ray Acquisition Dose Module	..	..

Table 82: X-Ray Filtration Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Filter Type	(0018,1160)	SH	Table 80 X-Ray Acquisition Dose Module	..	..
Filter Material	(0018,7050)	CS	Table 80 X-Ray Acquisition Dose Module	..	..
Filter Thickness Minimum	(0018,7052)	DS	Table 80 X-Ray Acquisition Dose Module	..	..
Filter Thickness Maximum	(0018,7054)	DS	Table 80 X-Ray Acquisition Dose Module	..	..

Table 83: X-Ray Grid Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Grid	(0018,1166)	DS	Acquisition with grid: FOCUSED\ PARALLEL Acquisition w/o grid. Antiscatter correction algorithm applied: NONE\ PRIME Acquisition w/o grid: NONE	ALWAYS	AUTO

Table 84: Mammography Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	Based on Table 77: DX Image Module Conclusion listed in Table 171: Image Types / Frame Types	..	..
Distance Source to Detector	(0018,1110)	DS	Table 79: DX Positioning Module	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS	Value is positive from vertical to patient's right	ALWAYS	AUTO
Positioner Primary Angle direction	(0018,9559)	DS	CW	ALWAYS	AUTO
Positioner Secondary Angle	(0018,1511)	DS	0	ALWAYS	AUTO
Image Laterality	(0020,0062)	CS	R | L | B	ALWAYS	USER
Organ Exposed	(0040,0318)	CS	BREAST	ALWAYS	AUTO
Implant Present	(0028,1300)	CS	YES or NO	ALWAYS	AUTO
Partial View	(0028,1350)	CS	NO	ALWAYS	AUTO
Positioner Type	(0018,1508)	CS	MAMMOGRAPHIC	ANAP	AUTO
View Code Sequence	(0054,0220)	SQ	One value defined in CID 4014: CC MLO ML LMO LM	ALWAYS	AUTO | USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
			FB SIO XCC XCCL XCCM SPEC XCCL, XCCM and SPEC: Special encoding can be configured		
> Code Value	(0008,0100)	SH	According to CID 4014	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	SH	SNM3 XCCL, XCCM and SPEC: SRT	ALWAYS	AUTO
> Code Meaning	(0008,0104)	LO	According to CID 4014	ALWAYS	AUTO
> View Modifier Code Sequence	(0054,0222)	SQ	empty or one value as defined in CID 4015: Cleavage CV Axillary Tail AT Rolled Lateral, RL Rolled Medial, RM Rolled Inferior, RI Rolled Superior, RS Implant Displaced, ID Magnification, M Spot, S Tangential, TAN Normally set by user. S and M defined by paddle	VNAP	AUTO | USER
>> Code Value	(0008,0100)	SH	According to CID 4015	VNAP	AUTO | USER
>> Coding Scheme Designator	(0008,0102)	SH	SNM3 RI, RS: SRT	VNAP	AUTO | USER
>> Code Meaning	(0008,0104)	SH	According to CID 4015	VNAP	AUTO | USER
Anatomic Region Sequence	(0008,2218)	SQ	One item containing (T-04000, SNM3, “Breast”)	ALWAYS	AUTO
> Code Value	(0008,0100)	SH	T-04000	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	SH	SNM3	ALWAYS	AUTO
> Code Meaning	(0008,0104)	SH	Breast	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Biopsy Target Sequence	(0018,2041)	SQ	For Biopsy: 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 Equivalent to data stored in Overlay group or Presentation State respectively	ANAP	AUTO
> Calculated Target Position	(0018,2044)	FL	The calculated target position (x, y, z) in mm	ANAP	AUTO
> Target Label	(0018,2045)	SH	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.	ANAP	AUTO
> Needle Info	(0023,xx01)	LO	Needle Type, Needle Gauge and Needle Length in mm, e.g. Type:Fine Gauge:0.7 Length: 100.0	ANAP	AUTO

Table 85: Overlay Plane Module

Overlay Planes are present in images when graphics have been stored which are not supported by MAMMOMAT B.brilliant's Greyscale Softcopy Presentation State, or if the Presentation State Support is disabled for a remote DICOM node.

Attribute Name	Tag	VR	Value	Presence of Value	Source
Overlay Rows	(60xx,0010)	US	Number of Rows in Overlay	ANAP	AUTO
Overlay Columns	(60xx,0011)	US	Number of Columns in Overlay	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
Overlay Description	(60xx,0022)	LO	Siemens MedCom Object Graphics	ANAP	AUTO

Table 86: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
VOI LUT Sequence	(0028,3010)	SQ	0-10 VOI LUTs depending on configuration	ANAP	AUTO
> LUT Descriptor	(0028,3002)	US	<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	<array of data, accord. descriptor>	ANAP	AUTO

Table 87: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)	SQ	Default: Empty PRIME: One item for scatter correction information	VNAP	AUTO
PRIME					
>Value Type	(0040,A040)	CS	"TEXT"	ALWAYS	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	"scatter_info"	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	1C	99SMS_SPWH	ALWAYS	AUTO
>>Coding Scheme Version	(0008,0103)	1C	1.0	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	1	"Scatter Correction information"	ALWAYS	AUTO
>Text Value	(0040,A160)	1C	<Scatter Correction params for Prime Undo received from harmonIC>	ALWAYS	AUTO
Acquisition Context Description	(0040,0556)	ST	Text description	ALWAYS	AUTO

Table 88: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	Digital Mammography X-Ray Image Storage – For Pres. 1.2.840.10008.5.1.4.1.1.1.2 Digital Mammography X-Ray Image Storage – For Proc 1.2.840.10008. 5.1.4.1.1.1.2.1 Breast Tomosynthesis Image Storage 1.2.840.10008.5.1.4.1.1.13.1.3 X-Ray Radiation Dose SR Storage 1.2.840.10008.5.1.4.1.1.88.67 Mammography CAD SR Storage 1.2.840.10008.5.1.4.1.1.88.50	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Created	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	From Configuration / RIS	ANAP	MWL | CONFIG
Instance Number	(0020,0013)	IS	Table 72: General Image Module	ALWAYS	AUTO

Table 89: Extended Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Distance Source to Isocenter	(0018,9402)	FL	Added to Tomo projection images FOR PROCESSING Distance from source to isocenter in mm	ANAP	AUTO
Requesting Physician	(0032,1032)	PN	Only present if value is provided	ANAP	MWL | USER
Number of Frames in Overlay	(60xx,0015)	US	1 In case Overlay Module is used, e.g. if graphic cannot be exported to GSPS	ANAP	AUTO
Image Frame Origin	(60xx,0051)	US	1 In case Overlay Module is used, e.g. if graphic cannot be exported to GSPS	ANAP	AUTO

8.1.1.2 Breast Tomosynthesis image

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

Table 90: Breast Tomosynthesis Image IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	General Series	Table 67: General Series Module	ALWAYS
	Enhanced Mammography Series	Table 91: Enhanced Mammography Series	ALWAYS
Frame of Reference	Frame of Reference	Table 92: Frame of Reference Module	ALWAYS
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS
	Enhanced General Equipment	Table 93: Enhanced General Equipment Module	ALWAYS
Image	Image Pixel	Table 74: Image Pixel Module	ALWAYS
	Acquisition Context	Table 87: Acquisition Context Module	ALWAYS
	Multi-frame Functional Groups	Table 94: Multi-frame Functional Groups Module	ALWAYS
	X-Ray 3D Image	Table 107: X-Ray 3D Image Module	ALWAYS
	Breast Tomosynthesis Contributing Sources	Table 108: Breast Tomosynthesis Contributing Sources Module	ALWAYS
	Breast Tomosynthesis Acquisition	Table 111: Breast Tomosynthesis Acquisition Module	ALWAYS
	Breast View	Table 115: Breast View Module	ALWAYS
	SOP Common	Table 88: SOP Common Module	ALWAYS
	Extended Attributes	Table 116: Extended Attributes BTO	ALWAYS
Private Tags	Private Tags	Table 156: Data Dictionary of Private Attributes	ALWAYS

Table 91: Enhanced Mammography Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	MG	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.3.1.2.3.3	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008,1155)	UI	Copy from corresponding MPPS	ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ	From RIS	ANAP	MWL
> Requested Procedure ID	(0040,1001)	SH	From RIS or “Request ID” input	ANAP	MWL | USER

Table 92: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	UI	Generated	ALWAYS	AUTO
Positioner Reference Indicator	(0020,1040)	LO	Empty	VNAP	--

Table 93: Enhanced General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	SIEMENS	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	MAMMOMAT B.brilliant	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	<modality serial number>	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	<system and component versions>	ALWAYS	AUTO

Table 94: Multi-frame Functional Groups Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Shared Functional Groups Sequence	(5200,9229)	SQ	Table 95: Shared Functional Group Sequence	..	..
Per Frame Functional Groups Sequence	(5200,9230)	SQ	Table 102: Per Frame Functional Group Sequence	..	..

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Date of Creation	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time of Creation	ALWAYS	AUTO
Number of Frames	(0028,0008)	IS	Number of frames	ALWAYS	AUTO
Representative Frame Number	(0028,6010)	US	First frame = 1	ALWAYS	AUTO

Table 95: Shared Functional Group Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Derivation Image Sequence	(0008,9124)	SQ	Table 96: Derivation Image Sequence	..	..
Frame Anatomy Sequence	(0020,9071)	SQ	Table 97: Frame Anatomy Sequence	..	..
Plane Orientation Sequence	(0020,9116)	SQ	Table 98: Plane Orientation Sequence	..	..
Pixel Measures Sequence	(0028,9110)	SQ	Table 99: Pixel Measures Sequence	..	..
Frame VOI LUT sequence	(0028,9132)	SQ	Table 100: Frame VOI LUT Sequence	..	..
Pixel Value Transformation Sequence	(0028,9145)	SQ	Table 101: Pixel Value Transformation Sequence	..	..

Table 96: Derivation Image Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Derivation Image Sequence	(0008,9124)	SQ		ALWAYS	AUTO
> Derivation Description	(0008,2111)	ST	Tomo: RPG name Insight 3D: RPG name and IPPG name	ALWAYS	AUTO
> Derivation Code Sequence	(0008,9125)	SQ		ALWAYS	AUTO
>> Code Value	(0008,0100)	SH	113074	ALWAYS	AUTO
>> Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>> Code Meaning	(0008,0104)	LO	Volume rendering	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Source Image Sequence	(0008,2112)	SQ	Lists all projection images	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.4.1.1.1.2	ALWAYS	AUTO
>> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID	ALWAYS	AUTO
>> Purpose of Reference Code Sequence	(0040,A170)	SQ		ALWAYS	AUTO
>>> Code Value	(0008,0100)	SH	121322	ALWAYS	AUTO
>>> Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	AUTO
>>> Code Meaning	(0008,0104)	LO	Source image for image processing operation	ALWAYS	AUTO
>> Spatial Locations Preserved	(0028,135A)	CS	YES	ALWAYS	AUTO

Table 97: Frame Anatomy Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Anatomy Sequence	(0020,9071)	SQ		ALWAYS	AUTO
> Frame Laterality	(0020,9072)	CS	R | L | B	ALWAYS	AUTO
> Anatomic Region Sequence	(0008,2218)	SQ		ALWAYS	AUTO
>> Code Value	(0008,0100)	SH	T-04000	ALWAYS	AUTO
>> Coding Scheme Designator	(0008,0102)	SH	SNM3	ALWAYS	AUTO
>> Code Meaning	(0008,0104)	LO	Breast	ALWAYS	AUTO

Table 98: Plane Orientation Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Plane Orientation Sequence	(0020,9116)	SQ		ALWAYS	AUTO
> Image Orientation (Patient)	(0020,0037)	DS	Direction cosines of the first row and the first column with respect to the patient.	ALWAYS	AUTO

Table 99: Pixel Measures Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Measures Sequence	(0028,9110)	SQ		ALWAYS	AUTO
> Pixel Spacing	(0028,0030)	DS	calculated	ALWAYS	AUTO
> Slice Thickness	(0018,0050)	DS	Tomo: 1 Insight 3D: Equals Body Part Thickness	ALWAYS	AUTO

Table 100: Frame VOI LUT Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame VOI LUT Sequence	(0028,9132)	SQ		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
> VOI LUT Function	(0028,1056)	LO	LINEAR	ALWAYS	AUTO
> VOI LUT Sequence	(0028,3010)	SQ	Insight 3D: 0-10 VOI LUTs depending on configuration	ANAP	AUTO
>> LUT Descriptor	(0028,3002)	US	<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	<array of data, accord. descriptor>	ANAP	AUTO

Table 101: Pixel Value Transformation Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Value Transformation Sequence	(0028,9145)	SQ		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

Table 102: Per Frame Functional Group Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
X-Ray 3D Frame Type	(0018,9504)	SQ	Table 103: X-ray 3D Frame Type Sequence	..	..
Frame Content Sequence	(0020,9111)	SQ	Table 104: Frame Content Sequence	..	..
Plane Position Sequence	(0020,9113)	SQ	Table 105: Plane Position Sequence	..	..
Biopsy Target Sequence	(0018,2041)	SQ	Table 106: Biopsy Target Sequence	..	..

Table 103: X-ray 3D Frame Type Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
X-Ray 3D Frame Type Sequence	(0018,9504)	SQ		ALWAYS	AUTO
> Frame Type	(0008,9007)	CS	Table 171: Image Types / Frame Types	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

Table 104: Frame Content Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Content Sequence	(0020,9111)	SQ		ALWAYS	AUTO
> Frame Acquisition Number	(0020,9156)	UL	Acquisition Number	ALWAYS	AUTO
> Frame Acquisition Date and Time	(0018,9074)	DT	Date and Time	ALWAYS	AUTO

Table 105: Plane Position Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Plane Position Sequence	(0020,9113)	SQ		ALWAYS	AUTO
> Image Position (Patient)	(0020,0032)	DS	x, y, z	ALWAYS	AUTO

Table 106: Biopsy Target Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
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)	ANAP	USER
> 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)	LO	Needle Type, Needle Gauge and Needle Length in mm, e.g. Type:Fine Gauge:0.7 Length: 100.0	ANAP	USER

Table 107: X-Ray 3D Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	"Table 171: Image Types / Frame Types	..	..
Pixel Presentation	(0008,9205)	CS	Table 74: Image Pixel Module	..	..
Volumetric Properties	(0008,9206)	CS	VOLUME	ALWAYS	AUTO
Volumetric Based Calculation Technique	(0008,9207)	CS	TOMOSYNTHESIS	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Table 74: Image Pixel Module	..	..

