SPECT*syngo* VA10A

[redacted] MI

DICOM Conformance Statement

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1 CONFORMANCE STATEMENT OVERVIEW

This conformance statement refers to **SPECT*syngo*,** the SIEMENS SPECT/CT acquisition workplace. Refer to Figure 3.7-1: Overview of **SPECTsyngo** DICOM Capabilities for an overview.

SPECT*syngo* conforms to the DICOM 3.0 Standard and supports the network services as described in Table 1-1 and the media services as described in Table 1-2.

Table 1-1 Network Services

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Verification		
Verification Service	Yes	Yes
Transfer (Image SOP Class)		
Breast Tomosynthesis Image Storage	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
Computed Tomography Image Storage	Yes	Yes
Digital Mammography Image Storage for Presentation	Yes	Yes
Digital Mammography Image Storage for Processing	Yes	Yes
Digital X-Ray Image Storage for Presentation	Yes	Yes
Digital X-Ray Image Storage for Processing	Yes	Yes
Enhanced Computed Tomography Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
Enhanced MR Color Image Storage	Yes	Yes
Enhanced XA Image Storage	Yes	Yes
Enhanced XRF Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
PET Image Storage	Yes	Yes
RT Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Ultrasound Image Storage (Retired)	Yes	Yes
Ultrasound Multi-Frame Image Storage	Yes	Yes
Ultrasound Multi-Frame Image Storage (Retired)	Yes	Yes
X-Ray 3D Angiographic Image Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radio-Fluoroscopic Image Storage	Yes	Yes

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Transfer (Non-Image SOP Class)		
12-lead ECG Waveform Storage	Yes	Yes
Ambulatory ECG Waveform Storage	Yes	Yes
Basic Text Structured Report Storage	Yes	Yes
Blending Softcopy Presentation State Storage	Yes	Yes
Cardiac Electrophysiology Waveform Storage	Yes	Yes
Color Softcopy Presentation State Storage	Yes	Yes
Comprehensive Structured Report Storage	Yes	Yes
Deformable Spatial Registration Storage	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Enhanced Structured Report Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage	Yes	Yes
Hemodynamic Waveform Storage	Yes	Yes
Key Object Selection Document Storage	Yes	Yes
Mammography CAD SR Storage	Yes	Yes
MR Spectroscopy Storage	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage	Yes	Yes
Procedure Log Storage	Yes	Yes
Raw DataStorage	Yes	Yes
Real World Value Mapping Storage	Yes	Yes
RT Beams Treatment Record Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Ion Beams Treatment Record Storage	Yes	Yes
RT Ion Plan Storage	Yes	Yes
RT Plan Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Treatment Summary Record Storage	Yes	Yes
Segmentation Storage	Yes	Yes
Spatial Fiducials Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Surface Segmentation Storage	Yes	Yes
X-Ray Radiation Dose Structured Report Storage	Yes	Yes
Transfer (Private SOP Class)		
CSA Non-Image Storage	No	Yes
Query / Retrieve		
Study Root – Query/Retrieve Information Model – FIND	Yes	Yes
Study Root – Query/Retrieve Information Model – MOVE	Yes	Yes
Workflow Management		
Storage Commitment Push Model	Yes	Yes
Modality Worklist Information Model – FIND	Yes	No
Modality Performed Procedure Step SOP Class	Yes	No

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Unified Procedure Step – Push	No	Yes
Print Management		
Basic Grayscale Print Management Meta SOP Class	Yes	No
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Printer SOP Class	Yes	No
Print Job SOP Class	Yes	No
Presentation LUT SOP Class	Yes	No
Basic Color Print Management Meta SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No

Table 1-2 Media Services

Media Storage Application Profile	Write Files (FSC)	Read Files (FSR)
Compact Disk – Recordable		
STD-GEN-CD (augmented, see 5.2.1)	Yes	Yes
DVD – Recordable		
STD-GEN-DVD (augmented, see 5.2.1)	Yes	Yes
STD-GEN-DVD-J2K (augmented, see 5.2.1)	Yes	Yes
USB		
STD-GEN-USB-J2K (augmented, see 5.2.1)	Yes	Yes

SPECT*syngo* creates ISO files to be burnt by **SPECT*syngo*** local burning SW (if hardware and software are available). Therefore, it is only possible to update DICOMDIRs before the burning process has been started. When selecting the 'Standard' profile from the export UI, the export job will be handled according to the STD-GEN-XXX profile; depending on which media has been selected. In case the 'Patient' profile is selected, the STD-GEN-XXX-J2K profile will be used, depending on which media or destination has been selected.

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3 INTRODUCTION

3.1 GENERAL

The Conformance Statement describes the DICOM interface for **SPECT*syngo*,** the SIEMENS SPECT/CT acquisition workplace in terms of part PS 3.2 of [1].

3.2 AUDIENCE

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

3.3 REMARKS

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

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

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

The user should be aware of the following important issues:

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

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

3.4 TERMS AND DEFINITIONS

Terms used in this document shall be interpreted as defined in the DICOM Standard.

3.5 ABBREVIATIONS

ACR	American College of Radiology
AE	Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
DB	Database
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
DSA	Digital Subtraction Angiography
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
GSDF	Grayscale Standard Display Function

IIDC	Image-Intensifier Distortion Correction
IOD	Information Object Definition
ISO	International Standard Organization
MI	Molecular Imaging
MWL	Modality Worklist
MPPS	Modality Performed Procedure Step
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
O	Optional Key Attribute
PDU	Protocol Data Unit
PET	Positron Emission Tomography
R	Required Key Attribute
RIS	Radiology Information System
SC	Storage Commitment
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair
SCS	Specific Character Set
SPECT	Single Photon Emission Computer Tomography
SR	Structured Report
U	Unique Key Attribute
UID	Unique Identifier
UTF-8	Unicode Transformation Format-8
UPS	Unified Worklist and Procedure Step
VNC	Virtual Non-Contrast
VR	Value Representation
xSPECT	Siemens MI Proprietary Reconstruction Technology

3.6 REFERENCES

[1] Digital Imaging and Communications in Medicine (DICOM PS3.1-3.20 2016a), National Electrical Manufac-turers Association (NEMA), http://medical.nema.org/

[2] IHE Radiology Technical Framework, Vol. I – IV, http://www.ihe.net/Technical_Frameworks

[3] DICOM Conformance Statement *syngo*.via VB40A

3.7 SCOPE AND FIELD OF APPLICATION

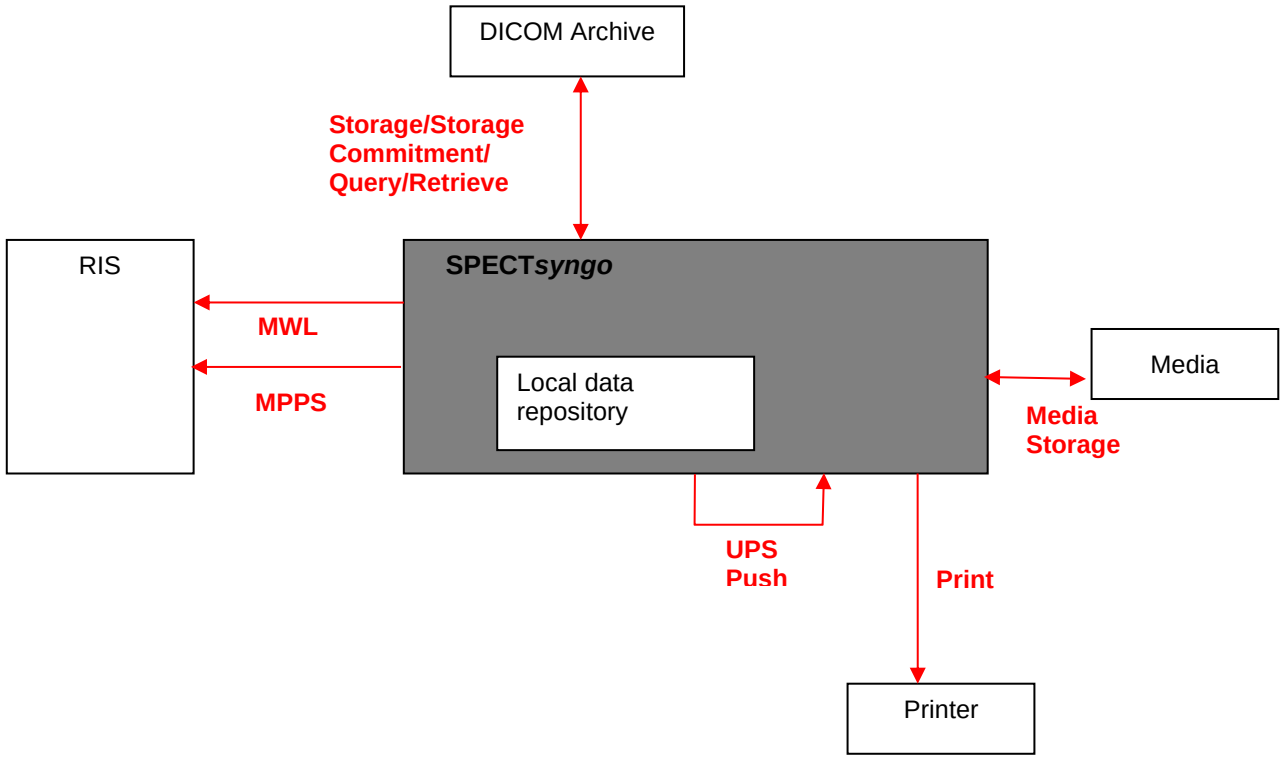


Figure 3.7-1: Overview of SPECT*syngo* DICOM Capabilities

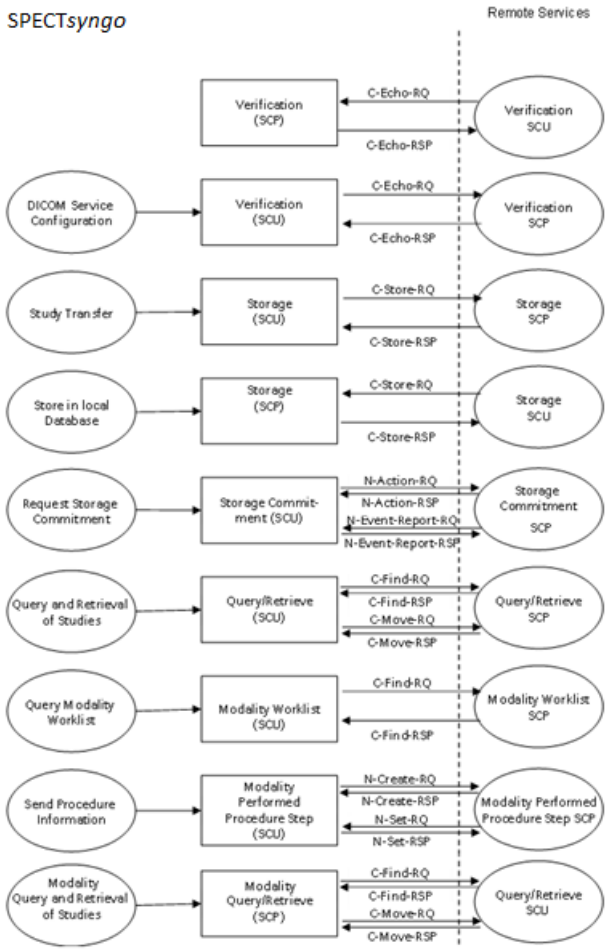
4 NETWORKING

4.1 IMPLEMENTATION MODEL

SPECT*syngo* 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 **SPECT*syngo*** can query remote notes, retrieve and store selected instances from that node. Using the Modality Worklist service, the **SPECT*syngo*** 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 color and grayscale images is supported.

4.1.1 Application Data Flow

The following figures provide a functional overview of the **SPECT*syngo*** 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)



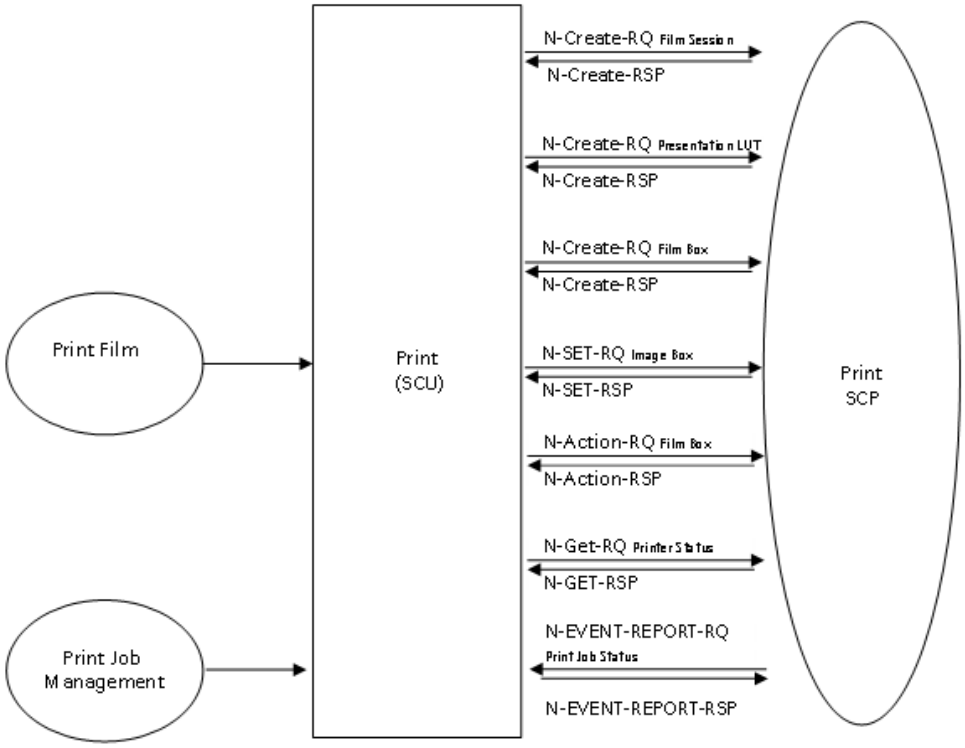


Figure 4.1-1: Application Data Flow Diagram

4.1.2 Functional Definition of Application Entities

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

The SCU components of the Application Entity are invoked upon requests from the user interface or indirect by trigger from internal processes.

4.1.2.1 Functional Definition of Verification AE

SPECT*syngo* supports the Verification service as a SCP and SCU. As a SCU, Verification can be activated from the Administrator Portal during system configuration by sending a C-ECHO-Request.

As a SCP of the Verification Service the **SPECT*syngo*** processes and responds to incoming verification requests using the C-ECHO-Response.

4.1.2.2 Functional Definition of Storage AE

SPECT*syngo* Storage SCU is invoked either directly by the user, by an auto-archive trigger or internally by the Query/Retrieve Application Entity that is responsible for processing retrieve requests. The job consists of data describing the composite objects selected for storage and the destination Application Entity Title. An association is negotiated with the destination Application Entity and the image data is transferred using the C-STORE-Request. The transfer status is reported to the initiator of the Storage request.

The Storage SCP component of **SPECT*syngo*** starts to receive the Composite Objects and import them into the database after accepting an association with a negotiated Presentation Context. The system responses to the Storage Request immediately after reception of the Data.

4.1.2.3 Functional Definition of the Storage Commitment AE

If configured, **SPECT*syngo*** can serve as a SCU for the DICOM Storage Commitment service. Upon successful completion of a storage job, the system uses the N-ACTION-Request to request storage commitment from a remote DICOM storage commitment SCP. This can either be the same as the storage destination or a different system depending on the system configuration. Storage Commitment Requests are sent after a configurable delay after storing the objects. **SPECT*syngo*** can receive the N-EVENT-REPORT-Request on the same or a different association.

4.1.2.4 Functional Definition of Query/Retrieve AE

SPECT*syngo* supports DICOM Query/Retrieve as a SCU: The user can initiate a query to a remote node using the C-FIND-Request. After matching the specified keys, the remote Query /Retrieve SCP uses the C-FIND-Response to return the results of its search, which will be displayed to the user. Depending on user action **SPECT*syngo*** Query/Retrieve DICOM SCU sends a C-MOVE-Request 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.

SPECT*syngo* supports the following query model:

- Study Root Query Model.

Furthermore, the SCU services may issue relational queries, if supported by the remote Query/Retrieve SCP node and required by the querying Application.

SPECT*syngo* DICOM Query/Retrieve SCP accepts C-FIND Request, queries the local database based on the provided matching keys and returns the matches using the C-FIND-Response. Depending on further request from the remote Query/Retrieve SCU, **SPECT*syngo*** responds to C-MOVE-Requests by initiating a C-STORE sub-operation to send image objects to the Storage SCP of the querying system.

4.1.2.5 Functional Definition of Modality Worklist AE

SPECT*syngo* Modality Worklist SCU issues DICOM Modality Worklist requests using C-FIND-Requests. The results in the C-FIND-Response are stored in internal database. The provided Patient and Procedure information is used for patient registration prior to starting an exam.

4.1.2.6 Functional Definition of Modality Performed Procedure Step SCU AE

SPECT*syngo* MPPS SCU uses the N-CREATE-Request to inform an Information System that a procedure step is IN PROGRESS.

SPECT*syngo* MPPS SCU uses the N-SET-Request to inform the Information System about the finalization of the Procedure Step, using either a status of COMPLETED or DISCONTINUED.

4.1.2.7 Functional Definition of Print AE

The Print SCU of **SPECT*syngo*** 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, to intermediately

store several film-sheets in case of resource problems on printer. The SCU will only supply and require the mandatory SOP Classes of the Print Management Service Class.

4.1.3 Sequencing of Real-World Activities

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

4.1.3.1 System Configuration

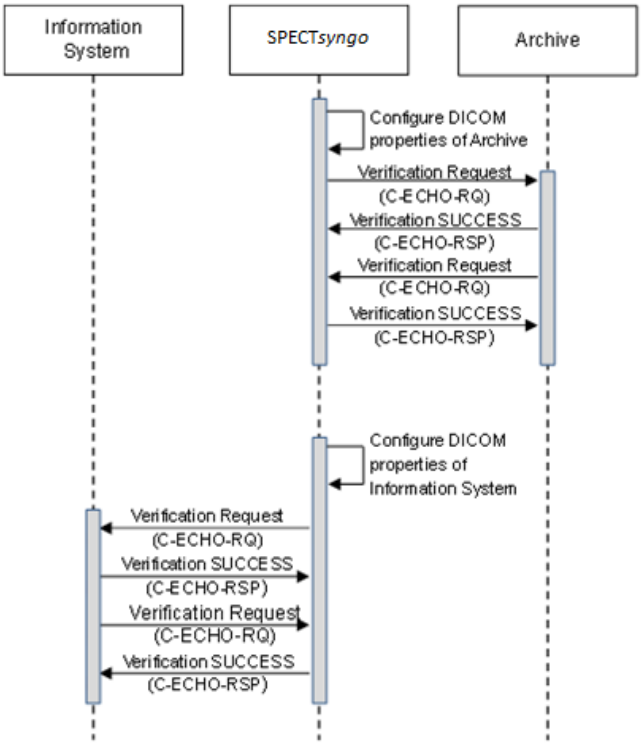


Figure 2**:** Sequence Diagram for Real World Activities - System Configuration

4.1.3.2 Acquisition Workflow

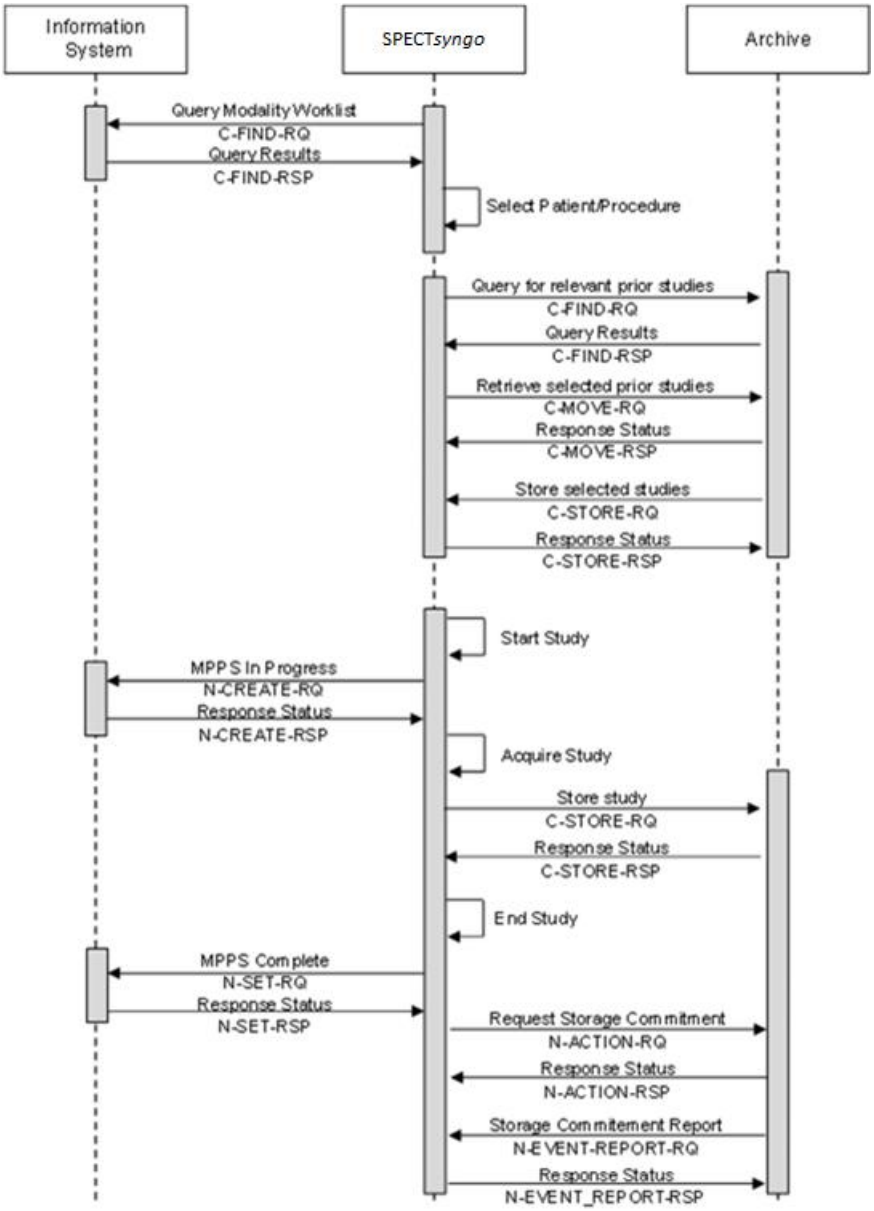


Figure 3: Sequence Diagram for Real World Activities -Acquisition workflow

4.1.3.3 Printing Workflow

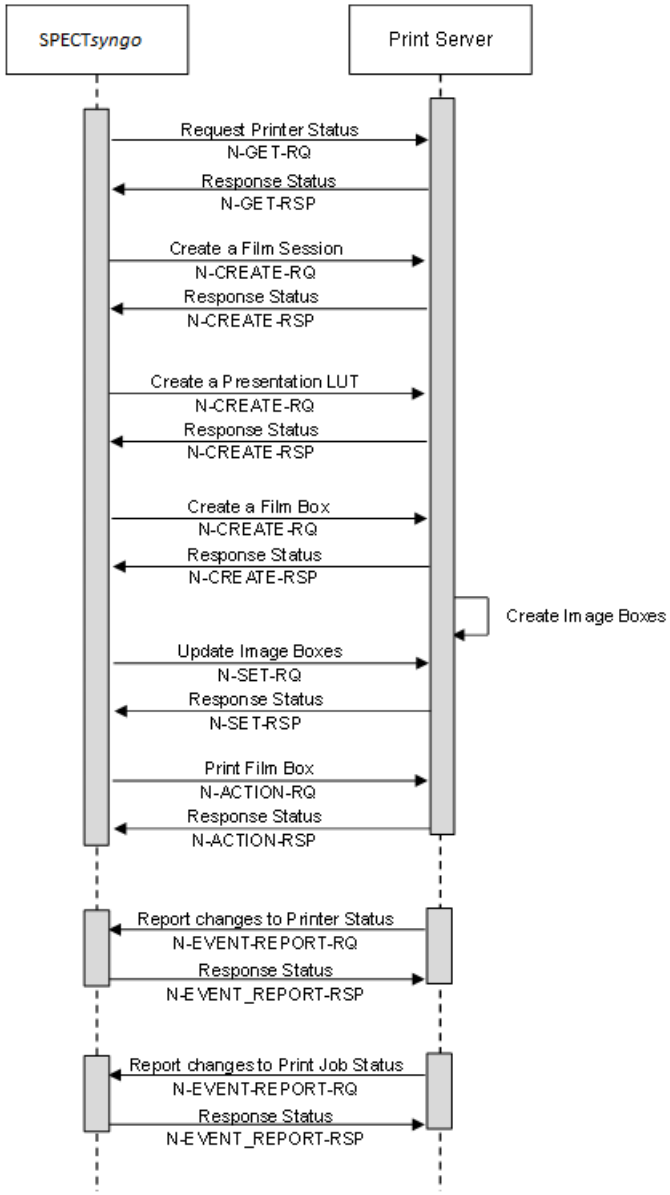


Figure 4: Sequence Diagram for Real World Activities – Printing

4.2 AE SPECIFICATIONS

This section outlines the specifications for each of the Application Entities that are part of **SPECT*syngo***.

