# DICOM Conformance Statement

## Application Annex:
## SmartCT R1.3 on Interventional Workspot R1.8

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# 1. DICOM Conformance Statement Overview

For information about this section, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

## 2. Contents

# 3. Introduction

This DICOM Conformance Statement annex is applicable to the SmartCT R1.3 on Interventional Workspot R1.8 hosting platform, later referred to as SmartCT Application.
**SmartCT** is a 3D image visualization and analysis software product (Interventional Tool) intended to provide fast and high-resolution 3D visualization of vasculature, hemorrhages, soft tissue and bone structures.

## 3.1. Revision History

The revision history provides dates and differences of the different releases.

**Table 1: Revision History**

| Document Version | Date of Issue | Description of change |
|---|---|---|
| 01 | 13-Feb-2023 | First Release for SmartCT R1.3 on Interventional Workspot R1.8 |

## 3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

## 3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to ensure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its

equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

## 3.4. Definitions, Terms and Abbreviations

**Table 2: Definitions, Terms and Abbreviations**

| Abbreviation/Term | Explanation |
|---|---|
| AE | Application Entity |
| ANSI | American National Standard Institute |
| AP | Application Profile |
| BMI | Body Mass Index |
| BOT | Basic Offset Table |
| CD | Compact Disc |
| CD-R | CD-Recordable |
| CD-M | CD-Medical |
| CB | Contrast/Brightness |
| CR | Computed Radiography |
| CT | Computed Tomography |
| DCR | Dynamic Cardio Review |
| DICOM | Digital Imaging and Communications in Medicine |
| DIMSE | DICOM Message Service Element |
| DIMSE-C | DIMSE-Composite |
| DIMSE-N | DIMSE-Normalized |
| DX | Digital X-Ray |
| EBE | DICOM Explicit VR Big Endian |
| ELE | DICOM Explicit VR Little Endian |
| FSC | File-set Creator |
| FSR | File-set Reader |
| FSU | File-set Updater |
| GUI | Graphic User Interface |
| HIS | Hospital Information System |
| HL7 | Health Level Seven |
| ILE | DICOM Implicit VR Little Endian |
| IOD | Information Object Definition |
| IW | Interventional Workspot |
| MAR | Metal Artifact Reduction |
| MC | Motion Correction |
| MOD | Magneto-Optical Disk |
| MPPS | Modality Performed Procedure Step |
| MR | Magnetic Resonance |
| NEMA | National Electrical Manufacturers Association |
| NM | Nuclear Medicine |
| PDU | Protocol Data Unit |

| Abbreviation/Term | Explanation |
|---|---|
| RF | X-Ray Radiofluoroscopic |
| RIS | Radiology Information System |
| RT | Radiotherapy |
| RWA | Real-World Activity |
| SC | Secondary Capture |
| SCM | Study Component Management |
| SCP | Service Class Provider |
| SCU | Service Class User |
| SES | Session |
| SKULL | Skull Segmentation |
| SNS | Snapshot |
| SOP | Service Object Pair |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| UID | Unique Identifier |
| US | Ultrasound |
| USMF | Ultrasound Multi-frame |
| WLM | Worklist Management |
| XA | X-Ray Angiographic |

## 3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
National Electrical Manufacturers Association
1300 North 17th Street
Suite 900
Arlington, Virginia 22209
Internet: https://www.dicomstandard.org/current

## 4. Networking

For information about this section, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

## 5. Media Interchange

For information about this section, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

## 6. Support of Character Set

For information about this section, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

## 7. Security

For information about this section, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

# 8. Annexes of "SmartCT R1.3 Application"

## 8.1. IOD Contents

This section specifies each IOD accepted and / or created by SmartCT R1.3 Application.

ACCEPTED The applicable IOD is accepted for storage in the repository of the hosting platform and supported for import in SmartCT Application for viewing and analysis.

CREATED The SmartCT Application supports generation of derived data by using the applicable IOD and is able to store this data in the repository of the hosting platform.

**Table 3: Supported IOD's**

| IOD | | Supported | |
|---|---|---|---|
| **Name** | **UID** | **Accepted** | **Created** |
| X-Ray Angiographic Image Storage SOP Class* | 1.2.840.10008.5.1.4.1.1.12.1 | Yes | Yes |
| Secondary Capture Image Storage SOP Class** | 1.2.840.10008.5.1.4.1.1.7 | Yes | Yes |
| Multiframe True Color Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7.4 | No | Yes |
| X-Ray 3D Angiographic Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.13.1.1 | Yes | Yes |

***Note**: SmartCT supports the import of the following XA series from the Philips Azurion Modality:

- 3D acquisition series
- 2D acquisition series (2D X-ray and fluoro) received during the Live tasks from the Philips Azurion modality.
- Only these XA series can be recalled when the study is loaded again in SmartCT.

