DICOM Conformance Statement (Annex)

syngo Application Software VE2

SIEMENS Healthineers

1 Conformance Statement Object Overview

The *syngo* Application Software creates various DICOM objects which are encoded in different SOP classes. It conforms to the DICOM Standard and creates the SOP Classes as listed in Table 1: SOP Classes.

Table 1: SOP Classes

SOP Classes	SOP Class UID	Create	Display
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes (Note 1)
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes

Note 1: current restriction: only self-created objects.

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3 Introduction

3.1 Revision History

Table 2 - Revision History

Product	Product Version	Document Version	Date
syngo Application Software on ARTIS icono	VE20A	10999021-ESK-001-00	01/2019
syngo Application Software on ARTIS icono	VE20B	10999021-ESK-001-01	10/2019

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

This DICOM Conformance Statement is an annex to the ARTIS icono DICOM Conformance Statement. It is only to be used in conjunction with the ARTIS icono DICOM Conformance Statement and not to be used autonomously.

4 IOD Contents

4.1 Created SOP Instances

4.1.1 Common Modules

4.1.1.1 Supported attributes on Patient level

The *syngo* Application Software copies the listed attributes – if provided – from original images.

Table 3: Patient level attributes

Attribute Name	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Issuer of Patient ID	(0010,0021)
Patient's Birth Date	(0010,0030)
Patient's Birth Time	(0010,0032)
Patient's Sex	(0010,0040)
Other Patient IDs	(0010,1000)

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Attribute Name	Tag
Other Patient Names	(0010,1001)
Patient's Birth Name	(0010,1005)
Patient's Address	(0010,1040)
Military Rank	(0010,1080)
Branch of Service	(0010,1081)
Ethnic Group	(0010,2160)
Patient Comments	(0010,4000)

4.1.1.2 Supported attributes on Study level

The *syngo* Application Software copies the listed attributes – if provided – from original images.

Table 4: Study level attributes

Attribute Name	Tag
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Referring Physician's Name	(0008,0090)
Study Description	(0008,1030)
Procedure Code Sequence	(0008,1032)
>Code Value	(0008,0100)
>Coding Scheme Designator	(0008,0102)
>Code Meaning	(0008,0104)
Admitting Diagnoses Description	(0008,1080)
Referenced Study Sequence	(0008,1110)
>Referenced SOP Class UID	(0008,1150)
>Referenced SOP Instance UID	(0008,1155)
Patient's Age	(0010,1010)
Patient's Size	(0010,1020)
Patient's Weight	(0010,1030)
Medical Alerts	(0010,2000)
Allergies	(0010,2110)
Smoking Status	(0010,21A0)

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Attribute Name	Tag
Additional Patient History	(0010,21B0)
Pregnancy Status	(0010,21C0)
Last Menstrual Date	(0010,21D0)
Study Instance UID	(0020,000D)
Study ID	(0020,0010)
Study ID Issuer	(0032,0012)
Requesting Physician	(0032,1032)
Study Comments	(0032,4000)
Admission ID	(0038,0010)
Special Needs	(0038,0050)
Current Patient Location	(0038,0300)

4.1.2 SC Standard Extended SOP Class

The *syngo* Application Software will create functional images from special applications. Those will be encoded as SC Standard extended SOP Class. Please see the following tables for a complete overview of supplied Type 1/2/3 Standard and Private attributes.

4.1.2.1 Captured Projection Image

Table 5: SC Derived Image (RGB) from 3D Projections

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	DERIVED\SECONDARY\OTHER\IAE_PRJ\ <Filter_Type> <Filter_Type> values: MPR MPR_CV MIP MIP_CV MINIP VRT OVERVIEW
Instance Creation Date	(0008,0012)	<yyyymmdd>

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Attribute Name	Tag	Value
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
Instance Creator UID	(0008,0014)	<implementation_class_uid>.<individual_id>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Acquisition Date	(0008,0022)	from Original
Content Date	(0008,0023)	<yyyymmdd>
Acquisition DateTime	(0008,002A)	from Original
Series Time	(0008,0031)	<hhmmss.ffffff>
Acquisition Time	(0008,0032)	from Original
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	OT or XA or CT (default = OT, can be configured)
Conversion Type	(0008,0064)	WSD
Manufacturer	(0008,0070)	from Original
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	
Institutional Department Name	(0008,1040)	from WS Configuration
Performing Physician's Name	(0008,1050)	from Original / input via "Correct" possible
Operator's Name	(0008,1070)	from Original
Manufacturer's Model Name	(0008,1090)	from Original
Related Series Sequence	(0008,1250)	from Original
>Study Instance UID	(0020,000D)	from Original
>Series Instance UID	(0020,000E)	from Original
>Purpose of Reference Code Sequence	(0040,A170)	<zero length>
Derivation Description	(0008,2111)	from Original
Source Image Sequence	(0008,2112)	if derived from single image
Body Part Examined	(0018,0015)	from Original
Device Serial Number	(0018,1000)	from Original

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Attribute Name	Tag	Value
Secondary Capture Device ID	(0018,1010)	from WS Configuration
Date of Secondary Capture	(0018,1012)	<yyyymmdd>
Time of Secondary Capture	(0018,1014)	<hhmmss.ffffff>
Secondary Capture Device Manufacturer	(0018,1016)	“Siemens”
Secondary Capture Device Manufacturer’s Model Name	(0018,1018)	“syngo_Application_SW_SYS”
Secondary Capture Device Software Version	(0018,1019)	from WS Configuration
Software Versions	(0018,1020)	from Original
Protocol Name	(0018,1030)	“Radial Ranges”, “Parallel Ranges”, “Volume Ranges”, “Curved Ranges” or from Original
Patient Position	(0018,5100)	from Original
Series Instance UID	(0020,000E)	
Series Number	(0020,0011)	940 for Ranges, 970 for all other Captured Projection objects.
Acquisition Number	(0020,0012)	from Original
Instance Number	(0020,0013)	n-m (n, m >0) 0 for reference image
Patient Orientation	(0020,0020)	from original (derived from single image) or calculated or <zero length> (derived from multiple images).
Images in Acquisition	(0020,1002)	from Original
Image Comments	(0020,4000)	from Original if derived from single image
Samples per Pixel	(0028,0002)	3
Photometric Interpretation	(0028,0004)	RGB
Planar Configuration	(0028,0006)	0
Rows	(0028,0010)	
Columns	(0028,0011)	
Pixel Spacing	(0028,0030)	If image has been calibrated
Bits Allocated	(0028,0100)	8
Bits Stored	(0028,0101)	8
High Bit	(0028,0102)	7
Pixel Representation	(0028,0103)	0

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Attribute Name	Tag	Value
Burned In Annotation	(0028,0301)	YES, if set to YES in Original or if any text flag is set to “On”. Not set otherwise.
Pixel Spacing Calibration Type	(0028,0A02)	from Original
Pixel Spacing Calibration Description	(0028,0A04)	from Original
Lossy Image Compression	(0028,2110)	from Original
Performed Procedure Step Start Date	(0040,0244)	from Original
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Performed Protocol Code Sequence	(0040,0260)	from Original
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason For The Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Pixel Data	(7FE0,0010)	

4.1.2.2 Bookmarks

Table 6: SC Derived Image (RGB) for 4D Viewer Bookmarks

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	DERIVED\SECONDARY\OTHER\IAE_BOOKMARK
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>

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Attribute Name	Tag	Value
Instance Creator UID	(0008,0014)	<implementation_class_uid>.<individual_id>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Acquisition Date	(0008,0022)	from Original
Content Date	(0008,0023)	<yyyymmdd>
Acquisition DateTime	(0008,002A)	from Original
Series Time	(0008,0031)	<hhmmss.ffffff>
Acquisition Time	(0008,0032)	from Original
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	XA
Conversion Type	(0008,0064)	WSD
Manufacturer	(0008,0070)	from Original
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	
Institutional Department Name	(0008,1040)	from WS Configuration
Performing Physician's Name	(0008,1050)	from Original / input via "Correct" possible
Operator's Name	(0008,1070)	from Original
Manufacturer's Model Name	(0008,1090)	from Original
Related Series Sequence	(0008,1250)	from Original
>Study Instance UID	(0020,000D)	from Original
>Series Instance UID	(0020,000E)	from Original
>Purpose of Reference Code Sequence	(0040,A170)	<zero length>
Derivation Description	(0008,2111)	from Original
Source Image Sequence	(0008,2112)	If derived from single image
Device Serial Number	(0018,1000)	from Original
Secondary Capture Device ID	(0018,1010)	from WS Configuration
Date of Secondary Capture	(0018,1012)	<yyyymmdd>
Time of Secondary Capture	(0018,1014)	<hhmmss.ffffff>
Body Part Examined	(0018,0015)	from Original

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Attribute Name	Tag	Value
Secondary Capture Device Manufacturer	(0018,1016)	“Siemens”
Secondary Capture Device Manufacturer’s Model Name	(0018,1018)	”syngo_Application_SW_SYS”
Secondary Capture Device Software Version	(0018,1019)	from WS Configuration
Software Versions	(0018,1020)	from Original
Protocol Name	(0018,1030)	
Patient Position	(0018,5100)	from Original
Private Creator	(0019,00xx)	“SIEMENS SMS-AX IAE”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	
Series Number	(0020,0011)	980
Acquisition Number	(0020,0012)	from Original
Instance Number	(0020,0013)	1 - n
Patient Orientation	(0020,0020)	From original (derived from single image) or calculated or <zero length> (derived from multiple images).
Images in Acquisition	(0020,1002)	from Original
Image Comments	(0020,4000)	from Original if derived from single image
Samples per Pixel	(0028,0002)	3
Photometric Interpretation	(0028,0004)	RGB
Planar Configuration	(0028,0006)	0
Rows	(0028,0010)	
Columns	(0028,0011)	
Bits Allocated	(0028,0100)	8
Bits Stored	(0028,0101)	8
High Bit	(0028,0102)	7
Pixel Representation	(0028,0103)	0
Pixel Spacing Calibration Type	(0028,0A02)	from Original
Pixel Spacing Calibration Description	(0028,0A04)	from Original
Lossy Image Compression	(0028,2110)	from Original
Private Creator	(0029,00xx)	“SIEMENS MEDCOM HEADER”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Performed Procedure Step Start Date	(0040,0244)	from Original

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Attribute Name	Tag	Value
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Performed Protocol Code Sequence	(0040,0260)	from Original
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason For The Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Pixel Data	(7FE0,0010)	Representative image icon.