Attribute Name	Tag	VR	Value	Presence of Value	Source
Bits Stored	(0028,0101)	US	Table 74: Image Pixel Module	..	..
High Bit	(0028,0102)	US	Table 74: Image Pixel Module	..	..
Samples per Pixel	(0028,0002)	US	Table 74: Image Pixel Module	..	..
Photometric Interpretation	(0028,0004)	CS	Table 74: Image Pixel Module	..	..
Content Qualification	(0018,9004)	CS	PRODUCT	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Table 72: General Image Module	..	..
Lossy Image Compression	(0028,2110)	CS	Table 72: General Image Module	..	..
Lossy Image Compression Ratio	(0028,2112)	CS	Table 72: General Image Module	..	..
Lossy Image Compression Method	(0028,2114)	CS	Table 72: General Image Module	..	..
Image Comments	(0020,4000)	LT	Anytime: Entered in UI Insight Breast Density configured adds: INBD Grade or Reject Information Insight 3D adds: "Insight 3D"	VNAP	USER | AUTO
Quality Control Image	(0028,0300)	CS	YES or NO	ALWAYS	USER | AUTO
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO
Source Irradiation Event Sequence	(0008,3011)	SQ	from projections	ALWAYS	AUTO
> Irradiation Event UID	(0008,3010)	UI	from projections	ALWAYS	AUTO

Table 108: Breast Tomosynthesis Contributing Sources Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contributing Sources Sequence	(0018,9506)	SQ		..	..
> *Include Table 109: General Contributing Macro*				..	..
> *Include Table 110: Contributing Image Sources Macro*				..	..
> Detector Type	(0018,7004)	CS	DIRECT	ALWAYS	AUTO
> Detector ID	(0018,700A)	SH	Factory Serial Number	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Date of Last Detector Calibration	(0018,700C)	DA	<yyyymmdd> from projection	ALWAYS	AUTO
> Time of Last Detector Calibration	(0018,700E)	TM	<hhmmss> from projection	ALWAYS	AUTO
> Detector Element Spacing	(0018,7022)	DS	0.085\0.085	ALWAYS	AUTO

Table 109: General Contributing Macro

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contributing SOP Instances Reference Sequence	(0020,9529)	SQ		ALWAYS	AUTO
> Study Instance UID	(0020,000D)	UI	value from projections	ALWAYS	MWL | AUTO
> Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
>> Series Instance UID	(0020,000E)	UI	value from projections	ALWAYS	AUTO
>> Series Number	(0020,0011)	IS	value from projections	ALWAYS	AUTO
>> Referenced Instance Sequence	(0008,114A)	SQ	1 item for each Projection Image For Processing	ALWAYS	AUTO
>>> Referenced SOP Class UID	(0008,1150)	UI	SOP Class	ALWAYS	AUTO
>>> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID	ALWAYS	AUTO
>>> Instance Number	(0020,0013)	IS	Instance Number	ALWAYS	AUTO
Manufacturer	(0008,0070)	LO	Table 93: Enhanced General Equipment Module	..	..
Manufacturer's Model Name	(0008,1090)	LO	Table 93: Enhanced General Equipment Module	..	..
Device Serial Number	(0018,1000)	LO	Table 93: Enhanced General Equipment Module	..	..
Software Versions	(0018,1020)	LO	Table 93: Enhanced General Equipment Module	..	..
Acquisition Date Time	(0008,002A)	DT	Value	ALWAYS	AUTO
Station Name	(0008,1010)	SH	Table 71: General Equipment Module	..	..
Operator's Name	(0008,1070)	PN	Table 67: General Series Module	..	..
Protocol Name	(0018,1030)	LO	Table 67: General Series Module	..	..

Attribute Name	Tag	VR	Value	Presence of Value	Source
Performed Protocol Code Sequence	(0040,0260)	SQ	Table 67: General Series Module	..	..
> Code Value	(0008,0100)	SH	Table 67: General Series Module	..	..
> Coding Scheme Designator	(0008,0102)	SH	Table 67: General Series Module	..	..
> Coding Scheme Version	(0008,0103)	SH	Table 67: General Series Module	..	..
> Code Meaning	(0008,0104)	LO	Table 67: General Series Module	..	..

Table 110: Contributing Image Sources Macro

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rows	(0028,0010)	US	Table 74: Image Pixel Module	..	..
Columns	(0028,0011)	US	Table 74: Image Pixel Module	..	..
Bits Stored	(0028,0101)	US	Table 74: Image Pixel Module	..	..
Lossy Image Compression	(0028,2110)	CS	Table 72: General Image Module	..	..
Lossy Image Compression Ratio	(0028,2112)	CS	Table 72: General Image Module	..	..
Lossy Image Compression Method	(0028,2114)	CS	Table 72: General Image Module	..	..

Table 111: Breast Tomosynthesis Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
X-Ray 3D Acquisition Sequence	(0018,9507)	SQ		ALWAYS	AUTO
> Field of View Shape	(0018,1147)	CS	RECTANGLE	ALWAYS	AUTO
> X-Ray Receptor Type	(0018,9420)	CS	DIGITAL_DETECTOR	ALWAYS	AUTO
> X-Ray 3D General Shared Acquisition Macro Attributes		SQ	Table 112: X-Ray 3D General Shared Acquisition Macro	..	..
> X-Ray 3D General Positioner Movement Macro Attributes		SQ	Table 113: X-Ray 3D General Positioner Movement Macro	..	..
> Distance Source to Detector	(0018,1110)	DS	(mm) SID	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Distance Source to Patient	(0018,1111)	DS	(mm) SOD	ALWAYS	AUTO
> Estimated Radiographic Factor	(0018,1114)	DS	(mm) SID/SOD	ALWAYS	AUTO
> Anode Target Material	(0018,1191)	CS	TUNGSTEN	ALWAYS	AUTO
> Body Part Thickness	(0018,11A0)	DS	(mm)	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
> 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	For all projections	ALWAYS	AUTO
> Focal Spot	(0018,1190)	DS	0.3	ALWAYS	AUTO
> Detector Binning	(0018,701A)	DS	1\1	ALWAYS	AUTO
> Detector Temperature	(0018,7001)	DS	<value>	ALWAYS	AUTO
> Filter Type	(0018,1160)	SH	STRIP	ALWAYS	AUTO
> Filter Material	(0018,7050)	CS	ALUMINUM	ALWAYS	AUTO
> Filter Thickness Minimum	(0018,7052)	DS	For Aluminum: 0.7	ALWAYS	AUTO
> Filter Thickness Maximum	(0018,7054)	DS	For Aluminum: 0.7	ALWAYS	AUTO
> Compression Force	(0018,11A2)	DS	(Newton)	ALWAYS	AUTO
> Paddle Description	(0018,11A4)	LO	ID and size of Compression Paddle	ALWAYS	AUTO
> Per Projection Acquisition Sequence	(0018,9538)	SQ	Table 114: Per Projection Acquisition Sequence	ALWAYS	AUTO

Table 112: X-Ray 3D General Shared Acquisition Macro

Attribute Name	Tag	VR	Value	Presence of Value	Source
Source Image Sequence	(0008,2112)	SQ	An item for each tomo projection	ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.2.4.2.2.2.1	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID of projection image (FOR PROCESSING)	ALWAYS	AUTO
Field of View Dimension(s) in Float	(0018,9461)	FL	mm	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
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
Grid	(0018,1166)	DS	NONE	ALWAYS	AUTO
KVP	(0018,0060)	DS	value	ALWAYS	AUTO
X-Ray Tube Current	(0018,9330)	FD	(mA)	ALWAYS	AUTO
Exposure Time	(0018,9328)	FD	<duration of x-Ray exposure> (ms)	ALWAYS	AUTO
Exposure in mAs	(0018,9332)	FD	(mAs)	ALWAYS	AUTO
Start Acquisition Date Time	(0018,9516)	DT	Current value	ALWAYS	AUTO

Table 113: X-Ray 3D General Positioner Movement Macro

Attribute Name	Tag	VR	Value	Presence of Value	Source
Primary Positioner Scan Arc	(0018,9508)	FL	traveled angle Note: sign indicates direction	ALWAYS	AUTO
Secondary Positioner Scan Arc	(0018,9509)	FL	0	ALWAYS	AUTO
Primary Positioner Scan Start Angle	(0018,9510)	FL	Current value	ALWAYS	AUTO
Secondary Positioner Scan Start Angle	(0018,9511)	FL	0	ALWAYS	AUTO
Secondary Positioner Increment	(0018,9515)	FL	0	ALWAYS	AUTO

Table 114: Per Projection Acquisition Sequence

Attribute Name	Tag	VR	Value	Presence of Value	Source
Irradiation Event UID	(0008,3010)	UI	value from projection	ALWAYS	AUTO
KVP	(0018,0060)	DS	value	ALWAYS	AUTO
X-Ray Tube Current in mA	(0018,9330)	FD	(mA)	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS	value	ALWAYS	AUTO
Exposure Time in ms	(0018,9328)	FD	<duration of x-Ray exposure> (ms)	ALWAYS	AUTO
Exposure in mAs	(0018,9332)	FD	(mAs)	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Relative X-Ray Exposure	(0018,1405)	IS	Percentage value of maximum allowed dose	ALWAYS	AUTO
Organ dose	(0040,0316)	DS	Organ dose for scan	ALWAYS	AUTO
Entrance Dose in mGy	(0040,8302)	DS	value	ALWAYS	AUTO

Table 115: Breast View Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	Based on Table 107: X-Ray 3D Image Module Conclusion listed in Table 171: Image Types / Frame Types	..	..
View Code Sequence	(0054,0220)	SQ	One value defined in CID 4014: CC MLO ML LMO LM FB SIO XCC XCCL XCCM SPEC XCCL, XCCM and SPEC: Special encoding can be configured	ALWAYS	AUTO | USER
> Code Value	(0008,0100)	SH	According to CID 4014	ALWAYS	AUTO
> Coding Scheme Designator	(0008,0102)	SH	SNM3 XCCL, XCCM and SPEC: SRT	ALWAYS	AUTO
> Code Meaning	(0008,0104)	SH	According to CID 4014	ALWAYS	AUTO
> View Modifier Code Sequence	(0054,0222)	SQ	as defined in CID 4015: Cleavage, CV Axillary tail, AT Rolled lateral, RL Rolled medial, RM Rolled inferior, RI Rolled superior, RS Implant displaced, ID Magnification, M	VNAP	AUTO | USER

Attribute Name	Tag	VR	Value	Presence of Value	Source
			Spot, S Tangential, TAN Normally set by user. S and M defined by paddle		
>> Code Value	(0008,0100)	SH	According to CID 4015	VNAP	AUTO
>> Coding Scheme Designator	(0008,0102)	SH	SNM3 RI, RS: SRT	VNAP	AUTO
>> Code Meaning	(0008,0104)	SH	According to CID 4015	VNAP	AUTO
Breast Implant Present	(0028,1300)	CS	Yes or No	ALWAYS	AUTO
Partial View	(0028,1350)	CS	No	ALWAYS	AUTO

Table 116: Extended Attributes BTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Requesting Physician	(0032,1032)	PN	Only present if value is provided	ANAP	MWL | USER
Overlay Rows	(60xx,0010)	US	<same number as image rows> In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Columns	(60xx,0011)	US	<same number as image columns> In case graphic cannot be exported to GSPS	ANAP	AUTO
Number of Frames in Overlay	(60xx,0015)	US	<same number as image frames> In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Description	(60xx,0022)	LO	"Siemens MedCom Object Graphics" In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Type	(60xx,0040)	CS	"G" In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Origin	(60xx,0050)	SS	1\1 In case graphic cannot be exported to GSPS	ANAP	AUTO
Image Frame Origin	(60xx,0051)	US	1	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
			In case graphic cannot be exported to GSPS		
Overlay Bits Allocated	(60xx,0100)	US	1 In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Bit Position	(60xx,0102)	US	0 In case graphic cannot be exported to GSPS	ANAP	AUTO
Overlay Data	(60xx,3000)	OB-OW	Overlay across all frames In case graphic cannot be exported to GSPS	ANAP	AUTO

8.1.1.3 Greyscale Softcopy Presentation State

The User can add annotations and measurements to an image. When the image is exported or transferred all annotations for that image (MG or BTO) will be stored in a GSPS object.

A single GSPS object contains the graphics of all exported/transferred images which belong to the same series.

Upon „re-enter" new annotations will stored together with old annotation in a new instance of a GSPS Object.

The GSPS will be supported for the following (0008,0008) Image Types:

Table 117: Image Types supporting GSPS

Value	Description
FFDM Images	
DERIVED | PRIMARY | | <laterality>	FFDM Image FOR PRESENTATION
Tomosynthesis	
DERIVED | PRIMARY | TOMO_PROJ | <laterality>	Tomosynthesis projections FOR PRESENTATION
DERIVED | PRIMARY | TOMOSYNTHESIS | NONE	Tomo Slices in BTO format
Synthetic Images	
DERIVED | PRIMARY | TOMO_2D | <laterality> | INSIGHT_2D	Synthetic Mammogram calculated from whole BTO
DERIVED | PRIMARY | TOMOSYNTHESIS | INSIGHT_3D	Rotating Mammogram in BTO format
Stereo Biopsy Images	
DERIVED | PRIMARY | STEREO_SCOUT | <laterality>	Stereo Biopsy SCOUT Image FOR PRESENTATION
DERIVED | PRIMARY | STEREO_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION
DERIVED | PRIMARY | STEREO_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION
DERIVED | PRIMARY | PREFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION – needle tip at target
DERIVED | PRIMARY | PREFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION – needle tip at target
DERIVED | PRIMARY | POSTFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION – needle shot
DERIVED | PRIMARY | POSTFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION – needle shot
Tomosynthesis Biopsy Images	
DERIVED | PRIMARY | TOMO_PROJ_SCOUT | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION Including: Derived tomo projection with multi-hole paddle for 2D biopsy
DERIVED | PRIMARY | TOMO_SCOUT | NONE	Tomosynthesis Biopsy Scout Including Tomo with multi hole paddle for 2D biopsy
ORIGINAL | PRIMARY | PREFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PROCESSING – needle tip at target
DERIVED | PRIMARY | PREFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION – needle tip at target

Value	Description
ORIGINAL | PRIMARY | POSTFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PROCESSING – needle shot
DERIVED | PRIMARY | POSTFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION – needle shot
DERIVED | PRIMARY | PREFIRE | NONE	Tomosynthesis Biopsy Scout – needle tip at target
DERIVED | PRIMARY | POSTFIRE | NONE	Tomosynthesis Biopsy Scout – needle shot
TiCEM	
DERIVED | PRIMARY | LOW_ENERGY | <laterality> | LOW_ENERGY	TiCEM Low Energy image FOR PRESENTATION
DERIVED | PRIMARY | RECOMBINED | SUBTRACTION | INSIGHT_CEM	Insight CEM Recombined Subtraction Image

Grayscale Softcopy Presentation State IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	General Series	Table 67: General Series Module	ALWAYS
	Presentation Series	Table 118: Presentation Series	ALWAYS
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS
Presentation States	Presentation State Identification	Table 119: Presentation State Identification	ALWAYS
	Presentation State Relationship	Table 120: Presentation State Relationship Module	ALWAYS
	Presentation State Shutter	*Display Shutter never present in images*	*ALWAYS*
	Presentation State Mask	*Mask never present in images*	*ALWAYS*
	Mask	*Required if the referenced image(s) are multi-frame and are to be subtracted*	*NEVER*
	Display Shutter	*Required if a Display Shutter is to be applied to referenced image(s) and the Bitmap Display Shutter Module is not present*	*NEVER*
	Bitmap Display Shutter	*Required if a Display Shutter is to be applied to referenced image(s) and the Display Shutter Module is not present*	*NEVER*
	Overlay Plane	*Required if Overlay is to be applied to referenced image(s) or the Bitmap Display Shutter Module is present*	*NEVER*
	Overlay Activation	*Required if referenced image contains overlay data that is to be displayed or*	*NEVER*

IE	Module	Reference	Presence of Module
		Presentation State Instance contains Overlay data other than Bitmap Shutter	
	Displayed Area	Table 122: Displayed Area Module	ALWAYS
	Graphic Annotation	Table 123: Graphical Annotation Required if Graphic Annotations are to be applied to referenced image(s)	ALWAYS
	Spatial Transformation	*Required if rotation or flipping are to be applied to referenced image(s)*	*NEVER*
	Graphic Layer	Table 124: Graphical Layer Required if Graphic Annotations or Overlays or Curves are to be applied to referenced image(s)	ALWAYS
	Graphic Group		*NEVER*
	Modality LUT	*Required if a Modality LUT is to be applied to referenced image(s)*	*NEVER*
	Softcopy VOI LUT	*Required if a VOI LUT is to be applied to referenced image(s)*	*NEVER*
	Softcopy Presentation LUT	Table 125: Softcopy Presentation LUT	ALWAYS
	SOP Common	Table 126: SOP Common	ALWAYS

Table 118: Presentation Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	PR	ALWAYS	AUTO