****Note:** The following Secondary Capture Images are created by the SmartCT application:

- DICOM Snapshot can be created in SmartCT application.
- Data objects with results of:
  - SmartCT session data (Tasks settings automatically created when the SmartCT application is closed).
  - Contrast/Brightness settings (for 2D X-ray overlay series)
  - Motion Compensation (for the 2D X-ray overlay series)
  - Skull Segmentation data (only created for VasoCT volumes)

Only the Secondary Capture objects containing the SmartCT session information, Contrast/Brightness data, Motion Compensation data and Skull Segmentation data can be used as input in the SmartCT app.
DICOM Secondary Capture snapshots cannot be viewed in the SmartCT application, but they can be viewed in the image viewer of the Interventional Workspot and in other appropriate DICOM image viewers.

### 8.1.1. Acceptance Criteria

This section specifies the acceptance criteria applied by SmartCT Application to which a dataset should adhere before it can be imported into the application. This can be criteria on the highest level (e.g. data from a certain manufacturer or system model) or certain DICOM attributes mandatory to be present into the dataset holding a specific value. In case one or more Philips private attributes are required, then a list of supported Philips system models will be mentioned.

**Table 4: Accepted System Models**

| Manufacturer | Modality | System Model Name(s) |
|---|---|---|
| Philips | XA | Allura<br>Azurion |

Table 5: Accepted Transfer Syntax per IOD

For information about this Table, Refer to HSDP-1068450 DICOM Conformance Statement Interventional Workspot R1.8.

Table 6: : Accepted Attribute Values

| Attribute Name | Attribute Number | Values/Comments |
|---|---|---|
| Not Applicable | Not Applicable | Not Applicable |

## 8.1.2. Created SOP Instance

This section specifies each IOD created by this application.
This section specifies each IOD created. It should specify the attribute name, tag, VR, and value. The value should specify 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 should be specified. Whether the value is always present or not shall be 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 |

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 |
| MPPS | The attribute value is the same as that use for Modality Performed Procedure Step |
| MWL | The attribute value source is a Modality Worklist |
| USER | The attribute value source is explicit user input |

### 8.1.2.1. List of Created SOP Classes

Table 7: List of Created SOP Classes

| SOP Class Name | SOP Class UID |
|---|---|
| X-Ray Angiographic Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.12.1 |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 |
| Multiframe True Color Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7.4 |
| X-Ray 3D Angiographic Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.13.1.1 |

#### 8.1.2.1.1 X-Ray Angiographic Image Storage SOP Class

The 2D overlay series received by SmartCT R1.3 from the X-ray modality in the live Task are stored as an X-ray Angiographic Image.

There are 2 types of overlay series:
- 2D exposure series.
- Fluoroscopy series.

Attribute values in the created X-ray Angiographic IOD can be different for 2D exposure series and Fluoroscopy series.

Differences in attribute values are indicated in the table below with:
- 2DXA
- FLUO

**Table 8: IOD of Created X-Ray Angiographic Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| | Patient Study Module | ALWAYS |
| Series | General Series Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| Acquisition | General Acquisition Module | ALWAYS |
| Image | General Image Module | ALWAYS |
| | Image Pixel Module | ALWAYS |
| | Cine Module | CONDITIONAL<br>(only present in multi frame XA runs) |
| | Multi-Frame Module | CONDITIONAL<br>(only present in multi frame XA runs) |
| | Display Shutter Module | ALWAYS |
| | X-Ray Image Module | ALWAYS |
| | X-Ray Acquisition Module | ALWAYS |
| | X-Ray Table Module | ALWAYS |
| | XA Positioner Module | ALWAYS |
| | DX Detector Module | ALWAYS |
| | VOI LUT Module | ALWAYS |
| | SOP Common Module | ALWAYS |

**Remark:** in tables below, source value = COPY means that the attribute value is copied from the imported X-Ray Angiographic run from the modality.

**Table 9: Patient Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | VNAP | COPY | |
| Patient ID | 0010,0020 | LO | | VNAP | COPY | |
| Patient's Birth Date | 0010,0030 | DA | | VNAP | COPY | |
| Patient's Sex | 0010,0040 | CS | | VNAP | COPY | |

**Table 10: General Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Accession Number | 0008,0050 | SH | | VNAP | COPY | |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | |
| Study ID | 0020,0010 | SH | | VNAP | COPY | |

**Table 11: Patient Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient Weight | 0010,1030 | DS | | ALWAYS | COPY | |

**Table 12: General Series Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | |
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Series Description | 0008,103E | LO | 2DXA: Copied from received 2D exposure series)<br>FLUO: “ SmartCT 2D overlay series ” | ALWAYS | AUTO, COPY | |
| Performing Physician's Name | 0008,1050 | PN | | ANAP | COPY | |
| Related Series Sequence | 0008,1250 | SQ | | VNAP | AUTO | Added by SmartCT |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| >Purpose of Reference Code Sequence | 0040,A170 | SQ | | VNAP | AUTO | |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Number | 0020,0011 | IS | 2DXA: 5000 + y (y = series number of 2D exposure series received from the X-ray system)<br>FLUO: <xxxxx> (xxxxx is received from the X_ray modality via proprietary CWIS interface and is added by the SmartCT app to the series) | ALWAYS | AUTO | |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | COPY | |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | COPY | |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | COPY | |

