DICOM Conformance Statement

Application Annex:
EmboGuide R1.1
On Interventional Workspot R1.5
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1. Introduction
This DICOM Conformance Statement annex is applicable to the EmboGuide 1.1 Application, later referred to as EmboGuide application. In general the EmboGuide application is the user environment for viewing and analyzing XA images in order to guide the physician during tumor embolization procedures.

1.1. Revision History
The revision history below provides dates and differences among individual document versions.

<table>
<thead>
<tr>
<th>Document Version</th>
<th>Date of Issue</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>19-Sep-2018</td>
<td>Authorized</td>
<td>Final Version for EmboGuide R1.1 on Interventional Workspot R1.5</td>
</tr>
</tbody>
</table>

1.2. Terminology
DICOM       Digital Imaging and Communications in Medicine
IOD         Information Object Definition
UID         Unique Identifier
VR          Value Representation
2. Data Specifications

2.1. Supported IODs

This section specifies each IOD accepted and / or created by EmboGuide Application.

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

**CREATED** The EmboGuide 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>
<thead>
<tr>
<th>IOD</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Raw Data Storage SOP Class</strong></td>
<td><strong>ACCEPTED</strong></td>
</tr>
<tr>
<td><strong>X-Ray Angiographic Image Storage SOP Class</strong></td>
<td><strong>CREATED</strong></td>
</tr>
<tr>
<td><strong>Multiframe True Color Secondary Capture Image Storage SOP Class</strong></td>
<td><strong>CREATED</strong></td>
</tr>
<tr>
<td><strong>Secondary Capture Image Storage SOP Class</strong></td>
<td><strong>CREATED</strong></td>
</tr>
</tbody>
</table>

**Table 2: Supported IOD’s**

### 2.1.1. Acceptance Criteria

This section specifies the acceptance criteria applied by EmboGuide 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 3: Accepted system models**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Modality</th>
<th>System Model Name(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Table 4: Accepted transfer syntaxes per IOD**

<table>
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<th>IOD</th>
<th>Transfer Syntax</th>
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<tbody>
<tr>
<td><strong>X-Ray Angiographic Image Storage SOP Class</strong></td>
<td>Implicit VR Little Endian</td>
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<tr>
<td></td>
<td>Explicit VR Big Endian</td>
</tr>
<tr>
<td></td>
<td>Explicit VR Little Endian</td>
</tr>
<tr>
<td></td>
<td>JPEG 2000 Image Compression</td>
</tr>
<tr>
<td></td>
<td>JPEG 2000 Image Compression (Lossless Only)</td>
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<td></td>
<td>JPEG Baseline (Process 1)</td>
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<td>JPEG Extended (Process 2 &amp; 4)</td>
</tr>
<tr>
<td></td>
<td>JPEG Lossless, Non-Hierarchical, FOP (Process 14)</td>
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<td></td>
<td>RLE Lossless</td>
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</table>

**Table 5: Accepted attribute values**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Attribute Number</th>
<th>Values / Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### 2.1.2. Contents of Created IOD’s

This section specifies in detail the attribute contents of created data objects. Attributes are grouped together by its corresponding module as specified by DICOM standard. Philips private attributes are excluded for specification.
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

### 2.1.2.1. List of created SOP Classes

Table 6: List of created SOP Classes

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Ray Angiographic Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.12.1</td>
</tr>
<tr>
<td>Raw Data Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.66</td>
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<tr>
<td>Secondary Capture Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.7</td>
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<td>Multiframe True Color Secondary Capture Image Storage SOP Class</td>
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### 2.1.2.2. X-Ray Angiographic Image Storage SOP Class

Table 7: IOD of Created X-Ray Angiographic Image Storage Instances

<table>
<thead>
<tr>
<th>Information Entity</th>
<th>Module</th>
<th>Presence Of Module</th>
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<td>Patient</td>
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<tr>
<td>Series</td>
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<td>ALWAYS</td>
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<tr>
<td>Equipment</td>
<td>General Equipment Module</td>
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<tr>
<td>Image</td>
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<tr>
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<td>Image Pixel Module</td>
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</tr>
<tr>
<td></td>
<td>Cine Module</td>
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</tr>
<tr>
<td></td>
<td>Multi-Frame Module</td>
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<tr>
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<td>Display Shutter Module</td>
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<tr>
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<td>X-Ray Table Module</td>
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<td>DX Detector Module</td>
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Table 8: Patient Module