4.2.1 SPECT*syngo* AE

4.2.1.1 SOP Classes supported

This AE provides Standard Conformance to the SOP Classes listed in Table 8-1 SOP CLASSES and Table 8-2: Supported Non-Storage SOP Classes.

4.2.1.2 Association Establishment Policies

Table 4-1: Association Policies

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB [1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

SPECT*syngo* AE contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.
The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.
There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system. Nevertheless, transfer jobs to one distinct remote system (Send, Retrieve) will be run sequentially one after the other.

4.2.1.2.1 Asynchronous Nature

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

Table 4-2: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	Infinite

4.2.1.2.2 Implementation Identifying Information

Table 4-3: DICOM Implementation Class and Version

Implementation Class UID	1.3.12.2.1107.5.1.7 (CT) or 1.3.12.2.1107.5.6.2 (NM or PET)
Implementation Version Name	“SIEMENS_S10VA30A” (CT) or “SPECTSYNGO_VA10A” (NM or PET)

4.2.1.3 Association Initiation Policy

SPECT*syngo* initiates associations while processing the service operations and internal messages as shown below:

Table 4-4: Association initiation policies

Operation or Real-World Activity	Association for
Verification	C-ECHO
Send / Receive Instance	C-STORE
Storage Commitment	N-ACTION N-EVENT-REPORT
Querying a remote node	C-FIND

[1] Default, the value is configurable

Operation or Real-World Activity	Association for
Retrieval of Instances	C-MOVE
Querying for Modality Worklist	C-FIND
Send Modality Performed Procedure Step	N-CREATE N-SET
Print Instance	N-GET N-SET N-CREATE N-ACTION N-DELETE N-EVENT-REPORT
UPS-Push	N-CREATE

4.2.1.3.1 Activity "Send To"

4.2.1.3.1.1 Description and Sequencing of Activities

Storage of DICOM object is either triggered internally in **SPECT*syngo*** (either “Send to” from the UI or triggered by auto-archiving events) or by a C-MOVE request initiated by an external DICOM AE to **SPECT*syngo***.

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

Automatic retry mechanism:
it is configurable, how many retry attempts are performed before the job goes to failed.

Retries are performed if:

- the network connection has been lost from SCU perspective. In this case retry is performed as soon as the network connection is available again.
- the partner is not reachable for other reasons (e.g. partner node has broken down) that appear to be transient. The number of retries and the interval between the retries are configurable (the default of retries is 2 and the interval is 30 seconds).

In case the transfer fails for a permanent reason (rejection permanent reported by SCP, all Presentation Contexts refused, …) the transfer will not be retried.

4.2.1.3.1.2 Proposed Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 8-1) the following Transfer Syntaxes are supported:

Table 4-5: Proposed Presentation Contexts for Storage

UID value	Transfer Syntax
1.2.840.10008.1.2	Implicit Value Representation Little Endian
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian
1.2.840.10008.1.2.2	Explicit Value Representation Big Endian
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1)
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4)
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14)
1.2.840.10008.1.2.4.90	JPEG 2000 Lossless Image Compression
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression (Lossy Only)
1.2.840.10008.1.2.5	RLE Lossless

Depending on the Configuration, the Storage SCU Service will choose a compressed or uncompressed Transfer Syntax among those accepted by the SCP. The Transfer Syntax chosen is the preferred one among the compressed and uncompressed ones. The preference order is the order of occurrence in the configuration. It is possible to configure for a specific node, which Transfer Syntax shall be used, and which one shall be excluded. The configuration can even be extended, based on the combination of SOP Classes and supported Transfer Syntax. The configuration can be performed in the Service UI.
An instance will be JPEG lossless compressed only if it fulfills the following criteria:

- is an image and not already compressed?
- Photometric Interpretation (0028,0004) is MONOCHROME or RGB or YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) equal to 16 or 8 bits
- Bits Stored (0028,0101) is >8
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0 bit

An instance will be JPEG lossy compressed only if it fulfills the following criteria:

- is an image and not already compressed?
- photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Allocated (0028,0100) equal to 16 or 8 bits
- Bits Stored (0028,0101) equal to 12 or 8 bits
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0 bit

An instance will be JPEG 2000 lossless compressed only if it fulfills the following criteria:

- is an image and not already compressed?
- Photometric interpretation (0028,0004) not MONOCHROME or RGB or YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) 16 or 8 bits

An instance will be JPEG 2000 lossy compressed only if it fulfills the following criteria:

- is an image and not already compressed?
- Photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Stored (0028,0101) equal to 12 or 8 bits

There is no extended negotiation as SCU.

4.2.1.3.1.3 SOP specific Conformance for SOP classes

SPECT*syngo* will not add or change private attributes by default, even in case objects are compressed or image header is updated according to IHE [2] Patient Information Reconciliation. The behavior of **SPECT*syngo*** when encountering status codes in a C-STORE response is summarized in Table 4-6:

Table 4-6: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Duplicate SOP Instance UID: some of the instances sent to the SCP were already available there.	0111	Job is continued till the end and marked as Completed(!). A warning mentions that some images were already available on the remote node. These will not be overwritten.
Error	Out-Of-Resources: The remote node has run out of resources (storage resources for example)	A7XX	Job is continued till the end. An according message is shown to the user.
Error	Any other DIMSE Error Status	XXXX	Job is continued till the end. An according message is shown to the user. Error is logged in the system log.
Error	Sending partially or completely failed	Any none-null Code	Failure reported to user (percentage of transferred instances is shown)
Success	Image is successfully stored on file system.	0000	Success reported to user

Table 4-7: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.1.4 Encapsulation of SOP classes generated

Some PACS systems do not support specific SOP classes, like for example:

- Encapsulated PDF (1.2.840.10008.5.1.4.1.1.104.1)
- Real World Value Mapping (1.2.840.10008.5.1.4.1.1.67)
- Spatial Registration (1.2.840.10008.5.1.4.1.1.66.1)
- Segmentation (1.2.840.10008.5.1.4.1.1.66.4)

In order to enable archiving of instances of such SOP classes, **SPECT*syngo*** packs them into a Basic Text Structured Report (SR) instance to enforce a SOP Class UID (0008,0016) '1.2.840.10008.5.1.4.1.1.88.11', supported by most PACS systems. In case that a PACS system does not even support structured reports, the instance will be packed into a Secondary Capture (SC) image with the SOP Class UID (0008,0016) '1.2.840.10008.5.1.4.1.1.7' if clinical

administrator chooses this option.
A well-defined list (see Table 4-8) of **SPECT*syngo*** internally generated objects will be packed. The bulk data (Content Sequence (0040,A730), Modality Image Header Type (0029,0008), Modality Image Header Version (0029,0009), Modality Image Header Info (0029,0010), Pixel Data (7FE0,0010) and Series Description (0008,103E)) of such generated instances contain a coding indicating that this is a Siemens private object created for archival purposes only.

Table 4-8: Packed SOP Classes

SOP Class Name	SOP Class UID
Basic Text Structured Report	1.2.840.10008.5.1.4.1.1.88.11
Comprehensive Structured Report	1.2.840.10008.5.1.4.1.1.88.33
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5

4.2.1.3.1.5 Storage of DICOM private, CSA Non-Image

When objects of SOP Class 1.3.12.2.1107.5.9.1 (DICOM private, CSA Non-Image) are received by **SPECT*syngo*** new instances of SOP Class 1.2.840.10008.5.1.4.1.1.66.1 (Spatial Registration) are created, if applicable, which include the information of the original objects. For each affected CSA Non-Image a new series is created for its own Spatial Registration object.

4.2.1.3.1.6 Correction and Rearrangement

When a Study is moved to:

- Procedure, the Study Instance UID is overwritten with the Study Instance UID and Accession Number of the Procedure.
- Patient, the system generates a new Study Instance UID.

The system will not update references to the changed Study Instance UIDs, therefore it is possible that there will be broken links between Studies after such move operations.
In case of Patient Merge and Correction no UIDs are changed, therefore it is advised to delete any corrected or rearranged objects from the PACS before attempting to archive them again, to ensure that the PACS system can store them successfully.

When the Patient Position (0018,5100) attribute is corrected, the following attributes are recalculated by the system, except for NM and PET data:
1) Image Position (0020,0032)
2) Image Orientation (0020,0037)
3) Patient Orientation (0020,0020)
4) Data Collection Center (Patient) (0018,9313) (CT only)

5) Reconstruction Target Center (Patient) (0018,9318) (CT only)

Also, the value of the Slice Location (0020,1041) attribute is emptied, and a new Frame of Reference UID (0020,0052) is generated for the corrected series.

When the Patient Birth Date or the Study Date is corrected, the system recalculates the Patient Age. A new item containing attributes that were removed or replaced by other values is added to the Original Attribute Sequence (0400,0561).

4.2.1.3.2 Activity "Send Initial Storage Commitment"

4.2.1.3.2.1 Description and Sequencing of Activities

After sending Images to a configured Archive, **SPECT*syngo*** will initiate a Storage Commitment request, if configured **SPECT*syngo*** initiates a new association in order to send the N-ACTION-RQ to the SCP.
The Storage Commitment Request will be sent after the storage, delayed by a configurable amount of time in order to make sure that the remote node had enough time to index correctly the instances received (default delay is 10 minutes).

SPECT*syngo* will accept the N-EVENT-REPORT-RQ in the same association when sent immediately after the N-ACTION-RSP but will not wait for it (association will be closed after 3 seconds).

The system may issue one N-ACTION-RQ for a complete set (bundle) of instances or issue one N-ACTION-RQ per instance. This behavior is configurable; the default value is "bundled".

4.2.1.3.2.2 Proposed Presentation Contexts

Table 4-9: Proposed Presentation Contexts for Storage Commitment

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	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		

4.2.1.3.2.3 SOP specific Conformance for SOP classes

The behavior of **SPECT*syngo*** when encountering status codes in an N-ACTION response is summarized in Table 4-10:

Table 4-10: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Any failure that occurs	Any nonnull Code	Failure reported to user; corresponding object(s) will be marked as "Archived failed"

Success	All Instances are available on the remote node	0000	Success reported to user; in case failures exist, the corresponding instances will be marked as "Archived failed"

Table 4-11: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s); the request will be retried
Association Aborted	Failure reported to user; the request will be retried

4.2.1.3.3 Activity "Send Reply to Commitment Requests on separate associations"

4.2.1.3.3.1 Description and Sequencing of Activities

In case **SPECT*syngo*** has received a Storage Commitment request (N-ACTION-RQ) from an external node, **SPECT*syngo*** initiates a new association in order to send the N-EVENT-REPORT-RQ to the SCU (Storage Commitment initiator).

4.2.1.3.3.2 Proposed Presentation Contexts

Table 4-12: Proposed Presentation Contexts for Storage Commitment

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

4.2.1.3.3.3 SOP specific Conformance for SOP classes

The behavior of **SPECT*syngo*** when encountering status codes in an N-EVENT-REPORT response is summarized in Table 4-13:

Table 4-13: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Storage Commitment Reply ignored.	Any none null Code	Storage Commitment will be repeated.
Success	Storage Commitment Reply noticed.	0000	Success reported to user.

SPECT*syngo* does not support the optional Storage Media File-Set ID and UID attributes in the N-ACTION.

4.2.1.3.4 Activity "Querying a Remote Node" for Instances

4.2.1.3.4.1 Description and Sequencing of Activities

The associated Real-World activity is a C-FIND request initiated by the user. The user specifies some attributes and will send a C-FIND request (according to the query model) and will then 3return the results to the initiating application.

4.2.1.3.4.2 Proposed Presentation Contexts

SPECT*syngo* will propose Presentation Contexts as shown in the following table:

Table 4-14: Proposed Presentation Contexts for Query

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 4-15: Extended Negotiation as SCU

Name	UID	Extended Negotiation
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated if necessary, as defined in DICOM PS3.4.

4.2.1.3.4.3 SOP Specific Conformance Statement to Query SOP classes

SPECT*syngo* checks for the following status codes in the Query SCP's C-FIND-RSP:

Table 4-16: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Failure	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FF00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FF01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 4-17: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

SPECT*syngo* supports the following query levels:

- Patient
- Study
- Series

Matching Keys on Instance Level is not supported by **SPECT*syngo*** as SCU.

The following table lists the various attributes at Patient, Study and Series levels, which can be used for **hierarchical** queries as well as return values for display. The display capabilities are highly configurable and "yes" indicates that it is possible to configure display of the data:
A "yes" in the **UI** column will indicate that the attribute may be visualized when browsing the Query results with the Browser. The Browser display is additionally influenced by the related Browser configuration

Table 4-18: Attributes supported for instance Query - SCU

Attribute Name	Tag	Type	User input	UI
Patient Level				
Patient's Name	(0010,0010)	O	enter value	yes
Patient ID	(0010,0020)	O	enter value	yes
Patient's Birth Date	(0010,0030)	O	enter value	yes
Patient's Birth Time	(0010,0032)	O	enter value	yes
Patient's Sex	(0010,0040)	O	enter value	yes

Attribute Name	Tag	Type	User input	UI
Study Level				
Accession Number	(0008,0050)	O	enter value	yes
Study ID	(0020,0010)	O	enter value	yes
Study Instance UID	(0020,000D)	U	enter value	yes
Study Date	(0008,0020)	O	enter value	yes
Study Time	(0008,0030)	O	enter value	yes
Referring Physician' s Name	(0008,0090)	O	enter value	yes
Study Description	(0008,1030)	O	enter value	yes
Number of Study related Instances	(0020,1208)	O	-	yes
Modalities in Study	(0008,0061)	O	enter value	yes
Number of Study Related Series	(0020,1206)	O	-	yes
Series Level				
Modality	(0008,0060)	O	enter value	yes
Series Date	(0008,0021)	O	enter value	yes
Series Time	(0008,0031)	O	enter value	yes
Number of Series related Instances	(0020,1209)	O	-	yes
Series Number	(0020,0011)	O	enter value	yes
Series Description	(0008,103E)	O	enter value	yes
Request Attributes Sequence \ Requested Procedure ID	(0040,0275) \ (0040,1001)	O	enter value	yes
Request Attributes Sequence \ Scheduled Procedure Step ID	(0040,0275) \ (0040,0009)	O	enter value	yes
Performed Procedure Step Start Date	(0040,0244)	O	enter value	yes
Performed Procedure Step Start Time	(0040,0245)	O	enter value	yes
Series Instance UID	(0020,000E)	U	-	yes

Note: Always a "*" is appended to the user-supplied string.
Not all query attributes are supported for NM and PET SOP classes.

4.2.1.3.5 Activity “Move SCU”

4.2.1.3.5.1 Description and Sequencing of Activities

The C-MOVE-RQs are used to retrieve the referenced images.

4.2.1.3.5.2 Accepted Presentation Contexts

Table 4-19: Proposed Presentation Contexts for Retrieve and Activity “MOVE SCU”

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root	1.2.840.10008.5.1.4.1.2	Implicit VR Little Endian	1.2.840.10008.1.2		

Query/Retrieve Model – MOVE	.2.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.5.3 SOP Specific Conformance Statement for Move SCU Classes

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

The behavior of **SPECT*syngo*** when encountering status codes in a C-MOVE response is summarized in Table 4-20:

Table 4-20: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process; Move destination unknown	Any nonnull Code	Failure reported to user
Pending	Move Operation continues	FF00	Operation continues in background
Success	Move has been performed successfully.	0000	Success reported to user

Table 4-21: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.6 Activity "Querying a Remote Node" for Modality Worklist

4.2.1.3.6.1 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 immediate request. The received worklist items will be compared with the contents of the local workflow management database. New items will be inserted into workflow management database. The results are used to prepare subsequent workflow tasks, when receiving instances.

4.2.1.3.6.2 Proposed Presentation Contexts

Table 4-22: Proposed Presentation Contexts for Worklist

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist-FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No

		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.6.3 SOP Specific Conformance for SOP Classes

- Search Key Attributes of the Worklist C-FIND

  SPECT*syngo* DICOM worklist SCU supports “broad worklist queries” with all required search keys. The following tables describe the “broad query” search keys that the SCU supports. The list is configurable in ‘DICOM Modality Worklist Query’.

Table 4-23: Broad Query search keys

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Modality	(0008,0060)	R	“*” or <configured Modality>
>Scheduled Station AE Title	(0040,0001)	R	<own AET> or “*”[1]
>Scheduled Procedure Step Start Date	(0040,0002)	R	Range from UI[2]
>Scheduled Procedure Step Description	(0040,0007)	O	
>Scheduled Station Name	(0040,0010)	O	
>Scheduled Procedure Step Location	(0040,0011)	O	
>Scheduled Procedure Step Status	(0040,0020)	O	
>Scheduled Performing Physician’s Name	(0040,0006)	O	
>Scheduled Protocol Code Sequence	(0040,0008)	O	
>>Code Value	(0008,0100)	O	
Requested Procedure Description	(0032,1060)	O	
Requested Procedure Priority	(0040,1003)	O	
Patient Transport Arrangements	(0040,1004)	O	
Requested Procedure Comments	(0040,1400)	O	
Requested Procedure Code Sequence	(0032,1064)	O	
>Code Value	(0008,0100)	O	
Requesting Physician	(0032,1032)	O	
Referring Physicians Name	(0008,0090)	O	

[1] This depends on user configuration (Administration Portal->Technical Configuration->DICOM Nodes->Local DICOM Node->Worklist) if the "own AET" is provided or not.
[2] A time window can be configured by defining how many days to look into the past and into the future (Administration Portal-> Technical Configuration->DICOM Nodes->Local DICOM Node->Worklist)

Attribute Name	Tag	Matching Key Type	Query Value
Current Patient Location	(0038,0300)	O	
Pregnancy Status	(0010, 21C0)	O	
Medical Alerts	(0010,2000)	O	
Allergies	(0010,2110)	O	

- Return Key Attributes of the Modality Worklist C-FIND

  SPECT*syngo* DICOM Modality Worklist SCU supports worklist queries with return key attributes of all types. The following tables describe the return keys that the SCU supports.

  An “x” in the **UI** column will indicate that the attribute may be visualized when browsing the Worklist results with the Browser. The Browser display is additionally influenced by the related Browser configuration.

Table 4-24: Modality Worklist C-Find Return keys

Attribute Name	Tag	Return Key Type	UI	Notes
SOP Common				
Specific Character Set	(0008,0005)	1C	-	
Scheduled Procedure Step				
Scheduled Procedure Step Sequence	(0040,0100)	1		
>Modality	(0008,0060)	1	x	
>Scheduled Station AE Title	(0040,0001)	1		“Scheduled Station AE Title” is taken as default for “Performed Station AE Title”
>Scheduled Procedure Step Start Date	(0040,0002)	1	-	
>Scheduled Procedure Step Start Time	(0040,0003)	1	-	
>Scheduled Procedure Step End Date	(0040,0004)	3	-	
>Scheduled Procedure Step End Time	(0040,0005)	3	-	
>Scheduled Performing Physician’s Name	(0040,0006)	1	x	“Scheduled Performing Physician’s Name” is taken as default for “Performing Physician’s Name”
>Scheduled Procedure Step Description	(0040,0007)	1C	x	“Scheduled Procedure Step Description” is taken as default for “Performed Procedure Step Description”
>Scheduled Protocol Code Sequence **	(0040,0008)	1C	-	Uses universal sequence match “Scheduled Protocol Code Sequence” is taken as default for “Performed Protocol Code Sequence”
>>Code Value	(0008,0100)	1C	-	
>>Coding Scheme Designator	(0008,0102)	1C	-	
>>Coding Scheme Version	(0008,0103)	3	-	
>>Code Meaning	(0008,0104)	3	-	
>Scheduled Procedure Step ID	(0040,0009)	1	x	“Scheduled

Attribute Name	Tag	Return Key Type	UI	Notes
				Procedure Step ID" is taken as default for "Performed Procedure Step ID"
>Scheduled Station Name	(0040,0010)	2	x	
>Scheduled Procedure Step Location	(0040,0011)	2	-	"Scheduled Procedure Step Location" is taken as default for "Performed Location"
>Scheduled Procedure Step Status	(0040,0020)	3	-	
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-	
Requested Procedure				
Study Date	(0008,0020)	3	x	
Study Time	(0008,0030)	3	x	
Referenced Study Sequence **	(0008,1110)	2	-	Uses universal sequence match
>Referenced SOP Class UID	(0008,1150)	1C	-	
>Referenced SOP Instance UID	(0008,1155)	1C	-	
Study Instance UID	(0020,000D)	1	-	
Requested Procedure Description	(0032,1060)	1C	x	
Requested Procedure Code Sequence **	(0032,1064)	1C	-	Uses universal sequence match "Requested Procedure Code Sequence" is taken as default for "Procedure Code Sequence"
>Code Value	(0008,0100)	1C	-	
>Coding Scheme Designator	(0008,0102)	1C	-	
>Coding Scheme Version	(0008,0103)	3	-	
>Code Meaning	(0008,0104)	3	-	
Requested Procedure ID	(0040,1001)	1	x	"Requested Procedure ID" is taken as default for "Study ID"
Reason for the Requested Procedure	(0040,1002)	3	-	
Requested Procedure Priority	(0040,1003)	2	x	
Patient Transport Arrangements	(0040,1004)	2	-	
Confidentiality Code	(0040,1008)	3	-	
Reporting Priority	(0040,1009)	3	x	
Names of intended Recipients of Results	(0040,1010)	3	-	
Requested Procedure Comments	(0040,1400)	3	-	
Imaging Service Request				
Accession Number	(0008,0050)	2	x	
Referring Physician's Name	(0008,0090)	2	x	
Requesting Physician	(0032,1032)	2	x	
Requesting Service	(0032,1033)	3	-	
Issuing Date of Imaging Service Request	(0040,2004)	3	-	
Issuing Time of Imaging Service Request	(0040,2005)	3	-	
Placer Order Number / Imaging Service Request *	(0040,2016)	3	-	Old tag (0040,2006) is retired and not used.
Filler Order Number / Imaging Service Request *	(0040,2017)	3	-	Old tag (0040,2007) is retired and not used.
Order entered by …	(0040,2008)	3	-	
Order Enterer's location	(0040,2009)	3	-	

Attribute Name	Tag	Return Key Type	UI	Notes
Order Callback Phone Number	(0040,2010)	3	-	
Imaging Service Request Comments	(0040,2400)	3	-	
Visit Identification				
Admission ID	(0038,0010)	2	x	
Issuer of Admission ID	(0038,0011)	3	-	
Visit Status				
Current Patient Location	(0038,0300)	2	x	
Visit Admission				
Admitting Diagnosis Description	(0008,1080)	3	x	
Admitting Date	(0038,0020)	3	-	
Patient Identification				
Patient's Name	(0010,0010)	1	x	
Patient ID	(0010,0020)	1	x	
Issuer of Patient ID	(0010,0021)	3	x	
Other Patient IDs	(0010,1000)	3	x	
Other Patient Names	(0010,1001)	3	x	
Patient's Birth Name	(0010,1005)	3	-	
Patient Demographic				
Patient's Birth Date	(0010,0030)	2	x	
Patient's Birth Time	(0010,0032)	3	x	
Patient's Sex	(0010,0040)	2	x	
Patient's Insurance Plan Code Sequence **	(0010,0050)	3	-	Uses universal sequence match
>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	-	
Patient's Size	(0010,1020)	3	x	
Patient's Weight	(0010,1030)	2	x	
Patient's Address	(0010,1040)	3	x	
Military Rank	(0010,1080)	3	x	
Branch of Service	(0010,1081)	3	-	
Ethnic Group	(0010,2160)	3	x	
Patient Comments	(0010,4000)	3	x	
Patient Medical				
Medical Alerts	(0010,2000)	2	x	
Allergies	(0010,2110)	2	x	
Pregnancy Status	(0010,21C0)	2	x	
Smoking Status	(0010,21A0)	3	x	
Last Menstrual Date	(0010,21D0)	3	x	
Additional Patient History	(0010,21B0)	3	x	
Special Needs	(0038,0050)	2	x	

The behavior of **SPECT*syngo*** when encountering status codes in a C-FIND response is summarized in Table 4-25:

Table 4-25: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior

Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any nonnull Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FF00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FF01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 4-26: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.7 Activity "Send MPPS"

4.2.1.3.7.1 Description and Sequencing of Activities

When a patient examination is started or continued, an MPPS N-CREATE message will be sent to the configured MPPS SCP containing patient, study, and examination information, setting the status to IN PROGRESS.

If the examination is aborted without image creation, an MPPS N-SET message will be sent, reporting the status DISCONTINUED.

In all other cases after the finished examination an MPPS N-SET message will be sent, reporting the status COMPLETED.