**Table 13: General Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | Philips | ALWAYS | FIXED | |
| Institution Name | 0008,0080 | LO | | VNAP | CONFIG | Hospital Name Configured in SW |
| Manufacturer's Model Name | 0008,1090 | LO | SmartCT | ALWAYS | FIXED | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | 12 digit MAC address of network card in IW system |
| Software Versions | 0018,1020 | LO | 1.3.x.y | ALWAYS | AUTO | where “x.y” is the detailed application SW Version |

**Table 14: General Acquisition Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Acquisition Date | 0008,0022 | DA | | ALWAYS | COPY | |
| Acquisition Time | 0008,0032 | TM | | ALWAYS | COPY | |

**Table 15: General Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | ORIGINAL\ PRIMARY\ SINGLE PLANE | ALWAYS | COPY | |
| Content Date | 0008,0023 | DA | | VNAP | COPY | |
| Content Time | 0008,0033 | TM | | ANAP | COPY | |
| Instance Number | 0020,0013 | IS | 2DXA: 12000 + y (y = run number of 2D exposure series received from the X-ray system) FLUO: <xxxx> (xxxx is generated by the SmartCT app) | ALWAYS | AUTO | |
| Patient Orientation | 0020,0020 | CS | | ANAP | COPY | |
| Lossy Image Compression | 0028,2110 | CS | | ANAP | COPY | |
| Icon Image Sequence | 0088,0200 | SQ | | ALWAYS | AUTO | |
| >Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | AUTO | |
| >Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| >Rows | 0028,0010 | US | 128 | ALWAYS | AUTO | |
| >Columns | 0028,0011 | US | 128 | ALWAYS | AUTO | |
| >Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| >Bits Stored | 0028,0101 | US | 8 | ALWAYS | AUTO | |
| >High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| >Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| >Pixel Data | 7FE0,0010 | OW/OB | | ALWAYS | AUTO | |

**Table 16: Image Pixel Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | COPY | |
| Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | COPY | |
| Rows | 0028,0010 | US | | ALWAYS | COPY | |
| Columns | 0028,0011 | US | | ALWAYS | COPY | |
| Bits Allocated | 0028,0100 | US | 16 | ALWAYS | COPY | |
| Bits Stored | 0028,0101 | US | 16 | ALWAYS | COPY | |
| High Bit | 0028,0102 | US | 15 | ALWAYS | COPY | |
| Pixel Representation | 0028,0103 | US | 0 | ALWAYS | COPY | |
| Pixel Data | 7FE0,0010 | OB/OW | | ALWAYS | COPY | |

**Table 17: Cine Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Cine Rate | 0018,0040 | IS | | ANAP | COPY | only present in multi-frame XA images |
| Frame Time | 0018,1063 | DS | | ANAP | COPY | only present in multi-frame XA images |

**Table 18: Multi-Frame Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Number of Frames | 0028,0008 | IS | | ANAP | COPY | only present in multi-frame XA images |
| Frame Increment Pointer | 0028,0009 | AT | 00181063 | ANAP | COPY | only present in multi-frame XA images |

**Table 19: Display Shutter Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Shutter Shape | 0018,1600 | CS | RECTANGULAR | ALWAYS | COPY | |
| Shutter Left Vertical Edge | 0018,1602 | IS | | ALWAYS | COPY | |
| Shutter Right Vertical Edge | 0018,1604 | IS | | ALWAYS | COPY | |
| Shutter Upper Horizontal Edge | 0018,1606 | IS | | ALWAYS | COPY | |
| Shutter Lower Horizontal Edge | 0018,1608 | IS | | ALWAYS | COPY | |

**Table 20: X-Ray Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | | ALWAYS | COPY | |
| Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | COPY | |
| Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | COPY | |
| Frame Increment Pointer | 0028,0009 | AT | 00181063 | ANAP | COPY | |
| Bits Allocated | 0028,0100 | US | 16 | ALWAYS | COPY | |
| Bits Stored | 0028,0101 | US | 16 | ALWAYS | COPY | |
| High Bit | 0028,0102 | US | 15 | ALWAYS | COPY | |
| Pixel Representation | 0028,0103 | US | 0 | ALWAYS | COPY | |
| Pixel Intensity Relationship | 0028,1040 | CS | LIN | ALWAYS | COPY | |
| Lossy Image Compression | 0028,2110 | CS | 00 | ALWAYS | COPY | |

**Table 21: X-Ray Acquisition Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| KVP | 0018,0060 | DS | | VNAP | COPY | |
| Exposure Time | 0018,1150 | IS | | VNAP | COPY | |
| Radiation Setting | 0018,1155 | CS | SC | ALWAYS | COPY | |
| Imager Pixel Spacing | 0018,1164 | DS | | ANAP | COPY | |
| Pixel Spacing | 0028,0030 | DS | | ALWAYS | COPY | |

**Table 22: X-Ray Table Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Table Motion | 0018,1134 | CS | STATIC | VNAP | COPY | |
| Table Angle | 0018,1138 | DS | | ANAP | COPY | |