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<th>Comment</th>
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<td>VNAP</td>
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<td>Attribute Name</td>
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<td>Value</td>
<td>Presence of Value</td>
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Table 10: General Series Module

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<td>VNAP</td>
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<td>ANAP</td>
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Table 11: General Equipment Module

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<th>VR</th>
<th>Value</th>
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<tbody>
<tr>
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<td>Philips</td>
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<tr>
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<td>0008,0080</td>
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<td>Manufacturer's Model Name</td>
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<td>Interventional Workspot</td>
<td>ANAP</td>
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<td>Software Versions</td>
<td>0018,1020</td>
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<td>1.5.x</td>
<td>ANAP</td>
<td></td>
<td>where &quot;x&quot; is the detailed application SW version.</td>
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### Table 12: General Image Module

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<th>Value</th>
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<tbody>
<tr>
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<td>ANAP</td>
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<td>VNAP</td>
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<tr>
<td>Patient Orientation</td>
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<td>CS</td>
<td>ANAP</td>
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<td>Lossy Image Compression</td>
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<td>ANAP</td>
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<td>&gt; Samples per Pixel</td>
<td>0028,0002</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&gt; Photometric Interpretation</td>
<td>0028,0004</td>
<td>CS</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Rows</td>
<td>0028,0010</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
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<td>&gt; Columns</td>
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<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Bits Allocated</td>
<td>0028,0100</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Bits Stored</td>
<td>0028,0101</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; High Bit</td>
<td>0028,0102</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
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<tr>
<td>&gt; Pixel Representation</td>
<td>0028,0103</td>
<td>US</td>
<td>ALWAYS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&gt; Pixel Data</td>
<td>7FE0,0010</td>
<td>OW/OB</td>
<td>ANAP</td>
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<td>&gt; Image Type</td>
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<td>ANAP</td>
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<tr>
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<td>ANAP</td>
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<td>UI</td>
<td>ANAP</td>
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<td>ANAP</td>
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<td>&gt; Patient Orientation</td>
<td>0020,0020</td>
<td>CS</td>
<td>ANAP</td>
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### Table 13: Image Pixel Module

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<tr>
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<th>VR</th>
<th>Value</th>
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<td>Rows</td>
<td>0028,0010</td>
<td>US</td>
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<td>Columns</td>
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<td>Bits Allocated</td>
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<td>ALWAYS</td>
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### Table 14: Cine Module

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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
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### Table 15: Multi-Frame Module

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### Table 17: X-Ray Image Module

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### Table 18: X-Ray Acquisition Module

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<td></td>
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### Table 19: X-Ray Table Module

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### Table 20: XA Positioner Module

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<td>ANAP</td>
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<td>VNFAP</td>
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<tr>
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Positioner Primary Angle Increment 0018,1520 DS VNAP
Positioner Secondary Angle Increment 0018,1521 DS VNAP

Table 21: DX Detector Module

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<tr>
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<tr>
<td>Pixel Spacing</td>
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Table 22: VOI LUT Module

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Table 23: SOP Common Module

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2.1.2.3. Raw data Storage SOP class

Table 24: IOD of Created Raw Data Storage SOP Class Instances

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<td>Series</td>
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<td>Frame of Reference Module</td>
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<td>General Equipment Module</td>
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<td>Image</td>
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Table 25 : Patient Module

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<td>Patient's Birth Date</td>
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<td>Attribute Name</td>
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<td>VR</td>
<td>Value</td>
<td>Presence of Value</td>
<td>Source</td>
<td>Comment</td>
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**Table 26: General Study Module**

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<tr>
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<td>VNAP</td>
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**Table 27: General Series Module**

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**Table 28: Frame of Reference Module**

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### Table 29: General Equipment Module

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<td>Philips</td>
<td>VNAP</td>
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<td>LO</td>
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<td>ANAP</td>
<td>USER</td>
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<td>Interventional Workspot</td>
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### Table 30: Acquisition Context Module

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### Table 31: Raw Data Module

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<td>ANAP</td>
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### Table 32: SOP Common Module