4.2.1.3.7.2 Proposed Presentation Contexts

Table 4-27: Proposed Presentation Contexts for MPPS

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	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		

4.2.1.3.7.3 SOP Specific Conformance Statement for MPPS SOP classes

The behavior of **SPECT*syngo*** when encountering status codes in an N-CREATE-RSP/N-SET_RSP response is summarized in following table:

Table 4-28: MPPS N-CREATE/N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	MPPS creation request could not be processed.	Any nonnull Code	MPPS is not created/updated.
Success	MPPS creation request processed successfully.	0000	MPPS is created/updated.

4.2.1.3.8 Activity "Printing to a Remote Node"

4.2.1.3.8.1 Description and Sequencing of Activities

Whenever a film-sheet is prepared by the user, it is forwarded to the Printer Job queue. As soon as the associated Printer device is available the job is activated, and association is set up.

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-REPORT message all 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 printing is stopped and the job status is set to Aborted.

4.2.1.3.8.2 Proposed Presentation Contexts

Table 4-29: Proposed Presentation Contexts for Print

Presentation Context Table					
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	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.1.3.8.3 SOP Specific Conformance Statement for Print SOP classes

SPECT*syngo* Print SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class and the Basic Color Print Management Meta SOP Class.

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

- supported film sizes of the connected Print SCP
- supported film formats of the Print SCP

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

The command communication failure behavior for the following subchapters is identical. So it has been put as only one table to this position:

Table 4-30: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.8.3.1 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.

SPECT*syngo* 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 attributes listed in the table below:

Table 4-31: Attributes of N-Create-Request of Basic Film Session

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	1
Medium Type	(2000,0030)	U	BLUE FILM
			CLEAR FILM
			PAPER
			MAMMO BLUE FILM
			MAMMO CLEAR FILM

The Number of Copies sent to the DICOM Printer is always 1, a number higher than 1 is not supported in this version.

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.

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 status codes (from N-CREATE-RSP messages) listed in the table below:

Table 4-32: N-CREATE-RSP Status Handling Behavior

Service Status	Further Meaning	Error Codes	Behavior
Warning	Memory Allocation not supported	B600	Print job continues, warning is logged
Success	Film session successfully created	0000	Print job continues

4.2.1.3.8.3.2 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 attributes listed below. The actual values for each attribute depend on DICOM printer configuration within **SPECT*syngo*** DICOM Print Management SCU:

Table 4-33: Attributes for N-CREATE-RQ of Basic Film Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	STANDARD\C,R
Referenced Film Session Sequence	(2010,0500)	M	
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT, LANDSCAPE
Film Size ID	(2010,0050)	M	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN,, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR, CUBIC, NONE, REPLICATE
Border Density	(2010,0100)	U	BLACK, WHITE
Max Density	(2010,0130)	U	0 < Value
Min Density	(2010,0120)	U	0 < Value < 50
Required if Presentation LUT is present			
Reflective Ambient Light	(2010,0160)	U	0 < Value
Illumination	(2010,015E)	U	0 < Value
Referenced Presentation LUT Sequence	(2050,0500)	U	

For Page Mode printing, the Image Display Format used is Standard\1,1.

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 to be further 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, **SPECT*syngo*** print manager will issue a 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.

The Basic Film Box SOP class interprets the status codes listed in the table below:

Table 4-34: N-CREATE-RSP Response Status Handling Behavior for Basic Film Box SOP Class

Service Status	Meaning	Error Codes	Behavior
Failure	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed	C616	Print job is marked as failed and the reason is logged
Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead	B605	Print job continues and warning is logged
Success	Film Box successfully created	0000	Print job continues

Table 4-35: N-ACTION Response Status Handling Behavior for Basic Film Box SOP Class

Service Status	Meaning	Error Codes	Behavior
Failure	Unable to create print job, print queue is full	C602	Print job is marked as failed and the reason is logged
	Image size is larger than images box size	C603	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Film box does not contain image box (empty page)	B603	Print job continues and warning is logged
	Image size is larger than image box size, the image has been unmagnified	B604	Print job continues and warning is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	Print job continues and warning is logged
Success	Film accepted for printing	0000	Print job continues

4.2.1.3.8.3.3 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 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 attributes listed in the table below:

Table 4-36: Attributes for N-SET-RQ of Basic Grayscale Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
Basic Grayscale Image Sequence	(2020,0110)	M	
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME2
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> 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	

The Grayscale Image Box SOP class interprets the status codes as listed below:

Table 4-37: DICOM Command Response Status Handling Behavior for Basic Grayscale Image Box SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Image size is larger than image box size, the image has been unmagnified.	B604	Print job continues and the reason is logged
	Requested Min Density or Max Density outside of Printer's operating range	B605	Print job continues and the reason is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	Print job continues and warning is logged
Success	Image successfully stored in Image Box	0000	Print job continues

4.2.1.3.8.3.4 Basic Color Image Box SOP Class

The Basic Color Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Color Image Box SOP Class uses only the N-SET-RQ with the attributes listed below:

Table 4-38: Attributes for N-SET-RQ of Basic Color Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Color Image Sequence	(2020,0111)	M	
> Samples per Pixel	(0028,0002)	M	3
> Photometric Interpretation	(0028,0004)	M	RGB
> Planar Configuration	(0028,0006)	M	0
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8
> Bits Stored	(0028,0101)	M	8
> High Bit	(0028,0102)	M	7
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Color Image Box SOP class interprets the status codes listed below:

Table 4-39: DICOM Command Response Status Handling Behavior for Basic Color Image Box SOP Class

Service Status	Meaning	Error Codes	Behavior
Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
	Combined Print Image size is larger than the Image Box size	C613	Print job is marked as failed and the reason is logged
Warning	Image size larger than image box size	B604	Print job continues and the reason is logged
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	Print job continues and warning is logged
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	Print job continues and warning is logged
Success	Image successfully stored in Image Box	0000	Print job continues

4.2.1.3.8.3.5 Presentation LUT SOP Class

The objective of the Presentation LUT is to realize image hardcopy printing tailored 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 attributes listed below:

Table 4-40: Attributes for N-CREATE-RQ of Presentation LUT SOP Class

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

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).

The Presentation LUT SOP class interprets the status codes listed below:

Table 4-41: DICOM Command Response Status Handling Behavior for Presentation LUT SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Warning	Requested Min Density or Max Density outside of HCD's operating range. HCD will use its respective minimum or maximum density value instead.	B605	Print job continues and the reason is logged
Success	Presentation LUT successfully created	0000	Print job continues

4.2.1.3.8.3.6 Printer SOP Class

The Printer SOP Class is the possibility to monitor the status of the hardcopy printer in a synchronous and in 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.

It can directly ask the Printer for its status or receive Events from the Printer asynchronously:

- N-GET as SCU
- N-EVENT-REPORT as SCP

In both cases the information listed in the two following tables is supported:

Table 4-42: Used Printer N-EVENT-REPORT-RQ 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

Table 4-43: Used Printer N-GET-RSP attributes

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See table in chapter 8.6 possible values.

4.2.1.3.8.3.7 Print Job SOP Class

The Print Job SOP Class is the possibility to monitor the execution of the print process.

SPECT*syngo* 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.

Note: SPECT*syngo* DICOM Print Management application does not support receiving N-EVENT-REPORT requests from the camera during print sessions. Refer to Table 4-44: Used Print Job N-EVENT-REPORT attributes for the N-EVENT-REPORT attributes **SPECT*syngo*** DICOM Print Management application can handle.

Table 4-44: Used Print Job N-EVENT-REPORT attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Pending	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

Event-type Name	Event	Attributes	Tag	Usage SCU
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

4.2.1.4 Association Acceptance Policy

SPECT*syngo* attempts to accept a new association for

- DIMSE C-STORE
- DIMSE N-ACTION (Storage Commitment)
- DIMSE C-MOVE
- DIMSE C-FIND
- DIMSE N-CREATE (UPS Create Work item)

service operations.

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

- The "called AET" matches one of the configured AE Titles of **SPECT*syngo***.
- The "calling AET" is known (configured) at **SPECT*syngo***. This check can be disabled.
- The maximum number of incoming associations is not reached.
- At least one Presentation Context with a minimum of one suitable transfer syntax has been proposed as defined by the "Presentation Context Tables" in the following subsections.
- The system has enough available resources to perform the service requested (e.g. enough free disk space, less than the max. number of associations are already in use)

4.2.1.4.1 Activity “Receive Instances”

4.2.1.4.1.1 Description and Sequencing of Activities

SPECT*syngo* receiving process will accept an association, receive any objects transmitted on that association and store the objects on disk.

4.2.1.4.1.2 Accepted Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 8-1) the Transfer Syntaxes described in Table 4-5 are supported.

Generally, all Presentation Contexts are accepted as long as they contain at least one suitable Transfer Syntax. All other Presentation Contexts are rejected.

There is no Extended Negotiation as an SCP.

4.2.1.4.1.3 SOP-specific Conformance Statement for Storage SOP classes

SPECT*syngo* conforms to the Full Storage Class at Level 2.

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

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

The following header attributes must be available and filled:

- SOP Class UID,
- Study Instance UID,
- Series Instance UID and
- SOP Instance UID.

Table 4-45: Storage C-STORE Response Status

Service Status	Further Meaning	Error Code	Reason
Success	success	0000	Image received correctly (success notification is done after receiving, before indexing and storing)
Failure	Out-of-resource	A700	No resource left in the Short-Term Storage
Failure	Unable to Process	Cxxx	Error during instance reception
Failure	Data set does not match SOP Class	A9xx	The data set is not conformed to the SOP Class contained in the resource.

Restriction: successful operation does not guarantee storage of header data in the database.

4.2.1.4.1.4 Other SOP specific behavior

- If an image is received that is already stored in the database - identified by the SOP Instance UID - the new image will be ignored. The existing instance is not superseded.

4.2.1.4.2 Activity "Receive Initial Storage Commitment Request"

4.2.1.4.2.1 Description and Sequencing of Activities

When receiving an initial Storage Commitment request (N-ACTION-RQ) **SPECT*syngo*** will accept it with an N-ACTION-RSP and trigger a check in the database for the required instances.

The subsequently issued N-EVENT-REPORT-RQ will always be sent in a second association.

SPECT*syngo* will store SOP instances indefinitely unless the instances are manually deleted by a user or automatically by a watermark system, if the images have been routed to a PACS and the PACS committed the images back to **SPECT*syngo***. The manual deletion may lead to deletion of acknowledged instances before archiving to PACS has happened.

4.2.1.4.2.2 Accepted Presentation Contexts

Table 4-46: Acceptable Presentation Contexts for Storage Commitment and Activity "Receive Commitment Request

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

4.2.1.4.2.3 SOP-Specific Conformance Statement for SC SOP classes

There are only 2 different return status codes for the commitment request itself. They indicate only whether the request was successfully received or not. The real response is sent via N-EVENT-REPORT-RQ either on the same or on a different association.

Success or failure of Storage Commitment will be signaled via the N-EVENT-REPORT primitive.

The SCU is responsible for creating a unique Transaction UID. The SCP will not check whether the UID is already in use or not.

Table 4-47: Storage Commitment N-EVENT-REPORT Response Status

Service Status	Further Meaning	Error Codes	Reason
Success	success	0000	Image received correctly (success notification is done after receiving, before indexing and storing)
Failure	Unable to Process	Cxxx	Error during instance reception
Failure	Data set does not match SOP Class	A9xx	The data set is not conformed to the SOP Class contained in the resource.

4.2.1.4.3 Activity "Receive Instance Retrieve Requests"

4.2.1.4.3.1 Description and Sequencing of Activities

SPECT*syngo* responds to requests issued by an SCU with the query model Study Root Only.

Hierarchical and relational retrieve operations are both supported.

4.2.1.4.3.2 Accepted Presentation Contexts

SPECT*syngo* will accept Presentation Contexts as shown in Table 4-48.

Table 4-48: Acceptable Presentation Contexts Activity "Receive Instance Retrieve Request"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 4-49: Extended Negotiation as an SCP

SOP Class Name	SOP Class UID	Extended Negotiation
Study Root Query/ Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated if necessary, as defined in DICOM PS3.4

4.2.1.4.3.3 SOP Specific Conformance Statement to Query SOP classes

SPECT*syngo* Query AE supports query attributes listed in Table 4-50.

Table 4-50: Attributes supported for instance Query SCP

Attribute Name	Tag	Type	Matching

Attribute Name	Tag	Type	Matching
Patient Level			
Patient's Name	(0010,0010)	O	wildcard[1]
Patient ID	(0010,0020)	O	wildcard
Patient's Birth Date	(0010,0030)	O	universal (Null)
Patient's Birth Time	(0010,0032)	O	universal (Null)
Patient's Sex	(0010,0040)	O	universal (Null)
Issuer of Patient ID	(0010,0021)	O	wildcard
Other Patient Names	(0010,1001)	O	-
Other Patient IDs	(0010,1000)	O	-
Ethnic Group	(0010,2160)	O	-
Military Rank	(0010,1080)	O	-
Patient's Address	(0010,1040)	O	-
Patient Comments	(0010,4000)	O	-
Medical Alerts	(0010,2000)	O	-
Contrast Allergies	(0010,2110)	O	-
Smoking Status	(0010,21A0)	O	-
Pregnancy Status	(0010,21C0)	O	-
Last Menstrual Date	(0010,21D0)	O	-
Special Needs	(0038,0050)	O	-
Confidentiality Constraint on Patient Data Description	(0040,3001)	O	-
Study Level			
Patient's Name	(0010,0010)	O	wildcard[1]
Patient ID	(0010,0020)	O	wildcard
Patient's Birth Date	(0010,0030)	O	universal (Null)
Patient's Birth Time	(0010,0032)	O	universal (Null)
Patient's Sex	(0010,0040)	O	universal (Null)
Issuer of Patient ID	(0010,0021)	O	wildcard
Other Patient Names	(0010,1001)	O	-
Other Patient IDs	(0010,1000)	O	-
Ethnic Group	(0010,2160)	O	-
Military Rank	(0010,1080)	O	-
Patient's Address	(0010,1040)	O	-
Patient Comments	(0010,4000)	O	-
Medical Alerts	(0010,2000)	O	-
Contrast Allergies	(0010,2110)	O	-
Smoking Status	(0010,21A0)	O	-
Pregnancy Status	(0010,21C0)	O	-
Last Menstrual Date	(0010,21D0)	O	-
Special Needs	(0038,0050)	O	-

Attribute Name	Tag	Type	Matching
Confidentiality Constraint on Patient Data Description	(0040,3001)	O	-
Patient's Size	(0010,1020)	O	-
Patient's Weight	(0010,1030)	O	-
Additional Patient History	(0010,21B0)	O	-
Accession Number	(0008,0050)	O	wildcard
Study ID	(0020,0010)	O	wildcard
Study Instance UID	(0020,000D)	U	universal (Null)
Study Date	(0008,0020)	O	universal (Null)
Study Time	(0008,0030)	O	universal (Null)
Study Comments	(0032,4000)	O	wildcard
Name of Physician (s) Reading Study	(0008,1060)	O	wildcard
Referring Physician' s Name	(0008,0090)	O	wildcard
Study Description	(0008,1030)	O	wildcard
Number of Study related Instances	(0020,1208)	O	universal (Null)
Modalities in Study	(0008,0061)	O	universal (Null)
Admitting Diagnoses Description	(0008,1080)	O	-
Patient's Institution Residence	(0038,0400)	O	-
Admission ID	(0038,0010)	O	-
Requesting Physician	(0032,1032)	O	wildcard
Number of Study Related Series	(0020,1206)	O	universal (Null)
Series Level			
Modality	(0008,0060)	O	universal (Null)
Series Date	(0008,0021)	O	universal (Null)
Series Time	(0008,0031)	O	universal (Null)
Number of Series related Instances	(0020,1209)	O	universal (Null)
Series Number	(0020,0011)	O	universal (Null)
Series Description	(0008,103E)	O	wildcard
Institutional Department Name	(0008,1040)	O	wildcard
Request Attributes Sequence \ Requested Procedure ID	(0040,0275) \ (0040,1001)	O	wildcard
Request Attributes Sequence \ Scheduled Procedure Step ID	(0040,0275) \ (0040,0009)	O	wildcard
Performed Procedure Step Start Date	(0040,0244)	O	universal (Null)
Performed Procedure Step Start Time	(0040,0245)	O	universal (Null)
Series Instance UID	(0020,000E)	U	universal (Null)
Manufacturer's Model Name	(0008,1090)	O	wildcard
Patient Position	(0018,5100)	O	-
Station Name	(0008,1010)	O	wildcard
Institution Name	(0008,0080)	O	wildcard
Institution Address	(0008,0081)	O	wildcard

Attribute Name	Tag	Type	Matching
Performing Physician's Name	(0008,1050)	O	wildcard
Operators' Name	(0008,1070)	O	-
Body Part Examined	(0018,0015)	O	universal (Null)
Protocol Name	(0018,1030)	O	wildcard
Laterality	(0020,0060)	O	-
Frame of Reference UID	(0020,0052)	O	-
Manufacturer	(0008,0070)	O	-
Device Serial Number	(0018,1000)	O	-
Series Type	(0054,1000)	O	-
Counts Source	(0054,1002)	O	-
Corrected Image	(0028,0051)	O	-
Units	(0054,1001)	O	-
Instance Level			
Instance Number	(0020,0013)	O	universal (Null)
Image Type	(0008,0008)	O	-
Instance Creation Date	(0008,0012)	O	-
Instance Creation Time	(0008,0013)	O	-
Acquisition Date	(0008,0022)	O	universal (Null)
Acquisition Time	(0008,0032)	O	universal (Null)
Slice Location	(0020,1041)	O	-
Content Date	(0008,0023)	O	-
Content Time	(0008,0033)	O	-
SOP Class UID	(0008,0016)	O	universal (Null)
SOP Instance UID	(0008,0018)	U	universal (Null)
Retrieve AE Title	(0008,0054)	O	-
Source AE Title	(0002,0016)	O	-
Acquisition Number	(0020,0012)	O	-
Rows	(0028,0010)	O	-
Columns	(0028,0011)	O	-
Bits Allocated	(0028,0100)	O	-
Number of Frames	(0028,0008)	O	-
Slice Thickness	(0018,0050)	O	universal (Null)
Instance Availability	(0008,0056)	O	-
Image Comments	(0020,4000)	O	-
Treatment Date	(3008,0250)	O	-
Treatment Time	(3008,0251)	O	-
Calibration Image	(0050,0004)	O	-
Image Laterality	(0020,0062)	O	-
Patient Orientation	(0020,0020)	O	-
Contrast/Bolus Total Dose	(0018,1044)	O	-

Attribute Name	Tag	Type	Matching
Image Position (Patient)	(0020,0032)	O	-
Image Orientation (Patient)	(0020,0037)	O	-
Data Collection Center (Patient)	(0018,9313)	O	-
Reconstruction Target Center (Patient)	(0018,9318)	O	-
Contrast/Bolus Agent	(0018,0010)	O	-
KVP	(0018,0060)	O	-
Gantry/Detector Tilt	(0018,1120)	O	-
Convolution Kernel	(0018,1210)	O	-
Exposure Time	(0018,1150)	O	-
X-Ray Tube Current	(0018,1151)	O	-
Acquisition Duration	(0018,9073)	O	-
Exposure	(0018,1152)	O	-
Single Collimation Width	(0018,9306)	O	-
CT Exposure Sequence \ CTDIvol	(0018,9321) \ (0018,9345)	O	-
CTDI Phantom Type Code Sequence \ Code Value	(0018,9346) \ (0008,0100)	O	-
CTDI Phantom Type Code Sequence \ Coding Scheme Designator	(0018,9346) \ (008,0102)	O	-
CTDI Phantom Type Code Sequence \ Coding Scheme Version	(0018,9346) \ (008,0103)	O	-
CTDI Phantom Type Code Sequence \ Code Meaning	(0018,9346) \ (008,0104)	O	-
Acquisition Datetime	(0008,002A)	O	-
Contrast/Bolus Agent Sequence \ Code Value	(0018,0012) \ (0008,0100)	O	-
Contrast/Bolus Agent Sequence \ Coding Scheme Designator	(0018,0012) \ (0008,0102)	O	-
Contrast/Bolus Agent Sequence \ Coding Scheme Version	(0018,0012) \ (0008,0103)	O	-
Contrast/Bolus Agent Sequence \ Code Meaning	(0018,0012) \ (0008,0104)	O	-
Repetition Time	(0018,0080)	O	-
Echo Time	(0018,0081)	O	-
Inversion Time	(0018,0082)	O	-
Trigger Time	(0018,1060)	O	-
MR Diffusion Sequence \ Diffusion b-value	(0018,9117) \ (0018,9087)	O	-

1 - Always a "*" is appended to the user-supplied string

Note: Not all query attributes are supported for NM and PET SOP classes

The query attribute contents will be treated case insensitive.
Wildcards (*, ?) will not replace component and component group separators (^, =).

For attributes with PN value representation the following components (from all three component groups) are used for matching: family name complex, given name complex and middle name. Universal matching is applied for PN components.

Regardless of extended negotiation, **SPECT*syngo*** does not consider the value of Timezone Offset from UTC(0008,0201) to adjust values of time attributes from the local time zone to UTC for matching.

Single value matching of date and time is performed by meaning. For example:

- TM "2230" matches values:

  "2230", "223000", from "223000." to "223059.999999" including all values extended with trailing zeros (e.g. "223000.500").

Range matching of date and time is performed by meaning. For example:

- TM "21-224010" matches values:

  "21", "2100", "210000", from "210000." to "224010.999999" including all values extended with trailing zeros (e.g. "224010.500").

Regardless of extended negotiation of combined date time matching, a pair of attributes that are a date and a time, both of which specify the same form of range matching, will have the concatenated string values of each range matching component matched as if they were a single date time attribute.

In case of combined date time matching the time condition also matches with undefined/null time values.

The Query AE of **SPECT*syngo*** does not return any Media File-Set ID or UID, they always return the Retrieve AET (0008,0054). Furthermore, "Instance Availability" (0008,0056) is always returned.

Enterprise Query:

It is possible to group several native/*syngo* Modules based systems in an “Enterprise Group” (via configuration). A special Query SCP AET is available which spans the Query to the complete Enterprise Group. This AET is automatically created and has always the following syntax: “<Hostname>_E”, where <Hostname> is the AET of the corresponding native/*syngo* Modules based server, automatically shortened to 14 characters in order to keep the total AET length below 16 characters (DICOM Conformance).
A Query sent to this AET will return all matching attributes present in all native/*syngo* Modules based systems configured in the Enterprise Group. The returned Retrieve AET allows to retrieve the instances directly from the native/*syngo* Modules based system storing them.

4.2.1.4.3.4 Hierarchical and Relational Queries

Independent of the negotiation for relational queries, each C-FIND request is treated as if it was a relational query. The SCP allows any combination of keys at or above the provided Query/Retrieve level in the hierarchy. Keys below Query/Retrieve level return an error.

If for example a series level attribute is requested in a study level query, an error will be returned by **SPECT*syngo*.**

4.2.1.4.3.5 Return Codes

Table 4-51: Query C-FIND / C-CANCEL Response Status

Service Status	Further Meaning	Error Codes	Reason
Failure	Parsing or translation of the DICOM request failed. A response could not be generated. The response could not be sent to the SCU. The query of the database failed.	C001	Any error during Query in the Database
Success	Matching is complete - No final Identifier is supplied	0000	
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Further Items will be returned;
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Further Items will be returned; Some of Required Attributes are not present in the Database

The maximum number of matches returned can be configured. The status of the final response will always be SUCCESS whether the clipping occurred or not.

4.2.1.4.4 Activity “Move SCP”

4.2.1.4.4.1 Description and Sequencing of Activities

The Retrieve AE responds to retrieve requests of an SCU. The requests are used to retrieve the referenced images. The Retrieve AE supports the query model Study Root Only.

4.2.1.4.4.2 Accepted Presentation Contexts

Table 4-52: Acceptable Presentation Contexts for Retrieve and Activity "MOVE SCP"

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

4.2.1.4.4.3 SOP Specific Conformance Statement for Move SCP Classes

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

The Retrieve AE sends continuously C-MOVE responses to indicate progress about the de-archiving of images. The C-MOVE-RSP contains the Service parameters listed in Table 4-53.

Table 4-53: C-MOVE-RSP Service Parameters

Attribute	Meaning
Number of Remaining Sub-Operation	Is sent if the C-MOVE-RSP has the status Pending. Indicates the number of images which have not yet been sent.
Number of Completed Sub-Operation	Indicates the number of images which were sent.
Number of Failed Sub-Operation	Number of failing images within the Sending Association (C-STORE)
Number of Warning Sub-Operation	Always 0.

The final C-MOVE-RSP is sent after all images have been de-archived either successfully or unsuccessfully.

4.2.1.4.4.4 Return Codes

Table 4-54: Retrieve C-MOVE Response Status

Service Status	Further Meaning	Error Code	Reason
Success	success	0000	Image received correctly (success notification is done after receiving, before indexing and storing)
Failure	Out-of-resource	A700	Not resource left in the Short-Term Storage
Failure	Unable to Process	Cxxx	Error during instance reception
Failure	Data set does not match SOP Class	A9xx	The data set is not conforming to the SOP Class contained in the resource.

4.2.1.4.5 Activity "Create Work item"

4.2.1.4.5.1 Description and Sequencing of Activities

SPECT*syngo* responds to requests issued by an SCU with create new work item request (N-CREATE-RQ).