**Table 23: XA Positioner Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Distance Source to Detector | 0018,1110 | DS | | ALWAYS | COPY | |
| Distance Source to Patient | 0018,1111 | DS | | ALWAYS | COPY | |
| Positioner Motion | 0018,1500 | CS | DYNAMIC | ANAP | COPY | Only present in dynamic scans |
| Positioner Primary Angle | 0018,1510 | DS | | ALWAYS | COPY | |
| Positioner Secondary Angle | 0018,1511 | DS | | ALWAYS | COPY | |
| Positioner Primary Angle Increment | 0018,1520 | DS | | ANAP | COPY | Only present in dynamic scans |
| Positioner Secondary Angle Increment | 0018,1521 | DS | | ANAP | COPY | Only present in dynamic scans |

**Table 24: DX Detector Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Imager Pixel Spacing | 0018,1164 | DS | | ALWAYS | COPY | |
| Pixel Spacing | 0028,0030 | DS | | ALWAYS | COPY | |

**Table 25: VOI LUT Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Window Center | 0028,1050 | DS | | ALWAYS | COPY | |
| Window Width | 0028,1051 | DS | | ALWAYS | COPY | |

**Table 26: SOP Common Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ANAP | AUTO | As supported by hosting platform |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | |
| SOP Class UID | 0008,0016 | UI | 1.2.840.10008.5.1.4.1.1.12.1 | ALWAYS | FIXED | |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | |
| Instance Number | 0020,0013 | IS | 2DXA: 12000 + y (y = run number of 2D exposure series received from the X-ray system)<br>FLUO: <xxxx> (value generated by SmartCT) | ALWAYS | AUTO | |

#### 8.1.2.1.2 Secondary Capture Image Storage SOP Class

The Secondary Capture Image Storage SOP class is used for the storage of the following SmartCT objects:

- Session
- Contrast/Brightness
- Motion Compensation
- Skull Segmentation
- Snapshot

In the tables below the attributes and attribute values are specified for above objects

**Table 27: IOD of Created Secondary Capture Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| | Patient Study Module | ALWAYS |
| Series | General Series Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| | SC Equipment Module | ALWAYS |
| Image | General Image Module | ALWAYS |
| | Image Pixel Module | ALWAYS |
| | SC Image Module | CONDITIONAL<br>(Only present in SNS object) |
| | VOI LUT Module | CONDITIONAL<br>(Not present in the SES, SNS and SKULL objects) |
| | SOP Common Module | ALWAYS |

**Table 28: Patient Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | VNAP | COPY | |
| Patient ID | 0010,0020 | LO | | VNAP | COPY | |
| Patient's Birth Date | 0010,0030 | DA | | VNAP | COPY | |
| Patient's Sex | 0010,0040 | CS | | VNAP | COPY | |

**Table 29: General Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | |
| Accession Number | 0008,0050 | SH | | VNAP | COPY | |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | |
| Study ID | 0020,0010 | SH | | VNAP | COPY | |

**Table 30: Patient Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Weight | 0010,1030 | DS | | ALWAYS | COPY | |

**Table 31: General Series Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Description | 0008,103E | LO | **SNS:** Snapshot<br>**SES:** SmartCT<br>**CB:** X-ray run contrast brightness data<br>**MC:** Motion Compensation Data<br>**SKULL:** SmartCT | ALWAYS | AUTO | |
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| Series Number | 0020,0011 | IS | **SNS:** 8001 (incremented by 1 for each additional snapshot)<br>**SES:** 5000 +y<br>**CB:** 5000 +y<br>**MC:** 5000 +y<br>**SKULL:** 5000 +y | ALWAYS | AUTO | y = number of primary exposure series received from the X-ray system. |
| Patient Position | 0018,5100 | CS | | ANAP | COPY | |
| Related Series Sequence | 0008,1250 | SQ | | VNAP | AUTO | |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| >Purpose of Reference Code Sequence | 0040,A170 | SQ | | VNAP | AUTO | |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | COPY | |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | COPY | |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | COPY | |

**Table 32: General Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | Philips | ALWAYS | FIXED | |
| Institution Name | 0008,0080 | LO | | VNAP | CONFIG | Hospital name configured in IW |
| Manufacturer's Model Name | 0008,1090 | LO | SmartCT | ALWAYS | FIXED | |
| Software Versions | 0018,1020 | LO | 1.3.x.y | ALWAYS | AUTO | where “x.y” is the detailed application SW Version |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | 12 digit MAC address of network card in IW system |

**Table 33: SC Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Conversion Type | 0008,0064 | CS | WSD | ALWAYS | FIXED | |