4.1.2.3 EP Segmentation Path Objects

The Segmentation application may create an SC Image (RGB) to contain the Segmentation results for use in a specific workflow only.

The content is only useful in this context and therefore the DICOM content is “tailored” for this special use. It can be identified with the help of the following attributes:

(0008,0008) Image Type is set to “DERIVED\SECONDARY\\INSPACE_EP_SEGM\<SW-Version>.

(0008,0016) SOP Class UID is set to “1.2.840.10008.5.1.4.1.1.7”.

(0008,103E) Series Description is set to “EP_Segm_<object label>” or “EP_Segm_<object id>”.

4.1.3 CT Standard Extended SOP Class

4.1.3.1 DynaCT Reconstructed Volume Data

The *syngo* Application Software will create 3D volume datasets from 3D reconstruction application package. Those will be encoded as CT Standard extended SOP Class. Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 7: CT Derived Image (Monochrome) from Reconstruction

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		

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Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	DERIVED\SECONDARY\AXIAL\3DANGIO\<Data_Type> <Data_Type> values: NAT_MASK Images acquired w/o contrast media NAT_FILL Images acquired with contrast media SUB Subtracted acquisition PBV "Parenchymal Blood Volume" acq.
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.2 (CT Image Storage)
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd> (date of creation)
Acquisition Date	(0008,0022)	derived from original Acquisition/Content Date
Content Date	(0008,0023)	<yyyymmdd> (date of creation)
Acquisition DateTime	(0008,002A)	from Original or calculated
Series Time	(0008,0031)	<hhmmss.ffffff> (time of creation)
Acquisition Time	(0008,0032)	derived from original Acquisition/Content Time
Content Time	(0008,0033)	<hhmmss.ffffff> (time of creation)
Modality	(0008,0060)	XA or CT (default = XA, can be configured)
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from Original
Institution Address	(0008,0081)	from Original
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	contains information about used reconstruction parameters
Performing Physician’s Name	(0008,1050)	from Original
Operator’s Name	(0008,1070)	from Original
Manufacturer’s Model Name	(0008,1090)	“AXIOM-Artis”
Related Series Sequence	(0008,1250)	reference to Study and Series of originating images
>Study Instance UID	(0020,000D)	reference to Study
>Series Instance UID	(0020,000E)	reference to Series

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Attribute Name	Tag	Value
>Purpose of Reference Code Sequence	(0040,A170)	(121323, DCM, “Source series for image processing operation”)
Derivation Description	(0008,2111)	code for applied correction algorithms
Contrast/Bolus Agent	(0018,0010)	from Original
Body Part Examined	(0018,0015)	from Original
Scan Options	(0018,0022)	for images created by “Gated Cardiac 3D Acquisition”
Slice Thickness	(0018,0050)	calculated
KVP	(0018,0060)	from Original
Device Serial Number	(0018,1000)	from WS Configuration
Gantry ID	(0018,1008)	from WS Configuration
Software Versions	(0018,1020)	from Original\<product version of *syngo* Application Software>
Protocol Name	(0018,1030)	<name of organ program> <zoom size> <step width> <dose> <correction> <auto transfer>
Contrast/Bolus Ingredient	(0018,1048)	from Original
Reconstruction Diameter	(0018,1100)	set for reconstructed slice
Distance Source to Detector	(0018,1110)	from Original
Date of Last Calibration	(0018,1200)	<yyyymmdd> (date of last 3D calibration)
Time of Last Calibration	(0018,1201)	<hhmmss.ffffff> (time of last 3D calibration)
Convolution Kernel	(0018,1210)	<kernel type>\<Image characteristics> Values for kernel type: “EE” (Default for high contrast) “HU” (Default for DynaCT) Values for image characteristics: “Auto”, “Sharp”, “Normal”, “Smooth”, “Very Smooth”
Patient Position	(0018,5100)	from Original
Private Creator	(0019,00xx)	“SIEMENS AX DYNACT”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	from Original
Acquisition Number	(0020,0012)	from Original
Instance Number	(0020,0013)	1 (feet) continuous to number of slices (head)
Image Position (Patient)	(0020,0032)	calculated during reconstruction

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Attribute Name	Tag	Value
Image Orientation (Patient)	(0020,0037)	calculated during reconstruction
Frame of Reference UID	(0020,0052)	<new UID> (per reconstructed image-set)
Laterality	(0020,0060)	from Original
Position Reference Indicator	(0020,1040)	from Original
Private Creator	(0021,00xx)	“SIEMENS SMS-AX ACQ 1.0”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME2
Rows	(0028,0010)	256, 512, 768 or 1024.
Columns	(0028,0011)	256, 512, 768 or 1024.
Pixel Spacing	(0028,0030)	calculated during reconstruction
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	16
High Bit	(0028,0102)	15
Pixel Representation	(0028,0103)	0
Smallest Image Pixel Value	(0028,0106)	
Largest Image Pixel Value	(0028,0107)	
Pixel Padding Value	(0028,0120)	
Burned In Annotation	(0028,0301)	NO
Window Center	(0028,1050)	Value from the "Visualization Preset" configuration
Window Width	(0028,1051)	Value from the "Visualization Preset" configuration
Rescale Intercept	(0028,1052)	0.0 or -1024 (only for HU values)
Rescale Slope	(0028,1053)	1
Rescale Type	(0028,1054)	“HU” for Hounsfield Units, only expected with CT “US” for unspecified
Lossy Image Compression	(0028,2110)	00
VOI LUT Sequence	(0028,3010)	from Original
Requested Procedure Description	(0032,1060)	from Original
Performed Procedure Step Start Date	(0040,0244)	from Original

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Attribute Name	Tag	Value
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason For The Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Pixel Data	(7FE0,0010)	

4.1.3.2 CT Ranges / Save Image as Derived Volume Data

The *syngo* Application Software will save radial, parallel or curved ranges or “Save image” functionality based on CT, XR3D or Enhanced CT Images as CT Standard extended SOP Class.

Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 8: Ranges / Save Image as CT Derived Image (Monochrome)

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	From Original or conf. Character Set
Image Type	(0008,0008)	DERIVED\SECONDARY\<*image type*>\<*filter type*>\\\<*range type*> <*image type*> values: AXIAL LOCALIZER <*filter type*> values: MPR MIP

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Attribute Name	Tag	Value
		MINIP <*range type*> values (in case of Range functionality): PARALLEL RADIAL CURVED
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
Instance Creator UID	(0008,0014)	<implementation_class_uid>.<individual_id>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.2 (CT Image Storage)
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd> (date of creation)
Acquisition Date	(0008,0022)	derived from original Acquisition/Content Date
Content Date	(0008,0023)	<yyyymmdd> (date of creation)
Acquisition DateTime	(0008,002A)	derived from original Acquisition Date/Time
Series Time	(0008,0031)	<hhmmss.ffffff> (time of creation)
Acquisition Time	(0008,0032)	derived from original Acquisition/Content Time
Content Time	(0008,0033)	<hhmmss.ffffff> (time of creation)
Modality	(0008,0060)	from Original
Manufacturer	(0008,0070)	from Original
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	
Institutional Department Name	(0008,1040)	from WS Configuration
Performing Physician's Name	(0008,1050)	from Original
Manufacturer's Model Name	(0008,1090)	from Original
Related Series Sequence	(0008,1250)	from Original
>Study Instance UID	(0020,000D)	from Original
>Series Instance UID	(0020,000E)	from Original
>Purpose of Reference Code Sequence	(0040,A170)	<zero length>

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Attribute Name	Tag	Value
Derivation Description	(0008,2111)	from Original
Scan Options	(0018,0022)	from Original if original is a CT image, not set in case original is an XR3D or Enhanced CT image
Slice Thickness	(0018,0050)	calculated
KVP	(0018,0060)	from Original
Device Serial Number	(0018,1000)	from Original
Software Versions	(0018,1020)	from Original\<product version of *syngo* Application Software>
Protocol Name	(0018,1030)	“Radial Ranges”, “Parallel Ranges”, “Volume Ranges”, “Curved Ranges” or from Original
Reconstruction Diameter	(0018,1100)	from Original
Distance Source to Detector	(0018,1110)	from Original
Date of last Calibration	(0018,1200)	from Original
Time of last Calibration	(0018,1201)	from Original
Convolution Kernel	(0018,1210)	from Original
Patient Position	(0018,5100)	from Original
Private Creator	(0019,00xx)	“SIEMENS AX DYNACT”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	940 for Ranges, from Original for all other Derived Volume Data
Acquisition Number	(0020,0012)	from Original if original is a CT image, empty in case original is an XR3D image
Instance Number	(0020,0013)	n-m (n, m >0) 0 for reference image
Patient Orientation	(0020,0020)	<removed>
Image Position (Patient)	(0020,0032)	calculated during reconstruction
Image Orientation (Patient)	(0020,0037)	calculated during reconstruction
Frame of Reference UID	(0020,0052)	<new UID>
Laterality	(0020,0060)	from Original
Position Reference Indicator	(0020,1040)	
Image Comments	(0020,4000)	
Private Creator	(0021,00xx)	“SIEMENS SMS-AX ACQ 1.0”

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Attribute Name	Tag	Value
Attributes according to "4.4 Data Dictionary of Private Attributes"		
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME2
Rows	(0028,0010)	256 or 512
Columns	(0028,0011)	256 or 512
Pixel Spacing	(0028,0030)	calculated during reconstruction
Bits Allocated	(0028,0100)	from Original
Bits Stored	(0028,0101)	from Original
High Bit	(0028,0102)	from Original
Pixel Representation	(0028,0103)	from Original
Burned In Annotation	(0028,0301)	from Original
Window Center	(0028,1050)	as set
Window Width	(0028,1051)	as set
Rescale Intercept	(0028,1052)	from Original
Rescale Slope	(0028,1053)	
Rescale Type	(0028,1054)	
Window Center & Width Explanation	(0028,1055)	
Lossy Image Compression	(0028,2110)	from Original
VOI LUT Sequence	(0028,3010)	from Original
Requested Procedure Description	(0032,1060)	from Original
Study Comments	(0032,4000)	from Original
Special Needs	(0038,0050)	from Original
Patient State	(0038,0500)	from Original
Performed Procedure Step Start Date	(0040,0244)	from Original
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Performed Protocol Code Se-	(0040,0260)	from Original

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Attribute Name	Tag	Value
quence		
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason For The Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Confidentiality Constraint on Patient Data Description	(0040,3001)	from Original
Pixel Data	(7FE0,0010)	

4.1.4 MR Standard Extended SOP Class

4.1.4.1 MR Ranges / Save Image as Derived Volume Data

The *syngo* Application Software will save radial, parallel or curved ranges or “Save image” functionality based on MR or MR Enhanced Images as MR Standard extended SOP Class.

Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 9: Ranges / Save Image as MR Derived Image (Monochrome)

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original or conf. Character Set
Image Type	(0008,0008)	DERIVED\SECONDARY\<*image type* copied from original>\<*filter type*>\<copied from original>\<copied from original>\<copied from original>\<*range type*> <*image type*> values: Replaced for Localizer image: OTHER <*filter type*> values: MPR MIP MINIP <*range type*> values (in case of Range functionali-

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Attribute Name	Tag	Value
		ty): PARALLEL RADIAL CURVED
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.4 (MR Image Storage)
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd> (date of creation)
Acquisition Date	(0008,0022)	derived from original Acquisition/Content Date
Content Date	(0008,0023)	<yyyymmdd> (date of creation)
Acquisition DateTime	(0008,002A)	derived from original Acquisition Date/Time
Series Time	(0008,0031)	<hhmmss.ffffff> (time of creation)
Acquisition Time	(0008,0032)	derived from original Acquisition/Content Time
Content Time	(0008,0033)	<hhmmss.ffffff> (time of creation)
Modality	(0008,0060)	from Original
Manufacturer	(0008,0070)	from Original
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	
Institutional Department Name	(0008,1040)	from WS Configuration
Performing Physician's Name	(0008,1050)	from Original
Manufacturer's Model Name	(0008,1090)	from Original
Related Series Sequence	(0008,1250)	from Original
>Study Instance UID	(0020,000D)	from Original
>Series Instance UID	(0020,000E)	from Original
>Purpose of Reference Code Sequence	(0040,A170)	<zero length>
Derivation Description	(0008,2111)	from Original
Body Part Examined	(0018,0015)	from Original
Scanning Sequence	(0018,0020)	from Original if original is an MR image, "SE", "GR"; "SE\GR", "IR" or "EP" in case original is an Enhanced MR image

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Attribute Name	Tag	Value
Sequence Variant	(0018,0021)	from Original if original is an MR image; “SP”, “MTC”, “SS”, “OSP” or “SK” in case original is an Enhanced MR image
Scan Options	(0018,0022)	from Original if original is an MR image; “FC”, “SP”, “PFP”, “PFP\PFF”, “CG”, “RG” or “FS” in case original is an Enhanced MR image
MR Acquisition Type	(0018,0023)	from Original
Slice Thickness	(0018,0050)	calculated
Repetition Time	(0018,0080)	from Original
Echo Time	(0018,0081)	from Original
Inversion Time	(0018,0082)	from Original
Echo Train Length	(0018,0091)	from Original
Device Serial Number	(0018,1000)	from Original
Software Versions	(0018,1020)	from Original\< product version of *syngo* Application Software>
Protocol Name	(0018,1030)	“Radial Ranges”, “Parallel Ranges”, “Volume Ranges”, “Curved Ranges” or from Original
Trigger Time	(0018,1060)	from Original
Date of last Calibration	(0018,1200)	from Original
Time of last Calibration	(0018,1201)	from Original
Patient Position	(0018,5100)	from Original
Private Creator	(0019,00xx)	“SIEMENS AX DYNACT”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	940 for Ranges, from Original for all other Derived Volume Data
Instance Number	(0020,0013)	n-m (n, m >0) 0 for reference image
Patient Orientation	(0020,0020)	<removed>
Image Position (Patient)	(0020,0032)	calculated during reconstruction
Image Orientation (Patient)	(0020,0037)	calculated during reconstruction
Frame of Reference UID	(0020,0052)	<new UID>
Laterality	(0020,0060)	from Original
Position Reference Indicator	(0020,1040)	

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Attribute Name	Tag	Value
Image Comments	(0020,4000)	
Private Creator	(0021,00xx)	“SIEMENS SMS-AX ACQ 1.0”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Samples per Pixel	(0028,0002)	from Original
Photometric Interpretation	(0028,0004)	from Original
Rows	(0028,0010)	256 or 512
Columns	(0028,0011)	256 or 512
Pixel Spacing	(0028,0030)	calculated during reconstruction
Bits Allocated	(0028,0100)	from Original
Bits Stored	(0028,0101)	from Original
High Bit	(0028,0102)	from Original
Pixel Representation	(0028,0103)	from Original
Burned In Annotation	(0028,0301)	from Original
Window Center	(0028,1050)	as set
Window Width	(0028,1051)	as set
Window Center & Width Explanation	(0028,1055)	
Lossy Image Compression	(0028,2110)	from Original
VOI LUT Sequence	(0028,3010)	from Original
Requested Procedure Description	(0032,1060)	from Original
Study Comments	(0032,4000)	from Original
Special Needs	(0038,0050)	from Original
Patient State	(0038,0500)	from Original
Performed Procedure Step Start Date	(0040,0244)	from Original
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Performed Protocol Code Sequence	(0040,0260)	from Original

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Attribute Name	Tag	Value
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason For The Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Confidentiality Constraint on Patient Data Description	(0040,3001)	from Original
Pixel Data	(7FE0,0010)	
Confidentiality Constraint on Patient Data Description	(0040,3001)	from Original
Pixel Data	(7FE0,0010)	

4.1.5 X-Ray 3D Angiographic Image Standard Extended SOP Class

4.1.5.1 4D DSA

The *syngo* Application Software will save 4D DSA (Dyna4D) reconstructions as X-Ray 3D Angiographic Object Standard extended SOP Class. The 4D DSA data is stored with transfer syntax 1.2.840.1.0008.1.2.4.80 (JPEG-LS Lossless).

Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 10: X-Ray 3D Angiographic Image from 4D DSA Reconstruction

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	ORIGINAL\PRIMARY\4D_DSA\NONE
Instance Creation	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.13.1.1
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Content Date	(0008,0023)	<yyyymmdd>

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Attribute Name	Tag	Value
Series Time	(0008,0031)	<hhmmss.ffffff>
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	XA
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from Original
Institution Address	(0008,0081)	from Original
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	contains information about used reconstruction parameters
Institutional Department Name	(0008,1040)	from WS configuration
Performing Physician’s Name	(0008,1050)	from Original
Operators’ Name	(0008,1070)	from Original
Manufacturer’s Model Name	(0008,1090)	“AXIOM-Artis”
Referenced Performed Procedure Step Sequence	(0008,1111)	from Original
Related Series Sequence	(0008,1250)	reference to Study and Series of originating images
>Study Instance UID	(0020,000D)	reference to Study
>Series Instance UID	(0020,000E)	reference to Series
>Purpose of Reference Code Sequence	(0040,A170)	(121323, DCM, “Source series for image processing operation”)
Pixel Presentation	(0008,9205)	MONOCHROME
Volumetric Properties	(0008,9206)	VOLUME
Volume Based Calculation Technique	(0008,9207)	NONE
Contrast/Bolus Agent Sequence	(0018,0012)	if contrast media was applied in original images (C-B0300, SRT, “Contrast Agent”)
>Contrast/Bolus Administration Route Sequence	(0018,0014)	(R-41198, SRT, “Unknown”)
>Contrast/Bolus Volume	(0018,1041)	<zero length>
>Contrast/Bolus Ingredient Concentration	(0018,1049)	<zero length>
>Contrast/Bolus Agent Number	(0018,9337)	
>Contrast/Bolus Ingredient Code	(0018,9338)	<zero length>

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Attribute Name	Tag	Value
Sequence		
Body Part Examined	(0018,0015)	from Original
Device Serial Number	(0018,1000)	from WS configuration
Software Versions	(0018,1020)	from Original\<product version of *syngo* Application Software>
Protocol Name	(0018,1030)	“<from Original> <zoom size(nnn)> <step width(n.nn)> <dose(nn.nn)> <correction(aaa)> <autotransfer rules>”
Date of Last Calibration	(0018,1200)	<yyyymmdd> (date of last 3D calibration)
Time of Last Calibration	(0018,1201)	<hhmmss.ffffff> (time of last 3D calibration)
Convolution Kernel	(0018,1210)	<kernel type>\<Image characteristics> Values for kernel type: "EE" (Default for high contrast) "HU" (Default for DynaCT) Values for image characteristics: "Auto", "Sharp", "Normal", "Smooth", "Very Smooth"
Patient Position	(0018,5100)	from Original
Content Qualification	(0018,9004)	PRODUCT
Contributing Sources Sequence	(0018,9506)	2 items (mask and contrast)
>Acquisition DateTime	(0008,002A)	<yyyymmddhhmmss.ffffff>
>Manufacturer	(0008,0070)	from Original
>Station Name	(0008,1010)	from Original
>Operators’ Name	(0008,1070)	from Original
>Operator Identification Sequence	(0008,1072)	from Original
>Manufacturer’s Model Name	(0008,1090)	from Original
>Device Serial Number	(0018,1000)	from Original
>Software Versions	(0018,1020)	from Original or from WS configuration, if not available.
>Protocol Name	(0018,1030)	from Original
>Contributing SOP Instances Reference Sequence	(0020,9529)	contains reference to exactly 1 original image on study, series and instance level
>Rows	(0028,0010)	from Original
>Columns	(0028,0011)	from Original