4.2.1.4.5.2 Accepted Presentation Contexts

Table 4-55: Acceptable Presentation Contexts Activity "Create Work item"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Unified Procedure Step - Push	1.2.840.10008.5.1.4.34.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.4.5.3 SOP specific Conformance for UPS Push SOP classes

The behavior of **SPECT*syngo*** when encountering status codes in an N-CREATE-RSP response is summarized in Table 4-56:

Table 4-56: UPS Push N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Failure	Work item creation request could not be processed.	Any nonnull Code	Work item is not created.
Success	Work item with empty transaction UID is created with "SCHEDULED" state.	0000	Work item is created.

4.2.1.4.6 Activity "Cancel Work item"

4.2.1.4.6.1 Description and Sequencing of Activities

SPECT*syngo* sends cancel work item (N-ACTION-RQ) to cancel a workflow.

4.2.1.4.6.2 Accepted Presentation Contexts

Table 4-57: Acceptable Presentation Contexts Activity "Cancel Work item"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Unified Procedure Step - Push	1.2.840.10008.5.1.4.34.6.1	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		

4.2.1.4.6.3 SOP specific Conformance for UPS Push SOP classes

The behavior of **SPECT*syngo*** when encountering status codes in an N-ACTION-RSP response is summarized in Table 4-58:

Table 4-58: UPS Push N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Cancel Workflow failed.	Any nonnull Code	Workflow is not cancelled.
Success	Cancel Workflow succeeded.	0000	Workflow cancelled.

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

SPECT*syngo* provides DICOM 3.0 TCP/IP network communication support as defined in Part 8 of [1]. The network communication is independent from the physical medium over which TCP/IP executes; it inherits this from the Windows OS system upon which it executes.

4.3.2 Additional Protocols

none

4.3.3 IPv4 and IPv6 Support

IPv4 and IPv6 are supported. Regarding IPv6 please note, that the complete networking infrastructure in the hospital (firewalls, DNS-Servers, …) must support IPv6 in order to get a functioning communication.

4.4 CONFIGURATION

4.4.1 AE Title/Presentation Address Mapping

AE Titles shall be unique within the hospital. A common way to achieve that is to use the hostname as part of the AE Titles. The string can be up to 16 characters and must not contain any extended characters. Only the Default Character set according to DICOM PS3.5 Annex E, excluding backslash character and control characters are allowed.

4.4.1.1 Secure DICOM Communication

The system supports configuring the DICOM communication to use secure channel (TLS) between **SPECT*syngo*** and configured remote nodes. As a security measure the certificate thumbprint of the remote nodes or from the certificate trust chain shall be added (pinned) to the between **SPECT*syngo*** system to authorize the incoming connection.

Detailed instructions how to set up secure DICOM communication are available in the Administrator Online Help.

Note: When the system is configured to use secure DICOM communication, it can communicate with remote nodes only securely, unsecure inbound connection is not allowed. The default DICOM port will change to 2762.

If the certificate of remote node contains Enhanced Key Usage (Extended Key Usage) field, then:

- If the remote node acts as DICOM SCP then it shall contain Server Authentication (1.3.6.1.5.5.7.3.1)

- If the remote node acts as a DICOM SCU then it shall contain Client Authentication (1.3.6.1.5.5.7.3.2)

Otherwise **SPECT*syngo*** will not accept the certificate.

4.4.1.2 Local AE Titles

SPECT*syngo* allows configuring of AE title, Port and Services. Default delivery is that all Services are using the same AE title and the same port number.

Parameter	Configurable	Default Value
Default AE title	Yes	hostname in uppercase characters; limited to 16 characters
Default Port	Yes	104

4.4.1.3 Remote AE Title/Presentation Address Mapping

4.4.1.3.1 Remote Association Initiators

All relevant remote applications that may setup DICOM associations towards **SPECT*syngo*** need to be configured in **SPECT*syngo***, before the association can be established. This behavior is configurable, but it is recommended not to change this behavior.

The mapping of external AE Titles to TCP/IP addresses and ports is configurable and initially set at the time of installation by Installation Personnel. Changes can later on also be performed by the local system administrator. The Application Entity Titles and supported transfer syntaxes need to be known for configuration.

To enable a fast and efficient configuration possibility Siemens Healthineers will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

4.4.1.3.2 Remote SCP's

For remote applications that shall be able to accept DICOM associations from **SPECT*syngo***, the following information needs to be available:

- Application Entity Title
- Host Name / IP address on which the remote application service runs
- Port number on which the remote application accepts association requests.

The remote system will be indicated in the UI of **SPECT*syngo*** with a logical name, that is also entered when configuring the node in the administration UI.

To enable a fast and efficient configuration possibility Siemens Healthineers will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

4.4.2 Parameters

The next table lists configuration parameters, which are true for all Application Entities.

Table 4-59: Parameter List

Parameter	Configurable	Default Value

Parameter	Configurable	Default Value
max PDU size	Yes	32768 Bytes
time-out for accepting/rejecting an association request	Yes	30 s
time-out for responding to an association open/close request	Yes	30 s
time-out for accepting a message over network	Yes	30 s
time-out for waiting for data between TCP/IP-packets	Yes	5 s
time-outs for waiting for a Service Request/Response message from the remote node (Storage SCP/SCU)	Yes	30 s
time-outs for waiting for a Service Request/Response message from the remote node (Query/Retrieve SCP/SCU)	Yes	30 s
time-out for waiting for a C-MOVE-RSP	No	1200 s
number of image collection before saving to database	Yes	20
max matches query limit	Yes	100
max number of parallel receiving associations	Yes	12

5 MEDIA INTERCHANGE

5.1 IMPLEMENTATION MODELS

5.1.1 Application Data Flow Diagram

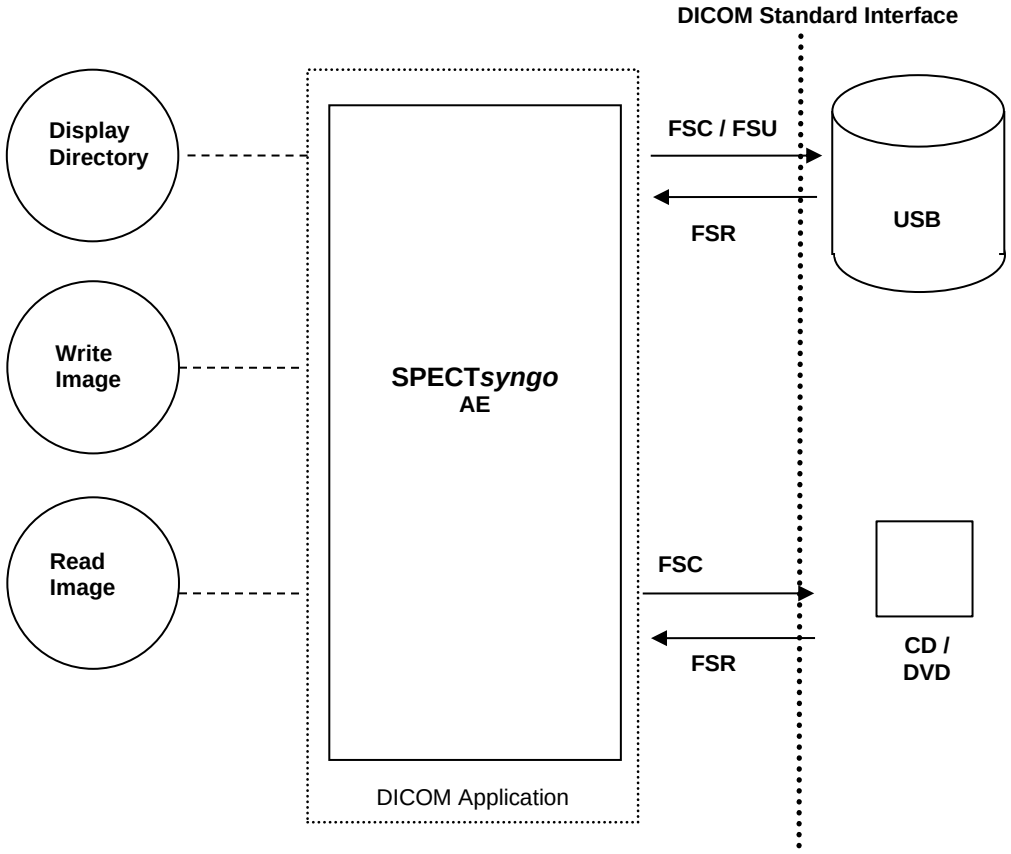


Figure 5.1-1: Media Interchange Application Data Flow Diagram

SPECT*syngo* provides the functionality to import or export DICOM Instances from and to the file system. During export, a DICOMDIR may also be generated (user selection). A complete ISO Image ready-to-burn can also be generated. All SOP Classes defined in Table 5-3 and Table 5-4 are supported for the import/export functionality.

5.1.2 Functional definitions of AEs

SPECT*syngo* application is capable of

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

- writing the File-sets DICOMDIR information into the file system and joining it to an ISO image.

5.1.3 Sequencing of Real-World Activities

Whenever data is written to an external media, **SPECT*syngo*** creates a DICOMDIR from the selected data and creates an ISO image of the selected data on the local hard disk. Depending on the selected data and options (selected media size, with or without compression) either General Purpose CD profile or DVD-J2K profile are used.

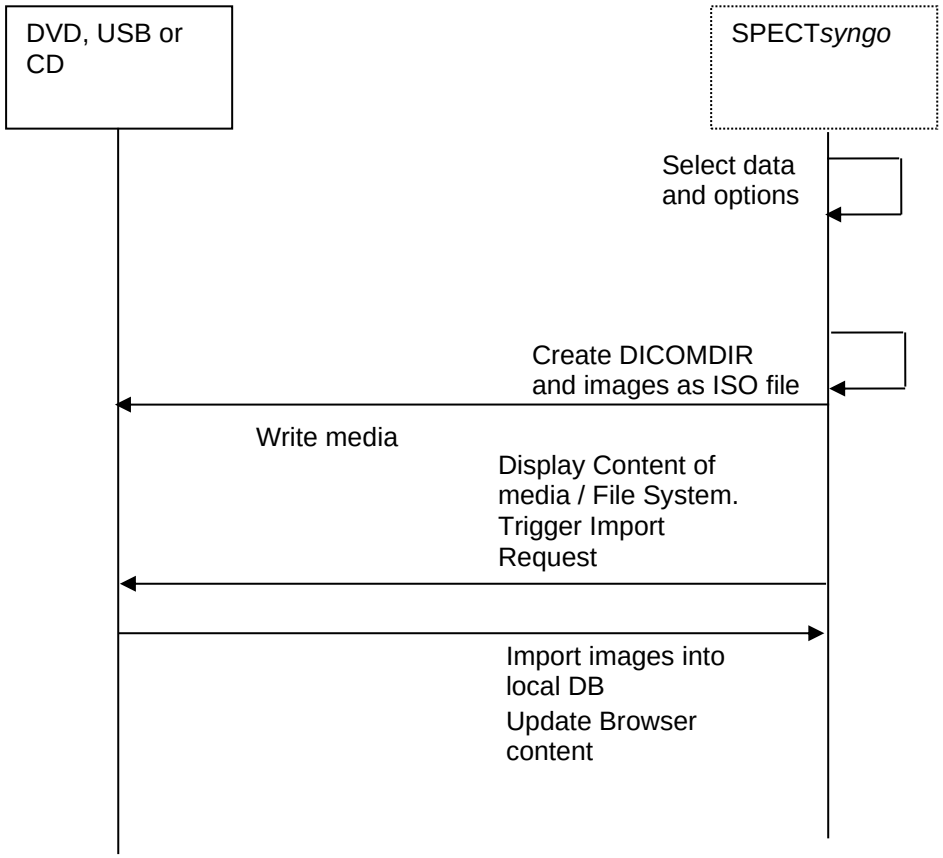


Figure 5.1-2: Sequence diagram – Media creation

5.1.4 File Meta Information for Implementation Class and Version

This section describes the values assigned to the File Meta Information attributes (see [1] PS3.10) that pertain to the Implementation Class and Version. The implementation Class UID and the Implementation Version name in the File Meta Header are the same as the values specified for networking.

Table 5-1: Implementation Class/Version Name - Media Interchange

File Meta Information Version	0001
Implementation Class UID	1.3.12.2.1107.5.1.7 (CT) or 1.3.12.2.1107.5.6.2 (NM or PET)
Implementation Version Name	“SIEMENS_S10VA30A” (CT) or “SPECTSYNGO_VA10A” (NM or PET)

5.2 AE SPECIFICATIONS

5.2.1 Media Storage AE – Specification

SPECT*syngo* provides conformance to the following Application Profiles as an FSC as well as an FSR. FSU is supported only on a non-optical storage device (e.g. USB stick).

In addition, augmented conformance is provided to store extra data attributes important for the full feature support of the *syngo*®-based products. Details are listed in Table 5-2:

Table 5-2: Media - Application Profiles and Real-World Activities

Application Profiles Supported	Real-World Activity	Role	Service Class Option
AUG-GEN-CD	Browse Directory Information Import into Application Export to local Archive Media	FSR , FSC , FSU	Interchange
AUG-GEN-DVD			
AUG- GEN-DVD-J2K			
AUG- GEN-USB-J2K			
STD-GEN-CD	Browse Directory Information Import into Application Export to local Archive Media	FSR , FSC, FSU	Interchange
STD-GEN-DVD-J2K			
STD-GEN-USB-J2K			
STD-GEN-DVD	Browse Directory Information Import into Application Export to local Archive Media	FSR , FSC	Interchange

5.2.1.1 File Meta Information

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity “Browse Directory Information”

SPECT*syngo* acts as FSR using the interchange option when requested to read the media directory.

SPECT*syngo* will read the DICOMDIR and insert those directory entries that are valid for the application profiles supported, into a local database. The database then is used for browsing media contents.

Note: The “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 database and are visible in the Browser.

5.2.1.2.1.1Media Storage Application Profiles

See Table 5-2 for the Application Profiles listed that invoke this Application Entity for the Browse Directory Information

5.2.1.2.2 Activity “Import into Application”

SPECT*syngo* application acts as FSR using the interchange option when requested to read SOP Instances from the medium into the application.

The SOP Instance selected from the media directory will be copied into the running Application. Only SOP Instances, that are valid for the application profile supported and supported by **SPECT*syngo*** (see Table 8-1), can be retrieved from media.

5.2.1.2.3 Real-World Activity “Export to local Archive Media”

SPECT*syngo* application acts as FSU (for media with existing DICOM file-set) or FSC (media not initialized) using the interchange option when requested to copy SOP Instances from the local storage to local Archive Medium. The activity as FSU is only possible as long as the local burning SW of **SPECT*syngo*** Client has not already processed the generated ISO file.

SPECT*syngo* application will receive a list of SOP Instances to be copied to the local archive medium. Depending on the profile selected (Standard: uncompressed, with DICOMDIR; Patient: compressed with DICOMDIR) the SOP Instances will be taken, and an ISO file is being generated that includes the DICOMDIR and the corresponding objects.

It is then up to **SPECT*syngo*** local configuration (if equipped with a local media burner) to burn the ISO file to the appropriate media.

5.2.1.2.4 Media Storage Application Profiles

See Table 5-2 for the Application Profiles listed that invoke this Application Entity for the local Archive Media Real-World Activity.

5.2.1.3 SOP Classes and Transfer Syntaxes

These Application Profiles are based on the Media Storage Service Class with the Interchange Option. In the table below (Table 5-3) the Transfer Syntax UID “RLE Lossless “only applies for decompression.

Table 5-3: SOP Classes and Transfer Syntaxes for STD-GEN-DVD-J2K and STD-GEN-USB-J2K

Information Object Definition	SOP Class UID	Transfer Syntax UID
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Breast Tomosythesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax UID
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
CT image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
DX Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
MG Image – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
MG Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax UID
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Multi-frame Grayscale Byte SC Image	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended)

Information Object Definition	SOP Class UID	Transfer Syntax UID
		1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Multi-frame Grayscale Word SC Image	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Multi-frame Single Bit SC Image	1.2.840.10008.5.1.4.1.1.7.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Multi-frame True Color SC Image	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
PET Image	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Raw Data	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)

Information Object Definition	SOP Class UID	Transfer Syntax UID
RT Dose	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Image	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Ion Plan	1.2.840.10008.5.1.4.1.1.481.8	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Plan	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Structure Set	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
RT Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90

Information Object Definition	SOP Class UID	Transfer Syntax UID
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Ultrasound Multi-frame (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended)

Information Object Definition	SOP Class UID	Transfer Syntax UID
		1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 1.2.840.10008.1.2.4.91 (Lossy Only)

Table 5-4: SOP Classes and Transfer Syntaxes for STD-GEN-CD and STD-GEN-DVD Profile

Information Object Definition	SOP Class UID	Transfer Syntax UID
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Breast Tomosythesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CT Image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
DX Image – For Processing	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
DX Image – For Presentation	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MG Image – For Processing	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MG Image – For Presentation	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced CT Image	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax UID
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Grayscale Byte SC Image	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Grayscale Word SC Image	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Single Bit SC Image	1.2.840.10008.5.1.4.1.1.7.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame True Color SC Image	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
PET Image	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Raw Data	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Dose	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Image	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Ion Plan	1.2.840.10008.5.1.4.1.1.481.8	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Plan	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Structure Set	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax UID
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Multi-frame (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

5.3 AUGMENTED AND PRIVATE APPLICATION PROFILES

5.3.1 Augmented Application Profiles

none

5.4 MEDIA CONFIGURATION

none

5.5 ATTRIBUTE CONFIDENTIALITY PROFILES

5.5.1 De-identification

SPECT*syngo* application can de-identify attributes using three different levels. During export to file system it is the user responsibility to select the appropriate anonymization level.
Note: reduced anonymization applies the following options: Retain UIDs, Patient Chars, Long. Full Dates

In the following table for attributes marked with:

- 'Yes' - data are anonymized (removed or replaced)
- 'No' - data are kept

Table 5-5: Application Level Confidentiality Profile attributes (standard tags)