**Table 34: General Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | **SNS:** DERIVED\SECONDARY **SES:** DERIVED\SECONDARY\ SMART3D **CB:** DERIVED\SECONDARY\ CONBRIGHTRUN **MC:** DERIVED\SECONDARY\ MOTIONCOMP **SKULL:** DERIVED\SECONDARY\ SKULLSEGMENT | ALWAYS | AUTO | |
| Instance Number | 0020,0013 | IS | **SNS:** 7001 – 7nnn **SES:** 1 -> n **CB:** 1 **MC:**1 **SKULL:** 2 | ALWAYS | AUTO | |
| Patient Orientation | 0020,0020 | CS | | VNAP | AUTO | |
| Content Date | 0008,0023 | DA | | ANAP | AUTO | Only Present in SNS |
| Content Time | 0008,0033 | TM | | ANAP | AUTO | Only Present in SNS |

**Table 35: Image Pixel Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | 1: for MONOCHROME 1<br>3: for RGB | ALWAYS | AUTO | |
| Photometric Interpretation | 0028,0004 | CS | **SNS:** RGB **SES:** RGB | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| | | | **CB:** MONOCHROME 1<br>**MC:** MONOCHROME 1<br>**SKULL:** RGB | | | |
| Planar Configuration | 0028,0006 | US | 0 | ANAP | AUTO | Only present in SNS ,SKULL and SES objects |
| Rows | 0028,0010 | US | **SNS:** <values depend on connected monitor resolution><br>**SES:** 128<br>**CB:** 1<br>**MC:** 1<br>**SKULL:** 128 | ALWAYS | AUTO | |
| Columns | 0028,0011 | US | **SNS:** <values depend on connected monitor resolution><br>**SES:** 128<br>**CB:** 1<br>**MC:** 1<br>**SKULL:** 128 | ALWAYS | AUTO | |
| Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| Bits Stored | 0028,0101 | US | 8 | ALWAYS | AUTO | |
| High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| Pixel Data | 7FE0,0010 | OW /OB | | ALWAYS | AUTO | |

**Table 36: SC Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Date of Secondary Capture | 0018,1012 | DA | | ANAP | AUTO | Only present in SNS |
| Time of Secondary Capture | 0018,1014 | TM | | ANAP | AUTO | Only present in SNS |

Table 37: VOI LUT Module

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Window Center | 0028,1050 | DS | **SNS:** not present<br>**SES:** not present<br>**CB:** 128<br>**MC:** 128<br>**SKULL:** not present | ANAP | AUTO | |
| Window Width | 0028,1051 | DS | **SNS:** not present<br>**SES:** not present<br>**CB:** 256<br>**MC:** 256<br>**SKULL:** not present | ANAP | AUTO | |

Table 38: SOP Common Module

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ANAP | AUTO | As supported by hosting platform |
| 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 | |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | |
| Instance Number | 0020,0013 | IS | **SNS:** 7001 – 7nnn<br>**SES:** 1 -> n<br>**CB:** 1<br>**MC:**1<br>**SKULL:** 2 | ALWAYS | AUTO | |

#### 8.1.2.1.3 Multi-Frame True Color Secondary Capture Image Storage SOP Class

Multiframe True Color Secondary capture storage objects are used for:

- Saving of an automatic movie
- Saving of free interaction movies

In the tables below, for the attributes where source value = “COPY” it means that the value is copied from the imported XA run.
The other attribute values are defined by the SmartCT application or by the IW platform.

Table 39: IOD of Created Multi-Frame True Color Secondary Capture Image Storage SOP Class Instances

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| | Patient Study Module | ALWAYS |
| Series | General Series Module | ALWAYS |
| Frame of Reference | Frame of Reference Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |

| Information Entity | Module | Presence Of Module |
|---|---|---|
| | SC Equipment Module | ALWAYS |
| Image | General Image Module | ALWAYS |
| | Image Pixel Module | ALWAYS |
| | Cine Module | ALWAYS |
| | Multi-Frame Module | ALWAYS |
| | Multi-Frame Functional Groups Module | ALWAYS |
| | SC Image Module | ALWAYS |
| | SC Multi-Frame Image Module | ALWAYS |
| | SOP Common Module | ALWAYS |

**Table 40: Patient Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | VNAP | COPY | |
| Patient ID | 0010,0020 | LO | | VNAP | COPY | |
| Patient's Birth Date | 0010,0030 | DA | | VNAP | COPY | |
| Patient's Sex | 0010,0040 | CS | | VNAP | COPY | |

**Table 41: General Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | |
| Accession Number | 0008,0050 | SH | | VNAP | COPY | |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | |
| Study ID | 0020,0010 | SH | | VNAP | COPY | |

**Table 42: Patient Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Weight | 0010,1030 | DS | | ALWAYS | COPY | |

**Table 43: General Series Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | |
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Series Description | 0008,103E | LO | Movie | ALWAYS | AUTO | |
| Related Series Sequence | 0008,1250 | SQ | | VNAP | AUTO | |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| >Purpose of Reference Code Sequence | 0040,A170 | SQ | | VNAP | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | Each DICOM movie has a unique value |
| Series Number | 0020,0011 | IS | 6001 -> 6nnn | ALWAYS | AUTO | For each DICOM movie a new series number is created (where nnn is incremented in steps of 1) |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | COPY | |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | COPY | |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | COPY | |