Table 119: Presentation State Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation Creation Date	(0070,0082)	DA	Date on which this presentation was created. Note: This date may be different from the date that the DICOM SOP Instance was created	ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM	Time at which this presentation was created. Note This time may be different from the time that the DICOM SOP Instance was created	VNAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Content Identification Macro					
Instance Number	(0020,0013)	IS	1-n	ALWAYS	AUTO
Content Label	(0070,0080)	CS	„SYNGO PR"	ALWAYS	AUTO
Content Description	(0070,0081)	LO	PR_STATE	ALWAYS	AUTO
Alternate Content Description Sequence	*(0070,0087)*	*SQ*		*NEVER*	
Content Creator's Name	(0070,0084)	PN	"SIEMENS"	ALWAYS	AUTO
Content Creator's Identification Code Sequence	*(0070,0086)*	*SQ*		*NEVER*	

Table 120: Presentation State Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Series Sequence	(0008,1115)	SQ	Sequence of Items where each Item includes the Attributes of one Series to which the Presentation applies.	ALWAYS	AUTO
> Series Instance UID	(0020,000E)	UI	Unique identifier of a Series that is part of the Study defined by the Study Instance UID (0020,000D) in the enclosing data set.	ALWAYS	AUTO
> Referenced Image Sequence	(0008,1140)	SQ	The set of images and frames to which the Presentation applies	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.2.4.2.2.2 Or 1.2.840.10008.5.1.4.1.1.13.1.3	ALWAYS	AUTO
>> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID of image	ALWAYS	AUTO
>>> Referenced Frame Number	(0008,1160)	IS	Only present for BTO objects: List of all frames, 1\2\...\n	ANAP	AUTO
Referenced Segment Number	*(0062,000B)*	*US*		*NEVER*	

Table 121: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Overlay Rows	(60xx,0010)	US	Number of Rows in Overlay	ALWAYS	AUTO
Overlay Columns	(60xx,0011)	US	Number of Columns in Overlay	ALWAYS	AUTO
Overlay Description	(60xx,0022)	LO	Siemens MedCom Object Graphics	ALWAYS	USER
Overlay Type	(60xx,0040)	CS	"G"	ALWAYS	AUTO
Overlay Origin	(60xx,0050)	SS	1\1	ALWAYS	AUTO
Overlay Bits Allocated	(60xx,0100)	US	1	ALWAYS	AUTO
Overlay Bit Position	(60xx,0102)	US	0	ALWAYS	AUTO
Overlay Data	(60xx,3000)	OB/ OW	Overlay Pixel Data	ALWAYS	AUTO

Table 122: Displayed Area Module

Attribute Name	Tag	VR	VALUE	Presence of Value	Source
Displayed Area Selection Sequence	(0070,005A)	SQ	One item per frame	ALWAYS	AUTO
> Referenced Image Sequence	(0008,1140)	SQ	A single item that references a single 2D image or a single frame from BTO	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.2.4.2.2.2 Or 1.2.840.10008.5.1.4.1.1.13.1.3	ALWAYS	AUTO
>> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID of image	ALWAYS	AUTO
>> Referenced Frame Number	(0008,1160)	IS	Only present for BTO objects: <frame number>	ANAP	AUTO
> Referenced Segment Number	*(0062,000B)*	*US*	*Required if the Referenced SOP Instance is a Segmentation or Surface Segmentation and the reference does not apply to all segments and Referenced Frame Number (0008,1160) is not present.*	*NEVER*	
> Pixel Origin Interpretation	*(0048,0301)*	*CS*	*Corner points are relative to frame pixel origins by default.*	*NEVER*	
> Displayed Area Top Left Hand Corner	(0070,0052)	SL	The top left (after spatial transformation) pixel in the referenced image to be displayed, given as column\row. Column is the horizontal (before spatial transformation) offset (X) and row is the vertical	ALWAYS	AUTO

Attribute Name	Tag	VR	VALUE	Presence of Value	Source
			(before spatial transformation) offset (Y) relative to the origin of the pixel data before spatial transformation, which is 1\1.		
> Displayed Area Bottom Right Hand Corner	(0070,0053)	SL	The bottom right (after spatial transformation) pixel in the referenced image to be displayed, given as column\row. Column is the horizontal (before spatial transformation) offset (X) and row is the vertical (before spatial transformation) offset (Y) relative to the origin of the pixel data before spatial transformation, which is 1\1.	ALWAYS	AUTO
> Presentation Size Mode	(0070,0100)	CS	Default: SCALE TO FITZoomed in/out:MAGNIFY	ALWAYS	AUTO
> Presentation Pixel Spacing	(0070,0101)	DS	Derived from referenced image, in order of preference: 1. Pixel Spacing 2. Imager Pixel Spacing / Estimated Radiographic Magnification Factor	ALWAYS	AUTO
> Presentation Pixel Aspect Ratio	*(0070,0102)*	*IS*	*Required if Presentation Pixel Spacing (0070,0101) is not present.*	*NEVER*	
> Presentation Pixel Magnification Ratio	(0070,0103)	FL	SCALE TO FIT: 1 MAGNIFY: According to zoom	ALWAYS	AUTO

Table 123: Graphical Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Annotation Sequence	(0070,0001)	SQ	One item per component of an annotating tool Example: distance line + graphic number + distance properties = 3 items	ALWAYS	AUTO
> Referenced Image Sequence	(0008,1140)	SQ	Graphics apply only to a single image/frame	ALWAYS	AUTO
>> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.2.4.2.2.2 Or 1.2.840.10008.5.1.4.1.1.13.1.3	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>> Referenced SOP Instance UID	(0008,1155)	UI	Instance UID of image	ALWAYS	AUTO
>>> Referenced Frame Number	(0008,1160)	IS	Only present for BTO objects: <frame number>	ALWAYS	AUTO
>> Referenced Segment Number	*(0062,000B)*	*US*	*Required if the Referenced SOP Instance is a Segmentation or Surface Segmentation and the reference does not apply to all segments and Referenced Frame Number (0008,1160) is not present.*	*NEVER*	
> Graphic Layer	(0070,0002)	CS	MG: "Group 1" to "Group n" BTO: "Group 1_1" to "Group n_1"	AWAYS	AUTO
> Text Object Sequence	(0070,0008)	SQ		ANAP	AUTO
>> Bounding Box Annotation Units	(0070,0003)	CS	"PIXEL"	ALWAYS	AUTO
>> Anchor Point Annotation Units	(0070,0004)	CS	"PIXEL"	ALWAYS	AUTO
>> Unformatted Text Value	(0070,0006)	ST		ALWAYS	User
>> Text Style Sequence	(0070,0231)	SQ		ALWAYS	AUTO
>>> Font Name	(0070,0227)	LO	MS Mincho for Siemens	ALWAYS	AUTO
>>> Font Name Type	(0070,0228)	CS	ISO_32000	ALWAYS	AUTO
>>> CSS Font Name	(0070,0229)	LO	Times New Roman	ALWAYS	AUTO
>>> Text Color CIELab Value	(0070,0241)	US	65535\32897\32893	ALWAYS	AUTO
>>> Horizontal Alignment	(0070,0242)	CS	LEFT | RIGHT	ALWAYS	AUTO
>>> Vertical Alignment	(0070,0243)	CS	TOP | CENTER | BOTTOM	ALWAYS	AUTO
>>> Shadow Style	(0070,0244)	CS	NORMAL	ALWAYS	AUTO
>>> Shadow Offset X	(0070,0245)	FL	1	ALWAYS	AUTO
>>> Shadow Offset Y	(0070,0246)	FL	1	ALWAYS	AUTO
>>> Shadow Color CIELab Value	(0070,0247)	US	0\32896\32896	ALWAYS	AUTO
>>> Shadow Opacity	(0070,0258)	FL	1	ALWAYS	AUTO
>>> Underlined	(0070,0248)	CS	N	ALWAYS	AUTO
>>> Bold	(0070,0249)	CS	N	ALWAYS	AUTO
>>> Italic	(0070,0250)	CS	N	ALWAYS	AUTO
>> Bounding Box Top Left Hand Corner	(0070,0010)	FL	x\y	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>> Bounding Box Bottom Right Hand Corner	(0070,0011)	FL	x\y	ALWAYS	AUTO
>> Bounding Box Text Horizontal Justification	(0070,0012)	SC	LEFT | RIGHT | CENTER	ALWAYS	AUTO
>> Anchor Point	(0070,0014)	FL	Same as (0070,0010) „Bounding Box Top Left Hand Corner“	ALWAYS	AUTO
>> Anchor Point Visibility	(0070,0015)	CS	“N”	ALWAYS	N
>> Compound Graphic Instance ID	*(0070,0226)*	*UL*		*NEVER*	
>> Graphic Group ID	*(0070,0295)*	*UL*		*NEVER*	
>> Tracking ID	*(0062,0020)*		*Required if Tracking UID (0062,0021) is present.*	*NEVER*	
>> Tracking UID	*(0062,0021)*	*UI*	*Required if Tracking ID (0062,0020) is present.*	*NEVER*	
> Graphic Object Sequence	(0070,0009)	SQ		ANAP	AUTO
>> Graphic Annotation Units	(0070,0005	CS	“PIXEL”	ALWAYS	AUTO
>> Graphic Dimensions	(0070,0020)	US	2	ALWAYS	AUTO
>> Number of Graphic Points	(0070,0021)	US	Number of data points in this graphic.	ALWAYS	AUTO
>> Graphic Data	(0070,0022)	FL	Coordinates that specify this graphic annotation. x\y	ALWAYS	AUTO
>> Graphic Type	(0070,0023)	CS	The shape of graphic that is to be drawn: POINT POLYLINE CIRCLE ELLIPSE	ALWAYS	User
>> Graphic Filled	(0070,0024)	CS	N	ALWAYS	AUTO
>> Line Style Sequence	(0070,0232)	SQ		ANAP	AUTO
>>> Pattern On Color CIELab Value	(0070,0251)	US	0\32896\32896	ALWAYS	AUTO
>>> Pattern Off Color CIELab Value	(0070,0252)	US	65535\32897\32893	ALWAYS	AUTO
>>> Pattern On Opacity	(0070,0284)	FL	1	ALWAYS	AUTO
>>> Pattern Off Opacity	(0070,0285)	FL	1	ALWAYS	AUTO
>>> Line Thickness	(0070,0253)	FL	1	ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>>> Line Dashing Style	(0070,0254)	CS	Default: SOLID Pixel Lens: STIPPLED	ALWAYS	AUTO
>>> Line Pattern	*(0070,0255)*	*UL*		*NEVER*	
>>> Shadow Style	(0070,0244)	CS	NORMAL	ANAP	AUTO
>>> Shadow Offset X	(0070,0245)	FL	1	ANAP	AUTO
>>> Shadow Offset Y	(0070,0246)	FL	1	ANAP	AUTO
>>> Shadow Color CIELab Value	(0070,0247)	US	0\32896\32896	ANAP	AUTO
>> Include Table C.10-5c "Fill Style Sequence Macro Attributes"				*NEVER*	
>> Compound Graphic Instance ID	(0070,0226)	UL	Implemented for: Rectangle ROI Annotation Text with Arrow	ANAP	
>> Graphic Group ID	*(0070,0295)*	*UL*		*NEVER*	
>> Tracking ID	*(0062,0020)*	*UT*	*Required if Tracking UID (0062,0021) is present.*	*NEVER*	
>> Tracking UID	*(0062,0021)*	*UI*	*Required if Tracking ID (0062,0020) is present.*	*NEVER*	
> Compound Graphic Sequence	(0070,0209)	SQ	Implemented for: Rectangle ROI Annotation Text with Arrow	ANAP	AUTO
>> Graphic Dimensions	(0070,0020)	US	2	ALWAYS	AUTO
>> Number of Graphic Points	(0070,0021)	US	Number of data points in this graphic.	ALWAYS	AUTO
>> Graphic Data	(0070,0022)	FL	Coordinates that specify this graphic annotation. x\y	ALWAYS	AUTO
>> Graphic Filled	(0070,0024)	CS	N	ALWAYS	AUTO
>> Compound Graphic Instance ID	(0070,0226)	UL	n	ALWAYS	AUTO
>> Line Style Sequence	(0070,0232)	SQ			
>>> Shadow Style	(0070,0244)	CS	NORMAL	ANAP	AUTO
>>> Shadow Offset X	(0070,0245)	FL	1	ANAP	AUTO
>>> Shadow Offset Y	(0070,0246)	FL	1	ANAP	AUTO
>>> Shadow Color CIELab Value	(0070,0247)	US	0\32896\32896	ANAP	AUTO
>>> Pattern On Color CIELab Value	(0070,0251)	US	0\32896\32896	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>>> Pattern Off Color CIELab Value	(0070,0252)	US	65535\32897\32893	ALWAYS	AUTO
>>> Line Thickness	(0070,0253)	FL	1	ANAP	AUTO
>>> Line Dashing Style	(0070,0254)	CS	SOLID	ALWAYS	AUTO
>>> Line Pattern	*(0070,0255)*	*UL*		*NEVER*	
>>> Pattern On Opacity	(0070,0284)	FL	1	ALWAYS	AUTO
>>> Pattern Off Opacity	(0070,0285)	FL	1	ALWAYS	AUTO
>> Compound Graphic Units	(0070,0282)	CS	PIXEL	ALWAYS	AUTO
>> Compound Graphic Type	(0070,0294)	CS	The shape of this Compound Graphic.	ALWAYS	AUTO

Table 124: Graphical Layer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Layer Sequence	(0070,0060)	SQ	One item per component of an annotating tool Example: distance line + graphic number + distance properties = 3 items	ALWAYS	AUTO
> Graphic Layer	(0070,0002)	CS	MG: Group 1 to n BTO: Group1_1 to n_1	ALWAYS	AUTO
> Graphic Layer Order	(0070,0062)	IS	0 to n	ALWAYS	AUTO
> Graphic Layer Recommended Display Grayscale Value	(0070,0066)		65535H	ALWAYS	AUTO
> Graphic Layer Recommended Display CIELab Value	(0070,0401)	US	65535\32897\32893	ALWAYS	AUTO
> Graphic Layer Description	*(0070,0068)*	*LO*		*NEVER*	

Table 125: Softcopy Presentation LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation LUT Sequence	*(2050,0010)*	*SQ*		*NEVER*	
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO

Table 126: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI		ALWAYS	AUTO
SOP Class Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ANAP	MWL | CONFIG

8.1.1.4 X-Ray Radiation Dose SR

MAMMOMAT B.brilliant automatically creates Projection X-Ray Radiation Dose Structured Reports using following tailored Template TID 10001 Projection X-Ray Radiation Dose.