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Attribute Name	Tag	Value
>Bits Stored	(0028,0101)	from Original
>Lossy Image Compression	(0028,2110)	from Original
>Lossy Image Compression Ratio	(0028,2112)	from Original
>Lossy Image Compression Meth-od	(0028,2114)	from Original
>Acquisition Device Processing Description	(0018,1400)	from Original
>Acquisition Device Processing Code	(0018,1401)	from Original
>Acquisition Protocol Name	(0018,9423)	from Original
>Plane Identification	(0018,9457)	derived from Original
>Imager Pixel Spacing	(0018,1164)	from Original
>Performed Protocol Code Se-quence	(0040,0260)	from Original
X-Ray 3D Acquisition Sequence	(0018,9507)	2 items (mask and contrast)
>Source Image Sequence	(0008,2112)	points to original image
>>Referenced SOP Class UID	(0008,1150)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	if only set of frames was taken as input
>Contrast/Bolus Agent	(0018,0010)	from Original
>KVP	(0018,0060)	from Original
>Distance Source to Detector	(0018,1110)	from Original
>Field of View Shape	(0018,1147)	from Original
>Focal Spot	(0018,1190)	from Original
>Detector Type	(0018,7004)	<zero length>
>Detector Description	(0018,7006)	from Original
>Detector ID	(0018,700A)	from Original
>Exposure Time in ms	(0018,9328)	from Original: attribute (0018,1150)
>X-Ray Tube Current in mA	(0018,9330)	from Original: attribute (0018,1151)
>Exposure in mAs	(0018,9332)	from Original: attribute (0018,1152)
X-Ray 3D Reconstruction Se-quence	(0018,9530)	1 item

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Attribute Name	Tag	Value
>Application Name	(0018,9524)	“3D Reconstruction”
>Application Version	(0018,9525)	version of reconstruction application
>Application Manufacturer	(0018,9526)	“Siemens”
>Algorithm Type	(0018,9527)	“FILTER_BACK_PROJ”
>Reconstruction Description	(0018,9531)	code for applied correction algorithms
>Acquisition Index	(0020,9518)	1\2
Private Creator	(0019,00xx)	“SIEMENS AX DYNACT”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	from Original
Instance Number	(0020,0013)	
Frame of Reference UID	(0020,0052)	from Original or <new UID>
Position Reference Indicator	(0020,1040)	from Original
Image Comments	(0020,4000)	from Original
Private Creator	(0021,00xx)	“SIEMENS SMS-AX ACQ 1.0”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME2
Number of Frames	(0028,0008)	
Rows	(0028,0010)	256, 512, 768 or 1042
Columns	(0028,0011)	256, 512, 768 or 1042
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	16
High Bit	(0028,0102)	15
Pixel Representation	(0028,0103)	0
Pixel Padding Value	(0028,0120)	
Burned in Annotation	(0028,0301)	NO
Lossy Image Compression	(0028,2110)	00
Representative Frame Number	(0028,6010)	
Performed Procedure Step Start Date	(0040,0244)	from Original

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Attribute Name	Tag	Value
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason for the Requested Procedure	(0040,1002)	from Original
Comments on the Performed Procedure Step	(0040,0280)	from Original
Acquisition Context Sequence	(0040,0555)	<zero length>
Patient Orientation Code Sequence	(0054,0410)	(F-10450, SRT, ”recumbent”)
>Patient Orientation Modifier Code Sequence	(0054,0412)	One of (F-10340, SRT, ”supine”), (F-10310, SRT, “prone”), (F-10317, SRT, “right lateral decubitus”), (F-10319, SRT, “left lateral decubitus”)
Patient Gantry Relationship Code Sequence	(0054,0414)	One of (F-10470, SRT, ”headfirst”), (F-10480, SRT, “feet-first”)
Presentation LUT Shape	(2050,0020)	IDENTITY
Shared Functional Groups Sequence	(5200,9229)	
>X-Ray 3D Frame Type Sequence	(0018,9504)	1 item
>>Frame Type	(0008,9007)	ORIGINAL\PRIMARY\4D_DSA\NONE
>>Pixel Presentation	(0008,9205)	MONOCHROME
>>Volumetric Properties	(0008,9206)	VOLUME
>>Volume Based Calculation Technique	(0008,9207)	NONE
>>Reconstruction Index	(0020,9536)	1

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Attribute Name	Tag	Value
>Frame Anatomy Sequence	(0020,9071)	1 item
>>Frame Laterality	(0020,9072)	from Original (“L” or “R”, if available)
>>Anatomic Region Sequence	(0008,2218)	(T-D0010, SRT, “Entire body”)
>Plane Orientation Sequence	(0020,9116)	1 item
>>Image Orientation (Patient)	(0020,0037)	
>Pixel Measures Sequence	(0028,9110)	1 item
>>Pixel Spacing	(0028,0030)	
>>Slice Thickness	(0018,0050)	
>Frame VOI LUT Sequence	(0028,9132)	
>>Window Center	(0028,1050)	<window 1 center value>\<window 2 center value>
>>Window Width	(0028,1051)	<window 1 width value>\<window 2 width value>
>Real World Value Mapping Sequence	(0040,9096)	
>>LUT Explanation	(0028,3003)	“Linear Mapping”
>>Measurements Units Code Sequence	(0040,08EA)	([hnsf’U], UCUM, “Hounsfield unit”)
>>LUT Label	(0040,9210)	1
>>Real World Value LUT Last Value Mapped	(0040,9211)	
>>Real World Value LUT First Value Mapped	(0040,9216)	
>>Real World Value Intercept	(0040,9224)	
>>Real World Value Slope	(0040,9225)	
Per-frame Functional Groups Sequence	(5200,9230)	as many items as frames
>Frame Content Sequence	(0020,9111)	1 item
>>Frame Acquisition DateTime	(0018,9074)	from Original: attribute Acquisition DateTime (0008,002A) or calculated from Acquisition Date (0008,0022) and Acquisition Time (0008,0032)
>>Frame Reference DateTime	(0018,9151)	Used to record the time course, computed using original Acquisition Date and Time value and FrameTime resp. FrameTimeVector.
>>Frame Acquisition Duration	(0018,9220)	from Original: private attribute Total Scene Time (0021,xx29) (default: 1000 ms)
>>Stack ID	(0020,9056)	4D_DSA

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Attribute Name	Tag	Value
>>In-Stack Position Number	(0020,9057)	ordinal index starting with 1
>Plane Position Sequence	(0020,9113)	1 item
>>Image Position Patient	(0020,0032)	
Pixel Data	(7FE0,0010)	

4.1.5.2 Perfusion

The *syngo* Application Software will save PERFUSION reconstructions as X-Ray 3D Angiographic Object Standard extended SOP Class.

Please see the following table for complete overview of supplied Type 1/2/3 Standard and Private attributes:

Table 11: X-Ray 3D Angiographic Image from PERFUSION Reconstruction

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	ORIGINAL\PRIMARY\PERFUSION\NONE
Instance Creation	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.13.1.1
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Content Date	(0008,0023)	<yyyymmdd>
Series Time	(0008,0031)	<hhmmss.ffffff>
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	XA
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from Original
Institution Address	(0008,0081)	from Original
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	contains information about used reconstruction parameters
Institutional Department Name	(0008,1040)	from WS configuration

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Attribute Name	Tag	Value
Performing Physician's Name	(0008,1050)	from Original
Operators' Name	(0008,1070)	from Original
Manufacturer's Model Name	(0008,1090)	"AXIOM-Artis"
Referenced Performed Procedure Step Sequence	(0008,1111)	from Original
Related Series Sequence	(0008,1250)	reference to Study and Series of originating images
>Study Instance UID	(0020,000D)	reference to Study
>Series Instance UID	(0020,000E)	reference to Series
>Purpose of Reference Code Sequence	(0040,A170)	(121323, DCM, "Source series for image processing operation")
Pixel Presentation	(0008,9205)	MONOCHROME
Volumetric Properties	(0008,9206)	VOLUME
Volume Based Calculation Technique	(0008,9207)	NONE
Contrast/Bolus Agent Sequence	(0018,0012)	if contrast media was applied in original images (C-B0300, SRT, "Contrast Agent")
>Contrast/Bolus Administration Route Sequence	(0018,0014)	(R-41198, SRT, "Unknown")
>Contrast/Bolus Volume	(0018,1041)	<zero length>
>Contrast/Bolus Ingredient Concentration	(0018,1049)	<zero length>
>Contrast/Bolus Agent Number	(0018,9337)	
>Contrast/Bolus Ingredient Code Sequence	(0018,9338)	<zero length>
Body Part Examined	(0018,0015)	from Original
Device Serial Number	(0018,1000)	from WS configuration
Software Versions	(0018,1020)	from Original\< product version of *syngo* Application Software>
Protocol Name	(0018,1030)	"<from Original> <zoom size(nnn)> <step width(n.nn)> <dose(nn.nn)> <correction(aaa)> <autotransfer rules>"
Date of Last Calibration	(0018,1200)	<yyyymmdd> (date of last 3D calibration)
Time of Last Calibration	(0018,1201)	<hhmmss.ffffff> (time of last 3D calibration)
Convolution Kernel	(0018,1210)	<kernel type>\<Image characteristics>