**Table 44: Frame of Reference Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | |
| Position Reference Indicator | 0020,1040 | LO | | VNAP | AUTO | |

**Table 45: General Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | Philips | ALWAYS | FIXED | |
| Institution Name | 0008,0080 | LO | | VNAP | CONFIG | Hospital Name Configured in IW |
| Manufacturer's Model Name | 0008,1090 | LO | SmartCT | ALWAYS | FIXED | |
| Software Version(s) | 0018,1020 | LO | 1.3.x.y | ALWAYS | AUTO | where “x.y” is the detailed application SW Version |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | 12 digit MAC address of network card in IW system |

**Table 46: SC Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Conversion Type | 0008,0064 | CS | WSD | ALWAYS | FIXED | |

**Table 47: General Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Instance Number | 0020,0013 | IS | 9001 -> 9nnn | ALWAYS | AUTO | For each DICOM movie a new instance number is created (where nnn is incremented in steps of 1) |
| Patient Orientation | 0020,0020 | CS | | ANAP | AUTO | |
| Burned in Annotation | 0028,0301 | CS | YES | ALWAYS | AUTO | |
| Image Type | 0008,0008 | CS | DERIVED\SECONDARY | ALWAYS | AUTO | |
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | |
| Icon Image Sequence | 0088,0200 | SQ | | ALWAYS | AUTO | |
| >Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | AUTO | |
| >Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| >Rows | 0028,0010 | US | 128 | ALWAYS | AUTO | |
| >Columns | 0028,0011 | US | 128 | ALWAYS | AUTO | |
| >Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| >Bits Stored | 0028,0101 | US | 8 | ALWAYS | AUTO | |
| >High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| >Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| >Pixel Data | 7FE0,0010 | OW/OB | | ALWAYS | AUTO | |

**Table 48: Image Pixel Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | 3 | ALWAYS | AUTO | |
| Photometric Interpretation | 0028,0004 | CS | RGB | ALWAYS | AUTO | |
| Planar Configuration | 0028,0006 | US | 0 | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Rows | 0028,0010 | US | | ALWAYS | AUTO | Value depends on:<br>- monitor resolution<br>- navigation pane expanded (Y/N)<br>- main view maximized (Y/N) |
| Columns | 0028,0011 | US | | ALWAYS | AUTO | Value depends on:<br>- monitor resolution<br>- navigation pane expanded (Y/N)<br>- main view maximized (Y/N) |
| Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| Bits Stored | 0028,0101 | US | 8 | ALWAYS | AUTO | |
| High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| Pixel Representation | 0028,0103 | US | 0000 | ALWAYS | AUTO | |
| Pixel Data | 7FE0,0010 | OW/OB | | ALWAYS | AUTO | |

**Table 49: Cine Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Frame Time | 0018,1063 | DS | 100 | ALWAYS | AUTO | |
| Cine Rate | 0018,0040 | IS | 10 | ALWAYS | AUTO | |

**Table 50: Multi-Frame Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | Value depends on:<br>- movie type (auto or free)<br>- 2D or 3D view recording<br>- slice thickness (2D) |
| Frame Increment Pointer | 0028,0009 | AT | 00181063 | ALWAYS | AUTO | |

**Table 51: Multi-Frame Functional Groups Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Instance Number | 0020,0013 | IS | 9001 -> 9nnn | ALWAYS | AUTO | For each DICOM movie a new instance number is created (where nnn is incremented in steps of 1) |
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | Value depends on:<br>- movie type (auto or free)<br>- 2D or 3D view recording<br>- slice thickness (2D) |
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | |

**Table 52: SC Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Date of Secondary Capture | 0018,1012 | DA | | ALWAYS | AUTO | |
| Time of Secondary Capture | 0018,1014 | TM | | ALWAYS | AUTO | |

**Table 53: SC Multi-Frame Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Frame Increment Pointer | 0028,0009 | AT | 00181063 | ALWAYS | AUTO | |
| Burned In Annotation | 0028,0301 | CS | YES | ALWAYS | AUTO | |

**Table 54: SOP Common Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| SOP Class UID | 0008,0016 | UI | 1.2.840.10008.5.1.4.1.1.7.4 | ALWAYS | FIXED | |
| Specific Character Set | 0008,0005 | CS | | ANAP | AUTO | As supported by hosting platform |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | |
| Instance Number | 0020,0013 | IS | 9001 -> 9nnn | ALWAYS | AUTO | For each DICOM movie a new |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| | | | | | | instance number is created (where nnn is incremented in steps of 1) |

#### 8.1.2.1.4 X-Ray 3D Angiographic Image Storage SOP Class

The X-Ray 3D angiographic Image is created from the 3D acquisition run that is received from the X-ray system.

In the SmartCT application the X-ray 3D angiographic image is created as a result of:

- New reconstruction.
- Subtracted reconstruction.