DICOM Tag	Attribute Name	Full	Reduced	Service
(0001,1001)	Requested SOP Instance UID	Yes	No	No
(0000,1000)	Affected SOP Instance UID	Yes	No	No
(0002,0003)	Media Storage SOP Instance UID	Yes	No	No
(0004,1511)	Referenced SOP Instance UID in File	Yes	No	No
(0008,0014)	Instance Creator UID	Yes	No	No
(0008,0015)	Instance Coercion DateTime	Yes	No	No
(0008,0018)	SOP Instance UID	Yes	No	No
(0008,0020)	Study Date	Yes	No	No
(0008,0021)	Series Date	Yes	No	No
(0008,0022)	Acquisition Date	Yes	No	No
(0008,0023)	Content Date	Yes	No	No
(0008,0024)	Overlay Date	Yes	No	No
(0008,0025)	Curve Date	Yes	No	No
(0008,002A)	Acquisition DateTime	Yes	No	No
(0008,0030)	Study Time	Yes	No	No
(0008,0031)	Series Time	Yes	No	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0008,0032)	Acquisition Time	Yes	No	No
(0008,0033)	Content Time	Yes	No	No
(0008,0034)	Overlay Time	Yes	No	No
(0008,0035)	Curve Time	Yes	No	No
(0008,0050)	Accession Number	Yes	Yes	No
(0008,0058)	Failed SOP Instance UID List	Yes	No	No
(0008,0080)	Institution Name	Yes	Yes	No
(0008,0081)	Institution Address	Yes	Yes	No
(0008,0082)	Institution Code Sequence	Yes	Yes	No
(0008,0090)	Referring Physician's Name	Yes	Yes	Yes
(0008,0092)	Referring Physician's Address	Yes	Yes	Yes
(0008,0094)	Referring Physician's Telephone Numbers	Yes	Yes	Yes
(0008,0096)	Referring Physician's Identification Sequence	Yes	Yes	No
(0008,010D)	Context Group Extension Creator UID	Yes	No	No
(0008,0201)	Timezone Offset From UTC	Yes	No	No
(0008,1010)	Station Name	Yes	Yes	Yes
(0008,1030)	Study Description	Yes	Yes	No
(0008,103E)	Series Description	Yes	Yes	No
(0008,1040)	Institutional Department Name	Yes	Yes	No
(0008,1048)	Physician(s) of Record	Yes	Yes	Yes
(0008,1049)	Physician(s) of Record Identification Sequence	Yes	Yes	No
(0008,1050)	Performing Physicians' Name	Yes	Yes	Yes
(0008,1052)	Performing Physicians' Identification Sequence	Yes	Yes	No
(0008,1060)	Name of Physician(s) Reading Study	Yes	Yes	Yes
(0008,1062)	Physician Reading Study Identification Sequence	Yes	Yes	No
(0008,1070)	Operators' Name	Yes	Yes	Yes
(0008,1072)	Operators' Identification Sequence	Yes	Yes	No
(0008,1080)	Admitting Diagnoses Description	Yes	Yes	No
(0008,1084)	Admitting Diagnoses Code Sequence	Yes	Yes	No
(0008,1110)	Referenced Study Sequence	Yes	No	No
(0008,1111)	Referenced Performed Procedure Step Sequence	Yes	No	No
(0008,1120)	Referenced Patient Sequence	Yes	Yes	No
(0008,1140)	Referenced Image Sequence	Yes	No	No
(0008,1155)	Referenced SOP Instance UID	Yes	No	No
(0008,1195)	Transaction UID	Yes	No	No
(0008,2111)	Derivation Description	Yes	No	No
(0008,2112)	Source Image Sequence	Yes	No	No
(0008,3010)	Irradiation Event UID	Yes	No	No
(0008,4000)	Identifying Comments	Yes	Yes	No
(0008,9123)	Creator Version UID	Yes	No	No
(0010,0010)	Patient's Name	Yes	Yes	Yes
(0010,0020)	Patient ID	Yes	Yes	Yes
(0010,0021)	Issuer of Patient ID	Yes	Yes	No
(0010,0030)	Patient's Birth Date	Yes	Yes	Yes
(0010,0032)	Patient's Birth Time	Yes	Yes	No
(0010,0040)	Patient's Sex	Yes	No	No
(0010,0050)	Patient's Insurance Plan Code Sequence	Yes	Yes	Yes
(0010,0101)	Patient's Primary Language Code Sequence	Yes	Yes	Yes
(0010,0102)	Patient's Primary Language Modifier Code Sequence	Yes	Yes	Yes
(0010,1000)	Other Patient IDs	Yes	Yes	Yes
(0010,1001)	Other Patient Names	Yes	Yes	Yes
(0010,1002)	Other Patient IDs Sequence	Yes	Yes	Yes
(0010,1005)	Patient's Birth Name	Yes	Yes	Yes
(0010,1010)	Patient's Age	Yes	No	No
(0010,1020)	Patient's Size	Yes	No	No
(0010,1030)	Patient's Weight	Yes	No	No
(0010,1040)	Patient Address	Yes	Yes	Yes
(0010,1050)	Insurance Plan Identification	Yes	Yes	No
(0010,1060)	Patient's Mother's Birth Name	Yes	Yes	Yes
(0010,1080)	Military Rank	Yes	Yes	No
(0010,1081)	Branch of Service	Yes	Yes	No
(0010,1090)	Medical Record Locator	Yes	Yes	No
(0010,1100)	Referenced Patient Photo Sequence	Yes	Yes	No
(0010,2000)	Medical Alerts	Yes	Yes	No
(0010,2110)	Allergies	Yes	Yes	No
(0010,2150)	Country of Residence	Yes	Yes	No
(0010,2152)	Region of Residence	Yes	Yes	No
(0010,2154)	Patient's Telephone Number	Yes	Yes	Yes
(0010,2160)	Ethnic Group	Yes	No	No
(0010,2180)	Occupation	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0010,21A0)	Smoking Status	Yes	No	No
(0010,21B0)	Additional Patient's History	Yes	Yes	Yes
(0010,21C0)	Pregnancy Status	Yes	No	No
(0010,21D0)	Last Menstrual Date	Yes	No	No
(0010,21F0)	Patient's Religious Preference	Yes	Yes	No
(0010,2203)	Patient Sex Neutered	Yes	No	No
(0010,2297)	Responsible Person	Yes	Yes	No
(0010,2299)	Responsible Organization	Yes	Yes	No
(0010,4000)	Patient Comments	Yes	Yes	Yes
(0018,0010)	Contrast Bolus Agent	Yes	Yes	No
(0018,1000)	Device Serial Number	Yes	Yes	No
(0018,1002)	Device UID	Yes	No	No
(0018,1004)	Plate ID	Yes	Yes	No
(0018,1005)	Generator ID	Yes	Yes	No
(0018,1007)	Cassette ID	Yes	Yes	No
(0018,1008)	Gantry ID	Yes	Yes	No
(0018,1030)	Protocol Name	Yes	Yes	No
(0018,1400)	Acquisition Device Processing Description	Yes	Yes	No
(0018,2042)	Target UID	Yes	No	No
(0018,4000)	Acquisition Comments	Yes	Yes	No
(0018,700A)	Detector ID	Yes	Yes	No
(0018,9424)	Acquisition Protocol Description	Yes	Yes	No
(0018,9516)	Start Acquisition DateTime	Yes	No	No
(0018,9517)	End Acquisition DateTime	Yes	No	No
(0018,A003)	Contribution Description	Yes	Yes	No
(0020,000D)	Study Instance UID	Yes	No	No
(0020,000E)	Series Instance UID	Yes	No	No
(0020,0010)	Study ID	Yes	Yes	No
(0020,0052)	Frame of Reference UID	Yes	No	No
(0020,0200)	Synchronization Frame of Reference UID	Yes	No	No
(0020,3401)	Modifying Device ID	Yes	Yes	No
(0020,3404)	Modifying Device Manufacturer	Yes	Yes	No
(0020,3406)	Modified Image Description	Yes	Yes	No
(0020,4000)	Image Comments	Yes	Yes	No
(0020,9158)	Frame Comments	Yes	Yes	No
(0020,9161)	Concatenation UID	Yes	No	No
(0020,9164)	Dimension Organization UID	Yes	No	No
(0028,1199)	Palette Color Lookup Table UID	Yes	No	No
(0028,1214)	Large Palette Color Lookup Table UID	Yes	No	No
(0028,4000)	Image Presentation Comments	Yes	Yes	No
(0032,0012)	Study ID Issuer	Yes	Yes	No
(0032,1020)	Scheduled Study Location	Yes	Yes	No
(0032,1021)	Scheduled Study Location AE Title	Yes	Yes	No
(0032,1030)	Reason for Study	Yes	Yes	No
(0032,1032)	Requesting Physician	Yes	Yes	No
(0032,1033)	Requesting Service	Yes	Yes	No
(0032,1060)	Requested Procedure Description	Yes	Yes	No
(0032,1070)	Requested Contrast Agent	Yes	Yes	No
(0032,4000)	Study Comments	Yes	Yes	No
(0038,0004)	Referenced Patient Alias Sequence	Yes	Yes	No
(0038,0010)	Admission ID	Yes	Yes	No
(0038,0011)	Issuer of Admission ID	Yes	Yes	No
(0038,001E)	Scheduled Patient Institution Residence	Yes	Yes	No
(0038,0020)	Admitting Date	Yes	No	No
(0038,0021)	Admitting Time	Yes	No	No
(0038,0040)	Discharge Diagnosis Description	Yes	Yes	No
(0038,0050)	Special Needs	Yes	Yes	No
(0038,0060)	Service Episode ID	Yes	Yes	No
(0038,0061)	Issuer of Service Episode ID	Yes	Yes	No
(0038,0062)	Service Episode Description	Yes	Yes	No
(0038,0300)	Current Patient Location	Yes	Yes	No
(0038,0400)	Patient's Institution Residence	Yes	Yes	No
(0038,0500)	Patient State	Yes	Yes	No
(0038,4000)	Visit Comments	Yes	Yes	No
(0040,0001)	Scheduled Station AE Title	Yes	Yes	No
(0040,0002)	Scheduled Procedure Step Start Date	Yes	No	No
(0040,0003)	Scheduled Procedure Step Start Time	Yes	No	No
(0040,0004)	Scheduled Procedure Step End Date	Yes	No	No
(0040,0005)	Scheduled Procedure Step End Time	Yes	No	No
(0040,0006)	Scheduled Performing Physician Name	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0040,0007)	Scheduled Procedure Step Description	Yes	Yes	No
(0040,000B)	Scheduled Performing Physician Identification Sequence	Yes	Yes	No
(0040,0010)	Scheduled Station Name	Yes	Yes	No
(0040,0011)	Scheduled Procedure Step Location	Yes	Yes	No
(0040,0012)	Pre-Medication	Yes	Yes	No
(0040,0241)	Performed Station AE Title	Yes	Yes	No
(0040,0242)	Performed Station Name	Yes	Yes	No
(0040,0243)	Performed Location	Yes	Yes	No
(0040,0244)	Performed Procedure Step Start Date	Yes	No	No
(0040,0245)	Performed Procedure Step Start Time	Yes	No	No
(0040,0250)	Performed Procedure Step End Date	Yes	No	No
(0040,0251)	Performed Procedure Step End Time	Yes	No	No
(0040,0253)	Performed Procedure Step ID	Yes	Yes	No
(0040,0254)	Performed Procedure Step Description	Yes	Yes	No
(0040,0275)	Request Attributes Sequence	Yes	Yes	No
(0040,0280)	Comments on Performed Procedure Step	Yes	Yes	No
(0040,0555)	Acquisition Context Sequence	Yes	Yes	No
(0040,1001)	Requested Procedure ID	Yes	Yes	No
(0040,1004)	Patient Transport Arrangements	Yes	Yes	No
(0040,1005)	Requested Procedure Location	Yes	Yes	No
(0040,1010)	Names of Intended Recipient of Results	Yes	Yes	No
(0040,1011)	Intended Recipients of Results Identification Sequence	Yes	Yes	No
(0040,1101)	Person Identification Code Sequence	Yes	Yes	No
(0040,1102)	Person Address	Yes	Yes	No
(0040,1103)	Person Telephone Numbers	Yes	Yes	No
(0040,1400)	Requested Procedure Comments	Yes	Yes	No
(0040,2001)	Reason for Imaging Service Request	Yes	Yes	No
(0040,2008)	Order Entered By	Yes	Yes	No
(0040,2009)	Order Enterer Location	Yes	Yes	No
(0040,2010)	Order Callback Phone Number	Yes	Yes	No
(0040,2016)	Placer Order Number of Imaging Service Request	Yes	Yes	No
(0040,2017)	Filler Order Number of Imaging Service Request	Yes	Yes	No
(0040,2400)	Imaging Service Request Comments	Yes	Yes	No
(0040,3001)	Confidentiality Constraint on Patient Data Description	Yes	Yes	No
(0040,4005)	Scheduled Procedure Step Start DateTime	Yes	No	No
(0040,4010)	Scheduled Procedure Step Modification DateTime	Yes	No	No
(0040,4011)	Expected Completion Date Time	Yes	No	No
(0040,4023)	Referenced General Purpose Scheduled Procedure Step Transaction UID	Yes	No	No
(0040,4025)	Scheduled Station Name Code Sequence	Yes	Yes	No
(0040,4027)	Scheduled Station Geographic Location Code Sequence	Yes	Yes	No
(0040,4028)	Performed Station Name Code Sequence	Yes	Yes	No
(0040,4030)	Performed Station Geographic Location Code Sequence	Yes	Yes	No
(0040,4034)	Scheduled Human Performers Sequence	Yes	Yes	No
(0040,4035)	Actual Human Performers Sequence	Yes	Yes	No
(0040,4036)	Human Performers Organization	Yes	Yes	No
(0040,4037)	Human Performers Name	Yes	Yes	No
(0040,4050)	Performed Procedure Step Start DateTime	Yes	No	No
(0040,4051)	Performed Procedure Step End DateTime	Yes	No	No
(0040,4052)	Procedure Step Cancellation DateTime	Yes	No	No
(0040,A027)	Verifying Organization	Yes	Yes	No
(0040,A073)	Verifying Observer Sequence	Yes	Yes	No
(0040,A075)	Verifying Observer Name	Yes	Yes	No
(0040,A078)	Author Observer Sequence	Yes	Yes	No
(0040,A07A)	Participant Sequence	Yes	Yes	No
(0040,A07C)	Custodial Organization Sequence	Yes	Yes	No
(0040,A088)	Verifying Observer Identification Code Sequence	Yes	Yes	No
(0040,A123)	Person Name	Yes	Yes	No
(0040,A124)	UID	Yes	Yes	No
(0040,A171)	Observation UID	Yes	No	No
(0040,A172)	Referenced Observation UID (Trial)	Yes	No	No
(0040,A192)	Observation Date (Trial)	Yes	No	No
(0040,A193)	Observation Time (Trial)	Yes	No	No
(0040,A307)	Current Observer (Trial)	Yes	Yes	No
(0040,A352)	Verbal Source (Trial)	Yes	Yes	No
(0040,A353)	Address (Trial)	Yes	Yes	No
(0040,A354)	Telephone Number (Trial)	Yes	Yes	Yes
(0040,A358)	Verbal Source Identifier Code Sequence (Trial)	Yes	Yes	No
(0040,A402)	Observation Subject UID (Trial)	Yes	No	No
(0040,A730)	Content Sequence	Yes	Yes	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0040,DB0C)	Template Extension Organization UID	Yes	No	No
(0040,DB0D)	Template Extension Creator UID	Yes	No	No
(0070,0001)	Graphic Annotation Sequence	Yes	Yes	No
(0070,0084)	Content Creator's Name	Yes	Yes	No
(0070,0086)	Content Creator's Identification Code Sequence	Yes	Yes	No
(0070,031A)	Fiducial UID	Yes	No	No
(0088,0140)	Storage Media File-set UID	Yes	No	No
(0088,0200)	Icon Image Sequence	Yes	Yes	No
(0088,0904)	Topic Title	Yes	Yes	No
(0088,0906)	Topic Subject	Yes	Yes	No
(0088,0910)	Topic Author	Yes	Yes	No
(0088,0912)	Topic Keywords	Yes	Yes	No
(0400,0100)	Digital Signature UID	Yes	Yes	No
(0400,0402)	Referenced Digital Signature Sequence	Yes	Yes	No
(0400,0403)	Referenced SOP Instance MAC Sequence	Yes	Yes	No
(0400,0404)	MAC	Yes	Yes	No
(0400,0550)	Modified Attributes Sequence	Yes	Yes	No
(0400,0561)	Original Attributes Sequence	Yes	Yes	No
(2030,0020)	Text String	Yes	Yes	No
(3006,0024)	Referenced Frame of Reference UID	Yes	No	No
(3006,00C2)	Related Frame of Reference UID	Yes	No	No
(3008,0105)	Source Serial Number	Yes	No	No
(300A,0013)	Dose Reference UID	Yes	No	No
(300E,0008)	Reviewer Name	Yes	Yes	No
(4000,0010)	Arbitrary	Yes	Yes	No
(4000,4000)	Text Comments	Yes	Yes	No
(4008,0042)	Results ID Issuer	Yes	Yes	No
(4008,0102)	Interpretation Recorder	Yes	Yes	No
(4008,010A)	Interpretation Transcriber	Yes	Yes	No
(4008,010B)	Interpretation Text	Yes	Yes	No
(4008,010C)	Interpretation Author	Yes	Yes	No
(4008,0111)	Interpretation Approver Sequence	Yes	Yes	No
(4008,0114)	Physician Approving Interpretation	Yes	Yes	No
(4008,0115)	Interpretation Diagnosis Description	Yes	Yes	No
(4008,0118)	Results Distribution List Sequence	Yes	Yes	No
(4008,0119)	Distribution Name	Yes	Yes	No
(4008,011A)	Distribution Address	Yes	Yes	No
(4008,0202)	Interpretation ID Issuer	Yes	Yes	No
(4008,0300)	Impressions	Yes	Yes	No
(4008,4000)	Results Comments	Yes	Yes	No
(5000,xxxx)	Curve Data	Yes	Yes	No
(60xx,0100)	Overlay Bits Allocated	Yes	Yes	No
(60xx,0102)	Overlay Bit Position	Yes	Yes	No
(60xx,3000)	Overlay Data	Yes	Yes	No
(60xx,4000)	Overlay Comments	Yes	Yes	No
(FFFA,FFFA)	Digital Signatures Sequence	Yes	Yes	Yes
(FFFC,FFFC)	Data Set Trailing Padding	Yes	Yes	Yes

Handling private attributes during de-identification:

- Full de-identification: private attributes are not included in anonymized studies
- Reduced de-identification: private attributes are not included in anonymized studies except for the tags listed in tables below
- Service de-identification: all private attributes are included in anonymized studies

Table 6: Application Level Confidentiality Profile Attributes (private tags)

DICOM Tag	Attribute Name	Full	Reduced	Service
(0019,0005)	Multiphase UID	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 90)	Osteo offset	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 92)	Osteo Regression Line Slope	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 93)	Osteo Regression Line Intercept	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 96)	Osteo Phantom Number	Yes	No	No
(0019, SIEMENS CT VA0 COAD, 01)	Table height used during Osteo calibration	Yes	No	No
(0021, SIEMENS MR SDS 01, 19)	MR Phoenix Protocol	Yes	No	No
(0029, SIEMENS CT EXAM IMAGE,49)	Metal Artifact Reduction Type	Yes	No	No
(0029, SIEMENS CSA ENVELOPE, 10)	*syngo* Report Data	Yes	No	No
(0029, SIEMENS CSA ENVELOPE, 11)	*syngo* Report Presentation	Yes	No	No

DICOM Tag	Attribute Name	Full	Reduced	Service
(0029, SIEMENS CSA HEADER, 08)	Modality Image Header Type	Yes	No	No
(0029, SIEMENS CSA HEADER, 09)	Modality Image Header Version	Yes	No	No
(0029, SIEMENS CSA HEADER, 10)	Modality Image Header Info	Yes	No	No
(0029, SIEMENS CSA HEADER, 18)	Modality Series Header Type	Yes	No	No
(0029, SIEMENS CSA HEADER, 19)	Modality Series Header Version	Yes	No	No
(0029, SIEMENS CSA HEADER, 20)	Modality Series Header Info	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 40)	Application Header Sequence	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 41)	Application Header Type	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 42)	Application Header ID	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 43)	Application Header Version	Yes	No	No
(0029, SIEMENS MEDCOM HEADER, 44)	Application Header Info	Yes	No	No
(0029, SIEMENS CT APPL DATASET, 00)	Dual Energy Algorithm Parameters	Yes	No	No
(0029, SIEMENS CT APPL ALG PARAMS, 20)	Perfusion Result Set Id	Yes	No	No
(0043, GEMS_PARM_01, 1E)	GE Delta Start Time	Yes	No	No
(0049, SIEMENS CT SPP HEADER, 10)	Raw Data Container	Yes	No	No

Application-Level Confidentiality Profile Attributes for NM & PET SOP Classes (private tags)

DICOM Tag	Attribute Name	Full	Reduced	Service
(0067, SIEMENS MED MI, 02)	Scanner Console Generation	Yes	No	No
(0067, SIEMENS MED MI, 03)	Recon Parameters	Yes	No	No
(0067, SIEMENS MED MI, 05)	Device IVK	Yes	No	No
(0067, SIEMENS MED MI, 14)	Raw Data Description	Yes	No	No
(0067, SIEMENS MED MI, 16)	Raw Data Series Instance UIDs	Yes	No	No
(0067, SIEMENS MED MI, 17)	Raw Data Referenced Series Instance UIDs	Yes	No	No
(0019, SIEMENS MED NM, 93)	Phase start time	Yes	No	No
(0019, SIEMENS MED NM, A1)	Number of Phases	Yes	No	No
(0019, SIEMENS MED NM, A5)	Number of repeats / phases	Yes	No	No
(0019, SIEMENS MED NM, A6)	Cycles Per Repeat	Yes	No	No
(0019, SIEMENS MED NM, A7)	Repeat Start time	Yes	No	No
(0019, SIEMENS MED NM, A8)	Repeat Stop time	Yes	No	No
(0019, SIEMENS MED NM, A9)	Effective Repeat Time	Yes	No	No
(0019, SIEMENS MED NM, AA)	Acquired Cycles Per Repeat	Yes	No	No
(0033, SIEMENS MED NM, 29)	Crystal Thickness	Yes	No	No
(0033, SIEMENS MED NM, 30)	Preset Name Used for Acquisition	Yes	No	No
(0033, SIEMENS MED NM, 38)	Pixel Scale factor	Yes	No	No
(0035, SIEMENS MED NM, 00)	Specialized TOMO Type	Yes	No	No
(0035, SIEMENS MED NM, 04)	Repeat ID	Yes	No	No
(0035, SIEMENS MED NM, 05)	Phase ID	Yes	No	No
(0041, SIEMENS MED NM, 01)	Whole Body Tomo Position Index	Yes	No	No
(0041, SIEMENS MED NM, 02)	Whole Body Tomo Number of Positions	Yes	No	No
(0057, SIEMENS MED NM, 03)	NM Pixel Units	Yes	No	No
(0061, SIEMENS MED NM, 62)	Recon Output Type	Yes	No	No
(0061, SIEMENS MED NM, 70)	NM Reconstruction Algorithm	Yes	No	No
(0061, SIEMENS MED NM, 8D)	QSPECT Flag	Yes	No	No
(0065, SIEMENS MED NM, 01)	Original Detector Index	Yes	No	No
(0065, SIEMENS MED NM, 02)	Siemens Planar Data Organization	Yes	No	No
(7FE3, SIEMENS MED NM, 14)	Minimum pixel value in frame	Yes	No	No
(7FE3, SIEMENS MED NM, 15)	Maximum pixel value in frame	Yes	No	No
(7FE3, SIEMENS MED NM, 29)	Number of R-waves in a frame	Yes	No	No
(0071, SIEMENS MED PT, 22)	Decay Correction DateTime	Yes	No	No

6 SUPPORT OF CHARACTER SETS

6.1 CHARACTER SETS

SPECT*syngo* DICOM application supports the following character sets as defined in the three tables below.

Table 6-1: Single-Byte Character Sets without Code Extension

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
Thai	ISO_IR166	ISO_IR166	TIS 620-253 (1990)
		ISO_IR 6	ISO 646

Table 6-2: Single-Byte Characters Sets with Code Extension

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

Multi-Byte Character Sets without Code Extension

Table 6-3: Multi-Byte Character Sets without Code Extension

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 6-4: Multi-Byte Character Sets with Code Extension

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Japanese	ISO 2022 IR 159	ISO 2022	ESC 02/04 02/08 04/04	ISO-IR 159	JIS X 0212: Supplementary Kanji set
Korean	ISO 2022 IR 149	ISO 2022	ESC 02/04 02/09 04/03	ISO-IR 149	KS X 1001: Hangul and Hanja

All SCs listed above are supported for incoming data.

When there is a mismatch between the given character set in attribute (0008,0005) and the characters in an IOD received by the system, then the following measures are taken to make the characters DICOM conform:

- Convert each illegal character to a '?'.

There are now three categories of character sets which have to be differentiated because of their different encoding formats:

- Conventional ISO character sets: ISO_IR 6, ISO 2022 IR 6, ISO_IR 100, etc. → encoded in ISO 2022
- ISO_IR 192 → encoded in UTF-8
- GB18030 → encoded in GB18030

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 be corrupted.

SPECT*syngo* supports Kanji characters in the byte zones after 74 (79, 7A, 7B and 7C).

7 SECURITY

7.1 SECURITY PROFILES

7.1.1 Time Synchronization Profiles

Time Synchronization Profiles: **SPECT*syngo*** acts as an NTP Client in the Maintain Time Transaction.

7.1.2 Basic TLS Secure Transport Connection Profile

Basic TLS Secure Transport Connection Profile supports TLS version 1.0 protocol with the following features:

Supported TLS Feature	Mechanism
Entity Authentication	RSA based certificates
Exchange of Master Secrets	RSA
Data Integrity	SHA
Privacy	Triple DES EDE, CBC

When the system is configured to use secure DICOM communication, it can communicate with remote nodes only securely, unsecure inbound connection is not allowed. The default DICOM port will be changed to 2762 (can be reconfigured).

7.2 ASSOCIATION LEVEL SECURITY

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

7.3 APPLICATION LEVEL SECURITY

- User must login with own password
- For configuration and Maintenance, Service Technician must login with a separate password.

8 ANNEXES

8.1 SOP CLASSES SUPPORTED

Table 8-1 SOP CLASSES for Storage

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Supported Storage SOP Classes				
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes	No
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	No
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes	No
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes	No
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes	No
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes	Yes
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	Yes	No
Digital Mammography Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	Yes
Digital Mammography Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	Yes
Digital X-Ray Image Storage- for Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes
Digital X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	No
Enhanced Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes	Yes
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes	No
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes	No
Grayscale Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	Yes

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes	No
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes	No
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	Yes	No
Raw DataStorage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes	No
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes	No
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	Yes	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes	No
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes	Yes
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	Yes
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	No
X-Ray Radio-Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	Yes
Supported private Storage SOP Classes				
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	No	Yes	No

Table 8-2: Supported Non-Storage SOP Classes

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Supported Verification SOP Classes				
Verification	1.2.840.10008.1.1	Yes	Yes	No
Supported Storage Commitment SOP Classes				
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes	No
Storage Commitment Push Model well known SOP Instance	1.2.840.10008.1.20.1.1	Yes	Yes	No
Supported Query/Retrieve-FIND SOP Classes				
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes	No
Supported Query/Retrieve-MOVE SOP Classes				
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes	No
Modality Worklist Information SOP Class				
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No	No
Grayscale Print Management META SOP classes				
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	No
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No	No
Color Print Management META SOP classes				
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	No
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No	No

8.2 IOD CONTENTS

8.2.1 Created SOP Instance(s)

This section specifies each IOD created by **SPECT*syngo*** acquisition workplace. IOD created by other application(s) deployed on the system may not conform to specifications outlined in the section.

This section specifies each IOD created (excluding private IOD's). It specifies the attribute name, tag, VR, and value. The value specifies the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values are specified.

Whether the value is always present or not is specified. Abbreviations used in the IOD tables for the column "Presence of Module" are

ALWAYS	The module is always present
CONDITIONAL	The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
VNAP	The attribute is always present, and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	The attribute is present under specified condition – if present then it will always have a value
ANAPCV	The attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	The attribute is present under specified condition – if present then it will not have any value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

The applications from **SPECT*syngo*** create objects of the following SOP Classes during Transferring, Post-Processing and Reading:

Table 8-3: List of created SOP Classes

SOP Class Name	SOP Class UID	Internally used (neither SCU nor SCP is applicable)
Basic Text Structured Report	1.2.840.10008.5.1.4.1.1.88.11	No
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	No
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No

SOP Class Name	SOP Class UID	Internally used (neither SCU nor SCP is applicable)
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	No
Siemens AX frame sets	1.3.12.2.1107.5.99.3.11	Yes
Siemens CT MR volume files	1.3.12.2.1107.5.99.3.10	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	No
X-Ray Radiation Dose Report Storage	1.2.840.10008.5.1.4.1.1.88.67	No

See chapter 4.2.1.3.1.4 for further details about encapsulation.