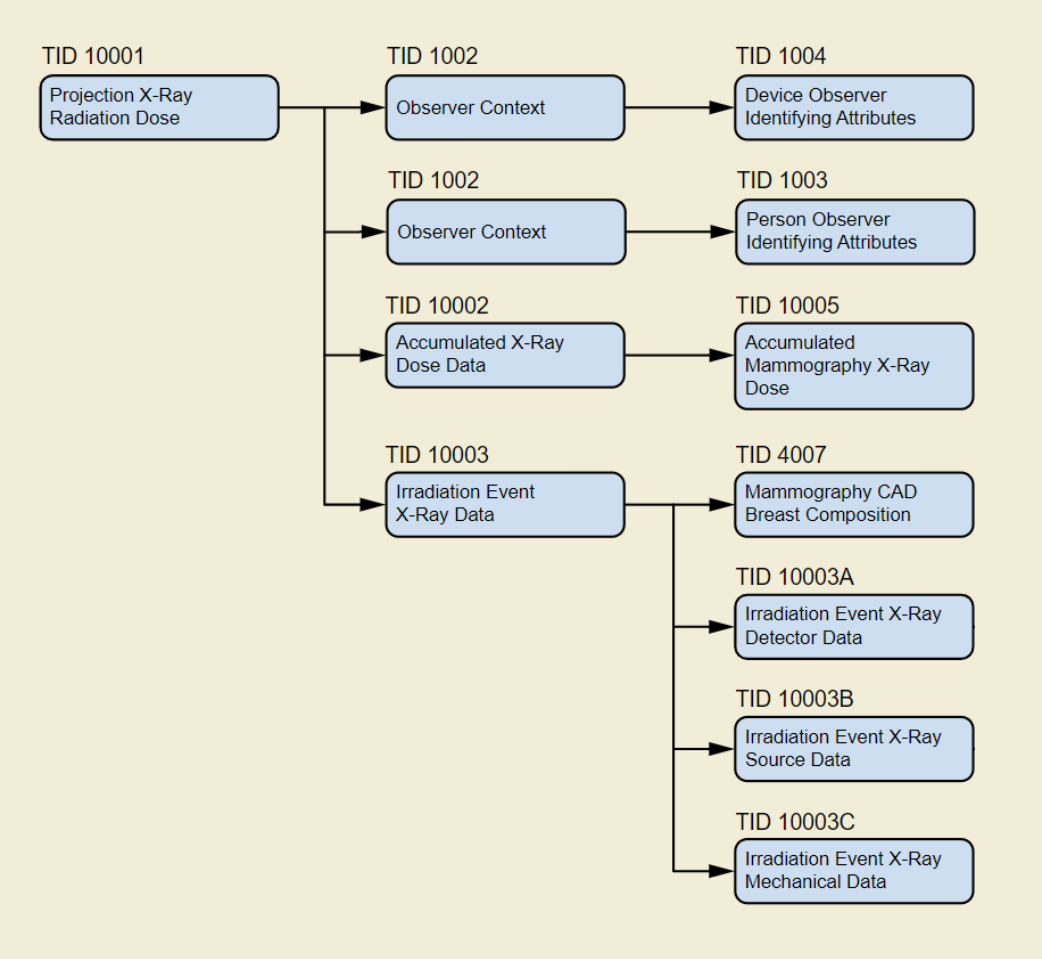

Figure 3: X-Ray Radiation Dose SR IOD Template Structure

Table 127: X-Ray Radiation Dose SR IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	SR Document Series	Table 128: SR Document Series Module	ALWAYS
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS
	Enhanced General Equipment	Table 93: Enhanced General Equipment Module	ALWAYS
Document	SR Document General	Table 129: SR Document General Module	ALWAYS
	SR Document Content	Table 130: SR Document Content Module	ALWAYS
	SOP Common	Table 88: SOP Common Module	ALWAYS
Private Tags	Private Tags	Table 156: Data Dictionary of Private Attributes	ALWAYS

Table 128: SR Document Series Module

Attribute Name	Tag	Type	Value	Presence of Value	Source
Modality	(0008,0060)	1	SR	ALWAYS	AUTO
Series Instance UID	(0020,000E)	1	Unique identifier of the Series	ALWAYS	AUTO
Series Number	(0020,0011)	1	No SR-specific semantics are specified.	ALWAYS	AUTO
Series Date	(0008,0021)	3	yyyymmdd	ALWAYS	AUTO
Series Time	(0008,0031)	3	Time	ALWAYS	AUTO
Protocol Name	(0018,1030)	3	Procedure name	ALWAYS	AUTO
Series Description	(0008,103E)	3	“Radiation Dose Structured Report”	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	2		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	1	1.2.840.10008.3.1.2.3.3	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008,1155)	1	Copy from corresponding MPPS	ALWAYS	AUTO

Table 129: SR Document General Module

Attribute Name	Tag	Type	Value	Presence of Value	Source
Instance Number	(0020,0013)	1	1	ALWAYS	AUTO
Completion Flag	(0040,A491)	1	COMPLETE	ALWAYS	AUTO
Verification Flag	(0040,A493)	1	UNVERIFIED	ALWAYS	AUTO
Content Date	(0008,0023)	1	generate	ALWAYS	AUTO
Content Time	(0008,0033)	1	generate	ALWAYS	AUTO

Table 130: SR Document Content Module – Dose SR

Attribute Name	Tag	Type	Value	Presence of Value	Source
Value Type	(0040,A040)	1	CONTAINER	ALWAYS	AUTO
Concept Name Code Sequence	(0040,A043)	1C		ALWAYS	AUTO
> Code Value	(0008,0100)	1C	113701	ALWAYS	AUTO
> Code Scheme Designator	(0008,0102)	1C	DCM	ALWAYS	AUTO
> Code Meaning	(0008,0104)	1C	X-Ray Radiation Dose Report	ALWAYS	AUTO
Continuity of Content	(0040,A050)	1C	SEPARATE	ALWAYS	AUTO
Content Template Sequence	(0040,A504)	1C		ALWAYS	AUTO
> Mapping Resource	(0008,0105)	1	DCMR	ALWAYS	AUTO
> Template Identifier	(0040,DB00)	1	10001	ALWAYS	AUTO
Content Sequence	(0040,A730)	1	Table 131: TID 10001 Projection X-Ray Radiation Dose	ALWAYS	AUTO

Table 131 shows the particular implementation of TID 10001:

Table 131: TID 10001 Projection X-Ray Radiation Dose

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	113701, DCM, "X-Ray Radiation Dose Report"	Root node
>	HAS CONCEPT MOD	CODE	121058, DCM, "Procedure reported"	DT (P5-40010, SRT, "Mammography")
>>	HAS CONCEPT MOD	CODE	G-C0E8, SRT, "Has Intent"	R-408C3, SRT, "Diagnostic Intent"
DTID 1002 "Observer Context" (incl. TID 1004, TID 1003)				
>	HAS OBS CONTEXTS	CODE	121005, DCM, "Observer Type"	CID 270 "Observer Type": 121007, DCM, "Device"
>	HAS OBS CONTEXTS	UIDREF	121012, DCM, "Device Observer UID"	1.3.12.2.1107.5.12.7
>	HAS OBS CONTEXTS	CODE	121005, DCM, "Observer Type"	CID 270 "Observer Type": 121006, DCM, "Person"
>	HAS OBS CONTEXTS	PNAME	121008, DCM, "Person Observer Name"	Performing physician | operator | unknown
>	HAS OBS CONTEXTS	CODE	121011, DCM, "Person Observer's Role in this procedure	113851, DCM," Irradiation Administering"
>	HAS OBS CONTEXT	CODE	113705, DCM, "Scope of Accumulation"	113016, DCM, "Performed Procedure Step"
>>	HAS PROPERTIES	UIDREF	121126, DCM, "Performed Procedure Step SOP Instance UID"	MPPS UID
>	CONTAINS	CODE	113945, DCM, "X-Ray Detector Data Available"	R-0038D, SRT, "Yes"
>	CONTAINS	CODE	113943, DCM, "X-Ray Source Data Available"	R-0038D, SRT, "Yes"
>	CONTAINS	CODE	113944, DCM, "X-Ray Mechanical Data Available"	R-0038D, SRT, "Yes"
>	CONTAINS	INCLUDE	Table 132: TID 10002 Accumulated X-Ray Dose	$Plane = 113622, DCM, "Single Plane"
>	CONTAINS	INCLUDE	Table 133: TID 10003 Irradiation Event X-Ray Data	For each Irradiation Event
>	CONTAINS	CODE	113854, DCM, "Source of Dose Information"	113856, DCM, "Automated Data Collection"

Table 132 shows the particular implementation of TID 10002:

Table 132: TID 10002 Accumulated X-Ray Dose

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	113702, DCM, "Accumulated X-Ray Dose Data"	
>	HAS CONCEPT MOD	CODE	113764, DCM, "Acquisition Plane"	$Plane (113622, DCM, "Single Plane")
DTID 10005 "Accumulated Mammography X-Ray Dose"				
>	CONTAINS	NUM	111637, DCM, "Accumulated Average Glandular Dose"	
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	SRT, T-04030, "Left breast"
>	CONTAINS	NUM	111637, DCM, "Accumulated Average Glandular Dose"	
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
>	CONTAINS	NUM	111637, DCM, "Accumulated Average Glandular Dose"	
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04080, SRT, "Both breasts"

Table 133 shows the particular implementation of TID 10003:

Table 133: TID 10003 Irradiation Event X-Ray Data

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	113706, DCM, "Irradiation Event X-Ray Data"	
>	HAS CONCEPT MOD	CODE	113764, DCM, "Acquisition Plane"	DCID 10003 "Equipment Plane Identification": 113622, DCM, "Single Plane"
>	CONTAINS	UIDREF	113769, DCM, "Irradiation Event UID"	From image hint: One UID for one Tomosynthesis view only
>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	From image
>	CONTAINS	CODE	113721, DCM, "Irradiation Event Type"	DCID 10002 "Irradiation Event Types":

NL	Rel with Parent	VT	Concept Name	Value
				113611, DCM, “Stationary Acquisition” for 2D images 113613, DCM, “Rotational Acquisition” for Tomo
>	CONTAINS	TEXT	125203, DCM, “Acquisition Protocol”	MAMMOGRAM | STEREO | TOMO_PROJ
>	CONTAINS	CODE	T-D0005, SRT, “Anatomical structure”	CID 4009 “DX Anatomy Imaged”: T-04000, SRT, “Breast”
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	CID 244 “Laterality”: G-A101, SRT, “Left” G-A100, SRT, “Right”
>	CONTAINS	CODE	111031, DCM, "Image View"	CID 4014 “View for Mammography”: View Code Sequence (0054,0220)
>>	HAS CONCEPT MOD	CODE	111032, DCM, "Image View Modifier"	CID 4015 “View Modifier for Mammography”: View Modifier Code Sequence (0054,0222) One content item for each modifier
>	CONTAINS	CODE	123014, DCM, "Target Region"	CID 4031 “Common Anatomic Regions”: T-04000, SRT, "Breast"
>	CONTAINS	NUM	111634, DCM, “Half Value Layer”	UNITS = mm, UCUM, “mm”
>	CONTAINS	NUM	111638, DCM, “Patient Equivalent Thickness”	UNITS = mm, UCUM, “mm” Body Part Thickness (0018,11A0)
>	CONTAINS	NUM	111636, DCM, “Entrance Exposure at RP”	UNITS = mGy, UCUM, “mGy” Entrance Dose (0040,8302)
>	CONTAINS	CODE	113780, DCM, “Reference Point Definition”	DCID 10025 “Radiation Dose Reference Points”: 113865, DCM, “Entrance exposure to a 4.2 cm breast thickness”
DTID 4007 “Mammography CAD Breast Composition”				
>	CONTAINS	CODE	F-01710, SRT, “Breast composition”	Grade Per Image, if Insight Breast Density is configured. DCID 6000 “Overall Breast Composition”: F-01711, SRT, “Almost entirely fat” F-01712, SRT, “Scattered fibroglandular densities”

NL	Rel with Parent	VT	Concept Name	Value
				F-01713, SRT, “Heterogeneously dense” F-01714, SRT, “Extremely dense”
>	CONTAINS	NUM	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	113795, DCM, “Acquired Image”	References to raw images. In case of Tomo all raw projection images are referenced. One content item for each image
>	CONTAINS	INCLUDE	Table 134: TID 10003B Irradiation Event X-Ray Source Data	
>	CONTAINS	INCLUDE	Table 135: TID 10003C Irradiation Event X-Ray Mechanical Data	

Table 134 shows the particular implementation of TID 10003B:

Table 134: TID 10003B Irradiation Event X-Ray Source Data

NL	Rel with Parent	VT	Concept Name	Value
		NUM	111631, DCM, “Average Glandular Dose”	AGD from image, in case of Tomo from one projection only
		NUM	113742, DCM, “Irradiation Duration”	Duration time taking this image
		NUM	113824, DCM, “Exposure Time”	Exposure time from image
		NUM	113736, DCM, “Exposure”	Exposure from image
		NUM	113733, DCM, “KVP”	KV from image
		NUM	113767, DCM, “Average X-Ray Tube Current”	mA from image
		NUM	113766, DCM, “Focal Spot Size”	UNITS = mm, UCUM, “mm”
		CODE	111632, DCM, “Anode Target Material”	CID 10016 “Anode Target Material”: 26194003, SCT, "Tungsten"

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	113771, DCM, “X-Ray Filters”	
>	CONTAINS	CODE	EV (113772, DCM, “X-Ray Filter Type”)	CID 10007 “X-Ray Filter Types”: 113650, DCM, "Strip filter"
>	CONTAINS	CODE	113757, DCM, “X-Ray Filter Material”	CID 10006 “X-Ray Filter Materials”: C-120F9, SRT, "Aluminum or Aluminum compound" C-166A2, SRT, "Titanium"
>	CONTAINS	NUM	113758, DCM, “X-Ray Filter Thickness Minimum”	Filter Thickness Minimum (0018,7052)
>	CONTAINS	NUM	113773, DCM, “X-Ray Filter Thickness Maximum”	Filter Thickness Maximum (0018,7054)
		CODE	111635, DCM, “X-Ray Grid”	DCID 10017 “X-Ray Grid”: 111646, DCM, "No grid" 111642, DCM, "Focused grid"
		CODE	111635, DCM, “X-Ray Grid”	Present for Prime or if Focused grid. DCID 10017 “X-Ray Grid”: G_001, 99SMS_SPWH, "Prime" for Prime 111644, DCM, "Parallel grid" if Focused grid

Table 135 shows the particular implementation of TID 10003C:

Table 135: TID 10003C Irradiation Event X-Ray Mechanical Data

NL	Rel with Parent	VT	Concept Name	Value
		NUM	112011, DCM, “Positioner Primary Angle”	UNITS = deg, UCUM, "deg" Positioner Primary Angle (0018,1510) If Tomo: from first projection
		NUM	112012, DCM, “Positioner Secondary Angle”	UNITS = deg, UCUM, "deg" ‘0’
		NUM	113739, DCM, “Positioner Primary End Angle”	Content item only available if Tomo UNITS = deg, UCUM, "deg" Positioner Primary Angle (0018,1510) from last projection

NL	Rel with Parent	VT	Concept Name	Value
		NUM	113740, DCM, "Positioner Secondary End Angle"	Content item only available if Tomo UNITS = deg, UCUM, "deg" '0'
		NUM	111633, DCM, "Compression Thickness"	UNITS = mm, UCUM, "mm" Body Part Thickness (0018,11A0)
		NUM	113748, DCM, "Distance Source to Isocenter"	Content item only available if Tomo UNITS = mm, UCUM, "mm" Distance Source to Isocenter (0018,9402)
		NUM	113750, DCM, "Distance Source to Detector"	UNITS = mm, UCUM, "mm" Distance Source to Detector (0018,1110)

8.1.1.5 Mammo CAD SR

MAMMOMAT B.brilliant automatically creates a Mammo CAD SR Object for storage of Breast Density Data using following tailored and extended Template TID 4000.