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<th>Value</th>
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<th>Source</th>
<th>Comment</th>
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<tbody>
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<td>0008,0016</td>
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</tr>
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<td>VNAP</td>
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<td>copied from source data</td>
</tr>
<tr>
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<td>TM</td>
<td></td>
<td>VNAP</td>
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### 2.1.2.4. Secondary Capture Image Storage SOP class

#### Table 33: IOD of Created Secondary Capture Image Storage SOP Class Instances

<table>
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<tr>
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<td>Study</td>
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<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>General Series Module</td>
<td>ALWAYS</td>
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<tr>
<td>Equipment</td>
<td>General Equipment Module</td>
<td>CONDITIONAL</td>
</tr>
<tr>
<td></td>
<td>SC Equipment Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>General Image Module</td>
<td>ALWAYS</td>
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<tr>
<td></td>
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### Table 34: Patient Module

<table>
<thead>
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<th>Source</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
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<td>PN</td>
<td></td>
<td>ALWAYS</td>
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</tr>
<tr>
<td>Patient ID</td>
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<td>LO</td>
<td></td>
<td>ALWAYS</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
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<td>DA</td>
<td></td>
<td>ALWAYS</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Patient's Sex</td>
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### Table 35: General Study Module

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<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>DA</td>
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<td>ALWAYS</td>
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</tr>
<tr>
<td>Study Time</td>
<td>0008,0030</td>
<td>TM</td>
<td></td>
<td>ALWAYS</td>
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</tr>
<tr>
<td>Accession Number</td>
<td>0008,0050</td>
<td>SH</td>
<td></td>
<td>VNAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referring Physician's Name</td>
<td>0008,0090</td>
<td>PN</td>
<td></td>
<td>VNAP</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>0020,000D</td>
<td>UI</td>
<td></td>
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</tr>
<tr>
<td>Study ID</td>
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<td>SH</td>
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### Table 36: General Series Module

<table>
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<th>Value</th>
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<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0008,0021</td>
<td>DA</td>
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<td>ALWAYS</td>
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</tr>
<tr>
<td>Series Time</td>
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<td>TM</td>
<td></td>
<td>ALWAYS</td>
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<td>copied from source data</td>
</tr>
<tr>
<td>Modality</td>
<td>0008,0060</td>
<td>CS</td>
<td></td>
<td>ALWAYS</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
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<td>UI</td>
<td></td>
<td>ALWAYS</td>
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</tr>
<tr>
<td>Series Number</td>
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<td>IS</td>
<td></td>
<td>VNAP</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
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<td>SQ</td>
<td></td>
<td>VNAP</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>UI</td>
<td></td>
<td>ALWAYS</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>UI</td>
<td></td>
<td>ALWAYS</td>
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<tr>
<td>&gt;Purpose of Reference Code Sequence</td>
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<td>SQ</td>
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### Table 37: General Equipment Module

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<tbody>
<tr>
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<td>0008,0070</td>
<td></td>
<td>Philips</td>
<td></td>
<td>VNAP</td>
<td></td>
</tr>
<tr>
<td>Station Name</td>
<td>0008,1010</td>
<td>SH</td>
<td></td>
<td></td>
<td>ANAP</td>
<td></td>
</tr>
<tr>
<td>Manufacturer’s Model Name</td>
<td>0008,1090</td>
<td>LO</td>
<td></td>
<td>Interventional Workspot</td>
<td>ALWAYS</td>
<td>FIXED</td>
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2.1.2.5. Multiframe True Color Secondary Capture Image Storage SOP class

Table 42: IOD of Created Multiframe True Color Secondary Capture Image Storage SOP Class Instances

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<th>Module</th>
<th>Presence Of Module</th>
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</table>
Table 33: Patient Module

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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
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<td>0010,0010</td>
<td>PN</td>
<td></td>
<td>VNAP</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Patient ID</td>
<td>0010,0020</td>
<td>LO</td>
<td></td>
<td>VNAP</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
<td>0010,0030</td>
<td>DA</td>
<td></td>
<td>VNAP</td>
<td>COPY</td>
<td>copied from source data</td>
</tr>
<tr>
<td>Patient's Sex</td>
<td>0010,0040</td>
<td>CS</td>
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<td>VNAP</td>
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Table 34: General Study Module