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Attribute Name	Tag	Value
		Values for kernel type: “EE” (Default for high contrast) “HU” (Default for DynaCT) Values for image characteristics: “Auto”, “Sharp”, “Normal”, “Smooth”, “Very Smooth”
Patient Position	(0018,5100)	from Original
Content Qualification	(0018,9004)	PRODUCT
Contributing Sources Sequence	(0018,9506)	1 item
>Acquisition DateTime	(0008,002A)	<yyyymmddhhmmss.ffffff>
>Manufacturer	(0008,0070)	from Original
>Station Name	(0008,1010)	from Original
>Operators’ Name	(0008,1070)	from Original
>Operator Identification Sequence	(0008,1072)	from Original
>Manufacturer’s Model Name	(0008,1090)	from Original
>Device Serial Number	(0018,1000)	from Original
>Software Versions	(0018,1020)	from Original or from WS configuration, if not available.
>Protocol Name	(0018,1030)	from Original
>Contributing SOP Instances Reference Sequence	(0020,9529)	contains reference to exactly 1 original image on study, series and instance level
>Rows	(0028,0010)	from Original
>Columns	(0028,0011)	from Original
>Bits Stored	(0028,0101)	from Original
>Lossy Image Compression	(0028,2110)	from Original
>Lossy Image Compression Ratio	(0028,2112)	from Original
>Lossy Image Compression Method	(0028,2114)	from Original
>Acquisition Device Processing Description	(0018,1400)	from Original
>Acquisition Device Processing Code	(0018,1401)	from Original
>Acquisition Protocol Name	(0018,9423)	from Original
>Plane Identification	(0018,9457)	derived from Original

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Attribute Name	Tag	Value
>Imager Pixel Spacing	(0018,1164)	from Original
>Performed Protocol Code Sequence	(0040,0260)	from Original
X-Ray 3D Acquisition Sequence	(0018,9507)	1 item
>Source Image Sequence	(0008,2112)	points to original image
>>Referenced SOP Class UID	(0008,1150)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	if only set of frames was taken as input
>Contrast/Bolus Agent	(0018,0010)	from Original
>KVP	(0018,0060)	from Original
>Distance Source to Detector	(0018,1110)	from Original
>Field of View Shape	(0018,1147)	from Original
>Focal Spot	(0018,1190)	from Original
>Detector Type	(0018,7004)	<zero length>
>Detector Description	(0018,7006)	from Original
>Detector ID	(0018,700A)	from Original
>Exposure Time in ms	(0018,9328)	from Original: attribute (0018,1150)
>X-Ray Tube Current in mA	(0018,9330)	from Original: attribute (0018,1151)
>Exposure in mAs	(0018,9332)	from Original: attribute (0018,1152)
X-Ray 3D Reconstruction Sequence	(0018,9530)	1 item
>Application Name	(0018,9524)	“3D Reconstruction”
>Application Version	(0018,9525)	version of reconstruction application
>Application Manufacturer	(0018,9526)	“Siemens”
>Algorithm Type	(0018,9527)	“FILTER_BACK_PROJ”
>Reconstruction Description	(0018,9531)	code for applied correction algorithms
>Acquisition Index	(0020,9518)	1
Private Creator	(0019,00xx)	“SIEMENS AX DYNACT”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	from Original

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Attribute Name	Tag	Value
Instance Number	(0020,0013)	1 – n
Frame of Reference UID	(0020,0052)	from Original or <new UID>
Position Reference Indicator	(0020,1040)	from Original
Image Comments	(0020,4000)	“Nat Mask” or “Nat Fill”
Private Creator	(0021,00xx)	“SIEMENS SMS-AX ACQ 1.0”
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME2
Number of Frames	(0028,0008)	
Rows	(0028,0010)	256, 512, 768 or 1042
Columns	(0028,0011)	256, 512, 768 or 1042
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	16
High Bit	(0028,0102)	15
Pixel Representation	(0028,0103)	0
Pixel Padding Value	(0028,0120)	
Burned in Annotation	(0028,0301)	NO
Lossy Image Compression	(0028,2110)	00
Representative Frame Number	(0028,6010)	
Performed Procedure Step Start Date	(0040,0244)	from Original
Performed Procedure Step Start Time	(0040,0245)	from Original
Performed Procedure Step ID	(0040,0253)	from Original
Performed Procedure Step Description	(0040,0254)	from Original
Request Attributes Sequence	(0040,0275)	from Original
>Scheduled Procedure Step Description	(0040,0007)	from Original
>Scheduled Procedure Step ID	(0040,0009)	from Original
>Requested Procedure ID	(0040,1001)	from Original
>Reason for the Requested Pro-	(0040,1002)	from Original

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Attribute Name	Tag	Value
cedure		
Comments on the Performed Procedure Step	(0040,0280)	from Original
Acquisition Context Sequence	(0040,0555)	<zero length>
Patient Orientation Code Sequence	(0054,0410)	(F-10450, SRT, ”recumbent”)
>Patient Orientation Modifier Code Sequence	(0054,0412)	One of (F-10340, SRT, ”supine”), (F-10310, SRT, “prone”), (F-10317, SRT, “right lateral decubitus”), (F-10319, SRT, “left lateral decubitus”)
Patient Gantry Relationship Code Sequence	(0054,0414)	One of (F-10470, SRT, ”headfirst”), (F-10480, SRT, “feet-first”)
Presentation LUT Shape	(2050,0020)	IDENTITY
Shared Functional Groups Sequence	(5200,9229)	
>X-Ray 3D Frame Type Sequence	(0018,9504)	1 item
>>Frame Type	(0008,9007)	ORIGINAL\PRIMARY\PERFUSION\NONE
>>Pixel Presentation	(0008,9205)	MONOCHROME
>>Volumetric Properties	(0008,9206)	VOLUME
>>Volume Based Calculation Technique	(0008,9207)	NONE
>>Reconstruction Index	(0020,9536)	1
>Frame Anatomy Sequence	(0020,9071)	1 item
>>Frame Laterality	(0020,9072)	from Original (“L” or “R”, if available)
>>Anatomic Region Sequence	(0008,2218)	(T-D0010, SRT, “Entire body”)
>Plane Orientation Sequence	(0020,9116)	1 item
>>Image Orientation (Patient)	(0020,0037)	
>Pixel Measures Sequence	(0028,9110)	1 item
>>Pixel Spacing	(0028,0030)	
>>Slice Thickness	(0018,0050)	
>Frame VOI LUT Sequence	(0028,9132)	

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Attribute Name	Tag	Value
>>Window Center	(0028,1050)	<window 1 center value>\<window 2 center value>
>>Window Width	(0028,1051)	<window 1 width value>\<window 2 width value>
>Real World Value Mapping Sequence	(0040,9096)	1 item
>>LUT Explanation	(0028,3003)	“Linear Mapping”
>>Measurements Units Code Sequence	(0040,08EA)	1 item, drawn from Context ID 82
>>LUT Label	(0040,9210)	same as Image Comments
>>Real World Value Last Value Mapped	(0040,9211)	
>>Real World Value First Value Mapped	(0040,9216)	
>>Real World Value Intercept	(0040,9224)	
>>Real World Value Slope	(0040,9225)	
Per-frame Functional Groups Sequence	(5200,9230)	as many items as frames
>Frame Content Sequence	(0020,9111)	1 item
>>Frame Acquisition DateTime	(0018,9074)	from Original: attribute Acquisition DateTime (0008,002A) or calculated from Acquisition Date (0008,0022) and Acquisition Time (0008,0032)
>>Frame Reference DateTime	(0018,9151)	from Original: attribute Acquisition DateTime (0008,002A) or calculated from Acquisition Date (0008,0022) and Acquisition Time (0008,0032)
>>Frame Acquisition Duration	(0018,9220)	from Original: private attribute Total Scene Time (0021,xx29) or set to 1000 ms otherwise.
>>Stack ID	(0020,9056)	PERFUSION
>>In-Stack Position Number	(0020,9057)	ordinal index starting with 1
>Plane Position Sequence	(0020,9113)	1 item
>>Image Position Patient	(0020,0032)	
Pixel Data	(7FE0,0010)	

4.1.6 Segmentation Standard Extended SOP Class

4.1.6.1 Segmentation Results

Table 12: Segmentation Results from 3D Applications

Attribute Name	Tag	Value

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Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Image Type	(0008,0008)	DERIVED\PRIMARY
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.66.4
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Acquisition Date	(0008,0022)	from Original (0008,0021), if available
Content Date	(0008,0023)	<yyyymmdd>
Series Time	(0008,0031)	<hhmmss.ffffff>
Acquisition Time	(0008,0032)	from Original (0008,0031), if available
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	SEG
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	same as Protocol Name
Institutional Department Name	(0008,1040)	from WS Configuration
Performing Physician’s Name	(0008,1050)	not set, unless input via “Correct”
Operators’ name	(0008,1070)	from Original, unless set via “Correct”
Manufacturer’s Model Name	(0008,1090)	“syngo_Application_SW_SYS”
Referenced Series Sequence	(0008,1115)	used, if this instance references instances in this study.
>Referenced Instance Sequence	(0008,114A)	referenced instances of Surface Segmentation object, if applicable.
>Series Instance UID	(0020,000E)	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	used, if this instance references instances in other studies.
>Referenced Series Sequence	(0008,1115)	

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Attribute Name	Tag	Value
>>Referenced Instance Sequence	(0008,114A)	referenced instances of Surface Segmentation object, if applicable.
>>Series Instance UID	(0020,000E)	
>Study Instance UID	(0020,000D)	
Source Image Sequence	(0008,2112)	Reference to the volume/slice object(s) used to generate this segmentation result
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
>Purpose of Reference Code Sequence	(0040,A170)	(121322, DCM, “Source Image for Image Processing Operation”)
>Spatial Locations Preserved	(0028,135A)	
Derivation Code Sequence	(0008,9215)	(113076, DCM, "Segmentation")
Device Serial Number	(0018,1000)	from WS Configuration
Software Versions	(0018,1020)	<product version of *syngo* Application Software>
Protocol Name	(0018,1030)	Information on Segmentation
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	from Original
Instance Number	(0020,0013)	
Patient Orientation	(0020,0020)	from Original
Image Comments	(0020,4000)	
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME2
Number of Frames	(0028,0008)	
Rows	(0028,0010)	
Columns	(0028,0011)	
Bits Allocated	(0028,0100)	1
Bits Stored	(0028,0101)	1
High Bit	(0028,0102)	0
Pixel Representation	(0028,0103)	0
Burned In Annotation	(0028,0301)	NO
Lossy Image Compression	(0028,2110)	00
Representative Frame Number	(0028,6010)	