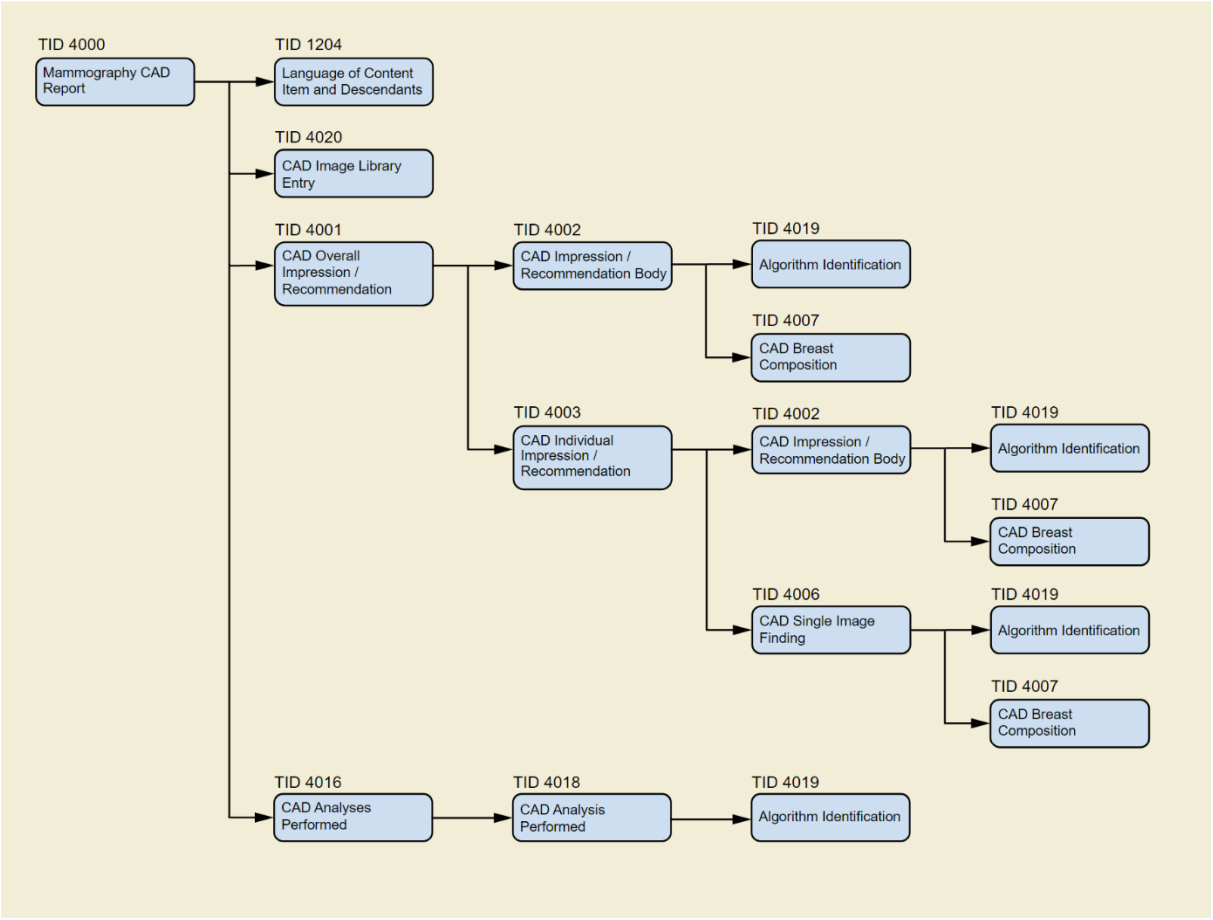

Figure 4: Mammography CAD SR IOD Template Structure

Table 136: Mammography CAD SR IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	SR Document Series	Table 137: SR Document Series Module	ALWAYS
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS
Document	SR Document General	Table 138: SR Document General Module	ALWAYS
	SR Document Content	Table 139: SR Document Content	ALWAYS
	SOP Common	Table 88: SOP Common Module	ALWAYS
Private Tags	Private Tags	Table 156: Data Dictionary of Private Attributes	ALWAYS

Table 137: SR Document Series Module

Attribute Name	Tag	Type	Value	Presence of Value	Source
Modality	(0008,0060)	1	SR	ALWAYS	AUTO
Series Instance UID	(0020,000E)	1	Unique identifier of the Series.	ALWAYS	AUTO
Series Number	(0020,0011)	1	No SR-specific semantics are specified.	ALWAYS	AUTO
Series Date	(0008,0021)	3	yymmdd	ALWAYS	AUTO
Series Time	(0008,0031)	3	hhmmss	ALWAYS	AUTO
Protocol Name	(0018,1030)	3	Procedure name	ALWAYS	AUTO
Series Description	(0008,103E)	3	“Breast Density Report”	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	2		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	1	1.2.840.10008.3.1.2.3.3	ALWAYS	AUTO
> Referenced SOP Instance UID	(0008,1155)	1	Copy from corresponding MPPS	ALWAYS	AUTO

Table 138: SR Document General Module

Attribute Name	Tag	Type	Value	Presence of Value	Source
Instance Number	(0020,0013)	1	1	ALWAYS	AUTO
Completion Flag	(0040,A491)	1	COMPLETE	ALWAYS	AUTO
Verification Flag	(0040,A493)	1	UNVERIFIED	ALWAYS	AUTO
Content Date	(0008,0023)	1	yymmdd	ALWAYS	AUTO
Content Time	(0008,0033)	1	hhmmss	ALWAYS	AUTO
Performed Procedure Code Sequence	(0040,A372)	2	Zero or more Items shall be included in this Sequence.	ALWAYS	AUTO
Current Requested Procedure Evidence Sequence	(0040,A375)	1C	One or more Items shall be included in this Sequence. Contains references to series and images used for the density calculation	ALWAYS	AUTO

Table 139: SR Document Content Module – Breast Density CAD SR

Attribute Name	Tag	Type	Value	Presence of Value	Source
Value Type	(0040,A040)	1	CONTAINER	ALWAYS	AUTO
Concept Name Code Sequence	(0040,A043)	1C	n.a	ALWAYS	AUTO
> Code Value	(0008,0100)	1C	111036	ALWAYS	AUTO
> Code Scheme Designator	(0008,0102)	1C	DCM	ALWAYS	AUTO
> Code Meaning	(0008,0104)	1C	Mammography CAD Report	ALWAYS	AUTO
Continuity of Content	(0040,A050)	1C	SEPARATE	ALWAYS	AUTO
Content Template Sequence	(0040,A504)	1C		ALWAYS	AUTO
> Mapping Resource	(0008,0105)	1	DCMR	ALWAYS	AUTO
> Template Identifier	(0040,DB00)	1	4000	ALWAYS	AUTO
Content Sequence	(0040,A730)	1	Table 140: TID 4000 Mammography CAD Document Root	ALWAYS	AUTO

Table 140 shows the particular implementation of TID 4000:

Table 140: TID 4000 Mammography CAD Document Root

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	111036, DCM, "Mammography CAD Report"	Root node
>	HAS CONCEPT MOD	INCLUDE	Table 141: TID 1204 Language Content Item and Descendants	
>	CONTAINS	CONTAINER	111028, DCM, "Image Library"	
>>	CONTAINS	INCLUDE	Table 142: TID 4020 CAD Image Library Entry	One content item is included for each raw image in the Study $ImageLaterality = T-04020, SRT, "Right breast" T-04030, SRT, "Left breast" (CID 6022 "Side") $ImageView = View Code Sequence (0054,0220) (CID 4014 "View for Mammography") $ImageViewMod = View Modifier Code Sequence (0054,0222) (CID 4015 "View Modifier for Mammography")
>	CONTAINS	INCLUDE	Table 143: TID 4001 "Mammography CAD Overall Impression/ Recommendation"	
>	CONTAINS	CODE	111064, DCM, "Summary of Detections"	DCID 6042 "Status of Results": 111225, DCM, "Not Attempted"
>	INFERRED FROM	CONTAINER	Table 149: TID 4016 "CAD Analyses Performed"	$AnalysisCode = P5-B3414, SRT, "Breast composition analysis"
>	CONTAINS	CODE	111065, DCM, "Summary of Analyses"	DCID 6042 "Status of Results" : 111222, DCM, "Succeeded" 111223, DCM, "Partially Succeeded" 111224, DCM, "Failed" *111225 is not used*

Table 141 shows the particular implementation of TID 1204:

Table 141: TID 1204 Language Content Item and Descendants

NL	Rel with Parent	VT	Concept Name	Value
	HAS CONCEPT MOD	CODE	121049, DCM, "Language of Content Item and Descendants"	CID 5000 "Languages": En, RFC3066, "English"
>	HAS CONCEPT MOD	CODE	121046, DCM, "Country of Language"	CID 5001 "Country of Language": US, ISO3166_1, "UNITED STATES"

Table 142 shows the particular implementation of TID 4020:

Table 142: TID 4020 CAD Image Library Entry

NL	Rel with Parent	VT	Concept Name	How set
		IMAGE	113795, DCM, "Acquired Image"	SOP Instance UID of source image
>	HAS ACQ CONTEXT	CODE	111027, DCM, "Image Laterality"	$ImageLaterality (T-04020, SRT, "Right breast" | T-04030, SRT, "Left breast")
>	HAS ACQ CONTEXT	CODE	111031, DCM, "Image View"	$ImageView (View Code Sequence (0054,0220))
>>	HAS CONCEPT MOD	CODE	111032, DCM, "Image View Modifier"	$ImageViewMod (View Modifier Code Sequence (0054,0222))
>	HAS ACQ CONTEXT	TEXT	111044, DCM, "Patient Orientation Row"	Set to (0020,0020) from source image IF PRESENT
>	HAS ACQ CONTEXT	TEXT	111043, DCM, "Patient Orientation Column"	Set to (0020,0020) from source image IF PRESENT
>	HAS ACQ CONTEXT	DATE	111060, DCM, "Study Date"	Set to (0008,0020) from source image
>	HAS ACQ CONTEXT	TIME	111061, DCM, "Study Time"	Set to (0008,0030) from source image
>	HAS ACQ CONTEXT	DATE	111018, DCM, "Content Date"	Set to (0008,0023) from source image
>	HAS ACQ CONTEXT	TIME	111019, DCM, "Content Time"	Set to (0008,0033) from source image
>	HAS ACQ CONTEXT	NUM	111066, DCM, "Vertical Pixel Spacing"	UNITS = um, UCUM, "micrometer" Set to 0018,1164 from source image
>	HAS ACQ CONTEXT	NUM	111026, DCM, "Horizontal Pixel Spacing"	UNITS = um, UCUM, "micrometer"

NL	Rel with Parent	VT	Concept Name	How set
				Set to 0018,1164 from source image

Table 143 shows the particular implementation of TID 4001:

Table 143: TID 4001 "Mammography CAD Overall Impression/ Recommendation"

NL	Rel with Parent	VT	Concept Name	Value
		CODE	111017, DCM, "CAD Processing and Findings Summary"	DCID 6047 "CAD Processing and Findings Summary": *111241, DCM, "All algorithms succeeded; without findings" – Not used* *111243, DCM "Not all algorithms succeeded; without findings – Not used* 111242, DCM, "All algorithms succeeded; with findings" if a density grade could be calculated 111244, DCM, "Not all algorithms succeeded; with findings" density grade could be calculated but one or more images failed to yield a result. 111245, DCM, "No algorithms succeeded; without findings" if a density grade could not be generated
>	HAS PROPERTIES	INCLUDE	Table 146: TID 4002 "Mammography CAD Impression/Recommendation Body"	(summary – study)
>	INFERRED FROM	INCLUDE	Table 145: TID 4003 "Mammography CAD Individual Impression/Recommendation"	(summary – per laterality)

Table 144 shows the particular implementation of TID 4019:

Table 144: TID 4019 „CAD Algorithm Identification"

NL	Rel with Parent	VT	Concept Name	Value
		TEXT	111001, DCM, "Algorithm Name"	"Insight BD"
		TEXT	111003, DCM, "Algorithm Version"	Version of the algorithm
		TEXT	111002, DCM, "Algorithm Parameters"	"AVERAGE" or "HIGHEST"; <Thresholds b\c\d> (e.g. 4.3\8.1\17)

Table 145 shows the particular implementation of TID 4003:

Table 145: TID 4003 "Mammography CAD Individual Impression/Recommendation"

NL	Rel with Parent	VT	Concept Name	How set
		CONTAINER	111034, DCM, "Individual Impression/ Recommendation"	
>	HAS CONCEPT MOD	CODE	111056, DCM, "Rendering Intent"	CID 6034 "Intended Use of CAD Output": 111051, DCM, "Presentation Required: Rendering device is expected to be present"
>	CONTAINS	INCLUDE	Table 146: TID 4002 "Mammography CAD Impression/Recommendation Body"	
>	CONTAINS	INCLUDE	Table 147: TID 4006 "Mammography CAD Single Image Finding	for each single image

Table 146 shows the particular implementation of TID 4002:

Table 146: TID 4002 "Mammography CAD Impression/Recommendation Body"

NL	Rel with Parent	VT	Concept Name	Value
		TEXT	111033, DCM, "Impression Description"	"Insight BD Breast Density Assessment"
	INFERRED FROM	INCLUDE	Table 144: TID 4019 „CAD Algorithm Identification"	
Results for Study (both lateralities considered)				
extended by content item				
	HAS PROPERTIES	INCLUDE	Table 148: TID 4007 "Mammography CAD Breast Composition"	
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04080, SRT, "Both breasts"
		NUM	DCID 6142 Calculated Value: 112191, DCM, "Breast tissue density"	UNITS = %, UCUM, "Percent" Present if 111017 (in TID 4000) is 111242 or 111244. VBD
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04080, SRT, "Both breasts"
>	HAS CONCEPT MOD	TEXT	112034, DCM, "Calculation Description"	"AVERAGE" or "MAXIMUM
>	HAS CONCEPT MOD	TEXT	112034, DCM, "Calculation Description"	<Density Thresholds b\c\d> e.g. 4.3\8.1\17
Results for Laterality RIGHT				
		NUM	DCID 6142 Calculated Value: 112193, DCM, "Volume of breast"	UNITS = cm3, UCUM, "cm3" Present if 111017 (in TID 4000) is 111242 or 111244. V_b ("0" if no image acquired for right breast)
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
		NUM	DCID 6142 Calculated Value:	UNITS = cm3, UCUM, "cm3"

NL	Rel with Parent	VT	Concept Name	Value
			112192, DCM, "Volume of parenchymal tissue"	Present if 111017 (in TID 4000) is 111242 or 111244. V_fg ("0" if no image acquired for right breast)
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
		NUM	DCID 6142 Calculated Value: 112191, DCM, "Breast tissue density"	UNITS = %, UCUM, "Percent" Present if 111017 (in TID 4000) is 111242 or 111244. VBD ("0" if no image acquired for right breast)
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
extended by content items				
	HAS PROPERTIES	INCLUDE	Table 148: TID 4007 "Mammography CAD Breast Composition"	
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
		NUM	R-00363, SRT, "+/-, range of measurement uncertainty"	-3 to + 3
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04020, SRT, "Right breast"
Results for Laterality LEFT				
		NUM	DCID 6142 Calculated Value: 112193, DCM, "Volume of breast"	UNITS = cm3, UCUM, "cm3" Present if 111017 (in TID 4000) is 111242 or 111244. V_b ("0" if no image acquired for left breast)

NL	Rel with Parent	VT	Concept Name	Value
>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	T-04030, SRT, “Left breast”
		NUM	DCID 6142 Calculated Value: 112192, DCM, “Volume of parenchymal tissue”	UNITS = cm3, UCUM, “cm3” Present if 111017 (in TID 4000) is 111242 or 111244. V_fg („0” if no image acquired for left breast)
>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	T-04030, SRT, “Left breast”
		NUM	DCID 6142 Calculated Value: 112191, DCM, “Breast tissue density”	UNITS = %, UCUM, “Percent” Present if 111017 (in TID 4000) is 111242 or 111244. VBD ("0” if no image acquired for left breast)
>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	T-04030, SRT, “Left breast”
extended by content items				
	HAS PROPERTIES	INCLUDE	Table 148: TID 4007 “Mammography CAD Breast Composition”	
>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	T-04030, SRT, “Left breast”
		NUM	R-00363, SRT, "+/-, range of measurement uncertainty"	-3 to + 3
>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	T-04030, SRT, “Left breast”

Table 147 shows the particular implementation of TID 4006:

Table 147: TID 4006 "Mammography CAD Single Image Finding

NL	Rel with Parent	VT	Concept Name	Value
		CODE	111059, DCM, "Single Image Finding"	CID 6014 "Mammography Single Image Finding": F-01710, SRT, "Breast composition"
>	HAS CONCEPT MOD	CODE	111056, DCM, "Rendering Intent"	CID 6034 "Intended Use of CAD Output": 111051, DCM, "Presentation Optional: Rendering device May Present"
>	HAS PROPERTIES	INCLUDE	Table 144: TID 4019 „CAD Algorithm Identification"	
>	INFRERRED FROM	IMAGE		Reference to an image content item in the Image Library.
>	HAS PROPERTIES	NUM	DCID 6142 Calculated Value: 112193, DCM, "Volume of breast"	UNITS = cm3, UCUM, "cm3" V_b
>>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	Depending on image laterality: T-04020, SRT, "Right breast" T-04030, SRT, "Left breast" T-04080, SRT, "Both breasts"
>	HAS PROPERTIES	NUM	DCID 6142 Calculated Value: 112192, DCM, "Volume of parenchymal tissue"	UNITS = cm3, UCUM, "cm3" V_fg
>>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	Depending on image laterality: T-04020, SRT, "Right breast" T-04030, SRT, "Left breast" T-04080, SRT, "Both breasts"
>	HAS PROPERTIES	NUM	DCID 6142 Calculated Value: 112191, DCM, "Breast tissue density"	UNITS = %, UCUM, "Percent" VBD

NL	Rel with Parent	VT	Concept Name	Value
>>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	Depending on image laterality: T-04020, SRT, "Right breast" T-04030, SRT, "Left breast" T-04080, SRT, "Both breasts"
>	HAS PROPERTIES	INCLUDE	Table 148: TID 4007 “Mammography CAD Breast Composition”	
>>	HAS CONCEPT MOD	CODE	121401, DCM, “Derivation”	CID 6140 “Calculation Methods”: 112188, DCM, “Two-dimensional method”
>>	HAS CONCEPT MOD	CODE	G-C171, SRT, “Laterality”	Depending on image laterality: T-04020, SRT, "Right breast" T-04030, SRT, "Left breast" T-04080, SRT, "Both breasts"

Table 148 shows the particular implementation of TID 4007:

Table 148: TID 4007 “Mammography CAD Breast Composition”

NL	Rel with Parent	VT	Concept Name	Value
		CODE	F-01710, SRT, “Breast composition”	DCID 6000 “Overall Breast Composition”: F-01711 “Almost entirely fat” F-01712 “Scattered fibro glandular densities” F-01713 “Heterogeneously dense” F-01714 “Extremely dense”

Table 149 shows the particular implementation of TID 4016:

Table 149: TID 4016 "CAD Analyses Performed"

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	111062, DCM, "Successful Analyses"	Present if value of parent is (111222, DCM, "Succeeded")
>	CONTAINS	INCLUDE	Table 150: TID 4018 "CAD Analysis Performed"	
		CONTAINER	111024, DCM, "Failed Analyses"	Present if value of parent is (111224, DCM, "Failed")
>	CONTAINS	INCLUDE	Table 150: TID 4018 "CAD Analysis Performed"	

Table 150 shows the particular implementation of TID 4018:

Table 150: TID 4018 "CAD Analysis Performed"

NL	Rel with Parent	VT	Concept Name	Value
		CODE	111004, DCM, "Analysis Performed"	$AnalysisCode (P5-B3414, SRT, "Breast composition analysis")
>	HAS PROPERTIES	INCLUDE	Table 144: TID 4019 „CAD Algorithm Identification"	
>	HAS PROPERTIES	IMAGE		SOP Instance UID of image

8.1.1.6 Key Object Selection

If the AWS is configured for the IHE [2] MAWF profile, KOS objects are created for every rejected image that was sent and every corrected image in a re-entered examination. All KOS objects are stored in one KOS-Series and use the tailored Template TID 2010.

Correction of images will be documented with Document Title valued:

113037, DCM, "Rejected for Patient Safety Reasons"

Rejected images will be documented with the Document Title valued:

113001, DCM, "Rejected for Quality Reasons"

Table 151: Key Object Selection Document IOD Modules

IE	Module	Reference	Presence of Module
Patient	Patient	Table 64: Patient Module	ALWAYS
Study	General Study	Table 65: General Study Module	ALWAYS
	Patient Study	Table 66: Patient Study Module	ALWAYS
Series	Key Object Document Series	Table 152: Key Object Document Series Module	ALWAYS
Equipment	General Equipment	Table 71: General Equipment Module	ALWAYS
Document	Key Object Document	Table 153: Key Object Document Module	ALWAYS
	SR Document Content	Table 154: SR Document Content Module – Rejection Note	ALWAYS
	SOP Common	Table 88: SOP Common Module	ALWAYS
Private Tags	Private Tags	Table 156: Data Dictionary of Private Attributes	ALWAYS

Table 152: Key Object Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"KO"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Unique identifier of the Series	ALWAYS	AUTO
Series Number	(0020,0011)	IS	generated	ALWAYS	AUTO
Series Date	(0008,0021)	DT	<yymmdd>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ALWAYS	AUTO
Series Description	(0008,103E)	LO	"KOS Series"	ALWAYS	USER | AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.3.1.2.3.3	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
> Referenced SOP Instance UID	(0008,1155)	UI	Identifier of PPS the KOS is being attached to / associated with.	ALWAYS	AUTO

Table 153: Key Object Document Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	1-n	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yymmdd>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ALWAYS	AUTO
Referenced Request Sequence	*(0040,A370)*	*SQ*	*Rejection Note never pertains to any Requested Procedure*	*NEVER*	
Current Requested Procedure Evidence Sequence	(0040,A375)	SQ		ALWAYS	AUTO
> Study Instance UID	(0020,000D)	UI	Identifier of study containing the referenced objects	ALWAYS	AUTO
> Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
>> Series Instance UID	(0020,000E)	UI	Identifier of a series containing referenced objects	ALWAYS	AUTO
>> Referenced SOP Sequence	(0008,1199)	SQ		ALWAYS	AUTO
>>> Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of a corrected/rejected object	ALWAYS	AUTO
>>> Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of a corrected/rejected object	ALWAYS	AUTO
Identical Documents Sequence	*(0040,A525)*	*SQ*	*Rejection Note never references Instances in another study*	*NEVER*	

Table 154: SR Document Content Module – Rejection Note

Attribute Name	Tag	VR	Value	Presence of Value	Source
Observation DateTime	*(0040,A032)*	*DT*	*Date and time are not different from Content Date/Time*	*NEVER*	
Value Type	(0040,A040)	CS	"CONTAINER"	ALWAYS	AUTO
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
> Code Value	(0008,0100)	CS	Rejection: "113001"	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
			Correction: "113037"		
> Coding Scheme Designator	(0008,0102)	SH	"DCM"	ALWAYS	AUTO
> Coding Scheme Version	*(0008,0103)*	*SH*	*Coding Scheme Designator is sufficient to identify the Code Value*	*NEVER*	
> Coding Meaning	(0008,0104)	LO	Rejection: "Rejected for Quality Reasons" Correction: "Rejected for Patient Safety Reasons"	ALWAYS	AUTO
Continuity Of Content	(0040,A050)	CS	"SEPARATE"	ALWAYS	AUTO
Content Template Sequence	(0040,A504)	SQ		ALWAYS	AUTO
> Mapping Resource	(0008,0105)	CS	"DCMR"	ALWAYS	AUTO
> Template Identifier	(0040,DB00)	CS	"2010"	ALWAYS	AUTO
Content Sequence	(0040,A730)	SQ	Table 155: TID 2010 Key Object Selection	ALWAYS	AUTO
> Referenced Content Item Identifier	*(0040,DB73)*	*UL*	*Relationships in KOS instances are conveyed by-value only* *(PS3.3 A.35.4.3.1.2)*	*NEVER*	

Table 155 shows the particular implementation of TID 2010:

Table 155: TID 2010 Key Object Selection

NL	Rel with Parent	VT	Concept Name	Value
		CONTAINER	113001, DCM, "Rejected for Quality Reasons"	Root node
>	Rejection: HAS CONCEPT MOD Correction: n.a.	CODE	113011, DCM, "Document Title Modifier"	Code from DCID 7011 "Rejected for Quality Reasons" as selected by user
DTID 1204 "Language of Content Item and Descendants"				
>	HAS CONCEPT MOD	CODE	121049, DCM, "Language of Content Item and Descendants"	CID 5000 "Languages": eng, ISO639_2, "English"
DTID 1002 "Observer Context"				
>	HAS OBS CONTEXT	CODE	121005, DCM, "Observer Type"	CID 270 "Observer Type": 121006, DCM, "Person"

NL	Rel with Parent	VT	Concept Name	Value
DTID 1003 "Person Observer Identifying Attributes"				
>	HAS OBS CONTEXT	PNAME	121008, DCM, "Person Observer Name"	Name of the rejector/corrector
>	CONTAINS	TEXT	113012, DCM, "Key Object Description"	Copied from "Code Meaning" in "Concept Name Code Sequence", Table 154: SR Document Content Module – Rejection Note
>	CONTAINS	IMAGE	n.a.	SOP Class UID and SOP Instance UID of one of the rejected images; Item repeated for each rejected image

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

MAMMOMAT B.brilliant implements an actor Acquisition Modality according to the IHE [2] Scheduled Workflow (SWF) profile.

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in “Table 44: Basic Worklist C-FIND-RSP Return Key Attributes“.

MAMMOMAT B.brilliant’s DICOM application is not performing data coercion.

8.1.4 Coerced/Modiefied Fileds

N/A

8.2 Data Dictionary of Private Attributes

Table 156: 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 – Rows	US	1
(0019,xx06)	SIEMENS MED SP DXMG WH AWS 1	AEC Control Image – Columns	US	1
(0019,xx07)	SIEMENS MED SP DXMG WH AWS 1	AEC Control Image – Pixel Data	OB	1
(0019,xx10)	SIEMENS MED SP DXMG WH AWS 1	Derivation Description	ST	1
(0019,xx20)	SIEMENS MED SP DXMG WH AWS 1	Compression Group Phase	US	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 Threshold Values	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
(0023,xx01)	SIEMENS MED SP DXMG WH AWS 1	Needle Info	LO	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,xx08)	SIEMENS MEDCOM OOG	MedCom OOG Type	CS	1
(0029,xx09)	SIEMENS CSA HEADER	Modality Image Header Version	LO	1
(0029,xx09)	SIEMENS MEDCOM OOG	MedCom OOG Version	LO	1
(0029,xx10)	SIEMENS CSA HEADER	Modality Image Header Info	OB	1
(0029,xx10)	SIEMENS MEDCOM OOG	MedCom OOG Info	OB	1
(0029,xx15)	SIEMENS CSA REPORT	SR Variant	US	1
(0029,xx17)	SIEMENS CSA REPORT	SC SOP Instance UID	UI	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
(0029,xx60)	SIEMENS MEDCOM HEADER2	Series Work Flow Status	LO	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 Percentiles	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

Tag	Private Owner Code	Name	VR	VM
(0051,xx50)	SIEMENS MED SP DXMG WH AWS 1	Projection Series Instance UID	UI	1
(0051,xx51)	SIEMENS MED SP DXMG WH AWS 1	BTO Series Instance UID	UI	1
(0051,xx60)	SIEMENS MED SP DXMG WH AWS 1	Primary Positioner Scan Arc (total travelled angle until this image)	DS	1
(0051,xx61)	SIEMENS MED SP DXMG WH AWS 1	Secondary Positioner Scan Arc	DS	1
(0051,xx62)	SIEMENS MED SP DXMG WH AWS 1	Primary Positioner Scan Start Angle (of current image)	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 (travelled angle from position before)	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

8.3.1 Context Groups

Table 157: Context Groups

Context Group	Default Value Set	Configurable	Use
View	CID 4014 "View for Mammography"	No	(0054,0220) "View Code SQ"
View Modifier	CID 4015 "View Modifier for Mammography"	No	(0054,0222) "View Modifier Code SQ"
Result Status	CID 6042 "Status of Results"	No	Used in: Breast Density SR, TID 4000
Language	CID 5000 "Languages"	No	Used in: Breast Density SR, X-Ray Dose SR, Key Object Selection (Rejection Note) TID 1204
Country	CID 5001 "Countries"	No	Used in: Breast Density SR, X-Ray Dose SR, Key Object Selection (Rejection Note) TID 1204
Intent	CID 3629 "Procedure Intent"	Extensible	Always 'Diagnostic Intent' Used in: X-Ray Dose SR, TID 10001
Observer	CID 270 "Observer Type"	No	Used in: X-Ray Dose SR and Key Object Selection (Rejection Note), TID 1002
Role	CID 7453 "Performing Roles"	Extensible	Always 'Irradiation Administering' Used in: X-Ray Dose SR, TID 1003
Scope	CID 10000 "Scope of Accumulation"	Extensible	Always 'Performed Procedure Step' Used in: X-Ray Dose SR, TID 10001
UID Type	CID 10001 "UID Types"	Extensible	Always 'PPS SOP Instance UID' Used in: X-Ray Dose SR, TID 10001
Source of Dose Info	CID 10020 "Source of Projection X-Ray Dose Information"	Extensible	Always 'Automated Data Collection' Used in: X-Ray Dose SR, TID 10001
Side	CID 6022 "Side"	No	Used in: X-Ray Dose SR, TID 10005
Irradiation Type	CID 10002 "Irradiation Event Types"	Extensible	Used in: X-Ray Dose SR, TID 10003
Anatomy	CID 4009 "DX Anatomy Imaged"	Extensible	Always 'Breast' Used in: X-Ray Dose SR, TID 10003
Laterality	CID 244 "Laterality"	No	Either 'Left' or 'Right' Used in: X-Ray Dose SR, TID 10003
Region	CID 4031 "Common Anatomic Regions"	Extensible	Always 'Breast' Used in: X-Ray Dose SR, TID 10003

Context Group	Default Value Set	Configurable	Use
Plane	CID 10003 “Equipment Plane Identification”	Extensible	Always ‘Single Plane’ Used in: X-Ray Dose SR, TID 10003
Reference Point	CID 10025 “Radiation Dose Reference Points”	Extensible	Always ‘Entrance exposure to a 4.2 cm breast thickness Used in: X-Ray Dose SR, TID 10003
Breast Density	CID 6000 “Overall Breast Composition”	Extensible	Used in: X-Ray Dose SR, TID 4007
Single Image Finding	CID 6014 “Mammography Single Image Finding”	Extensible	Always ‘Breast composition’ Used in: Breast Density SR, TID 4006
Summary	CID 6047 “CAD Processing and Findings Summary”	No	Used in: Breast Density SR, TID 4001
Analysis Type	CID 6043 “Types of Mammography CAD Analysis”	Extensible	Used in: Breast Density SR, TID 4001, 4018
Calculation	CID 6140 “Calculation Methods”	Extensible	Used in: Breast Density SR, TID 4002
Uncertainty	CID 225 “Measurement Uncertainty Concepts”	Extensible	Used in: Breast Density SR, TID 4002
Rendering	CID 6034 "Intended Use of CAD Output"	No	Used in: Breast Density SR, TID 4003, 4006
Calculation	CID 6142 "Calculated Value"	Extensible	Used in: Breast Density SR, TID 4002, 4006
Rejection Reason	CID 7011 “Rejected for Quality Reasons”	Extensible	Used in: Key Object Selection (Rejection Note), TID 2010
Anode Material	CID 10016 “Anode Target Material”	Extensible	Always ‘Tungsten’ Used in: X-Ray Dose SR, TID 10003B
Filter Type	CID 10007 “X-Ray Filter Types”	Extensible	Used in: X-Ray Dose SR, TID 10003B
Filter Material	CID 10006 “X-Ray Filter Materials”	Extensible	Code according to image Used in: X-Ray Dose SR, TID 10003B
Grid	CID 10017 “X-Ray Grid”	Extensible	Code according to image Used in: X-Ray Dose SR, TID 10003B
Derivation	CID 7203 “Image Derivation”	Extensible	(0008,9125) “Derivation Code SQ” in BTO
Source Purpose	CID 7202 “Source Image Purposes of Reference”	Extensible	(0040,A170) “Purpose of Reference Code SQ” in BTO
Discontinued Reason	CID 9301 "Modality PPS Discontinuation Reason"	Extensible	(0040,0281) “PPS Discontinuation Reason Code SQ” in MPPS

8.3.2 Template Specifications

This section specifies any extensions to standard templates and/or any private templates that are used, and defines them.