8.2.2 CT Image Storage SOP Class

Table 8-4: IOD of created CT Image Storage SOP Class Instances

IE	Module	Reference	Usage
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
	Patient Study	Table 8-7	CONDITIONAL
Series	General Series	Table 8-8	ALWAYS
Frame of Reference	Frame of Reference	Table 8-9	ALWAYS
Equipment	General Equipment	Table 8-10	ALWAYS
Image	General Image	Table 8-11	ALWAYS
	Image Plane	Table 8-13	ALWAYS
	Image Pixel	Table 8-12	ALWAYS
	Contrast/Bolus	Table 8-14	CONDITIONAL
	CT Image	Table 8-15	ALWAYS
	Overlay Plane	Table 8-16	CONDITIONAL
	VOI LUT	Table 8-17	ALWAYS
	SOP Common	Table 8-18	ALWAYS

8.2.2.1 Patient Module Attributes

Table 8-5: Patient Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN		ALWAYS	MWL, USER
Patient ID	(0010,0020)	LO		ALWAYS	MWL, USER
Patient's Birth Date	(0010,0030)	DA		ALWAYS	MWL, USER
Patient's Sex	(0010,0040)	CS	M, F, O	ALWAYS	MWL, USER
Patient's Birth Time	(0010,0032)	TM		VNAP	MWL
Other Patient IDs	(0010,1000)	LO		VNAP	MWL
Other Patient Names	(0010,1001)	PN		VNAP	MWL
Ethnic Group	(0010,2160)	SH		VNAP	MWL

8.2.2.2 General Study Module Attributes

Table 8-6: General Study Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI		ALWAYS	MWL
Study Date	(0008,0020)	DA		ALWAYS	AUTO
Study Time	(0008,0030)	TM		ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN		VNAP	MWL, USER
Study ID	(0020,0010)	SH		VNAP	MWL, USER
Accession Number	(0008,0050)	SH		VNAP	MWL, USER
Study Description	(0008,1030)	LO		VNAP	MWL, USER
Procedure Code Sequence	(0008,1032)	SQ		ANAP	AUTO
>Code Value	(0008,0100)	SH		ANAP	AUTO
>Code Meaning	(0008,0104)	LO		ANAP	AUTO
>Coding Scheme Designator	(0008,0102)	SH	99CT_VIA for d.via task flows	ANAP	AUTO

8.2.2.3 Patient Study Module Attributes

Table 8-7: Patient Study Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	SOURCE
Admitting Diagnoses Description	(0008,1080)	LO		ANAP	MWL, USER
Patient's Age	(0010,1010)	AS		ANAP	MWL, USER

DICOM Attribute Name	Tag	VR	Value	Presence of Value	SOURCE
Patient's Size	(0010,1020)	DS		ANAP	MWL
Patient's Weight	(0010,1030)	DS		ANAP	MWL, USER
Occupation	(0010,2180)	SH		ANAP	MWL
Admission ID	(0038,0010)	LO		ANAP	MWL

8.2.2.4 General Series Module Attributes

Table 8-8: General Series Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	CT	ALWAYS	FIXED
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Laterality	(0020,0060)	CS	only available if the body part examined is a paired structure	EMPTY	AUTO
Series Date	(0008,0021)	DA		ALWAYS	AUTO
Series Time	(0008,0031)	TM		ALWAYS	AUTO
Protocol Name	(0018,1030)	LO		ANAP	USER
Series Description	(0008,103E)	LO		ANAP	USER
Body Part Examined	(0018,0015)	CS		ALWAYS	AUTO
Patient Position	(0018,5100)	CS		ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ		ALWAYS	AUTO
>Requested Procedure ID	(0040,1001)	SH		ALWAYS	MWL
>Requested Procedure Description	(0040,0009)	SH		ALWAYS	MWL
>Accession Number	(0008,0050)	SH		ALWAYS	MWL
>Study Instance UID	(0020,000D)	UI		ALWAYS	MWL
Performed Procedure Step ID	(0040,0253)	SH		ALWAYS	MWL
Performed Procedure Step Start Date	(0040,0244)	DA		ALWAYS	MWL
Performed Procedure Step Start Time	(0040,0245)	TM		ALWAYS	MWL
Performed Procedure Step Description	(0040,0254)	LO		ALWAYS	MWL
Performed Protocol Code Sequence	(0040,0260)	SQ		ALWAYS	AUTO
>Code Value	(0008,0100)	SH		ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO		ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	99CT_VIA for d.via data roles	ALWAYS	AUTO

8.2.2.5 Frame of Reference Module Attributes

Table 8-9: Frame of Reference Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	UI		ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO		EMPTY	AUTO

8.2.2.6 General Equipment Module Attributes

Table 8-10: General Equipment Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	SIEMENS Healthineers	ALWAYS	FIXED
Institution Name	(0008,0080)	LO		ALWAYS	CONFIG
Institution Address	(0008,0081)	ST		ALWAYS	CONFIG, USER
Station Name	(0008,1010)	SH		ALWAYS	CONFIG
Institutional Department Name	(0008,1040)	LO		ALWAYS	CONFIG
Manufacturer's Model Name	(0008,1090)	LO	Symbia Pro.specta Q3 Symbia Pro.specta X3 Symbia Pro.specta X7	ALWAYS	FIXED
Device Serial Number	(0018,1000)	LO		ALWAYS	FIXED
Software Versions	(0018,1020)	LO	SPECT*syngo* VA10A	ALWAYS	FIXED
Gantry ID	(0018,1008)	LO		ALWAYS	FIXED
Spatial Resolution	(0018,1050)	DS		ALWAYS	FIXED
Date of Last Calibration	(0018,1200)	DA		ALWAYS	AUTO
Time of Last Calibration	(0018,1201)	TM		ALWAYS	AUTO
Pixel Padding Value	(0028,0120)	US		EMPTY	AUTO
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM EQUIPMENT	ALWAYS	FIXED

8.2.2.7 General Image Module Attributes

Table 8-11: General Image Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS		ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA		ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM		ALWAYS	AUTO
Acquisition DateTime	(0008,002A)	DT		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Images in Acquisition	(0020,1002)	IS		ALWAYS	AUTO
Image Comments	(0020,4000)	LT	e.g. ”Automatic Result, ME_70keV,Score9999,HD FoV,Artificial120” “60bpm, 75%, 400ms, TS” “Filter Sn”	ALWAYS	USER
Burned In Annotation	(0028,0301)	CS	NO	ALWAYS	FIXED
Lossy Image Compression	(0028,2110)	CS	00	ALWAYS	AUTO
Irradiation Event UID	(0008,3010)	UI		ALWAYS	COPY
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM IMAGE	ALWAYS	FIXED

8.2.2.8 Image Pixel Module Attributes

Table 8-12: Image Pixel Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Rows	(0028,0010)	US		ALWAYS	AUTO
Columns	(0028,0011)	US		ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0000H	ALWAYS	FIXED
Pixel Data	(7FE0,0010)	OB		ALWAYS	AUTO
Smallest Image Pixel Value	(0028,0106)	US		ALWAYS	AUTO
Largest Image Pixel Value	(0028,0107)	US		ALWAYS	AUTO

8.2.2.9 Image Plane Module Attributes

Table 8-13: Image Plane Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Spacing	(0028,0030)	DS		ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)	DS		ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS		ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS		ALWAYS	AUTO
Slice Location	(0020,1041)	DS		ALWAYS	AUTO
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM IMAGE	ALWAYS	FIXED

8.2.2.10 Contrast/Bolus Module Attributes

Table 8-14: Contrast Bolus Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO	The type of used Contrast medium, or UNDEFINED if no Contrast medium is specified	ALWAYS	AUTO
Contrast/Bolus Volume	(0018,1041)	DS		ALWAYS	AUTO
Contrast/Bolus Start Time	(0018,1042)	TM		ALWAYS	AUTO

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Stop Time	(0018,1043)	TM		ALWAYS	AUTO
Contrast/Bolus Total Dose	(0018,1044)	DS		ALWAYS	AUTO
Contrast Flow Rate	(0018,1046)	DS		ALWAYS	AUTO
Contrast Flow Duration	(0018,1047)	DS		ALWAYS	AUTO
Contrast/Bolus Ingredient	(0018,1048)	CS	IODINE	ALWAYS	FIXED
Contrast/Bolus Ingredient Concentration	(0018,1049)	DS		ALWAYS	AUTO

8.2.2.11 CT Image Module Attributes

Table 8-15: CT Image Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	See Image Type Values	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	1	ALWAYS	FIXED
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	FIXED
Bits Allocated	(0028,0100)	US	16	ALWAYS	FIXED
Bits Stored	(0028,0101)	US	16	ALWAYS	FIXED
High Bit	(0028,0102)	US	15	ALWAYS	FIXED
Rescale Intercept	(0028,1052)	DS		ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS		ALWAYS	AUTO
Rescale Type	(0028,1054)	LO		ALWAYS	AUTO
KVP	(0018,0060)	DS		ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS		ALWAYS	AUTO
Scan Options	(0018,0022)	CS	contains cardiac or respiratory information	ANAP	AUTO
Data Collection Diameter	(0018,0090)	DS		ALWAYS	AUTO
Reconstruction Diameter	(0018,1100)	DS		ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	DS		ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS		ALWAYS	AUTO
Gantry/Detector Tilt	(0018,1120)	DS		ALWAYS	AUTO
Table Height	(0018,1130)	DS		ALWAYS	AUTO
Rotation Direction	(0018,1140)	CS		ANAP	AUTO
Exposure Time	(0018,1150)	IS		ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS		ALWAYS	AUTO
Exposure	(0018,1152)	IS	Product of X-Ray Tube Current and Exposure Time. Unit is [mAs].	ALWAYS	AUTO
Filter Type	(0018,1160)	SH	SN_DE, SN_DESF, AU_DESF, AUSN_DESF, SN_LD, WEDGE_2	ALWAYS	AUTO
Generator Power	(0018,1170)	IS		ALWAYS	AUTO
Focal Spot(s)	(0018,1190)	DS		ALWAYS	AUTO
Convolution Kernel	(0018,1210)	SH		ALWAYS	AUTO
Single Collimation Width	(0018,9306)	FD		ALWAYS	AUTO

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Total Collimation Width	(0018,9307)	FD		ALWAYS	AUTO
Table Speed	(0018,9309)	FD		ANAP	AUTO
Table Feed per Rotation	(0018,9310)	FD		ANAP	AUTO
Spiral Pitch Factor	(0018,9311)	FD		ANAP	AUTO
Exposure Modulation Type	(0018,9323)	CS	OFF_OFF, OFF_OFF_MINDO, OFF_OFF_PULS, OFF_MAC, OFF_MAC_MINDO, OFF_MAC_PULS, OFF_ZEC, OFF_ZEC_MINDO, OFF_ZEC_PULS, SHAPE_OFF, SHAPE_OFF_MINDO, SHAPE_OFF_PULS, SHAPE_MAC, SHAPE_MAC_MINDO, SHAPE_MAC_PULS, SHAPE_ZEC, SHAPE_ZEC_MINDO, SHAPE_ZEC_PULS, SINOD_OFF, SINOD_OFF_MINDO, SINOD_OFF_PULS, SINOD_MAC, SINOD_MAC_MINDO, SINOD_MAC_PULS, SINOD_ZEC, SINOD_ZEC_MINDO, SINOD_ZEC_PULS, ELLIP_OFF, ELLIP_OFF_MINDO, ELLIP_OFF_PULS, ELLIP_MAC, ELLIP_MAC_MINDO, ELLIP_MAC_PULS, ELLIP_ZEC, ELLIP_ZEC_MINDO, ELLIP_ZEC_PULS, XCARE_OFF, XCARE_OFF_MINDO, XCARE_OFF_PULS, XCARE_MAC, XCARE_MAC_MINDO, XCARE_MAC_PULS, XCARE_ZEC, XCARE_ZEC_MINDO, XCARE_ZEC_PULS	ALWAYS	AUTO
CTDIvol	(0018,9345)	FD		ANAP	AUTO
Calcium Scoring Mass Factor Device Attribute	(0018,9352)	FL		ANAP	FIXED
Energy Weighting Factor	(0018,9353)	FL		ANAP	AUTO
CT Additional X-Ray Source Sequence	(0018,9360)	SQ		ANAP	AUTO
>Focal Spot(s)	(0018,1190)	DS		ANAP	AUTO
>Energy Weighting Factor	(0018,9353)	FL		ANAP	AUTO
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM IMAGE	ALWAYS	FIXED

8.2.2.11.1 Image Type Values

- Value 1 identifies the Pixel Data Characteristics; Enumerated Values for the Pixel Data Characteristics are:
  - ORIGINAL: Identifies an Original Image
  - DERIVED: Identifies a Derived Image
- Value 2 identifies the Patient Examination Characteristics; Enumerated Values for the Patient Examination Characteristics are:
  - PRIMARY: Identifies a Primary Image
  - SECONDARY: Identifies a Secondary Image
- Value 3 identifies any Image IOD-specific specialization. The following terms are defined in addition to the DICOM standard definitions:
  - AXIAL: identifies a CT cross-sectional image
  - LOCALIZER: identifies a CT Localizer Image
  - OTHER: Converted non-Axial and non-Localizer CT images
    Note: AXIAL in this context means any cross-sectional image, and includes transverse, coronal, sagittal and oblique images.
- Value 4 is implementation specific:
  - CT_SOM5 RTD: identifies a Real Time Display Image
  - CT_SOM5 MIP: identifies a Maximum Intensity Projection image created by a CT application of a non-fix-axial Spiral Range
  - CT_SOM5 MPR: identifies Multi Planar Reconstruction image created by a CT application of non-fix-axial Spiral range
  - CT_SOM5 MON: identifies an image of a Monitoring or Premonitoring range
  - CT_SOM5 SEQ: identifies an image of a Sequence range
  - CT_SOM10 DEMIX: identifies mixed reconstructions out of two energy spectra
  - CT_SOM10 DEMEP: identifies Monoenergetic reconstructions out of two energy spectra
  - CT_SOM10 DEVNC: identifies VNC or Iodine reconstructions out of two energy spectra
  - CT_SOM5 SPI: identifies an image of a fix-axial Spiral range
  - 4D SPI: identifies an image of a ZigZag range
  - CT_SOM5 TOP: identifies an image of a Topogram range
  - CT_SOM5 ROT: identifies an image of a ROT range
  - CT_SOM5 STA: identifies an image of a Static range
  - CSA BLACK IMAGE: identifies an SC Image with black pixels; only graphics information is of interest
  - CT_SOM PROT: identifies an SC Image with black pixels; only graphics information is of interest
- Value 5 is specific to **SPECT*syngo*** *or* ***Somaris 10*** products
  - STD: Standard image of corresponding Type as given in value 4.
  - OTOM: Osteo Scanned Tomogram
  - OTOP: Osteo Scanned Topogram
  - PMON: Premonitoring Scan
  - TESTBOLUS: Testbolus Scan
  - RECON REFERENCE: identifies an image containing overlay graphics indicating the location of recon slices.
  - RANGE REFERENCE: identifies an image containing overlay graphics indicating the area of a scan range.
  - ME<energy>KEV: Mono-Energetic Image
  - VNC: Virtual Non-Contrast Image
  - IOD: Iodine Enhancement Image
  - IMD: Iodine Concentration Image
  - MIX: mixed reconstructions out of two energy spectra
  - L: image out of low energy
  - H: image out of high energy
- Value 6 is specific to dual energy acquisitions. The following terms are defined:
  - DE_TB: split filter dual energy range.
  - DE_2SPI: dual spiral dual energy range.
- Value 7 is specific to reconstruction of dual energy acquisitions. The following terms are defined:

- MPR: Multi Planar Reconstruction image for mixed/Mono-energetic/VNC/Iodine reconstruction
- MIP THIN: Maximum Intensity Projection image for mixed/Mono-energetic/VNC/Iodine reconstruction

8.2.2.12 Overlay Plane Module Attributes

Table 8-16: Overlay Plane Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Overlay Rows	(60xx,0010)	US		ALWAYS	AUTO
Overlay Columns	(60xx,0011)	US		ALWAYS	AUTO
Overlay Type	(60xx,0040)	CS		ALWAYS	AUTO
Overlay Origin	(60xx,0050)	SS		ALWAYS	AUTO
Overlay Bits Allocated	(60xx,0100)	US	1	ALWAYS	FIXED
Overlay Bit Position	(60xx,0102)	US	0	ALWAYS	FIXED
Overlay Data	(60xx,3000)	OB		ALWAYS	AUTO
Number of Frames in Overlay	(60xx,0015)	IS	1	ALWAYS	FIXED
Overlay Description	(60xx,0022)	LO		ALWAYS	EMPTY
Overlay Subtype	(60xx,0045)	LO	AUTOMATED	ALWAYS	AUTO
Overlay Label	(60xx,1500)	LO		ALWAYS	EMPTY

8.2.2.13 VOI LUT Module Attributes

Table 8-17: VOI LUT Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS		ALWAYS	AUTO
Window Width	(0028,1051)	DS		ALWAYS	AUTO
Window Center & Width Explanation	(0028,1055)	LO		ALWAYS	AUTO

8.2.2.14 SOP Common Module Attributes

Table 8-18: SOP Common Module

DICOM Attribute Name	Tag	Type	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.2	ALWAYS	FIXED
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ALWAYS	AUTO
Timezone Offset From UTC	(0008,0201)	SH		ALWAYS	AUTO

8.2.3 Raw Data Storage SOP Class

Table 8-19: IOD of created Raw Data Storage SOP Class Instances

IE	Module	Reference	Usage
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
	Patient Study	Table 8-7	CONDITIONAL

IE	Module	Reference	Usage
Series	General Series	Table 8-20	ALWAYS
Frame of Reference	Frame of Reference	Table 8-9	ALWAYS
Equipment	General Equipment	Table 8-10	ALWAYS
Raw Data	Acquisition Context	Table 8-21	ALWAYS
	Raw Data	Table 8-22	ALWAYS
	SOP Common	Table 8-24	ALWAYS
	Scan Range Data	Table 8-23	ALWAYS

8.2.3.1 General Series Module Attributes

Table 8-20: General Series Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	CT	ALWAYS	FIXED
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Series Date	(0008,0021)	DA		ALWAYS	AUTO
Series Time	(0008,0031)	TM		ALWAYS	AUTO
Protocol Name	(0018,1030)	LO		ANAP	USER

8.2.3.2 Acquisition Context Module Attributes

Table 8-21: Acquisition Context Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)	SQ		EMPTY	AUTO

8.2.3.3 Raw Data Module Attributes

Table 8-22: Raw Data Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		VNAP	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Creator-Version UID	(0008,9123)	UI		ALWAYS	AUTO
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM RAWDATA	ALWAYS	FIXED

8.2.3.4 Scan Range Data Module Attributes

Table 8-23: Scan Range Data Module

DICOM Attribute Name	Tag	VR	Attribute Description	Presence of Value	Source
Private Creator	(0029,00xx)	LO	SIEMENS CT EXAM SCANRANGEDATA	ALWAYS	AUTO

8.2.3.5 SOP Common Module Attributes

Table 8-24: SOP Common Module

DICOM Attribute Name	Tag	Type	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.66	ALWAYS	FIXED
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ALWAYS	AUTO
Timezone Offset From UTC	(0008,0201)	SH		ALWAYS	AUTO

8.2.4 Secondary Capture Storage SOP Class

Table 8-25: IOD of created Secondary Capture Storage SOP Class Instances

IE	Module	Reference	Usage
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
	Patient Study	Table 8-7	CONDITIONAL
Series	General Series	Table 8-26	ALWAYS
Equipment	General Equipment	Table 8-10	CONDITIONAL
	SC Equipment	Table 8-29	ALWAYS
Image	General Image	Table 8-27	ALWAYS
	Image Pixel	Table 8-28	ALWAYS
	SC Image	Table 8-30	ALWAYS
	Overlay Plane	Table 8-31	CONDITIONAL
	SOP Common	Table 8-32	ALWAYS

8.2.4.1 General Series Module Attributes

Table 8-26: General Series Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	CT	ALWAYS	FIXED
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Series Date	(0008,0021)	DA		ALWAYS	AUTO
Series Time	(0008,0031)	TM		ALWAYS	AUTO
Protocol Name	(0018,1030)	LO		ANAP	USER
Series Description	(0008,103E)	LO		ANAP	USER
Request Attributes Sequence	(0040,0275)	SQ		ALWAYS	AUTO
>Requested Procedure ID	(0040,1001)	SH		ALWAYS	MWL
>Accession Number	(0008,0050)	SH		ALWAYS	MWL
>Study Instance UID	(0020,000D)	UI		ALWAYS	AUTO
>Scheduled Procedure Step ID	(0040,0009)	SH		ALWAYS	MWL
Performed Procedure Step ID	(0040,0253)	SH		ALWAYS	MWL

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Performed Procedure Step Start Date	(0040,0244)	DA		ALWAYS	MWL
Performed Procedure Step Start Time	(0040,0245)	TM		ALWAYS	MWL
Performed Procedure Step Description	(0040,0254)	LO		ALWAYS	MWL
Performing Physician's Name	(0008,1050)	PN		ALWAYS	MWL, USER
Operators' Name	(0008,1070)	PN		ALWAYS	MWL, USER

8.2.4.2 General Image Module Attributes

Table 8-27: General Image Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Image Type	(0008,0008)	CS	See Image Type Values	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS		ALWAYS	USER

8.2.4.3 Image Pixel Module Attributes

Table 8-28: Image Pixel Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	FIXED
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	FIXED
Rows	(0028,0010)	US	512	ALWAYS	FIXED
Columns	(0028,0011)	US	512	ALWAYS	FIXED
Bits Allocated	(0028,0100)	US	16	ALWAYS	FIXED
Bits Stored	(0028,0101)	US	12	ALWAYS	FIXED
High Bit	(0028,0102)	US	11	ALWAYS	FIXED
Pixel Representation	(0028,0103)	US	0000H	ALWAYS	FIXED
Pixel Data	(7FE0,0010)	OB		ALWAYS	AUTO

8.2.4.4 SC Equipment Module Attributes

Table 8-29: SC Equipment Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Conversion Type	(0008,0064)	CS	DF	ALWAYS	FIXED
Modality	(0008,0060)	CS	CT	ALWAYS	FIXED
Secondary Capture Device Manufacturer	(0018,1016)	LO		ALWAYS	COPY
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	LO		ALWAYS	COPY

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Secondary Capture Device Software Versions	(0018,1019)	LO		ALWAYS	COPY

8.2.4.5 SC Image Module Attributes

Table 8-30: SC Image Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Date of Secondary Capture	(0018,1012)	DA	The date the Secondary Capture Image was captured.	ALWAYS	AUTO
Time of Secondary Capture	(0018,1014)	TM	The time the Secondary Capture Image was captured.	ALWAYS	AUTO

8.2.4.6 Overlay Plane Module Attributes

Table 8-31: Overlay Plane Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Overlay Rows	(60xx,0010)	US	512	ALWAYS	FIXED
Overlay Columns	(60xx,0011)	US	512	ALWAYS	FIXED
Overlay Type	(60xx,0040)	CS	G	ALWAYS	FIXED
Overlay Origin	(60xx,0050)	SS	1,1	ALWAYS	FIXED
Overlay Bits Allocated	(60xx,0100)	US	1	ALWAYS	FIXED
Overlay Bit Position	(60xx,0102)	US	0	ALWAYS	FIXED
Overlay Data	(60xx,3000)	OB		ALWAYS	AUTO
Number of Frames in Overlay	(60xx,0015)	IS	1	ALWAYS	FIXED

8.2.4.7 SOP Common Module Attributes

Table 8-32: SOP Common Module

DICOM Attribute Name	Tag	Type	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	FIXED
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ALWAYS	AUTO
Timezone Offset From UTC	(0008,0201)	SH		ALWAYS	AUTO

8.2.5 X-Ray Radiation Dose Report Storage SOP Class

Table 8-33: IOD of created X-Ray Radiation Dose Report Storage SOP Class Instances

IE	Module	Reference	Usage
Patient	Patient	Table 8-5	ALWAYS
Study	General Study	Table 8-6	ALWAYS
Series	SR Document Series	Table 8-34	ALWAYS
Equipment	General Equipment	Table 8-10	ALWAYS

IE	Module	Reference	Usage
	Enhanced General Equipment	Table 8-35	ALWAYS
Document	SR Document General	Table 8-36	ALWAYS
	SR Document Content	Table 8-37	ALWAYS
	SOP Common	Table 8-38	ALWAYS

8.2.5.1 SR Document Series Module Attributes

Table 8-34: SR Document Series Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	SR	ALWAYS	FIXED
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Series Date	(0008,0021)	DA		ALWAYS	AUTO
Series Time	(0008,0031)	TM		ALWAYS	AUTO
Series Description	(0008,103E)	LO		ALWAYS	AUTO

8.2.5.2 Enhanced General Equipment Module Attributes

Table 8-35: Enhanced General Equipment Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO		ALWAYS	COPY
Manufacturer's Model Name	(0008,1090)	LO		ALWAYS	COPY
Device Serial Number	(0018,1000)	LO		ALWAYS	COPY
Software Versions	(0018,1020)	LO		ALWAYS	COPY

8.2.5.3 SR Document General Module Attributes

Table 8-36: SR Document General Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	1	ALWAYS	FIXED
Completion Flag	(0040,A491)	CS	COMPLETE	ALWAYS	FIXED
Verification Flag	(0040,A493)	CS	UNVERIFIED	ALWAYS	FIXED
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO

8.2.5.4 SR Document Content Module Attributes

Table 8-37: SR Document Content Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Value Type	(0040,A040)	CD	CONTAINER	ALWAYS	FIXED
Concept Name Code	(0040,A043)	SQ		ALWAYS	AUTO

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Sequence					
>Code Value	(0008,0100)	SH	113701	ALWAYS	FIXED
>Coding Scheme Designator	(0008,0102)	SH	DCM	ALWAYS	FIXED
>Code Meaning	(0008,0104)	LO	X-Ray Radiation Dose Report	ALWAYS	FIXED
Continuity of Content	(0040,A050)	CS	SEPARATE	ALWAYS	FIXED
Content Template Sequence	(0040,A504)	SQ		ALWAYS	AUTO
>Mapping Resource	(0008,0105)	CS	DCMR	ALWAYS	FIXED
>Template Identifier	(0040,DB00)	CS	10011	ALWAYS	FIXED
Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO

8.2.5.5 SOP Common Module Attributes

Table 8-38: SOP Common Module

DICOM Attribute Name	Tag	Type	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.88.67	ALWAYS	FIXED
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ALWAYS	AUTO

8.2.6 Examination Report Storage SOP Class

The Examination Report object is using “1.2.840.10008.5.1.4.1.1.88.22 Enhanced SR Storage” and complies to Enhanced SR Storage.

Table 8-39: IOD of Created Examination Report Storage SOP Class Instances

IE	Module	Reference	Usage
Patient	Patient	8.2.10.1	M
Study	General Study	8.2.10.1	M
Series	SR Document Series	Table 8-34	M
Equipment	General Equipment	Table 8-34	M
Document	SR Document General	Table 8-36	M
	SR Document Content	Table 8-40	M
	SOP Common	Table 8-41	M

8.2.6.1 SR Document Content Module Attributes

Table 8-40: SR Document Content Module

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Value Type	(0040,A040)	CD	CONTAINER	ALWAYS	FIXED
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	AUTO
>Code Value	(0008,0100)	SH	1	ALWAYS	FIXED
>Coding Scheme	(0008,0102)	SH	99CT_SOMX	ALWAYS	FIXED

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Designator					
>Code Meaning	(0008,0104)	LO	CT Examination Report	ALWAYS	FIXED
Continuity of Content	(0040,A050)	CS	SEPARATE	ALWAYS	FIXED
Content Template Sequence	(0040,A504)	SQ		ALWAYS	AUTO
>Mapping Resource	(0008,0105)	CS	99CT_SOMX	ALWAYS	FIXED
>Template Identifier	(0040,DB00)	CS		ALWAYS	AUTO
Content Sequence	(0040,A730)	SQ		ALWAYS	AUTO

8.2.6.2 SOP Common Module Attributes

Table 8-41: SOP Common Module

DICOM Attribute Name	Tag	Type	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.88.22	ALWAYS	FIXED
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS		ALWAYS	AUTO
Coding Scheme Identification Sequence	(0008,0110)	SQ		ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	99CT_SOMX	ALWAYS	FIXED
>Coding Scheme Responsible Organization	(0008,0116)	ST	Siemens AG, Healthcare, HC IM CR	ALWAYS	FIXED
>Coding Scheme Name	(0008,0115)	ST	CT Structured Report Content for Somaris/10	ALWAYS	FIXED

8.2.7 Usage of Attributes from Received IODs

N/A

8.2.8 Attribute Mapping

There is currently no mapping from attributes received in DICOM Modality Worklist to other attributes.