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Attribute Name	Tag	Value
Request Attributes Sequence	(0040,0275)	from Original
>item contents as provided		*from Original*
Segmentation Type	(0062,0001)	BINARY
Segment Sequence	(0062,0002)	
>Anatomic Region Sequence	(0008,2218)	
>Segmented Property Category Code Sequence	(0062,0003)	
>Segment Number	(0062,0004)	
>Segment Label	(0062,0005)	
>Segment Description	(0062,0005)	(optional)
>Segment Algorithm Type	(0062,0008)	
>Segment Algorithm Name	(0062,0009)	One of 'Stroke Segmentation', 'Left Atrium Segmentation', 'Model Based Left Atrium Segmentation', 'Hybrid Model Based Left Atrium Segmentation', 'Aortic Root Segmentation', 'unknown' if Segment Algorithm Type is not MANUAL.
>Recommended Display Grayscale Value	(0062,000C)	
>Recommended Display CIELab Value	(0062,000D)	
>Segmented Property Type Code Sequence	(0062,000F)	
Private Creator	(0063,00xx)	"SIEMENS SMS-AX Segmentation Extensions"
Attributes according to "4.4 Data Dictionary of Private Attributes"		
Content Label	(0070,0080)	
Content Description	(0070,0081)	Contains identifier to identify a related segmentation mesh result stored in a Surface Segmentation Object with same identifier
Content Creator's Name	(0070,0084)	<zero length>
Icon Image Sequence	(0088,0200)	optional
Shared Functional Groups Sequence	(5200,9229)	
>Derivation Image Sequence	(0008,9124)	
>>Derivation Code Sequence	(0008,9215)	(113076, DCM, "Segmentation")
>>Source Image Sequence	(0008,2112)	

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Attribute Name	Tag	Value
>>>>Referenced SOP Class UID	(0008,1150)	
>>>>Referenced SOP Instance UID	(0008,1155)	
>>>Purpose of Reference Code Sequence	(0040,A170)	(121322, DCM, “Image Processing Operation”)
>Frame Content Sequence	(0020,9111)	
>Plane Orientation Sequence	(0020,9116)	
>>Image Orientation (Patient)	(0020,0037)	
>Pixel Measure Sequence	(0028,9110)	
>>Slice Thickness	(0018,0050)	
>>Pixel Spacing	(0028,0030)	
>Segmentation Identification Sequence	(0062,000A)	
>>Referenced Segment Number	(0062,000B)	
Per-frame Functional Groups Sequence	(5200,9230)	one item for each frame
>Plane Position Sequence	(0020,9113)	
>>Image Position (Patient)	(0020,0032)	
Pixel Data	(7FE0,0010)	

4.1.7 Surface Segmentation Standard Extended SOP Class

4.1.7.1 General 3D Graphic Results Storage

Table 13: General 3D Graphic Results Storage

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		
Specific Character Set	(0008,0005)	from Original
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.66.5
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Content Date	(0008,0023)	<yyyymmdd>

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Attribute Name	Tag	Value
Series Time	(0008,0031)	<hhmmss.ffffff>
Content Time	(0008,0033)	<hhmmss>
Modality	(0008,0060)	SEG
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from WS Configuration
1	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	same as Protocol Name
Performing Physician’s Name	(0008,1050)	not set, unless input via “Correct”
Operators’ name	(0008,1070)	from Original, unless set via “Correct”
Manufacturer’s Model Name	(0008,1090)	“syngo_Application_SW_SYS”
Referenced Series Sequence	(0008,1115)	used, if this instance references instances in this study.
>Referenced Instance Sequence	(0008,114A)	referenced instances of Segmentation object, if applicable.
>Series Instance UID	(0020,000E)	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	used, if this instance references instances in other studies.
>Referenced Series Sequence	(0008,1115)	
>>Referenced Instance Sequence	(0008,114A)	referenced instances of Segmentation object, if applicable.
>>Series Instance UID	(0020,000E)	
>Study Instance UID	(0020,000D)	
Device Serial Number	(0018,1000)	from WS Configuration
Software Versions	(0018,1020)	<product version of *syngo* Application Software>
Protocol Name	(0018,1030)	Information on Surface Segmentation
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	950
Instance Number	(0020,0013)	
Frame of Reference UID	(0020,0052)	Copied from object to which the Surface Segmentation result applies or new UID. *Note*: In case of 2 volumes with 2 different FoR UIDs stored in same Series the related SSOs are also stored together in same series with FoR of the

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Attribute Name	Tag	Value
		volume the first SSO is related to.
Laterality	(0020,0060)	n.a. or <zero length>
Position Reference Indicator	(0020,1040)	if applicable, copied from object to which the Surface Segmentation result applies.
Request Attributes Sequence	(0040,0275)	from Original
>item contents as provided		*from Original*
Segment Sequence	(0062,0002)	
>Anatomic Region Sequence	(0008,2218)	
>Segmented Property Category Code Sequence	(0062,0003)	One of (T-D0050, SRT, "Tissue"), (T-D000A, SRT, "Anatomical Structure"), (A-00004, SRT, "Physical Object"), (M-01000, SRT, "Morphologically Altered Structure"), (R-42019, SRT, "Function") or private coded term.
>Segment Number	(0062,0004)	
>Segment Label	(0062,0005)	
>Segment Description	(0062,0006)	
>Segment Algorithm Type	(0062,0008)	
>Recommended Display Gray-scale Value	(0062,000C)	
>Recommended Display CIELab Value	(0062,000D)	
>Segmented Property Type Code Sequence	(0062,000F)	
>Surface Count	(0066,002A)	number of Surfaces comprising this segment.
>Referenced Surface Sequence	(0066,002B)	
>>Referenced Surface Number	(0062,002C)	
>>Segment Surface Generation Algorithm Identification Sequence	(0062,002D)	
>>>Algorithm Family Code Sequence	(0062,002F)	
>>>Algorithm Version	(0066,0031)	

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Attribute Name	Tag	Value
>>>Algorithm Name	(0066,0036)	
>>Segment Surface Generation Algorithm Identification Sequence	(0066,002D)	
>>>Algorithm Family Code Sequence	(0066,002F)	
>>>Algorithm Version	(0066,0031)	
>>>Algorithm Name	(0066,0036)	Identifies workflow/application
>>Segmented Surface Source Instance Sequence	(0066,002E)	reference to volume that was viewed while generating this surface segment.
>>>Referenced SOP Class UID	(0008,1150)	
>>>Referenced SOP Instance UID	(0008,1155)	
Number of Surfaces	(0066,0001)	
Surface Sequence	(0066,0002)	
>Recommended Display Grayscale Value	(0062,000C)	
>Recommended Display CIELab Value	(0062,000D)	
>Surface Number	(0066,0003)	
>Surface Comments	(0066,0004)	
>Surface Processing	(0066,0009)	typically set to NO
>Recommended Presentation Opacity	(0066,000C)	0.0 specifies 100% transparency and 1.0 a 100% opaqueness.
>Recommended Presentation Type	(0066,000D)	DICOM defined values: SURFACE WIREFRAME POINTS Private terms: CONTOUR (only contour of a wireframe) XRAY_SHADE NONE
>Finite Volume	(0066,000E)	
>Manifold	(0066,0010)	
>Surface Points Sequence	(0066,0011)	
>>Number of Surface Points	(0066,0015)	

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Attribute Name	Tag	Value
>>Point Coordinates Data	(0066,0016)	
>Surface Points Normals Sequence	(0066,0012)	<zero length>
>Surface Mesh Primitives Sequence	(0066,0013)	
>>Triangle Point Index List	(0066,0023)	only supported for import
>>Long Triangle Point Index List	(0066,0041)	
>>Edge Point Index List	(0066,0024)	typically not used
>>Long Edge Point Index List	(0066,0042)	typically not used
>>Vertex Point Index List	(0066,0025)	only supported for import
>>Long Vertex Point Index List	(0066,0043)	
>>Triangle Strip Sequence	(0066,0026)	typically not used
>>Triangle Fan Sequence	(0066,0027)	typically not used
>>Line Sequence	(0066,0028)	
>>>Primitive Point Index List	(0066,0029)	only supported for import
>>>Long Primitive Point Index List	(0066,0040)	
>>Facet Sequence	(0066,0034)	typically not used
>Recommended Point Radius	(0066,0037)	
>Recommended Line Thickness	(0066,0038)	
Private Creator	(0067,00xx)	“SIEMENS SMS-AX Surface Segmentation Extensions“
Attributes according to “4.4 Data Dictionary of Private Attributes”		
Content Label	(0070,0080)	
Content Description	(0070,0081)	
Content Creator’s Name	(0070,0084)	<zero length>

4.1.8 Registration SOP Class

4.1.8.1 Rigid 3D/3D Registration Result

Table 14: Rigid 3D/3D Registration Result

Attribute Name	Tag	Value
Attributes according to 4.1.1.1 Supported attributes on Patient level		
Attributes according to 4.1.1.2 Supported attributes on Study level		