Table 158: Extensions to TID 4003

NL	Rel with Parent	VT	Concept Name	Value
	HAS PROPERTIES	INCLUDE	Table 148: TID 4007 "Mammography CAD Breast Composition"	
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04030, SRT, "Left breast"
		NUM	R-00363, SRT, "+/-, range of measurement uncertainty"	-3 to + 3
>	HAS CONCEPT MOD	CODE	121401, DCM, "Derivation"	CID 6140 "Calculation Methods": 112188, DCM, "Two-dimensional method"
>	HAS CONCEPT MOD	CODE	G-C171, SRT, "Laterality"	T-04030, SRT, "Left breast"

8.3.3 Private Code Definitions

This section specifies any private codes used and their definitions.

Table 159: Private Codes

Coding Scheme Designator	Coding Scheme Version	Code Value	Code Meaning
99SMS_SPWH	1.0	W-0001	Calibration
99SMS_SPWH	1.0	G_001	Prime (virtual grid)
99SMS_SPWH	1.0	scatter_info	Scatter Correction information

8.4 Grayscale Image Consistency

The high resolution TFT display monitor option of MAMMOMAT B.brilliant 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 Extensions with Private Attributes

The following SOP Instances created by MAMMOMAT B.brilliant are standard extended by adding the following private modules. The used private creator value is “SIEMENS MED SP DXMG WH AWS 1”:

- Digital Mammography X-Ray Image
- Breast Tomosynthesis Image

Table 160: Private Modules

Module	Reference	Note
AEC Information	8.5.1.1	AEC information
Acquisition Data	8.5.1.2	additional information about image acquisition
TiCEM	8.5.1.3	additional TiCEM information
Breast Density	8.5.1.4	Breast Density Data
Tomosynthesis	8.5.1.5	additional Tomosynthesis data
CSA Image Header	8.5.1.6	syngo: private XP information
CSA Series Header	8.5.1.7	syngo
MECOM Header	8.5.1.8	syngo
MEDCOM OOG	8.5.1.9	syngo: if object graphics are attached to image
syngo Report Data	8.5.1.10	syngo: added to DICOM SR, incl. KOS

8.5.1.1 AEC Information Module

The following table describes private attributes that contain information about the AEC area.

Table 161: (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
AEC Control Image – Rows	(0019,xx05)	US	internal use only
AEC Control Image – Columns	(0019,xx06)	US	internal use only
AEC Control Image – Pixel Data	(0019,xx07)	OB	internal use only

8.5.1.2 Acquisition Data Module

The following table describes private attributes that contain additional acquisition parameters.

Table 162: (Private) Acquisition Data

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

8.5.1.3 TiCEM Module

The following table describes private attributes that contain additional dual energy parameters.

Table 163: (Private) TiCEM

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

The following table describes private attributes that contain results of breast density measurements calculated during acquisition.

Table 164: (Private) Breast Density

Attribute Name	Tag	VR	Description
Breast Density Version	(0021,xx02)	SH	<version>
Breast Density Threshold Values	(0021,xx05)	SH	3 values
Insight Breast Density values per Image	(0021,xx10)	LO	V_b: <Breast Volume> cm3 V_fg :< Fibro glandular Volume> cm3 VBD:<Volumetric breast density> %
Insight Breast Density Grade per Image	(0021,xx11)	SH	Breast Density grade of image

8.5.1.5 Tomosynthesis Module

The following table describes private attributes that contain additional data stored during a Tomosynthesis acquisition.

Table 165: (Private) Tomosynthesis

Attribute Name	Tag	VR	Description
Reconstruction Center	(0051,xx10)	ST	Reconstruction parameter: "ReconCenter: <> ; FocalSpotOffset:<> ; 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 Righthanded Cartesian. Origin in detector center
Image Orientation (Tomo)	(0051,xx37)	DS	In tomo equipment coordinate system
Projection Series	(0051,xx50)	UI	Instance UID of the projection series

8.5.1.6 CSA Image Header Module

The following table describes private attributes from syngo platform.

Table 166: (Private) CSA Image Header

Attribute Name	Tag	VR	Description
CSA Image Header Type	(0029,xx08)	CS	CSA Image Header identification characteristics. Always 'SIEMENS SP AWS'
CSA Image Header Version	(0029,xx09)	LO	Version of CSA Image Header Info (0029,xx10) format. Always 'VA60'
CSA Image Header Info	(0029,xx10)	OB	Manufacturer model dependent information

8.5.1.7 CSA Series Header Module

The following table describes private attributes from syngo platform.

Table 167: (Private) CSA Series Header

Attribute Name	Tag	VR	Description
CSA Series Header Type	(0029,xx18)	CS	CSA Series Header identification characteristics. Always 'SIEMENS SP AWS'

Attribute Name	Tag	VR	Description
CSA Series Header Version	(0029,xx19)	LO	Version of CSA Series Header Info (0029,xx20) format. Always 'VA60'
CSA Series Header Info	(0029,xx20)	OB	Manufacturer model dependent information

8.5.1.8 MECOM Header Module

The following table describes private attributes from syngo platform.

Table 168: (Private) MECOM Header

Attribute Name	Tag	VR	Description
Series Work Flow Status	(0029,xx60)	LO	syngo Patient Browser specific flags used for clinical work: • com = completed • rea = read • ver = verified

8.5.1.9 MEDCOM OOG Module

This module is used whenever object graphics is drawn on the image and need to be stored as graphic object properties. Given the condition that the module contents was not removed by other modalities, the graphic objects remain re-animatable if such an image was transferred and is then retrieved back.

The following table describes private attributes from syngo platform.

Table 169: (Private) MEDCOM OOG

Attribute Name	Tag	VR	Description
MedCom OOG Type	(0029,xx08)	CS	MEDCOM Object Oriented Graphics (OOG) identification characteristics. Defined Terms: • MEDCOM OOG 1 • MEDCOM OOG 2
MedCom OOG Version	(0029,xx09)	LO	Version of MEDCOM OOG Info (0029,xx10) format.
MedCom OOG Info	(0029,xx10)	OB	MEDCOM Object Oriented Graphics (OOG) data.

8.5.1.10 syngo Report Data Module

The following table describes private attributes from syngo platform.

Table 170: (Private) syngo Report Data

Attribute Name	Tag	VR	Description
SR Variant	(0029,xx15)	US	DICOM SR variant. Enumerated Values: 3 = Mammography CAD SR (1.2.840.10008.5.1.4.1.1.88.50) 4 = Key Object Selection Document (1.2.840.10008.5.1.4.1.1.88.59) 6 = X-Ray Radiation Dose SR (1.2.840.10008.5.1.4.1.1.88.67)
SC SOP Instance UID	(0029,xx17)	UI	DICOM SOP Instance UID of syngo based SC Image representing the syngo report object. This UID will be used to identify the Resulting SC object after SR to SC conversion. No conversion implemented.

8.5.2 Extended Set of Image Types

Following table describes all Image/Frame Type value combinations used to designate the purpose of the image objects created by MAMMOMAT B.brilliant.

The values consider the requirements and refines from several modules as they take precedence over each other.

Table 171: Image Types / Frame Types

Value Set	Description
FFDM Images	
ORIGINAL | PRIMARY | | <laterality>	FFDM Image FOR PROCESSING
DERIVED | PRIMARY | | <laterality>	FFDM Image FOR PRESENTATION
Tomosynthesis	
ORIGINAL | PRIMARY | TOMO_PROJ | <laterality>	Tomosynthesis projections FOR PROCESSING
DERIVED | PRIMARY | TOMO_PROJ | <laterality>	Tomosynthesis projections FOR PRESENTATION
DERIVED | PRIMARY | TOMOSYNTHESIS | NONE	Tomo Slices in BTO format
Synthetic Images	
DERIVED | PRIMARY | TOMO_2D | <laterality> | INSIGHT_2D	Synthetic Mammogram calculated from whole BTO
DERIVED | PRIMARY | TOMOSYNTHESIS | INSIGHT_3D	Rotating Mammogram in BTO format
Stereo Biopsy Images	
ORIGINAL | PRIMARY | STEREO_SCOUT | <laterality>	Stereo Biopsy SCOUT Image FOR PROCESSING
DERIVED | PRIMARY | STEREO_SCOUT | <laterality>	Stereo Biopsy SCOUT Image FOR PRESENTATION
ORIGINAL | PRIMARY | STEREO_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PROCESSING – determining coordinates
DERIVED | PRIMARY | STEREO_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION – determining coordinates
ORIGINAL | PRIMARY | STEREO_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PROCESSING – determining coordinates
DERIVED | PRIMARY | STEREO_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION – determining coordinates
ORIGINAL | PRIMARY | PREFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PROCESSING – needle tip at target
DERIVED | PRIMARY | PREFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION – needle tip at target
ORIGINAL | PRIMARY | PREFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PROCESSING – needle tip at target
DERIVED | PRIMARY | PREFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION – needle tip at target
ORIGINAL | PRIMARY | POSTFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PROCESSING – needle shot

Value Set	Description
DERIVED | PRIMARY | POSTFIRE_MINUS | <laterality>	Stereo Biopsy MINUS Image FOR PRESENTATION – needle shot
ORIGINAL | PRIMARY | POSTFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PROCESSING – needle shot
DERIVED | PRIMARY | POSTFIRE_PLUS | <laterality>	Stereo Biopsy PLUS Image FOR PRESENTATION – needle shot
Tomosynthesis Biopsy Images	
ORIGINAL | PRIMARY | TOMO_PROJ_SCOUT | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PROCESSING Including: Original tomo projection with multi-hole paddle for 2D biopsy
DERIVED | PRIMARY | TOMO_PROJ_SCOUT | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION Including: Derived tomo projection with multi-hole paddle for 2D biopsy
ORIGINAL | PRIMARY | PREFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PROCESSING – needle tip at target
DERIVED | PRIMARY | PREFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION – needle tip at target
ORIGINAL | PRIMARY | POSTFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PROCESSING – needle shot
DERIVED | PRIMARY | POSTFIRE | <laterality>	Tomosynthesis Biopsy Scout Projections FOR PRESENTATION – needle shot
DERIVED | PRIMARY | TOMO_SCOUT | NONE	Tomosynthesis Biopsy Scout Including Tomo with multi hole paddle for 2D biopsy
DERIVED | PRIMARY | PREFIRE | NONE	Tomosynthesis Biopsy Scout – needle tip at target
DERIVED | PRIMARY | POSTFIRE | NONE	Tomosynthesis Biopsy Scout – needle shot
TiCEM	
ORIGINAL | PRIMARY | LOW_ENERGY | <laterality> | LOW_ENERGY	TiCEM Low Energy image FOR PROCESSING
DERIVED | PRIMARY | LOW_ENERGY | <laterality> | LOW_ENERGY	TiCEM Low Energy image FOR PRESENTATION
ORIGINAL | PRIMARY | HIGH_ENERGY | <laterality> | HIGH_ENERGY	TiCEM High Energy image FOR PROCESSING
DERIVED | PRIMARY | RECOMBINED | SUBTRACTION | INSIGHT_CEM	Insight CEM Recombined Subtraction Image Value 5 extends the list of defined terms in DICOM, PS3.3, Table C.8-74e

NOTE: <laterality> = LEFT, RIGHT or BOTH in accordance with (0020,0062) Image Laterality

8.6 Private Transfer Syntaxes

No private Transfer Syntaxes are defined for or requested by MAMMOMAT B.brilliant's DICOM applications.

8.7 DICOM Print SCU – detailed status displays

The following tables document the behavior of the MAMMOMAT B.brilliant's Print AE in response to messages received for the printer SOP class and the print job SOP class.

Definitions of camera symbols:

Idle: Camera is installed and ready; idle icon is displayed.

Interact: The user must react in near future, but not immediately.
Example: A camera was low in 8x10 clear sheets: LOW 8x10 CLR was sent by n-event-report.

Queue Stopped: The user must react immediately. Either the camera needs immediate interaction or a job has been aborted.
Example: A camera is out of 8x10 clear sheets, or camera is down, or a film job is aborted.

Note: different camera symbols are displayed according to the Printer Status Info.