<table>
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<th>Source</th>
<th>Comment</th>
</tr>
</thead>
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<td>VNAP</td>
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</tr>
<tr>
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<td>TM</td>
<td></td>
<td>VNAP</td>
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</tr>
<tr>
<td>Accession Number</td>
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<td>VNAP</td>
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<tr>
<td>Referring Physician's Name</td>
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<td>PN</td>
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<td>VNAP</td>
<td>COPY</td>
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</tr>
<tr>
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<td></td>
<td>ALWAYS</td>
<td>COPY</td>
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</tr>
<tr>
<td>Study ID</td>
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<td>SH</td>
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<td>VNAP</td>
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Table 35: General Series Module

<table>
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<th>Source</th>
<th>Comment</th>
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</thead>
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<td>ANAP</td>
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<tr>
<td>Series Time</td>
<td>0008,0031</td>
<td>TM</td>
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<td>ANAP</td>
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<tr>
<td>Modality</td>
<td>0008,0060</td>
<td>CS</td>
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<td>ALWAYS</td>
<td>COPY</td>
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</tr>
<tr>
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<td>UI</td>
<td></td>
<td>ALWAYS</td>
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<tr>
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<td>0020,0011</td>
<td>IS</td>
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</tr>
<tr>
<td>Related Series Sequence</td>
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<td>SQ</td>
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<td>ANAP</td>
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</table>
DICOM Conformance Statement application annex: EmboGuide R1.1 on Interventional Workspot R1.5

>Study Instance UID       0020,000D UI ALWAYS
>Series Instance UID      0020,000E UI ALWAYS
>Purpose of Reference Code Sequence  0040,A170 SQ VNAP

<table>
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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>0008,0070</td>
<td>LO</td>
<td>Philips</td>
<td>VNAP</td>
<td>COPY</td>
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</tr>
<tr>
<td>Station Name</td>
<td>0008,1010</td>
<td>SH</td>
<td>ANAP</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Manufacturer’s Model Name</td>
<td>0008,1090</td>
<td>LO</td>
<td>Interventional Workspot</td>
<td>ANAP</td>
<td>FIXED</td>
<td></td>
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<td>LO</td>
<td>1.5.x</td>
<td>ANAP</td>
<td>FIXED</td>
<td>where “x” is the detailed application SW version.</td>
</tr>
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<table>
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<th>Source</th>
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<td>ANAP</td>
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<td>WSD</td>
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<table>
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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
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<tbody>
<tr>
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<td>VNAP</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Patient Orientation</td>
<td>0020,0020</td>
<td>CS</td>
<td>VNAP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burned in Annotation</td>
<td>0028,0301</td>
<td>CS</td>
<td>ANAP</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
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</thead>
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<tr>
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<td>0028,0002</td>
<td>US</td>
<td>ALWAYS</td>
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<td></td>
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<td>ALWAYS</td>
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<td>ALWAYS</td>
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<td>Rows</td>
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<td>US</td>
<td>ALWAYS</td>
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</tr>
<tr>
<td>Bits Allocated</td>
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<td>8</td>
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<tr>
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<td>US</td>
<td>8</td>
<td>ALWAYS</td>
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<tr>
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<td>ALWAYS</td>
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<td></td>
<td>copied from source data</td>
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<table>
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<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
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</thead>
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<td>ALWAYS</td>
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### Table 51: Multi-Frame Module

<table>
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<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>DS</td>
<td>ALWAYS</td>
<td>COPY</td>
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<td></td>
</tr>
<tr>
<td>Frame Increment Pointer</td>
<td>0028,0009</td>
<td>AT</td>
<td>ALWAYS</td>
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### Table 52: Multi-Frame Functional Groups Module

<table>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>IS</td>
<td>ALWAYS</td>
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</tr>
<tr>
<td>Number of Frames</td>
<td>0028,0008</td>
<td>IS</td>
<td>ALWAYS</td>
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### Table 53: SC Multi-Frame Image Module

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<th>Value</th>
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<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Increment Pointer</td>
<td>0028,0009</td>
<td>AT</td>
<td>ALWAYS</td>
<td>COPY</td>
<td>copied from source data</td>
<td></td>
</tr>
<tr>
<td>Burned In Annotation</td>
<td>0028,0301</td>
<td>CS</td>
<td>ALWAYS</td>
<td>COPY</td>
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<td></td>
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</table>

### Table 54: SOP Common Module

<table>
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<th>Attribute Name</th>
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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
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<tbody>
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