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Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	from original image (volume in registered space)
Image Type	(0008,0008)	DERIVED\PRIMARY
Instance Creation Date	(0008,0012)	<yyyymmdd>
Instance Creation Time	(0008,0013)	<hhmmss.ffffff>
SOP Class UID	(0008,0016)	1.2.840.10008.5.1.4.1.1.66.1
SOP Instance UID	(0008,0018)	
Series Date	(0008,0021)	<yyyymmdd>
Content Date	(0008,0023)	<yyyymmdd>
Series Time	(0008,0031)	<hhmmss.ffffff>
Content Time	(0008,0033)	<hhmmss.ffffff>
Modality	(0008,0060)	REG
Manufacturer	(0008,0070)	“Siemens”
Institution Name	(0008,0080)	from WS Configuration
Institution Address	(0008,0081)	from WS Configuration
Station Name	(0008,1010)	from WS Configuration
Series Description	(0008,103E)	same as Protocol Name
Performing Physician’s Name	(0008,1050)	not set, unless input via “Correct”.
Operators’ name	(0008,1070)	from Original, unless set via “Correct”
Manufacturer’s Model Name	(0008,1090)	“syngo_Application_SW_SYS”
Referenced Series Sequence	(0008,1115)	Used if both volumes are in same study. One item for each volume (registered space, registered volume)
>Referenced Instance Sequence	(0008,114A)	
>Series Instance UID	(0020,000E)	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	Used if both volumes are related to different studies.
>Referenced Series Sequence	(0008,1115)	
>>Referenced Instance Sequence	(0008,114A)	
>>Series Instance UID	(0020,000E)	
>Study Instance UID	(0020,000D)	
Device Serial Number	(0018,1000)	from WS Configuration
Software Versions	(0018,1020)	<product version of *syngo* Application Software>

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Attribute Name	Tag	Value
Protocol Name	(0018,1030)	“Fusion3D3D”
Series Instance UID	(0020,000E)	<new UID>
Series Number	(0020,0011)	960
Instance Number	(0020,0013)	
Frame of Reference UID	(0020,0052)	Copied from object to which the registration result applies. *Note*: In case of 2 volumes with 2 different FoR UIDs stored in same Series the related Registrations are also stored together in same series with FoR of the volume the first Registration is related to.
Laterality	(0020,0060)	n.a. or <zero length>
Position Reference Indicator	(0020,1040)	If applicable, copied from original image (volume in registered space) to which the registration result applies.
Request Attributes Sequence	(0040,0275)	from Original
>item contents as provided		*from Original*
Content Label	(0070,0080)	
Content Description	(0070,0081)	
Content Creator’s Name	(0070,0084)	optional, see also *Operator’s Name*
Registration Sequence	(0070,0308)	Two items, one “identity transformation” for the volume in the registered space, to which the volume specified in the second item, is registered to.
Item 1 refers to the volume in the registered space	(0062,0006)	
>Referenced Image Sequence	(0008,1140)	reference to the volume in the registered space
>Frame of Reference UID	(0020,0052)	
>Matrix Registration Sequence	(0070,0309)	
>>Matrix Sequence	(0070,030A)	
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	
>>>Frame of Reference Transformation Matrix	(3006,00C6)	“identity transformation” specified.
>>Registration Type Code Sequence	(0070,030D)	(125021, DCM, “Frame of Reference Identity”)
Item 2 refers to the volume that is	(0062,002D)	

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Attribute Name	Tag	Value
registered		
>Referenced Image Sequence	(0008,1140)	reference to the volume that is registered to the registered space
>Frame of Reference UID	(0020,0052)	
>Matrix Registration Sequence	(0070,0309)	
>>Matrix Sequence	(0070,030A)	
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	
>>>Frame of Reference Transformation Matrix	(3006,00C6)	
>>Registration Type Code Sequence	(0070,030D)	

4.2 Attribute mapping

The *syngo* Application Software is not an Acquisition Modality that maps schedules to performed procedures. The mapping of attributes for derived SOP Instances is disclosed in the tables of the previous sub-sections of "4.1 Created SOP Instances".

4.3 Coerced/Modified fields

The *syngo* Application Software DICOM Application is not performing data coercion.

4.4 Data Dictionary of Private Attributes

The following Table 15: Private Data Element Dictionary lists all private attributes created by *syngo* Application Software which may be included in the generated instances.

Table 15: Private Data Element Dictionary

Tag	Private Owner Code	Name	VR	VM
(0019,xx00)	SIEMENS SMS-AX IAE	Bookmark XML Structure	OB	1
(0019,xx02)	SIEMENS AX DYNACT	Transformation to Calibration	DS	16
(0019,xx03)	SIEMENS AX DYNACT	Calibration Coordinate System ID	US	1-n
(0019,xx10)	SIEMENS AX DYNACT	Reconstruction Joblist	UT	1
(0019,xx11)	SIEMENS AX DYNACT	HU Offset Correction Perfusion	FL	1
(0021,xx2A)	SIEMENS SMS-AX ACQ 1.0	Cardiac Phase Center	IS	1
(0021,xx2B)	SIEMENS SMS-AX ACQ 1.0	Cardiac Phase Width	IS	1
(0021,xx3B)	SIEMENS SMS-AX ACQ 1.0	mAs Modulation	IS	1

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Tag	Private Owner Code	Name	VR	VM
(0021,xx3C)	SIEMENS SMS-AX ACQ 1.0	R-Peaks Datetimes	DT	1
(0021,xx54)	SIEMENS SMS-AX ACQ 1.0	Rotation Angle	SS	1
(0021,xx56)	SIEMENS SMS-AX ACQ 1.0	Table Coordinates	SS	3
(0021,xx57)	SIEMENS SMS-AX ACQ 1.0	Iso Center Table Position	SS	1
(0021,xx5B)	SIEMENS SMS-AX ACQ 1.0	Table Coordinates System	FL	12
(0021,xx81)	SIEMENS SMS-AX ACQ 1.0	Table Tilt	SS	1
(0021,xx82)	SIEMENS SMS-AX ACQ 1.0	Table Rotation	SS	1
(0021,xx83)	SIEMENS SMS-AX ACQ 1.0	Table Cradle Tilt	SS	1
(0029,xx40)	SIEMENS MEDCOM HEADER	Application Header Sequence	SQ	1
(0029,xx41)	SIEMENS MEDCOM HEADER	Application Header Type	CS	1
(0029,xx42)	SIEMENS MEDCOM HEADER	Application Header ID	LO	1
(0029,xx43)	SIEMENS MEDCOM HEADER	Application Header Version	LO	1
(0029,xx44)	SIEMENS MEDCOM HEADER	Application Header Info	OB	1
(0063,xx42)	SIEMENS SMS-AX Segmenta-tion Extensions	Object GUID	LO	1
(0063,xx48)	SIEMENS SMS-AX Segmenta-tion Extensions	Private Segmentation Sequence	SQ	1
(0067,xx00)	SIEMENS SMS-AX Surface Segmentation Extensions	Object Type	CS	1
(0067,xx01)	SIEMENS SMS-AX Surface Segmentation Extensions	Object IAE Display	CS	1
(0067,xx02)	SIEMENS SMS-AX Surface Segmentation Extensions	Object Live Display	CS	1
(0067,xx03)	SIEMENS SMS-AX Surface Segmentation Extensions	Object Labeling	CS	1
(0067,xx04)	SIEMENS SMS-AX Surface Segmentation Extensions	SSO Version Number	US	1
(0067,xx05)	SIEMENS SMS-AX Surface Segmentation Extensions	EP Point Ablated	CS	1
(0067,xx07)	SIEMENS SMS-AX Surface Segmentation Extensions	Point Connector	CS	1
(0067,xx09)	SIEMENS SMS-AX Surface Segmentation Extensions	Show Length	CS	1
(0067,xx10)	SIEMENS SMS-AX Surface Segmentation Extensions	Polyline Shape	CS	1

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Tag	Private Owner Code	Name	VR	VM
(0067,xx11)	SIEMENS SMS-AX Surface Segmentation Extensions	Polyline Style	CS	1
(0067,xx13)	SIEMENS SMS-AX Surface Segmentation Extensions	Clipping	CS	1
(0067,xx14)	SIEMENS SMS-AX Surface Segmentation Extensions	Show Volume	CS	1
(0067,xx27)	SIEMENS SMS-AX Surface Segmentation Extensions	Object Volume Assignment	CS	1
(0067,xx35)	SIEMENS SMS-AX Surface Segmentation Extensions	Group Show	CS	1
(0067,xx36)	SIEMENS SMS-AX Surface Segmentation Extensions	Group IAE Display	CS	1
(0067,xx37)	SIEMENS SMS-AX Surface Segmentation Extensions	Group Live Display	CS	1
(0067,xx38)	SIEMENS SMS-AX Surface Segmentation Extensions	Group Volume Assignment	CS	1
(0067,xx39)	SIEMENS SMS-AX Surface Segmentation Extensions	Object Version Number	US	1
(0067,xx40)	SIEMENS SMS-AX Surface Segmentation Extensions	SSO Owner	LO	1
(0067,xx42)	SIEMENS SMS-AX Surface Segmentation Extensions	Object GUID	LO	1
(0067,xx43)	SIEMENS SMS-AX Surface Segmentation Extensions	Group GUID	LO	1
(0067,xx44)	SIEMENS SMS-AX Surface Segmentation Extensions	SSO GUID	LO	1
(0067,xx47)	SIEMENS SMS-AX Surface Segmentation Extensions	Group Sequence	SQ	1
(0067,xx48)	SIEMENS SMS-AX Surface Segmentation Extensions	Private Surface Segmentation Sequence	SQ	1
(0067,xx49)	SIEMENS SMS-AX Surface Segmentation Extensions	Group Name	LO	1
(0067,xx51)	SIEMENS SMS-AX Surface Segmentation Extensions	Referenced Group GUID	LO	1
(0067,xx53)	SIEMENS SMS-AX Surface Segmentation Extensions	Private Surface Mesh Sequence	SQ	1
(0067,xx54)	SIEMENS SMS-AX Surface Segmentation Extensions	Surface Show	CS	1