8.7.1 Common Status Information

Table 172: Common Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
NORMAL	Camera is ready	Camera is ready	<None>/Idle
BAD RECEIVE MGZ	There is a problem with the film receive magazine. Films from the printer cannot be transported into the magazine.	Problem with receive magazine.	<None>/Interact
BAD SUPPLY MGZ	There is a problem with the film supply magazine. Films from this magazine cannot be transported into the printer.	Problem with supply magazine.	<None>/Interact
CALIBRATING	Printer is performing self-calibration; it is expected to be available for normal operation shortly.	Self-calibration. Please wait.	<None>/Idle
CALIBRATION ERR	An error in the printer calibration has been detected, quality of processed films may not be optimal.	Problem in calibration. Film quality may not be optimal.	<None>/Interact
CHECK CHEMISTRY	A problem with the processor chemicals has been detected, quality of processed films may not be optimal.	Problem with chemistry. Film quality may not be optimal.	<None>/Interact
CHECK SORTER	There is an error in the film sorter	Error in film sorter.	<None>/Interact
CHEMICALS EMPTY	There are no processing chemicals in the processor, films will not be printed and processed until the processor is back to normal.	Camera chemistry empty. Please check.	<None>/Interact
CHEMICALS LOW	The chemical level in the processor is low, if not corrected, it will probably shut down soon.	Camera chemistry low. Please check.	<None>/Interact
COVER OPEN	One or more printer or processor covers, drawers, doors are open.	Camera cover, drawer, or door open.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
ELEC CONFIG ERR	Printer configured improperly for this job.	Camera configured improperly for this job. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped
ELEC DOWN	Printer is not operating due to some unspecified electrical hardware problem.	Camera electrical hardware Problem.	<None>/Interact
ELEC SW ERROR	Printer not operating for some unspecified software error.	Camera software problem. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped
EMPTY 8X10	The 8x10 inch film supply magazine is empty.	8x10 film supply empty.	<None>/Interact
EMPTY 8X10 BLUE	The 8x10 inch blue film supply magazine is empty.	8x10 blue film supply empty.	<None>/Interact
EMPTY 8X10 CLR	The 8x10 inch clear film supply magazine is empty.	8x10 clear film supply empty.	<None>/Interact
EMPTY 8X10 PAPR	The 8x10 inch paper supply magazine is empty.	8x10 paper supply empty.	<None>/Interact
EMPTY 10X12	The 10x12 inch film supply magazine is empty.	10x12 film supply empty.	<None>/Interact
EMPTY 10X12 BLUE	The 10x12 inch blue film supply magazine is empty.	10x12 blue film supply empty.	<None>/Interact
EMPTY 10X12 CLR	The 10x12 inch clear film supply magazine is empty.	10x12 clear film supply empty.	<None>/Interact
EMPTY 10X12 PAPR	The 10x12 inch paper supply magazine is empty.	10x12 paper supply empty.	<None>/Interact
EMPTY 10X14	The 10x14 inch film supply magazine is empty.	10x14 film supply empty.	<None>/Interact
EMPTY 10X14 BLUE	The 10x14 inch blue film supply magazine is empty.	10x14 blue film supply empty.	<None>/Interact
EMPTY 10X14 CLR	The 10x14 inch clear film supply magazine is empty.	10x14 clear film supply empty.	<None>/Interact
EMPTY 10X14 PAPR	The 10x14 inch paper supply magazine is empty.	10x14 paper supply empty.	<None>/Interact
EMPTY 11X14	The 11x14 inch film supply magazine is empty.	11x14 film supply empty.	<None>/Interact
EMPTY 11X14 BLUE	The 11x14 inch blue film supply magazine is empty.	11x14 blue film supply empty.	<None>/Interact
EMPTY 11X14 CLR	The 11x14 inch clear film supply magazine is empty.	11x14 clear film supply empty.	<None>/Interact
EMPTY 11X14 PAPR	The 11x14 inch paper supply magazine is empty.	11x14 paper supply empty.	<None>/Interact
EMPTY 14X14	The 14x14 inch film supply magazine is empty.	14x14 film supply empty.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
EMPTY 14X14 BLUE	The 14x14 inch blue film supply magazine is empty.	14x14 blue film supply empty.	<None>/Interact
EMPTY 14X14 CLR	The 14x14 inch clear film supply magazine is empty.	14x14 clear film supply empty.	<None>/Interact
EMPTY 14X14 PAPR	The 14x14 inch paper supply magazine is empty.	14x14 paper supply empty.	<None>/Interact
EMPTY 14X17	The 14x17 inch film supply magazine is empty.	14x17 film supply empty.	<None>/Interact
EMPTY 14X17 BLUE	The 14x17 inch blue film supply magazine is empty.	14x17 blue film supply empty.	<None>/Interact
EMPTY 14X17 CLR	The 14x17 inch clear film supply magazine is empty.	14x17 clear film supply empty.	<None>/Interact
EMPTY 14X17 PAPR	The 14x17 inch paper supply magazine is empty.	14x17 paper supply empty.	<None>/Interact
EMPTY 24X24	The 24x24 inch film supply magazine is empty.	24x24 film supply empty.	<None>/Interact
EMPTY 24X24 BLUE	The 24x24 inch blue film supply magazine is empty.	24x24 blue film supply empty.	<None>/Interact
EMPTY 24X24 CLR	The 24x24 inch clear film supply magazine is empty.	24x24 clear film supply empty.	<None>/Interact
EMPTY 24X24 PAPR	The 24x24 inch paper supply magazine is empty.	24x24 paper supply empty	<None>/Interact
EMPTY 24X30	The 24x30 inch film supply magazine is empty.	24x30 film supply empty.	<None>/Interact
EMPTY 24X30 BLUE	The 24x30 inch blue film supply magazine is empty.	24x30 blue film supply empty.	<None>/Interact
EMPTY 24X30 CLR	The 24x30 inch clear film supply magazine is empty.	24x30 clear film supply empty.	<None>/Interact
EMPTY 24X30 PAPR	The 24x30 inch paper supply magazine is empty.	24x30 paper supply empty.	<None>/Interact
EMPTY A4 PAPR	The A4 paper supply magazine is empty.	A4 paper supply empty	<None>/Interact
EMPTY A4 TRANS	The A4 transparency supply magazine is empty.	A4 transparency supply empty.	<None>/Interact
EXPOSURE FAILURE	The exposure device has failed due to some unspecified reason.	Exposure device has failed.	<None>/Interact
FILM JAM	A film transport error has occurred, and a film is jammed in the printer or processor.	Film jam.	<None>/Interact
FILM TRANSP ERR	There is a malfunction with the film transport, there may or may not be a film jam.	Film transport problem.	<None>/Interact
FINISHER EMPTY	The finisher is empty.	Finisher is empty.	<None>/Interact
FINISHER ERROR	The finisher is not operating due to some unspecified reason	Finisher problem.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
FINISHER LOW	The finisher is low on supplies.	Finisher low.	<None>/Interact
LOW 8X10	The 8x10 inch film supply magazine is low.	8x10 film supply low.	<None>/Interact
LOW 8X10 BLUE	The 8x10 inch blue film supply magazine is low.	8x10 blue film supply low.	<None>/Interact
LOW 8X10 CLR	The 8x10 inch clear film supply magazine is low.	8x10 clear film supply low.	<None>/Interact
LOW 8X10 PAPR	The 8x10 inch paper supply magazine is low.	8x10 paper supply low.	<None>/Interact
LOW 10X12	The 10x12 inch film supply magazine is low.	10x12 film supply low.	<None>/Interact
LOW 10X12 BLUE	The 10x12 inch blue film supply magazine is low.	10x12 blue film supply low.	<None>/Interact
LOW 10X12 CLR	The 10x12 inch clear film supply magazine is low.	10x12 clear film supply low.	<None>/Interact
LOW 10X12 PAPR	The 10x12 inch paper supply magazine is low.	10x12 paper supply low.	<None>/Interact
LOW 10X14	The 10x14 inch film supply magazine is low.	10x14 film supply low.	<None>/Interact
LOW 10X14 BLUE	The 10x14 inch blue film supply magazine is low.	10x14 blue film supply low.	<None>/Interact
LOW 10X14 CLR	The 10x14 inch clear film supply magazine is low.	10x14 clear film supply low.	<None>/Interact
LOW 10X14 PAPR	The 10x14 inch paper supply magazine is low.	10x14 paper supply low.	<None>/Interact
LOW 11X14	The 11x14 inch film supply magazine is low.	11x14 film supply low.	<None>/Interact
LOW 11X14 BLUE	The 11x14 inch blue film supply magazine is low.	11x14 blue film supply low.	<None>/Interact
LOW 11X14 CLR	The 11x14 inch clear film supply magazine is low.	11x14 clear film supply low.	<None>/Interact
LOW 11X14 PAPR	The 11x14 inch paper supply magazine is low.	11x14 paper supply low.	<None>/Interact
LOW 14X14	The 14x14 inch film supply magazine is low.	14x14 film supply low.	<None>/Interact
LOW 14X14 BLUE	The 14x14 inch blue film supply magazine is low.	14x14 blue film supply low.	<None>/Interact
LOW 14X14 CLR	The 14x14 inch clear film supply magazine is low.	14x14 clear film supply low.	<None>/Interact
LOW 14X14 PAPR	The 14x14 inch paper supply magazine is low.	14x14 paper supply low.	<None>/Interact
LOW 14X17	The 14x17 inch film supply magazine is low.	14x17 film supply low.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOW 14X17 BLUE	The 14x17 inch blue film supply magazine is low.	14x17 blue film supply low.	<None>/Interact
LOW 14X17 CLR	The 14x17 inch clear film supply magazine is low.	14x17 clear film supply low.	<None>/Interact
LOW 14X17 PAPR	The 14x17 inch paper supply magazine is low.	14x17 paper supply low.	<None>/Interact
LOW 24X24	The 24x24 inch film supply magazine is low.	24x24 film supply low.	<None>/Interact
LOW 24X24 BLUE	The 24x24 inch blue film supply magazine is low.	24x24 blue film supply low.	<None>/Interact
LOW 24X24 CLR	The 24x24 inch clear film supply magazine is low.	24x24 clear film supply low.	<None>/Interact
LOW 24X24 PAPR	The 24x24 inch paper supply magazine is low.	24x24 paper supply low.	<None>/Interact
LOW 24X30	The 24x30 inch film supply magazine is low.	24x30 film supply low.	<None>/Interact
LOW 24X30 BLUE	The 24x30 inch blue film supply magazine is low.	24x30 blue film supply low.	<None>/Interact
LOW 24X30 CLR	The 24x30 inch clear film supply magazine is low.	24x30 clear film supply low.	<None>/Interact
LOW 24X30 PAPR	The 24x30 inch paper supply magazine is low.	24x30 paper supply low.	<None>/Interact
LOW A4 PAPR	The A4 paper supply magazine is low.	A4 paper supply low.	<None>/Interact
LOW A4 TRANS	The A4 transparency supply magazine is low.	A4 transparency supply low.	<None>/Interact
NO RECEIVE MGZ	The film receive magazine is not available.	Film receiver not available.	<None>/Interact
NO RIBBON	The ribbon cartridge needs to be replaced.	Replace ribbon cartridge.	<None>/Interact
NO SUPPLY MGZ	The film supply magazine is not available.	Film supply not available.	<None>/Interact
CHECK PRINTER	The printer is not ready at this time, operator intervention is required to make the printer available.	Check camera.	<None>/Interact
CHECK PROC	The processor is not ready at this time, operator intervention is required to make the printer available.	Check processor.	<None>/Interact
PRINTER DOWN	The printer is not operating due to some unspecified reason.	Camera down.	<None>/Interact
PRINTER INIT	The printer is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Camera initializing.	<None>/Idle

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PRINTER OFFLINE	The printer has been disabled by an operator or service person.	Camera off-line.	<None>/Interact
PROC DOWN	The processor is not operating due to some unspecified reason.	Processor down.	<None>/Interact
PROC INIT	The processor is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Processor initializing.	<None>/Idle
PROC OVERFLOW FL	Processor chemicals are approaching the overflow full mark.	Processor chemicals near overflow.	<None>/Interact
PROC OVERFLOW HI	Processor chemicals have reached the overflow full mark.	Processor chemicals overflow.	<None>/Interact
QUEUED	Print job in Queue	--	<None>/Idle
RECEIVER FULL	The film receive magazine is full.	Receiver full.	<None>/Interact
REQ MED NOT INST	The requested film, paper, or other media supply magazine is installed in the printer, but may be available with operator intervention.	Install media supply.	<None>/Interact
REQ MED NOT AVAI	The requested film, paper, or other media requested is not available on this printer.	Media supply not available on this camera. Queue stopped. Change camera.	Queue for this camera will be STOPPED/ Queue stopped
RIBBON ERROR	There is an unspecified problem with the print ribbon.	Error with print ribbon.	<None>/Interact
SUPPLY EMPTY	The printer is out of film.	Camera out of film.	<None>/Interact
SUPPLY LOW	The film supply is low.	Film supply low.	<None>/Interact
UNKNOWN	There is an unspecified problem.	Unspecified problem with camera.	<None>/Interact
INVALID PAGE DES	The specified page layout cannot be printed, or other page description errors have been detected.	Film Job cannot be printed on this camera. Queue stopped. Please redirect film job.	Queue for this camera will be STOPPED/ Queue stopped
INSUFFICIENT MEMORY	There is not enough memory available to complete this job.	Not enough memory available in camera. Queue stopped. Please continue queue or change camera.	Queue for this camera will be STOPPED/ Queue stopped
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	--	<None>/Idle

8.7.2 Additional Status Information – AGFA printers

Table 173: Additional Agfa printer Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
WARMING UP	Printer is in the warm-up stage. Spooling of print jobs to disk is still possible.	Camera is warming up.	<None>/Idle
OFFLINE	OFFLINE Printer is switched off-line. Spooling of print jobs to disk is still possible.	Camera is switched off-line.	<None>/Interact
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	--	<None>/Idle

8.7.3 Additional Status Information – Kodak PACS Link (formerly Imation)

Table 174: Additional Kodak PACS Link (Imation) printer Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
SUPPLY MGZ ERR	The supply magazine has an error.	Film supply has an error.	<None>/Interact

8.7.4 Additional Status Information – Kodak 1901

Table 175: Additional Kodak 190 printer Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PRINTER STOPPED	The printer has stopped.	Camera has stopped.	<None>/Interact
FATAL ERROR	Fatal Error.	Fatal Error. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped

8.7.5 Additional Status Information – Kodak 2180/1120

Table 176: Additional Kodak 2180/1120 printer Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
PRINTER NOT RDY	Printer not ready.	Camera not ready.	<None>/Interact
CHECK PROCESSOR	Check processor.	Check processor.	<None>/Interact
NO TONER	No toner.	No toner.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
FATAL	Fatal Error.	Fatal Error. Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped

8.7.6 Additional Status Information – Codonics

Table 177: Additional Codonics printer Status Info evaluation

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
STANDARD	Printer is ready.	Camera is ready.	<None>/Normal
LOAD A-SIZE	Load A-Size media.	Load A-Size media.	<None>/Interact
LOAD A-DVPAPER	Load A-Size black and white paper.	Load A-Size black and white paper.	<None>/Interact
LOAD A-CVPAPER	Load A-Size color paper.	Load A-Size color paper.	<None>/Interact
LOAD A-CVTRANS	Load A-Size transparencies.	Load A-Size transparencies.	<None>/Interact
LOAD A4-SIZE	Load A4-Size media.	Load A4-Size media.	<None>/Interact
LOAD A4-DVPAPER	Load A4-Size black and white paper.	Load A4-Size black and white paper.	<None>/Interact
LOAD A4-CVPAPER	Load A4-Size color paper.	Load A4-Size color paper.	<None>/Interact
LOAD A4-CVTRANS	Load A4-Size transparencies.	Load A4-Size transparencies.	<None>/Interact
LOAD LA-SIZE	Load LA-Size media.	Load LA-Size media.	<None>/Interact
LOAD LA-DVPAPER	Load LA-Size black and white paper.	Load LA-Size black and white paper.	<None>/Interact
LOAD LA-CVPAPER	Load LA-Size color paper.	Load LA-Size color paper.	<None>/Interact
LOAD LA-CVTRANS	Load LA-Size transparencies.	Load LA-Size transparencies.	<None>/Interact
LOAD LA4-SIZE	Load LA4-Size media.	Load LA4-Size media.	<None>/Interact
LOAD LA4-DVPAPER	Load LA4-Size black and white paper.	Load LA4-Size black and white paper.	<None>/Interact
LOAD LA4-CVPAPER	Load LA4-Size color paper.	Load LA4-Size color paper.	<None>/Interact
LOAD LA4-CVTRANS	Load LA4-Size transparencies.	Load LA4-Size transparencies.	<None>/Interact
LOAD XLA-SIZE	Load XLA-Size media.	Load XLA-Size media.	<None>/Interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOAD XLA-DVPAPER	Load XLA-Size black and white paper.	Load XLA-Size black and white paper.	<None>/Interact
LOAD XLA-CVPAPER	Load XLA-Size color paper.	Load XLA-Size color paper.	<None>/Interact
LOAD XLA-CVTRANS	Load XLA-Size transparencies.	Load XLA-Size transparencies.	<None>/Interact
LOAD XLA4-SIZE	Load XLA4-Size media.	Load XLA4-Size media.	<None>/Interact
LOAD XLA4-DVPAPER	Load XLA4-Size black and white paper.	Load XLA4-Size black and white paper.	<None>/Interact
LOAD XLA4-CVPAPER	Load XLA4-Size color paper.	Load XLA4-Size color paper.	<None>/Interact
LOAD XLA4-CVTRANS	Load XLA4-Size transparencies.	Load XLA4-Size transparencies.	<None>/Interact
LOAD XLW-SIZE	Load XLW-Size media.	Load XLW-Size media.	<None>/Interact
LOAD XLW-DVPAPER	Load XLW-Size black and white paper.	Load XLW-Size black and white paper.	<None>/Interact
LOAD XLW-CVPAPER	Load XLW-Size color paper.	Load XLW-Size color paper.	<None>/Interact
LOAD 8X10-SIZE	Load 8x10 media.	Load 8x10 media.	<None>/Interact
LOAD 8X10-DVFILM	Load XLW-Size black and white film.	Load XLW-Size black and white film.	<None>/Interact
SUPPLY MISSING	The film supply magazine specified for this job is not available.	Film supply not available.	<None>/Interact
RIBBON MISSING	Ribbon is missing.	Ribbon is missing.	<None>/Interact
RIBBON EMPTY	Ribbon is empty.	Ribbon is empty.	<None>/Interact
TOP COVER OPEN	Top cover of printer is open.	Top cover of camera is open.	<None>/Interact

8.7.7 Unknown Status Information

Printer Status Info and Execution Status Info are defined terms and can therefore be extended or reduced by camera manufacturers. Therefore, syngo shall be flexible.

If any other printer status info or execution status info is received, syngo will react as shown in the following table:

Table 178: Additional DICOM Execution Status Information

Printer Status / Execution Status	Printer / Execution Status Info	Description	Message string visible in the HCD status bar	Other action for syngo / camera symbol
WARNING	<any other>	<not defined status info>	Camera info: <status info>	<None>/Interact

Printer Status / Execution Status	Printer / Execution Status Info	Description	Message string visible in the HCD status bar	Other action for syngo / camera symbol
FAILURE	<any other>	<not defined status info>	Camera info: <status info> Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped

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