8.2.9 Coerced / Modified Fields

N/A

8.2.10 NM Image Storage SOP Class

IE	Module	Reference	Usage
Patient	Patient	8.2.10.1	ALWAYS
Study	General Study	8.2.10.1	ALWAYS

IE	Module	Reference	Usage
	Patient Study	8.2.10.1	ALWAYS
Series	General Series	8.2.10.1	ALWAYS
	NM/PET Patient Orientation	8.2.10.1	ALWAYS
Frame of Reference	Frame of Reference	8.2.10.1	ALWAYS
Equipment	General Equipment	8.2.10.1	ALWAYS
Image	General Image	8.2.10.1	ALWAYS
	Acquisition Context	8.2.10.1	CONDITIONAL
	Image Pixel	8.2.10.1	ALWAYS
	NM Image Pixel	8.2.10.1	ALWAYS
	Multi-frame	8.2.10.1	ALWAYS
	NM Multi-frame	8.2.10.1	ALWAYS
	NM Image	8.2.10.1	ALWAYS
	NM Isotope	8.2.10.1	ALWAYS
	NM Detector	8.2.10.1	ALWAYS
	NM TOMO Acquisition	8.2.10.1	CONDITIONAL
	NM Multi-gated Acquisition	8.2.10.1	CONDITIONAL
	NM Phase	8.2.10.1	CONDITIONAL
	NM Reconstruction	8.2.10.1	CONDITIONAL
	Curve	8.2.10.1	CONDITIONAL
	VOI LUT	8.2.10.1	ALWAYS
	SOP Common	8.2.10.1	ALWAYS

8.2.10.1 Attributes by Modules

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source	Module
Acquisition Context Sequence	0040,0555	SQ		ANAP	AUTO	Acquisition Context
>Concept Name Code Sequence	0040,A043	SQ	Empty for non-cardiac coded terms, required for Cardiac coded terms	ALWAYS	AUTO	
>> [Code Sequence Macro]				ALWAYS	AUTO	
>Concept Code Sequence	0040,A168	SQ	Empty for non-cardiac coded terms, required for Cardiac coded terms	ALWAYS	AUTO	
>> [Code Sequence Macro]				ALWAYS	AUTO	
Acquisition Context Description	0040,0556	ST		ANAP	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Curve Dimensions	5000,0005	US		ALWAYS	AUTO	Curve
Number of Points	5000,0010	US		ALWAYS	AUTO	
Type of Data	5000,0020	CS		ALWAYS	AUTO	
Curve Description	5000,0022	LO		ALWAYS	AUTO	
Axis Units	5000,0030	SH		ALWAYS	AUTO	
Axis Labels	5000,0040	SH		ALWAYS	AUTO	
Data Value Representation	5000,0103	US		ALWAYS	AUTO	
Minimum Coordinate Value	5000,0104	US		ALWAYS	AUTO	

Maximum Coordinate Value	5000,0105	US		ALWAYS	AUTO	
Curve Range	5000,0106	SH		ALWAYS	AUTO	
Curve Data Descriptor	5000,0110	US		ALWAYS	AUTO	
Coordinate Start Value	5000,0112	US		ALWAYS	AUTO	
Coordinate Step Value	5000,0114	US		ALWAYS	AUTO	
Curve Label	5000,2500	LO		ALWAYS	AUTO	
Curve Data	5000,3000	OW		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	Frame of Reference
Position Reference Indicator	0020,1040	LO		EMPTY	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Manufacturer	0008,0070	LO	Siemens Healthineers	ALWAYS	FIXED	General Equipment
Institution Name	0008,0080	LO		ALWAYS	CONFIG	
Institution Address	0008,0081	ST		ALWAYS	CONFIG, USER	
Station Name	0008,1010	SH		ALWAYS	CONFIG	
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	
Manufacturer's Model Name	0008,1090	LO	Symbia Pro.specta Q3 Symbia Pro.specta X3 Symbia Pro.specta X7	ALWAYS	FIXED	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	
Software Versions	0018,1020	LO	SPECT*syngo* VA10A	ALWAYS	FIXED	
Date of Last Calibration	0018,1200	DA		ALWAYS	AUTO	
Time of Last Calibration	0018,1201	TM		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Image Type	0008,0008	CS	See section 8.2.10.1.1	ALWAYS	AUTO	General Image
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Acquisition Datetime	0008,002A	DA		ALWAYS	AUTO	
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Anatomic Region Sequence	0008,2218	SQ		ALWAYS	USER	
> [Code Sequence Macro]				ALWAYS	USER	
Patient Position	0018,5100	CS		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Image Comments	0020,4000	LT		ALWAYS	USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Series Date	0008,0021	DA		ALWAYS	AUTO	General Series
Series Time	0008,0031	TM		ALWAYS	AUTO	
Modality	0008,0060	CS	NM	ALWAYS	FIXED	
Series Description	0008,103E	LO		ANAP	USER	
Operators' Name	0008,1070	PN		ANAP	MWL, USER	
Related Series Sequence	0008,1250	SQ		ANAP	AUTO	

>Study Instance UID	0020,000D	UI		ANAP	AUTO	
>Series Instance UID	0020,000E	UI		ANAP	AUTO	
>Purpose of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	
>> [Code Sequence Macro]				ANAP	AUTO	
Body Part Examined	0018,0015	CS		ANAP	AUTO, USER	
Protocol Name	0018,1030	LO		ANAP	USER	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL	
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL	
Request Attributes Sequence	0040,0275	SQ		ALWAYS	AUTO	
>Accession Number	0008,0050	SH		ALWAYS	MWL, USER	
>Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
>Referenced Study Sequence	0008,1110	SQ		ALWAYS	MWL, AUTO	
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL, AUTO	
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL, AUTO	
>Requested Procedure Description	0032,1060	LO		ALWAYS	MWL	
>Requested Procedure Code Sequence	0032,1064	SQ		ANAP	MWL	
>> [Code Sequence Macro]				ANAP	MWL	
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SW		ANAP	MWL	
>> [Code Sequence Macro]				ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	
>Reason for The Requested Procedure	0040,1002	LO		ANAP	MWL	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Study Date	0008,0020	DA		ALWAYS	AUTO	General Study
Study Time	0008,0030	TM		ALWAYS	AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study Description	0008,1030	LO		ALWAYS	MWL, USER	

Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
> [Code Sequence Macro]				ANAP	MWL	
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study ID	0020,0010	SH		VNAP	MWL, USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Rows	0028,0010	US		ALWAYS	AUTO	Image Pixel
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Smallest Image Pixel Value	0028,0106	US		ALWAYS	AUTO	
Largest Image Pixel Value	0028,0107	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OB		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Group Length	0002,0000	UL		ALWAYS	AUTO	Meta Information
Media Storage SOP Class UID	0002,0002	UI	1.2.840.10008.5.1.4.1.1.20	ALWAYS	FIXED	
Media Storage SOP Instance UID	0002,0003	UI		ALWAYS	AUTO	
Transfer Syntax UID	0002,0010	UI		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Number of Frames	0028,0008	IS		ALWAYS	AUTO	Multi-frame
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Detector Information Sequence	0054,0022	SQ		ALWAYS	AUTO	NM Detector
>Radial Position	0018,1142	DS		ALWAYS	AUTO	
>Center of Rotation Offset	0018,1145	DS		ALWAYS	AUTO	
>Field of View Shape	0018,1147	CS	RECTANGLE	ALWAYS	FIXED	
>Field of View Dimensions	0018,1149	IS		ALWAYS	AUTO	
>Collimator Grid Name	0018,1180	SH		ALWAYS	AUTO	
>Collimator Type	0018,1181	CS		ALWAYS	AUTO	
>Focal Distance	0018,1182	IS		ALWAYS	AUTO	
>X Focus Center	0018,1183	DS		ALWAYS	AUTO	
>Y Focus Center	0018,1184	DS		ALWAYS	AUTO	
>Image Position Patient	0020,0032	DS		ALWAYS	AUTO	
>Image Orientation Patient	0020,0037	DS		ALWAYS	AUTO	
>Zoom Factor	0028,0031	DS		ALWAYS	AUTO	
>Zoom Center	0028,0032	DS		ALWAYS	AUTO	
>Start Angle	0054,0200	DS		ALWAYS	AUTO	
>View Code Sequence	0054,0220	SQ		ALWAYS	USER	
>> [Code Sequence Macro]				ALWAYS	USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Counts Accumulated	0018,0070	IS		ALWAYS	AUTO	NM Image
Acquisition Termination Condition	0018,0071	CS		ALWAYS	AUTO	

Trigger Source or Type	0018,1061	LO		ALWAYS	AUTO	
Table Height	0018,1130	DS		ALWAYS	AUTO	
Table Traverse	0018,1131	DS		ALWAYS	AUTO	
Actual Frame Duration	0018,1242	IS		ALWAYS	AUTO	
Scan Velocity	0018,1300	DS		ALWAYS	AUTO	
Whole Body Technique	0018,1301	CS		ALWAYS	AUTO	
Scan Length	0018,1302	IS		ALWAYS	AUTO	
Corrected Image	0028,0051	CS	See Note 3	ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	NM Image Pixel
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED	
Bits Stored	0028,0101	US	16	ALWAYS	FIXED	
High Bit	0028,0102	US	15	ALWAYS	FIXED	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Intervention Drug Information Sequence	0018,0026	SQ		ANAP	AUTO	NM Isotope
>Intervention Drug Dose	0018,0028	DS		ALWAYS	USER	
>Intervention Drug Name	0018,0034	LO		ALWAYS	USER	
>Intervention Drug Start Time	0018,0035	TM		ALWAYS	AUTO	
Energy Window Information Sequence	0054,0012	SQ		ALWAYS	AUTO	
>Energy Window Range Sequence	0054,0013	SQ		ALWAYS	AUTO	
>>Energy Window Lower Limit	0054,0014	DS		ALWAYS	AUTO	
>>Energy Window Upper Limit	0054,0015	DS		ALWAYS	AUTO	
>Energy Window Name	0054,0018	SH		ALWAYS	AUTO	
Radiopharmaceutical Information Sequence	0054,0016	SQ		ALWAYS	AUTO	
>Radiopharmaceutical	0018,0031	LO		ALWAYS	USER	
>Radiopharmaceutical Start Time	0018,1072	TM		ALWAYS	USER	
>Radionuclide Total Dose	0018,1074	DS		ALWAYS	USER	
>Radiopharmaceutical Start DateTime	0018,1078	DT		ALWAYS	USER	
>Radionuclide Code Sequence	0054,0300	SQ		ALWAYS	AUTO	
>> [Code Sequence Macro]				ALWAYS	AUTO	
>Radiopharmaceutical Code Sequence	0054,0304	SQ		ANAP	USER	
>> [Code Sequence Macro]				ALWAYS	USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO	NM Multi-frame
Energy Window Vector	0054,0010	US		ALWAYS	AUTO	
Number of Energy Windows	0054,0011	US		ALWAYS	AUTO	

Detector Vector	0054,0020	US		ALWAYS	AUTO	
Number of Detectors	0054,0021	US		ALWAYS	AUTO	
Phase Vector	0054,0030	US		ALWAYS	AUTO	
Number of phases	0054,0031	US		ALWAYS	AUTO	
Rotation Vector	0054,0050	US		ALWAYS	AUTO	
Number of Rotations	0054,0051	US		ALWAYS	AUTO	
RR Interval Vector	0054,0060	US		ALWAYS	AUTO	
Number of RR Intervals	0054,0061	US		ALWAYS	AUTO	
Time Slot Vector	0054,0070	US		ALWAYS	AUTO	
Number of Time Slots	0054,0071	US		ALWAYS	AUTO	
Slice Vector	0054,0080	US		ALWAYS	AUTO	
Number of Slices	0054,0081	US		ALWAYS	AUTO	
Angular View Vector	0054,0090	US		ALWAYS	AUTO	
Time Slice Vector	0054,0100	US		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Beat Rejection Flag	0018,1080	CS		ALWAYS	AUTO	NM Multi-gated Acquisition
PVC Rejection	0018,1085	LO		ALWAYS	AUTO	
Skip Beats	0018,1086	IS		ALWAYS	AUTO	
Heart Rate	0018,1088	IS		ALWAYS	AUTO	
Gated Information Sequence	0054,0062	SQ		ALWAYS	AUTO	
>Framing Type	0018,1064	LO	See Note 4	ALWAYS	FIXED	
>Data Information Sequence	0054,0063	SQ		ALWAYS	AUTO	
>>Nominal Interval	0018,1062	IS		ALWAYS	AUTO	
>>Frame Time	0018,1063	DS		ALWAYS	AUTO	
>>Low R-R Value	0018,1081	IS		ALWAYS	AUTO	
>>High R-R Value	0018,1082	IS		ALWAYS	AUTO	
>>Intervals Acquired	0018,1083	IS		ALWAYS	AUTO	
>>Intervals Rejected	0018,1084	IS		ALWAYS	AUTO	
>>Time Slot Information Sequence	0054,1072	SQ		ALWAYS	AUTO	
>>>Time Slot Time	0054,0073	DS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Patient Orientation Code Sequence	0054,0410	SQ		ALWAYS	AUTO	NM/PET Patient Orientation
> [Code Sequence Macro]				ANAP	AUTO	
>Patient Orientation Modifier Code Sequence	0054,0412	SQ		ANAP	AUTO	
>> [Code Sequence Macro]				ANAP	AUTO	
>Patient Gantry Relationship Code Sequence	0054,0414	SQ		ALWAYS	AUTO	
>> [Code Sequence Macro]				ANAP	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Phase Information Sequence	0054,0032	SQ		ALWAYS	AUTO	NM Phase
>Actual Frame Duration	0018,1242	IS		ALWAYS	AUTO	
>Number of Frames in Phase	0054,0033	US		ALWAYS	AUTO	
>Phase Delay	0054,0036	IS		ALWAYS	AUTO	
>Pause Between Frames	0054,0038	IS		ALWAYS	AUTO	
>Phase Description	0054,0039	CS		ALWAYS	USER	

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source	Module
Slice Thickness	0018,0050	DS		ALWAYS	AUTO	NM Reconstruction
Spacing Between Slices	0018,0088	DS		ALWAYS	AUTO	
Reconstruction Diameter	0018,1100	DS		ALWAYS	AUTO	
Convolution Kernel	0018,1210	SH		ALWAYS	AUTO	
Slice Progression Direction	0054,0500	CS		ANAP	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Rotation Information Sequence	0054,0052	SQ		ALWAYS	AUTO	NM TOMO Acquisition
>Table Height	0018,1130	DS		ALWAYS	AUTO	
>Table Traverse	0018,1131	DS		ALWAYS	AUTO	
>Rotation Direction	0018,1140	CS		ALWAYS	AUTO	
>Radial Position	0018,1142	DS	See Note 2	ALWAYS	AUTO	
>Scan Arc	0018,1143	DS		ALWAYS	AUTO	
>Angular Step	0018,1144	DS		ALWAYS	AUTO	
>Actual Frame Duration	0018,1242	DS		ALWAYS	AUTO	
>Number of Frames in Rotation	0054,0053	DS		ALWAYS	AUTO	
>Start Angle	0054,0200	DS		ALWAYS	AUTO	
Type of Detector Motion	0054,0202	CS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	Patient
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL	
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	
Patients Birth Time	0010,0032	TM		ANAP	MWL	
Patient's Sex	0010,0040	CS		ALWAYS	MWL, USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL	
Other Patient Names	0010,1001	PN		ANAP	MWL	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Admitting Diagnoses Description	0008,1080	LO		ANAP	MWL, USER	Patient Study
Patient's Age	0010,1010	AS		ANAP	MWL, USER	
Patient's Size	0010,1020	DS		ANAP	MWL, USER	
Patient's Weight	0010,1030	DS		ALWAYS	MWL, USER	
Admission ID	0038,0010	LO		ANAP	MWL	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Specific Character Set	0008,0005	CS		ALWAYS	AUTO	SOP Common
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.20	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Timezone Offset From UTC	0008,0201	SH		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**

Window Center	0028,1050	DS		ALWAYS	AUTO	VOI LUT
Window Width	0028,1051	DS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**[Code Sequence Macro]**
>Code Value	0008,0100	SH				
>Coding Scheme Designator	0008,0102	SH	See Note 1			
>Code Meaning	0008,0104	LO				

Note:

1. **SPECT*syngo*** generally uses SNOMED RT (SRT) codes even though the current version of the DICOM standard uses SNOMED CT (SCT) codes as coding scheme designator.
2. **SPECT*syngo*** stores the complete Radial Positions for all projection views only in NM Detector Module of TOMO image.
3. **SPECT*syngo*** adds the following Defined Terms for Corrected Image (0028,0051):
   a. DSC Distortion Corrected (only for data acquired with Focusing Collimator)
   b. RESPMOT Respiratory Motion Corrected
   c. INTRAMOT Intra Motion Corrected
   d. EMI Extra Modality Information Applied (Reconstruction with Zoning)
   e. DCAL Standard Sensitivity Calibration Applied
4. **SPECT*syngo*** adds the following Defined Terms for Framing Type (0018,1064): PHASED.

8.2.10.1.1 Image Type Values

- Value 1 identifies the Pixel Data Characteristics; Enumerated Values for the Pixel Data Characteristics are:
  - ORIGINAL: Identifies an Original Image, for all raw data and reconstructed images
  - DERIVED: Identifies an implementation specific Derived Image
- Value 2 identifies the Patient Examination Characteristics; Enumerated Values for the Patient Examination Characteristics are:
  - PRIMARY: Identifies a Primary Image
  - SECONDARY: not used
- Value 3 identifies any Image IOD-specific specialization. The following terms are defined:
  - TOMO: identifies a tomographic projection image
  - GATED TOMO: not used
  - RECON TOMO: identifies a reconstructed tomographic image.
  - STATIC: identifies a non-gated non-phased planar image
  - GATED: identifies a multi-gated planar image
  - DYNAMIC: identifies a multi-phased planar image
  - WHOLEBODY: identifies a whole-body planar image
- Value 4 contains NM specific values:
  - EMISSION: identifies an image acquired and/or reconstructed from Emission source
  - TRANSMISSION: identifies an image acquired and/or reconstructed from Transmission source

8.2.11 PET Image Storage SOP Class

IE	Module	Reference	Usage
Patient	Patient	8.2.11.1	ALWAYS
Study	General Study	8.2.11.1	ALWAYS
	Patient Study	8.2.11.1	ALWAYS
Series	General Series	8.2.11.1	ALWAYS
	PET Series	8.2.11.1	ALWAYS

IE	Module	Reference	Usage
	PET Isotope	8.2.11.1	ALWAYS
	NM/PET Patient Orientation	8.2.11.1	ALWAYS
Frame of Reference	Frame of Reference	8.2.11.1	ALWAYS
Equipment	General Equipment	8.2.11.1	ALWAYS
Image	General Image	8.2.11.1	ALWAYS
	Acquisition Context	8.2.11.1	CONDITIONAL
	Image Pixel	8.2.11.1	ALWAYS
	Image Plane	8.2.11.1	ALWAYS
	PET Image	8.2.11.1	ALWAYS
	Overlay Plane	8.2.11.1	CONDITIONAL
	VOI LUT	8.2.11.1	ALWAYS
	SOP Common	8.2.11.1	ALWAYS

8.2.11.1 Attributes by Modules

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source	Module
Acquisition Context Sequence	0040,0555	SQ		ANAP	AUTO	Acquisition Context
>**Concept Name Code Sequence**	0040,A043	SQ	Empty for non-cardiac coded terms, required for Cardiac coded terms	ANAP	AUTO	
>>[Code Sequence Macro]				ANAP	AUTO	
>**Concept Code Sequence**	0040,A168	SQ	Empty for non-cardiac coded terms, required for Cardiac coded terms	ANAP	AUTO	
>>[Code Sequence Macro]				ANAP	AUTO	
Acquisition Context Description	0040,0556	ST		ANAP	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Group Length	0002,0000	UL		ALWAYS	AUTO	Meta Information
Media Storage SOP Class UID	0002,0002	UI	1.2.840.10008.5.1.4.1.1.128	ALWAYS	FIXED	
Media Storage SOP Instance UID	0002,0003	UI		ALWAYS	AUTO	
Transfer Syntax UID	0002,0010	UI		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	Frame Of Reference
Position Reference Indicator	0020,1040	LO		EMPTY	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Manufacturer	0008,0070	LO	Siemens Healthineers	ALWAYS	FIXED	General Equipment
Institution Name	0008,0080	LO		ALWAYS	CONFIG	
Institution Address	0008,0081	ST		ALWAYS	CONFIG	
Station Name	0008,1010	SH		ALWAYS	CONFIG	

Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	
Manufacturer's Model Name	0008,1090	LO	Symbia Pro.specta Q3 Symbia Pro.specta X3 Symbia Pro.specta X7	ALWAYS	FIXED	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	
Software Versions	0018,1020	LO	SPECTsyngo VA10A	ALWAYS	FIXED	
Date of Last Calibration	0018,1200	DA		ALWAYS	AUTO	
Time of Last Calibration	0018,1201	TM		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Image Type	0008,0008	CS	See section 8.2.11.1.1.	ALWAYS	AUTO	General Image
Acquisition Date	0008,0022	DA		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	
Acquisition Datetime	0008,002A	DA		ALWAYS	AUTO	
Acquisition Time	0008,0032	TM		ALWAYS	AUTO	
Content Time	0008,0033	TM		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Image Comments	0020,4000	LT		ALWAYS	USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Series Date	0008,0021	DA		ALWAYS	AUTO	General Series
Series Time	0008,0031	TM		ALWAYS	AUTO	
Modality	0008,0060	CS	PT	ALWAYS	FIXED	
Series Description	0008,103E	LO		ANAP	USER	
Operators' Name	0008,1070	PN		ANAP	MWL, USER	
Related Series Sequences	0008,1250	SQ		ANAP	AUTO	
>Study Instance UID	0020,000D	UI		ANAP	AUTO	
>Series Instance UID	0020,000E	UI		ANAP	AUTO	
>Purpose Of Reference Code Sequence	0040,A170	SQ		ANAP	AUTO	
>>[Code Sequence Macro]				ANAP	AUTO	
Body Part Examined	0018,0015	CS		ALWAYS	AUTO, USER	
Protocol Name	0018,1030	LO		ANAP	USER	
Patient Position	0018,5100	CS		ALWAYS	AUTO	
Request Attributes Sequence	0040,0275	SQ		ALWAYS	AUTO	
>Accession Number	0008,0050	SH		ANAP	MWL, USER	
>Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
>Referenced Study Sequence	0008,1110	SQ		ALWAYS	MWL, AUTO	
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL, AUTO	
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL, AUTO	
>Requested Procedure Description	0032,1060	LO		ALWAYS	MWL	

>Requested Procedure Code Sequence	0032,1064	SQ		ANAP	MWL	
>>[Code Sequence Macro]				ANAP	MWL	
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL	
>Scheduled Procedure Code Sequence	0040,0008	SW		ANAP	MWL	
>>[Code Sequence Macro]				ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ANAP	MWL	
>Reason For The Requested Procedure	0040,1002	LO		ANAP	MWL	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step ID	0040,0253	SH		ANAP	MWL	
Performed Procedure Step Description	0040,0254	LO		ANAP	MWL	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Study Date	0008,0020	DA		ALWAYS	AUTO	General Study
Study Time	0008,0030	TM		ALWAYS	AUTO	
Accession Number	0008,0050	SH		VNAP	MWL, USER	
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	
Study Description	0008,1030	LO		ALWAYS	MWL, USER	
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL	
>[Code Sequence Macro]				ANAP	MWL	
Study Instance UID	0020,000D	UI		ALWAYS	MWL, AUTO	
Study ID	0020,0010	SH		VNAP	MWL, USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	Image Pixel
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED	
Bits Stored	0028,0101	US	16	ALWAYS	FIXED	
High Bit	0028,0102	US	15	ALWAYS	FIXED	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Smallest Image Pixel Value	0028,0106	US		ALWAYS	AUTO	
Largest Image Pixel Value	0028,0107	US		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of**	**Source**	**Module**