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Tag	Private Owner Code	Name	VR	VM
(0067,xx56)	SIEMENS SMS-AX Surface Segmentation Extensions	Surface Mean Diameter List	OF	1
(0067,xx57)	SIEMENS SMS-AX Surface Segmentation Extensions	Primary Angle	DS	1
(0067,xx58)	SIEMENS SMS-AX Surface Segmentation Extensions	Secondary Angle	DS	1
(0067,xx59)	SIEMENS SMS-AX Surface Segmentation Extensions	Centerline ID List	LT	1
(0067,xx60)	SIEMENS SMS-AX Surface Segmentation Extensions	Landmark ID List	LT	1
(0067,xx61)	SIEMENS SMS-AX Surface Segmentation Extensions	Surface Text Label	LO	1
(0067,xx62)	SIEMENS SMS-AX Surface Segmentation Extensions	Centerline Visualization Type	CS	1
(0067,xx64)	SIEMENS SMS-AX Surface Segmentation Extensions	MPR Views	UT	1
(0067,xx65)	SIEMENS SMS-AX Surface Segmentation Extensions	Fixed Line Thickness	CS	1
(0067,xx66)	SIEMENS SMS-AX Surface Segmentation Extensions	Fixed Point Radius	CS	1
(0067,xx67)	SIEMENS SMS-AX Surface Segmentation Extensions	Surface Supported	CS	1
(0067,xx68)	SIEMENS SMS-AX Surface Segmentation Extensions	Referenced Object GUID	LO	1
(0067,xx69)	SIEMENS SMS-AX Surface Segmentation Extensions	Show Caption	CS	1-n

Note: The following Private Owner Code contains double-spaces in the name definitions : SIEMENS SMS-AX<spc><spc>ACQ 1.0

4.5 Standard Extended/Specialized/Private SOP Classes

4.5.1 Standard Extended Segmentation

Any Segmentation SOP Instances created by *syngo* Application Software can be standard-extended by adding the following *syngo* private module attributes.

Table 16: Private Modules for Segmentation SOP Class

IE	Module	Reference	Usage	Note
Image	Private Segmentation Image	4.5.1.1	U	Private Segmentation information

U = User Option

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4.5.1.1 Private Segmentation

The table in this section contains private IOD Attributes that describe the Private Segmentation information:

Table 17: Private Segmentation Attributes

Attribute Name	Tag	Owner	Type	Notes
Private Segmentation Sequence	(0063,xx48)	SIEMENS SMS-AX Segmentation Extension	3	Sequence which contains private extensions for the Segmentation Image Module.
>SSO GUID	(0063,xx42)	SIEMENS SMS-AX Segmentation Extension	3	Global ID for the Segmentation object.

4.5.2 Standard Extended Surface Segmentation

Any Surface Segmentation SOP Instances created by *syngo* Application Software can be standard-extended by adding the following *syngo* private module attributes.

Table 18: Private Modules for Surface Segmentation SOP Class

IE	Module	Reference	Usage	Note
Surface	Private Surface Segmentation	4.5.2.1	U	Private Surface Segmentation information
Surface	Private Surface Mesh	4.5.2.2	U	Private Surface Mesh information

U = User Option

4.5.2.1 Private Surface Segmentation

The table in this section contains private IOD Attributes that describe the Private Segmentation information:

Table 19: Private Surface Segmentation Attributes

Attribute Name	Tag	Owner	Type	Notes
SSO Version Number	(0067,xx04)	SIEMENS SMS-AX Surface Segmentation Extensions	3	The version is an increasing number.
SSO Owner	(0067,xx40)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines component that created the SSO.
SSO GUID	(0067,xx44)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Global ID for the SSO.
Group Sequence	(0067,xx47)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Shall contain Group related information. Contains at least 1 item
>Recommended Display CIELab	(0062,000D)	n.a.	3	Triplet value to define how this Group shall be rendered on a color

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Attribute Name	Tag	Owner	Type	Notes
Value				display. The units are in PCSValues and the value encoding is CIELab.
>Recommended Presentation Opacity	(0066,000C)	n.a.	3	Defines the opacity of the Group in percent. Float value between 0.0 (“0% opaqueness”) and 1.0 ("100% opaqueness").
>Group Show	(0067,xx35)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Group is hidden or not. Defined Terms: ON OFF
>Group IAE Display	(0067,xx36)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Group is shown on the IAE image area. Defined Terms: NONE ON OFF
>Group Live Display	(0067,xx37)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Group is shown on the Live image area. Defined Terms: NONE ON OFF
>Group Volume Assignment	(0067,xx38)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Group is shown on the registered volume(s). Defined Terms: REGISTERED PLANNING
>Group GUID	(0067,xx43)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Global ID for the Group
>Group Name	(0067,xx49)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Name of the group.
Private Surface Segmentation Sequence	(0067,xx48)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Sequence which contains private extensions for the Surface Segmentation Module. One Item for each item in the Segment Sequence.
>Object Type	(0067,xx00)	SIEMENS SMS-AX Surface Segmentation	3	Defines the type of the Object.

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Attribute Name	Tag	Owner	Type	Notes
		Extensions		Defined Terms: POLYLINE MARKER NEEDLE SCREW EP ABLATION PT SEGMENTATION VESSEL VESSEL LANDMARK VERTEBRA CENTER EMPTY_OBJ
>Object IAE Display	(0067,xx01)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Object is shown on the IAE image area. Defined Terms: NONE ON OFF
>Object Live Display	(0067,xx02)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Object is shown on the Live image area. Defined Terms: NONE ON OFF
>Object Labeling	(0067,xx03)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines whether the Object labels are shown. Defined Terms: ON OFF Note: Read-only, replaced by (0067,xx69)
>EP Point Ablated	(0067,xx05)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines whether the EP Point is ablated or not. Defined Terms: ABLATED NOT ABLATED
>Show Length	(0067,xx09)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines whether the display of the length value is shown. Defined Terms: ON

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Attribute Name	Tag	Owner	Type	Notes
				OFF Note: Read-only, replaced by (0067,xx69)
>Polyline Shape	(0067,xx10)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines the shape of a polyline. Defined Terms: LINEAR CURVED
>Polyline Style	(0067,xx11)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines the style of a polyline. Defined Terms : OPEN CLOSED
>Clipping	(0067,xx13)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines whether clipping affects the Object or not. Defined Terms: ON OFF
>Show Volume	(0067,xx14)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines whether the display of the volume value is shown. Defined Terms: ON OFF
>Object Volume Assignment	(0067,xx27)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Object is shown on the registered volume(s). Defined Terms: REGISTERED PLANNING NONE
>Object Version Number	(0067,xx39)	SIEMENS SMS-AX Surface Segmentation Extensions	3	The Object version is an increasing number.
>Object GUID	(0067,xx42)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Global ID for the Object
>Referenced Group GUID	(0067,xx51)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Value copied from GUID in the Group GUID (0067,xx43) attribute in the Group Sequence (0067,0047).
>Primary Angle	(0067,xx57)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Primary C-arm angle

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Attribute Name	Tag	Owner	Type	Notes
>Secondary Angle	(0067,xx58)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Secondary C-arm angle
>Segment Algorithm Name	(0062,0009)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Name of the algorithm that was used to generate the Surface. Defined Terms: Stroke Segmentation Left Atrium Segmentation Model Based Left Atrium Segmentation Hybrid Model Based Left Atrium Segmentation Aortic Root Segmentation Coronary Vessel Aorta Vessel Vessel Tree Definition Vessel Tree Detection Vessel Feeder Detection
>Recommended Display CIELab Value	(0062,000D)	n.a.	3	Triplet value to define how this segment shall be rendered on a color display.
>Recommended Presentation Opacity	(0066,000C)	n.a.	3	Single unsigned value to define how the maximum pixel value of this segment shall be rendered on a grayscale display.
>Recommended Point Radius	(0066,0037)	n.a.	3	Specifies the radius of the vertex points defined in the Long Vertex Point Index List (0066,0043) with which it is recommended that the point be rendered.
>Recommended Line Thickness	(0066,0038)	n.a.	3	Specifies the thickness of each edge or line defined in the Long Edge Point Index List (0066,0042) or Line Sequence (0066,0028) with which it is recommended that the line be rendered.

4.5.2.2 Private Surface Mesh

The table in this section contains private IOD Attributes that describe the Private Segmentation information:

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Table 20: Private Surface Mesh Attributes

Attribute Name	Tag	Owner	Type	Notes
Private Surface Mesh Sequence	(0067,xx53)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Sequence which contains private extensions for the Surface Mesh Module. One Item for each item in the Surface Sequence.
>Surface Show	(0067,xx54)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Surface is shown or not. Defined Terms: NONE ON OFF
>Surface Mean Diameter List	(0067,xx56)	SIEMENS SMS-AX Surface Segmentation Extensions	3	List of mean diameters in mm.
>Centerline ID List	(0067,xx59)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Vessel object: 2 values (CenterlineSegID\ParentID)
>Landmark ID List	(0067,xx60)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Vessel Landmarks object: 2 values (LandmarkID\VesselSegmentID)
>Surface Text Label	(0067,xx61)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Text label
>Centerline Visualization Type	(0067,xx62)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines how a Centerline is visualized. Defined Terms: NONE NORMAL COLOR CODED RULER
>MPR Views	(0067,xx64)	SIEMENS SMS-AX Surface Segmentation Extensions	3	XML structure
>Fixed Line Thickness	(0067,xx65)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines a fixed line thickness. Defined Terms: VERY SMALL SMALL MEDIUM LARGE VERY LARGE
>Fixed Point Radi-	(0067,xx66)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines a fixed point radius.

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Attribute Name	Tag	Owner	Type	Notes
us				Defined Terms: VERY SMALL SMALL MEDIUM LARGE VERY LARGE
>Surface Supported	(0067,xx67)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if the Surface is supported. Defined Terms: YES NO
>Referenced Object GUID	(0067,xx68)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Reference to another Segment
>Show Caption	(0067,xx69)	SIEMENS SMS-AX Surface Segmentation Extensions	3	Defines if captions are shown Defined terms: LENGTH_ON LENGTH_OFF LABEL_ON LABEL_OFF DIAMETER_ON DIAMETER_OFF

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Annex A: Index of Tables

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