**Table 55: IOD of Created X-Ray 3D Angiographic Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| | Patient Study Module | ALWAYS |
| Series | General Series Module | ALWAYS |
| | Enhanced Series Module | ALWAYS |
| Frame of reference | Frame of reference Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| | Enhanced General Equipment Module | ALWAYS |
| Image | Image Pixel Module | ALWAYS |
| | Acquisition Context Module | ALWAYS |
| | Multi-Frame Functional Groups Module | ALWAYS |
| | X-Ray 3D Image Module | ALWAYS |
| | X-Ray 3D Reconstruction Module | ALWAYS |
| | SOP Common Module | ALWAYS |

**Table 56: Patient Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | VNAP | COPY | |
| Patient ID | 0010,0020 | LO | | VNAP | COPY | |
| Patient's Birth Date | 0010,0030 | DA | | VNAP | COPY | |
| Patient's Sex | 0010,0040 | CS | | VNAP | COPY | |

**Table 57: General Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | |
| Accession Number | 0008,0050 | SH | | VNAP | COPY | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | |
| Study ID | 0020,0010 | SH | | VNAP | COPY | |

**Table 58: Patient Study Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Patient's Weight | 0010,1030 | DS | | ALWAYS | COPY | |

**Table 59: General Series Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | |
| Modality | 0008,0060 | CS | XA | ALWAYS | FIXED | |
| Series Description | 0008,103E | LO | CBCT /VasoCT volumes:<br><reconstruction size>%, <resolution size>, <smoothness/optimize for>, MAR, BMI,<br>3DRA volumes<br>Subtracted, <reconstruction size>%, <resolution size>, <smoothness/optimize for> | ALWAYS | AUTO | MAR, BMI, and Subtracted are added when applicable |
| Performing Physician Name | 0008,1050 | PN | | VNAP | COPY | |
| Related Series Sequence | 0008,1250 | SQ | | VNAP | AUTO | |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| >Purpose of Reference Code Sequence | 0040,A170 | SQ | | ANAP | AUTO | |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | |
| Series Number | 0020,0011 | IS | 5000 + y (y = number of primary acquisition run received from the X-ray system) | ALWAYS | AUTO | |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | COPY | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | COPY | |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | COPY | |

**Table 60: Enhanced Series Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Series Number | 0020,0011 | IS | 5nnn | ALWAYS | AUTO | nnn = number 3D acq run from X-ray system |

**Table 61: Frame of Reference Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | |
| Position Reference Indicator | 0020,1040 | LO | | VNAP | COPY | |

**Table 62: General Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | Philips | ALWAYS | FIXED | |
| Institution Name | 0008,0080 | LO | | VNAP | CONFIG | Hospital name configured in IW |
| Manufacturer's Model Name | 0008,1090 | LO | Smart CT | ALWAYS | FIXED | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | 12 digit MAC address of network card in IW system |
| Software Versions | 0018,1020 | LO | 1.3.x. y | ALWAYS | AUTO | where “x.y” is the detailed application SW Version |

**Table 63: Enhanced General Equipment Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | Philips | ALWAYS | FIXED | |
| Manufacturer's Model Name | 0008,1090 | LO | Smart CT | ALWAYS | FIXED | Hospital name configured in IW |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | 12 digit MAC address of network card in IW system |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Software Versions | 0018,1020 | LO | 1.3 x.y | ALWAYS | AUTO | where “x.y” is the detailed version of the SmartCT application Version |

**Table 64: Image Pixel Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | AUTO | |
| Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| Rows | 0028,0010 | US | | ALWAYS | AUTO | Value depends on:<br>- reconstruction type (subtracted/non-subtracted)<br>- selected reconstruction size |
| Columns | 0028,0011 | US | | ALWAYS | AUTO | Value depends on:<br>- reconstruction type (subtracted/non-subtracted)<br>- selected reconstruction size |
| Bits Allocated | 0028,0100 | US | 16 | ALWAYS | AUTO | |
| Bits Stored | 0028,0101 | US | 16 | ALWAYS | AUTO | |
| High Bit | 0028,0102 | US | 15 | ALWAYS | AUTO | |
| Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| Pixel Data | 7FE0,0010 | OW | | ALWAYS | AUTO | |

**Table 65: Acquisition Context Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Acquisition Context Sequence | 0040,0555 | SQ | | VNAP | AUTO | |