				Value		
Image Position (Patient)	0020,0032	DS		ALWAYS	AUTO	Image Plane
Image Orientation (Patient)	0020,0037	DS		ALWAYS	AUTO	
Slice Thickness	0018,0050	DS		ALWAYS	AUTO	
Slice Location	0020,1041	DS		ALWAYS	AUTO	
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Intervention Drug Information Sequence	0018,0026	SQ		ANAP	AUTO	PET Isotope
>Intervention Drug Dose	0018,0028	DS		ALWAYS	USER	
>Intervention Drug Name	0018,0034	LO		ALWAYS	USER	
>Intervention Drug Start Time	0018,0035	TM		ALWAYS	AUTO	
Radiopharmaceutical Information Sequence	0054,0016	SQ		ALWAYS	AUTO	
>Radiopharmaceutical	0018,0031	LO		ALWAYS	USER	
>Radiopharmaceutical Start Time	0018,1072	TM		ALWAYS	USER	
>Radionuclide Total Dose	0018,1074	DS		ALWAYS	USER	
>Radionuclide Half Life	0018,1075	DS		ALWAYS	AUTO	
>Radiopharmaceutical Start DateTime	0018,1078	DT		ALWAYS	USER	
>Radionuclide Code Sequence	0054,0300	SQ		ALWAYS	AUTO	
>>[Code Sequence Macro]				ALWAYS	AUTO	
>Radiopharmaceutical Code Sequence	0054,0304	SQ		ANAP	USER	
>>[Code Sequence Macro]				ANAP	USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	Patient
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	
Issuer of Patient ID	0010,0021	LO		ANAP	MWL	
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	
Patients Birth Time	0010,0032	TM		ANAP	MWL	
Patient's Sex	0010,0040	CS		ALWAYS	MWL, USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL	
Other Patient Names	0010,1001	PN		ANAP	MWL	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Admitting Diagnoses Description	0008,1080	LO		ANAP	MWL	Patient Study
Patient's Age	0010,1010	AS		ANAP	MWL, USER	
Patient's Size	0010,1020	DS		ANAP	MWL, USER	
Patient's Weight	0010,1030	DS		ALWAYS	MWL,	

					USER	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Frame Reference Time	0054,1300	DS		ALWAYS	AUTO	PET Image
Decay Factor	0054,1321	DS		ALWAYS	AUTO	
Dose Calibration Factor	0054,1322	DS		ALWAYS	AUTO	
Image Index	0054,1330	US		ALWAYS	AUTO	
Anatomic Region Sequence	0008,2218	SQ		ALWAYS	USER	
>[Code Sequence Marco]				ALWAYS	USER	
Actual Frame Duration	0018,1242	IS		ALWAYS	AUTO	
Rescale Intercept	0028,1052	DS	0	ALWAYS	FIXED	
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Acquisition Termination Condition	0018,0071	CS		ALWAYS	AUTO	PET Series
Number of Slices	0054,0081	US		ALWAYS	AUTO	
Type of Detector Motion	0054,0202	CS		ALWAYS	AUTO	
Reconstruction Diameter	0018,1100	DS		ALWAYS	AUTO	
Field of View Shape	0018,1147	CS	RECTANGLE	ALWAYS	FIXED	
Field of View Dimension(s)	0018,1149	IS		ALWAYS	AUTO	
Collimator/Grid Name	0018,1180	SH		ALWAYS	AUTO	
Collimator Type	0018,1181	CS		ALWAYS	AUTO	
Convolution Kernel	0018,1210	SH		ALWAYS	AUTO	
Corrected Image	0028,0051	CS	See Note 2	ALWAYS	AUTO	
Energy Window Range Sequence	0054,0013	SQ		ALWAYS	AUTO	
>Energy Window Lower Limit	0054,0014	DS		ALWAYS	AUTO	
>Energy Window Upper Limit	0054,0015	DS		ALWAYS	AUTO	
Series Type	0054,1000	CS		ALWAYS	AUTO	
Units	0054,1001	CS		ALWAYS	AUTO	
Counts Source	0054,1002	CS		ALWAYS	FIXED	
Attenuation Correction Method	0054,1101	LO		ALWAYS	AUTO	
Decay Correction	0054,1102	CS		ALWAYS	AUTO	
Reconstruction Method	0054,1103	LO		ALWAYS	AUTO	
Scatter Correction Method	0054,1105	LO		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Patient Orientation Code Sequence	0054,0410	SQ		ALWAYS	AUTO	NM/PET Patient Orientation
> [Code Sequence Macro]				ALWAYS	AUTO	
>Patient Orientation Modifier Code Sequence	0054,0412	SQ				
>> [Code Sequence Macro]				ALWAYS	AUTO	
Patient Gantry Relationship	0054,0414	SQ		ALWAYS	AUTO	

Code Sequence						
>[Code Sequence Macro]				ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Specific Character Set	0008,0005	CS		ALWAYS	AUTO	SOP Common
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.128	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Timezone Offset From UTC	0008,0201	SH		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**Module**
Window Center	0028,1050	DS		ALWAYS	AUTO	VOI LUT
Window Width	0028,1051	DS		ALWAYS	AUTO	
DICOM Attribute Name	**Tag**	**VR**	**Value**	**Presence of Value**	**Source**	**[Code Sequence Macro]**
> Code Value	0008,0100	SH				
> Coding Scheme Designator	0008,0102	SH	See Note 1			
> Code Meaning	0008,0104	LO				

Note:

1. **SPECT*syngo*** generally uses SNOMED RT (SRT) codes even though the current version of the DICOM standard uses SNOMED CT (SCT) codes as coding scheme designator.
2. **SPECT*syngo*** adds the following Defined Terms for Corrected Image (0028,0051):
   a. RESPMOT Respiratory Motion Corrected
   b. INTRAMOT Intra Motion Corrected
   c. EMI Extra Modality Information Applied (Reconstruction with Zoning)
   d. VSENS 3D Sensitivity Calibration Applied

8.2.11.1.1 Image Type Values

- Value 1 identifies the Pixel Data Characteristics; Enumerated Values for the Pixel Data Characteristics are:
  - ORIGINAL: Identifies an Original Image, for all raw data and reconstructed images
  - DERIVED: not used
- Value 2 identifies the Patient Examination Characteristics; Enumerated Values for the Patient Examination Characteristics are:
  - PRIMARY: Identifies a Primary Image
  - SECONDARY: not used

8.3 CODED TERMINOLOGY AND TEMPLATES

8.3.1 Context Groups

See Reference [1].

8.3.2 Template Specifications

SPECT*syngo* creates and stores, upon completion of the procedure step, a DICOM CT Radiation Dose SR object. The CT Radiation Dose SR uses template TID 10011.

8.3.2.1 CT Radiation Dose SR

Table 8-42: CT Radiation Dose

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
		CONTAINER	X-Ray Radiation Dose Report	1	ALWAYS	Root node
>	HAS CONCEPT MOD	CODE	Procedure reported	1	ALWAYS	Computed Tomography X-Ray
>>	HAS CONCEPT MOD	CODE	Has Intent	1	ALWAYS	Diagnostic Intent
>		INCLUDE	Observer Context	1-n	ALWAYS	
>	HAS OBS CONTEXT	DATETIME	Start of X-Ray Irradiation	1	ALWAYS	First Acquisition Date/Time in study
>	HAS OBS CONTEXT	DATETIME	End of X-Ray Irradiation	1	ALWAYS	Last Acquisition Date/Time in study
>	HAS OBS CONTEXT	CODE	Scope of Accumulation	1	ALWAYS	Study
>>	HAS PROPERTIES	UIDREF	UID Types	1	ALWAYS	Study Instance UID (0020,000D)
>	CONTAINS	INCLUDE	CT Accumulated Dose Data	1	ALWAYS	
>	CONTAINS	INCLUDE	CT Irradiation Event Data	1-n	ALWAYS	

Table 8-43: CT Accumulated Dose Data

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
		CONTAINER	CT Accumulated Dose Data	1	ALWAYS	
>	CONTAINS	NUM	Total Number of Irradiation Events	1	ALWAYS	
>	CONTAINS	NUM	CT Dose Length Product Total	1	ALWAYS	

Table 8-44: CT Irradiation Event Data

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
		CONTAINER	CT Acquisition	1	ALWAYS	
>	CONTAINS	TEXT	Acquisition Protocol	1	ALWAYS	Name of the Range
>	CONTAINS	CODE	Target Region	1	ALWAYS	Body Part Examined
>	CONTAINS	CODE	CT Acquisition Type	1	ALWAYS	
>	CONTAINS	CODE	Procedure Context	1	ALWAYS	
>	CONTAINS	UIDREF	Irradiation Event UID	1	ALWAYS	
>	CONTAINS	CONTAINER	CT Acquisition Parameters	1	ALWAYS	
>>	CONTAINS	NUM	Exposure Time	1	ALWAYS	
>>	CONTAINS	INCLUDE	Scanning Length	1	ALWAYS	
>>	CONTAINS	NUM	Nominal Single	1	ALWAYS	

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
			Collimation Width			
>>	CONTAINS	NUM	Nominal Total Collimation Width	1	ALWAYS	
>>	CONTAINS	NUM	Pitch Factor	1	VNAP	
>>	CONTAINS	NUM	Number of X-Ray Sources	1	ALWAYS	
>>	CONTAINS	CONTAINER	CT X-Ray Source Parameters	1-n	ALWAYS	
>>>	CONTAINS	TEXT	Identification of the X-Ray Source	1	ALWAYS	
>>>	CONTAINS	NUM	KVP	1	ALWAYS	
>>>	CONTAINS	NUM	Maximum X-Ray Tube Current	1	ALWAYS	
>>>	CONTAINS	NUM	X-Ray Tube Current	1	ALWAYS	
>>>	CONTAINS	NUM	Exposure Time per Rotation	1	VNAP	
>	CONTAINS	CONTAINER	CT Dose	1	VNAP	
>>	CONTAINS	NUM	Mean CTDIvol	1	ALWAYS	
>>	CONTAINS	CODE	CTDIw Phantom Type	1	ALWAYS	

Table 8-45: CT Dose Check Details

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
		CONTAINER	Dose Check Alert Details	1	VNAP	Only if Dose Alert is configured
>	CONTAINS	CODE	DLP Alert Value Configured	1	ALWAYS	
>	CONTAINS	CODE	CTDIvol Alert Value Configured	1	ALWAYS	
>	CONTAINS	NUM	DLP Alert Value	1	ALWAYS	
>	CONTAINS	NUM	CTDIvol Alert Value	1	ALWAYS	
>	CONTAINS	NUM	Accumulated DLP Forward Estimate	1	ALWAYS	
>	CONTAINS	NUM	Accumulated CTDIvol Forward Estimate	1	ALWAYS	
>	CONTAINS	TEXT	Reason for Proceeding	1	ALWAYS	
>	CONTAINS	INCLUDE	Person Participant	1	ALWAYS	
		CONTAINER	Dose Check Notification Details	1	VNAP	Only if Dose Notification is configured
>	CONTAINS	CODE	DLP Notification Value Configured	1	ALWAYS	
>	CONTAINS	CODE	CTDIvol Notification Value Configured	1	ALWAYS	
>	CONTAINS	NUM	DLP Notification Value	1	ALWAYS	
>	CONTAINS	NUM	CTDIvol Notification Value	1	ALWAYS	

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
>	CONTAINS	NUM	DLP Forward Estimate	1	ALWAYS	
>	CONTAINS	NUM	CTDIvol Forward Estimate	1	ALWAYS	
>	CONTAINS	TEXT	Reason for Proceeding	1	ALWAYS	
>	CONTAINS	INCLUDE	Person Participant	1	ALWAYS	

Table 8-46: Device Participant

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value
		CODE	Device Role in Procedure	1	ALWAYS	
>	HAS PROPERTIES	TEXT	Device Manufacturer	1	ALWAYS	
>	HAS PROPERTIES	TEXT	Device Model Name	1	ALWAYS	
>	HAS PROPERTIES	TEXT	Device Serial Number	1	ALWAYS	
>	HAS PROPERTIES	UIDREF	Device Observer UID	1	ALWAYS	

8.3.2.2 Examination SR

Table 8-47: Examination Report

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value Set Constraint
		CONTAINER	EV(1, 99CT_SOMX, ”CT Examination Report”)	1	ALWAYS	
>	CONTAINS	CONTAINER	EV(2, 99CT_SOMX, “CT Acquisition Report”)	1	ALWAYS	
>>	CONTAINS	NUM	EV(100, 99CT_SOMX, “Total mAs”)	1	ALWAYS	UNITS = EV (mAs, UCUM, “mAs”)
>>	CONTAINS	TEXT	EV(102, 99CT_SOMX, “Performing Physician Name”)	1	ALWAYS	
>>	CONTAINS	TEXT	EV(103, 99CT_SOMX, “Operators Name”)	1	ALWAYS	
>>	CONTAINS	NUM	EV(113813, DCM, “CT Dose Length Product Total”)	1	ALWAYS	UNITS = EV (mGy.cm, UCUM, "mGy.cm")
>>	CONTAINS	CONTAINER	EV(600, 99CT_SOMX, “Patient Position Attribues”)	1-n	ALWAYS	
>>>	CONTAINS	TEXT	EV(601, 99CT_SOMX, “Patient Position”)	1	ALWAYS	
>>>	CONTAINS	TEXT	EV(602, 99CT_SOMX, “Frame of reference id”)	1	ALWAYS	
>>	CONTAINS	CONTAINER	EV(550, 99CT_SOMX, “Contrast Phase”)	1-n	ANAP	
>>>	CONTAINS	TEXT	EV(121145, DCM, "Description of Material")	1	ALWAYS	
>>>	CONTAINS	NUM	EV(122091, DCM, "Volume administered")	1	ALWAYS	UNITS = EV (ml, UCUM, "ml")
>>>	CONTAINS	NUM	EV(122093, DCM, "Concentration")	1	ALWAYS	UNITS = EV (mg/ml, UCUM, "mg/ml")
>>>	CONTAINS	NUM	EV(122094, DCM, "Rate of administration")	1	ALWAYS	
>>>	CONTAINS	NUM	EV(300, 99CT_SOMX, “CM Ratio”)	1	ALWAYS	UNITS = EV (%, UCUM, "%")
>>>	CONTAINS	TEXT	EV (123011, DCM, "" Contrast/Bolus Agent)	1	ALWAYS	
>>	CONTAINS	CONTAINER	EV(113819, DCM, “CT Acquisition”)	1	ALWAYS	
>>>	CONTAINS	TEXT	EV(101, 99CT_SOMX, “Range Name”)	1-n	ALWAYS	
>>>	CONTAINS	CONTAINER	EV(4, 99CT_SOMX, “Decision Tree”	1	ALWAYS	
>>>>	CONTAINS	TEXT	EV(803, 99CT_SOMX, “Comment”	1	ANAP	“No decision tree selected”
>>>>	CONTAINS	CONTAINER	EV(5, 99CT_SOMX, “User”	1	ANAP	
>>>>	CONTAINS	CONTAINER	EV(800, 99CT_SOMX, “Attribute”	1-n	ALWAYS	

NL	Rel with Parent	VT	Concept Name	VM	Presence of Value	Value Set Constraint
	CONTAINS	TEXT	EV(801, 99CT_SOMX, “Question”	1	ALWAYS	
>>>>>>	CONTAINS	TEXT	EV(802, 99CT_SOMX, “Answer”	1	ALWAYS	
>>>>	CONTAINS	CONTAINER	EV(6, 99CT_SOMX, “System”	1	ANAP	
>>>>>	CONTAINS	CONTAINER	EV(800, 99CT_SOMX, “Attribute”	1-n	ALWAYS	
>>>>>>	CONTAINS	TEXT	EV(801, 99CT_SOMX, “Question”	1	ALWAYS	
>>>>>>	CONTAINS	TEXT	EV(802, 99CT_SOMX, “Answer”	1	ALWAYS	
>>>	CONTAINS	CONTAINER	EV(113822, DCM, “CT Acquisition Parameters”)	1-n	ALWAYS	
>>>>	CONTAINS	NUM	EV(113824, DCM, "Exposure Time")	1	ALWAYS	UNITS = EV (s, UCUM, "s")
>>>>	CONTAINS	NUM	EV(113826, DCM, "Nominal Single Collimation Width")	1	ALWAYS	UNITS = EV (mm, UCUM, "mm")
>>>>	CONTAINS	NUM	EV(113830, DCM, "Mean CTDIvol")	1	ALWAYS	UNITS = EV (mGy, UCUM, "mGy")
>>>>	CONTAINS	TEXT	EV(113835, DCM, "CTDIw Phantom Type")	1	ALWAYS	
>>>>	CONTAINS	NUM	EV(113838, DCM, "DLP")	1	ALWAYS	UNITS = EV (mGy.cm, UCUM, "mGy.cm")
>>>>	CONTAINS	NUM	EV(113812, DCM, "Total Number of Irradiation events")	1	ALWAYS	UNITS = EV ({events},UCUM, "events")
>>>>	CONTAINER	CONTAINER	EV(113831, DCM, "CT X-Ray Source Parameters")	1-n	ALWAYS	
>>>>>	CONTAINS	NUM	EV (113733, DCM, "KVP")	1	ALWAYS	UNITS = EV (kV, UCUM, "kV")
>>>>>	CONTAINS	NUM	EV (113734, DCM, "X-Ray Tube Current")	1	ANAP	UNITS = EV (mA, UCUM, "mA")
>>>>>	CONTAINS	NUM	EV (113736, DCM, "Exposure")	1	ANAP	UNITS = EV (mAs, UCUM, "mAs")
>>>>>	CONTAINS	NUM	EV(200, 99CT_SOMX, “Effective Exposure”)	1	ANAP	UNITS = EV (mAs, UCUM, "mAs")
>>>>>	CONTAINS	TEXT	EV(113832, DCM, "Identification of the X-Ray Source")	1	ALWAYS	
>>>>>	CONTAINS	TEXT	EV(201, 99CT_SOMX, “Tin Filter”)	1	ALWAYS	
>>>>>	CONTAINS	TEXT	EV(202, 99CT_SOMX, “Additional Letter”)	1	ALWAYS	
>>>>>	CONTAINS	TEXT	EV(203, 99CT_SOMX, “Scan Number”)	1	ALWAYS	

8.3.3 Private Code definitions

Table 8-48: Private Code definitions

Code Value	Code Meaning	Definition	Notes
1	CT Examination Report	Report for one CT examination	
2	CT Acquisition Report	Report for one CT acquisition	
3	Scan protocols	Section for scan protocols within an CT examination	
100	Total mAs	Total mAs applied during one CT examination	
101	Range Name	Name of the range within a CT acquisition	
102	Performing Physicians Name	Name of the performing physician of a CT examination	
103	Operators' Name	Name of the operator of a CT examination	
300	CM Ratio	Ratio of the contrast medium	
500	Contrast	Section for contrast application	
550	Contrast Phase	Contrast phase indicator	
600	Patient Position Attributes	Section for patient positions	
601	Patient Position	Patient position within a Frame of Reference	
602	Frame of reference id	Unique identifier for a Frame of Reference	

Note: **SPECT*syngo*** contains additional private code definitions with coding scheme designator of 99NMG.

8.4 GRAYSCALE IMAGE CONSISTENCY

N/A

8.5 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES

8.5.1 NM Standard Extended SOP Class

The following table lists the data dictionary of all DICOM IOD attributes which are encoded in a DICOM standard where the Private Creator Identification is "SIEMENS MED NM".

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Phase start time	0019, xx93	SL		ANAP	AUTO
Number of Phases	0019, xxA1	SS		ANAP	AUTO
Number of repeats / phases	0019, xxA5	SS		ANAP	AUTO
Cycles Per Repeat	0019, xxA6	SS		ANAP	AUTO
Repeat Start time	0019, xxA7	SL		ANAP	AUTO
Repeat Stop time	0019, xxA8	SL		ANAP	AUTO
Effective Repeat Time	0019, xxA9	SL		ANAP	AUTO
Acquired Cycles Per Repeat	0019, xxAA	SS		ANAP	AUTO
Number of point sources used for NCO and MHR Calibrations	0033, xx28	SL		ANAP	USER
Crystal Thickness	0033, xx29	FL		ALWAYS	AUTO
Preset Name Used for Acquisition	0033, xx30	LO		ALWAYS	AUTO

Camera Configuration Angle	0033, xx31	FL		ALWAYS	AUTO
Pixel Scale factor	0033, xx38	FL		ANAP	AUTO
Specialized TOMO Type	0035, xx00	LO		ANAP	AUTO
Repeat ID	0035, xx04	SS		ANAP	AUTO
Phase ID	0035, xx05	SS		ANAP	AUTO
Whole Body Tomo Position Index	0041, xx01	SL		ANAP	AUTO
Whole Body Tomo Number of Positions	0041, xx02	SL		ANAP	AUTO
Total Counts	0045, xx05	SL		ALWAYS	AUTO
Collimator Type ID	0045, xx21	US		ALWAYS	AUTO
Point Source Number	0045, xx22	US		ANAP	AUTO
Calibration Type	0045, xx23	LO		ANAP	AUTO
Useful Field of View	0055, xxC0	SS		ANAP	AUTO
NM Pixel Units	0057, xx03	LO		ANAP	AUTO
Recon CT Input UID	0061, xx36	LO		ANAP	AUTO
Recon Output Type	0061, xx62	LT		ANAP	AUTO
NM Reconstruction Algorithm	0061, xx70	LT		ANAP	AUTO
xSPECT Quant Source Labels	0063, xx0C	LO		ANAP	AUTO
Assay Dose List	0063, xx80	FL		ANAP	AUTO
Assay Dose Date/Time List	0063, xx81	DT		ANAP	AUTO
Original Detector Index	0065, xx01	SS		ANAP	AUTO
Siemens Planar Data Organization	0065, xx02	LO		ANAP	AUTO
Minimum pixel value in frame	7FE3, xx14	OW		ANAP	AUTO
Maximum pixel value in frame	7FE3, xx15	OW		ANAP	AUTO
Number of R-Waves in a frame	7FE3, xx29	OW		ANAP	AUTO

The following table lists the data dictionary of all DICOM IOD attributes which are encoded in a DICOM standard where the Private Creator Identification is “SIEMENS MED MI”.

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
MI Scan ID	0067, xx01	LT		ALWAYS	AUTO
Scanner Console Generation	0067, xx02	LO	native *syngo*	ALWAYS	FIXED
Recon Parameters	0067, xx03	OB		ANAP	AUTO
Group Reconstruction ID	0067, xx04	LO		ANAP	AUTO
Device IVK	0067, xx05	LO		ALWAYS	FIXED
Raw Data Description	0067, xx14	LO		ALWAYS	AUTO
Raw Data Series Instance UIDs	0067, xx16	UI		ALWAYS	AUTO
Raw Data Referenced Series Instance UIDs	0067, xx17	UI		ALWAYS	AUTO
Raw Data Blob Sequence	0067, xx18	SQ		ALWAYS	AUTO
Raw Data Blob Sequence Element	0067, xx19	OB		ALWAYS	AUTO

8.5.2 PET Standard Extended SOP Class

The following table lists the data dictionary of all DICOM IOD attributes which are encoded in a DICOM standard where the Private Creator Identification is “SIEMENS MED NM”.

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Crystal Thickness	0033,xx29	FL		ALWAYS	AUTO
Preset Name Used for Acquisition	0033,xx30	LO		ALWAYS	AUTO
NM Reconstruction Algorithm	0061,xx70	LT		ANAP	AUTO
QSPECT Flag	0061,xx8D	SS	1	ALWAYS	FIXED

The following table lists the data dictionary of all DICOM IOD attributes which are encoded in a DICOM standard where the Private Creator Identification is “SIEMENS MED MI”.

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
MI Scan ID	0067,xx01	LT		ALWAYS	AUTO
Scanner Console Generation	0067,xx02	LO	native *syngo*	ALWAYS	FIXED
Recon Parameters	0067,xx03	OB		ANAP	AUTO
Group Reconstruction ID	0067,xx04	LO		ANAP	AUTO
Device IVK	0067,xx05	LO		ALWAYS	FIXED

The following table lists the data dictionary of all DICOM IOD attributes which are encoded in a DICOM standard where the Private Creator Identification is “SIEMENS MED PT”.

DICOM Attribute Name	Tag	VR	Value	Presence of Value	Source
Decay Correction DateTime	0071,xx22	DT		ANAP	AUTO

8.6 DICOM PRINT SCU – DETAILED STATUS DISPLAYS

The following tables document the behavior of **SPECT*syngo*** DICOM 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.

8.6.1 Common Status Information

"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
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
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	11x14 blue film supply	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
	magazine is low.	low.	
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
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 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

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
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

8.6.2 Additional DICOM Execution Status Information

Printer Status Info and Execution Status Info are defined terms and can therefore be extended or reduced by camera manufacturers. Therefore **SPECT*syngo*** shall be flexible.
If any other printer status info or execution status info is received (as described in Table 8.6.1), **SPECT*syngo*** will react as shown in the following table:

Printer Status / Execution	Printer / Execution Status Info	Description	Message string visible in the Job status bar	Other action for *syngo* / camera symbol
WARNING	<any other>	<not defined status info>	Camera info: <status info>	<None>/Interact
FAILURE	<any other>	<not defined status info>	Camera info: <status info> Queue stopped.	Queue for this camera will be STOPPED/ Queue stopped

The original language of this document is English.

Caution: Federal law restricts this device to sale by or on the order of a physician, dentist, or veterinarian (21 CFR 801.109(b)(1)).

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