**Table 66: Multi-Frame Functional Groups Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Instance Number | 0020,0013 | IS | 1 | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | Value depends on:<br>- reconstruction type (subtracted/non-subtracted)<br>- selected reconstruction size |
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | |
| Shared Functional Groups Sequence | 5200,9229 | SQ | | ALWAYS | AUTO | |
| >Frame Anatomy Sequence | 0020,9071 | SQ | | ALWAYS | AUTO | |
| >>Anatomic Region Sequence | 0008,2218 | SQ | | ALWAYS | AUTO | |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | |
| >>Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | |
| >Pixel Measures Sequence | 0028,9110 | SQ | | ALWAYS | AUTO | |
| >>Slice Thickness | 0018,0050 | DS | | ALWAYS | AUTO | |
| >>Pixel Spacing | 0028,0030 | DS | | ALWAYS | AUTO | |
| >Frame VOI LUT Sequence | 0028,9132 | SQ | | ALWAYS | AUTO | |
| >>Window Center | 0028,1050 | DS | | ALWAYS | AUTO | |
| >>Window Width | 0028,1051 | DS | | ALWAYS | AUTO | |
| Per-frame Functional Groups Sequence | 5200,9230 | SQ | | ALWAYS | AUTO | |
| >X-Ray 3D Frame Type Sequence | 0018,9504 | SQ | | ALWAYS | AUTO | |
| >>Frame Type | 0008,9007 | CS | DERIVED\PRIMARY\ VOLUME\NONE | ALWAYS | AUTO | |
| >>Pixel Presentation | 0008,9205 | CS | MONOCHROME | ALWAYS | AUTO | |
| >>Volumetric Properties | 0008,9206 | CS | VOLUME | ALWAYS | AUTO | |
| >>Volume Based Calculation Technique | 0008,9207 | CS | NONE | ALWAYS | AUTO | |
| >>Reconstruction Index | 0020,9536 | US | 1 -> n | ALWAYS | AUTO | Value incremented by 1 for each new reconstruction |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| >Frame Content Sequence | 0020,9111 | SQ | | ALWAYS | AUTO | |
| >Plane Position Sequence | 0020,9113 | SQ | | ALWAYS | AUTO | |
| >>Image Position (Patient) | 0020,0032 | DS | | ALWAYS | AUTO | |
| >Plane Orientation Sequence | 0020,9116 | SQ | | ALWAYS | AUTO | |
| >>Image Orientation (Patient) | 0020,0037 | DS | | ALWAYS | AUTO | |

**Table 67: X-Ray 3D Image Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | For 3DRA volume: DERIVED\SECONDARY\AXIAL\3DRA_PROP or 3DRA_ROLL<br>For CBCT/VasoCT volume: DERIVED\SECONDARY\AXIAL\XPERCT_PROP or XPERCT_ROLL | ALWAYS | AUTO | 4th value indicates if the scan was acquired with:<br>- 3DRA or CBCT procedure<br>- prop or roll scan |
| Pixel Presentation | 0008,9205 | CS | MONOCHROME | ALWAYS | AUTO | |
| Volumetric Properties | 0008,9206 | CS | VOLUME | ALWAYS | AUTO | |
| Volume Based Calculation Technique | 0008,9207 | CS | NONE | ALWAYS | AUTO | |
| Content Qualification | 0018,9004 | CS | PRODUCT | ALWAYS | AUTO | |
| Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | AUTO | |
| Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| Bits Allocated | 0028,0100 | US | 16 | ALWAYS | AUTO | |
| Bits Stored | 0028,0101 | US | 16 | ALWAYS | AUTO | |
| High Bit | 0028,0102 | US | 15 | ALWAYS | AUTO | |
| Burned In Annotation | 0028,0301 | CS | NO | ALWAYS | AUTO | |
| Lossy Image Compression | 0028,2110 | CS | 00 | ALWAYS | AUTO | |
| Icon Image Sequence | 0088,0200 | SQ | | ALWAYS | AUTO | |
| >Samples per Pixel | 0028,0002 | US | 1 | ALWAYS | AUTO | |
| >Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| >Rows | 0028,0010 | US | 128 | ALWAYS | AUTO | |

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| >Columns | 0028,0011 | US | 128 | ALWAYS | AUTO | |
| >Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| >Bits Stored | 0028,0101 | US | 8 | ALWAYS | | |
| >High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| >Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| >Pixel Data | 7FE0,0010 | OW | | ALWAYS | AUTO | |
| Presentation LUT Shape | 2050,0020 | CS | IDENTITY | ALWAYS | AUTO | |

**Table 68: X-Ray 3D Reconstruction Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| X-Ray 3D Reconstruction Sequence | 0018,9530 | SQ | | ALWAYS | AUTO | |
| >Application Name | 0018,9524 | LO | Interventional Workspot/SmartCT | ALWAYS | FIXED | |
| >Application Version | 0018,9525 | LO | 1.8.x | ALWAYS | AUTO | where “x.y” is the detailed Interventional Workspot/SmartCT version |
| >Application Manufacturer | 0018,9526 | LO | Philips | ALWAYS | FIXED | |
| >Algorithm Type | 0018,9527 | CS | FILTER_BACK_PROJ | ALWAYS | FIXED | |
| >Acquisition Index | 0020,9518 | US | 1 | ALWAYS | AUTO | |

**Table 69: SOP Common Module**

| Attribute Name | TAG | VR | Value | Presence of Value | Source | Comments |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ANAP | AUTO | As supported by hosting platform |
| SOP Class UID | 0008,0016 | UI | 1.2.840.10008.5.1.4.1.1.13.1.1 | ALWAYS | FIXED | |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | |
| Instance Number | 0020,0013 | IS | 1 | ALWAYS | AUTO | |
| Original Specialized SOP Class UID | 0008,001B | UI | | ALWAYS | AUTO | |
| Content Qualification | 0018,9004 | CS | PRODUCT | ALWAYS | AUTO | |

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