DICOM Conformance Statement

Application Annex:

EP navigator R5.4
On Interventional Workspot R1.6

SNIP-IOCC-T-020001.09 (Version 2.2)

PHILIPS

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1. Table of Contents

2. Introduction

This DICOM Conformance Statement annex is applicable to EP navigator R5.4 Application. In general, the EP navigator R5.4 application is the user environment for viewing and analyzing MR and CT images. EP navigator also stores (creates) 3D-ATG as CT series SOP class, but with Modality type XA.

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2.1. Revision History

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

Table 1: Revision History

Document Version	Date of Issue	Description of change
00	02-Mar-2020	First Release for EP navigator R5.4 on Interventional Workspot R1.6
01	04-Aug-2022	• Updated Value Under “General Equipment” Table for “Software Version” attribute. • Updated Value columns in Table Nos. 12, 25 for created SOP Classes as mentioned in Section 3.1.3 are updated for correctness, no change in the product behavior.

2.2. Audience

This Conformance Statement is intended for:

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

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

2.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

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

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

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

2.4. Definitions, Terms and Abbreviations

Table 2: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
UID	Unique Identifier
VR	Value Representation
XA	X-Ray Angiography

2.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
National Electrical Manufacturers Association
1300 North 17th Street
Suite 900
Arlington, Virginia 22209
Internet: https://www.dicomstandard.org/current
Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2022 plus all the supplements and correction items that have been approved as Final Text.

3. Annexes of application "EP navigator R5.4 application"

3.1. IOD Contents

This section specifies each IOD accepted and / or created by EP navigator R5.4 Application.

ACCEPTED The applicable IOD is accepted for storage in the repository of the hosting platform and supported as input data for EP navigator R5.4 Application or viewing and analysis.

CREATED The EP navigator R5.4 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.

3.1.1. Created SOP Instance

This section specifies each IOD created by this application.
This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:

ALWAYS The module is always present

CONDITIONAL The module is used under specified condition

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

ALWAYS The attribute is always present with a value

EMPTY The attribute is always present without any value (attribute sent zero length)

VNAP The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)

ANAP The attribute is present under specified condition – if present then it will always have a value

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

AUTO The attribute value is generated automatically

CONFIG The attribute value source is a configurable parameter

COPY The attribute value source is another SOP instance

FIXED The attribute value is hard-coded in the application

IMPLICIT The attribute value source is a user-implicit setting

MPPS The attribute value is the same as that use for Modality Performed Procedure Step

MWL The attribute value source is a Modality Worklist

USER The attribute value source is explicit user input

3.1.1.1. List of created SOP Classes

Table 3: List of created SOP Classes

IOD		Support	
Name	**UID**	**ACCEPTED**	**CREATED**
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	No	Yes

Note: EP navigator can also use session data as input, which is stored as SC image. However, it cannot use any other SC image object.

3.1.2. Acceptance Criteria

This section specifies the acceptance criteria applied by EP navigator 5.4 Application to which a dataset should adhere before it can be imported into the application. This can be criteria on the highest level (e.g. data from a certain manufacturer or system model) or certain DICOM attributes mandatory to be present into the dataset holding a specific value. In case one or more Philips private attributes are required, then a list of supported Philips system models will be mentioned.

Table 4: Accepted system models.

Manufacturer	Modality	System Model Name(s)
Philips	MR	Intera 1.5T and 3T, Achieva 1.5T and 3T, Ingenia 1.5T and 3T (SW release 2.5.3 onwards)
	CT	Brilliance 10, 16, 40, 64, 256 slice systems
Siemens	MR	Avanto 1.5T
	CT	Definition Sensation 16, 64 (32 channels)
General Electric	CT	Lightspeed 16, 16Pro, VCT Select (32), VCT (64)
Toshiba	CT	Aquilion One

Table 5: Accepted transfer syntaxes per IOD

IOD		Transfer Syntax	
Name	**UID**	**Name**	**UID**
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1

Table 6: Accepted attribute values

Attribute Name	Attribute Number	Values / Comments
Not applicable	Not applicable	Not applicable

3.1.3. 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

3.1.3.1. List of created SOP Classes

Table 7: List of created SOP Classes

SOP Class Name	SOP Class UID
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2

3.1.3.2. Secondary Capture Image Storage SOP class

Table 8: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
	Patient Study Module	USER DEFINED
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	USER DEFINED
	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	SOP Common Module	ALWAYS
	SC Image Module	ALWAYS
	Modality LUT Module	USER DEFINED
	VOI LUT Module	USER DEFINED

Table 9: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	COPY	copied from source data
Patient ID	0010,0020	LO		ALWAYS	COPY	copied from source data
Patient's Birth Date	0010,0030	DA		ALWAYS	COPY	copied from source data
Patient's Sex	0010,0040	CS		ALWAYS	COPY	copied from source data
Issuer of Patient ID	0010,0030	DA		VNAP	COPY	copied from source data
Patient's Birth Date	0010,0040	CS		VNAP	COPY	copied from source data

Table 10: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	COPY	copied from source data
Study Time	0008,0030	TM		ALWAYS	COPY	copied from source data

Accession Number	0008,0050	SH		VNAP	COPY	copied from source data
Referring Physician's Name	0008,0090	PN		VNAP	COPY	copied from source data
Study Instance UID	0020,000D	UI		ALWAYS	COPY	copied from source data
Study ID	0020,0010	SH		ALWAYS	COPY	copied from source data
Study Description	0008,1030	LO		ANAP	COPY, USER	copied from source data
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	copied from source data
>Code Value	0008,0100	SH		ALWAYS	COPY	copied from source data
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	copied from source data
>Code Meaning	0008,0104	LO		ALWAYS	COPY	copied from source data
Physician(s) of Record	0008,1048	PN		ANAP	COPY, COPY, USER	copied from source data
Referenced Study Sequence	0008,1110	SQ		ANAP	COPY	copied from source data
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	COPY	copied from source data
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	COPY	copied from source data
Requesting Service	0032,1033	LO		ANAP	COPY	copied from source data

Table 11 : Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		ANAP	COPY	copied from source data
Admitting Diagnoses Description	0008,1080	LO		ANAP	COPY	copied from source data
Patient's Weight	0010,1030	DS		ANAP	COPY	copied from source data
Pregnancy Status	0010,21C0	US		ANAP	COPY	copied from source data

Table 12: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Description	0008,103E	LO		ANAP	COPY, USER	
Series Date	0008,0021	DA		ANAP		
Series Time	0008,0031	TM		ANAP		
Modality	0008,0060	CS	XA	ALWAYS	COPY	
Performing Physician's Name	0008,1050	PN		ANAP	COPY, USER	

Operators' Name	0008,1070	PN		ANAP	COPY, COPY, USER	
Study Instance UID	0020,000D	UI		ALWAYS	COPY	
Series Instance UID	0020,000E	UI		ALWAYS	COPY, COPY	
Series Number	0020,0011	IS		VNAP	COPY, COPY	
Request Attributes Sequence	0040,0275	SQ		ANAP	COPY	copied from source data
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	copied from source data
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	copied from source data
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	copied from source data
Performed Procedure Step Description	0040,0254	LO		ANAP	COPY, USER	

Table 13: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	VNAP	FIXED	
Institution Name	0008,0080	LO		ANAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO	EP navigator	ANAP	FIXED	
Software Versions	0018,1020	LO	5.4.x	ANAP	FIXED	where “x” is the detailed application SW version.

Table 14: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	XA	ANAP	COPY	copied from source data In Case Application Session: XA: In case Stude or Carto export depending on input data CT=>CT,MR=>MR, 3D-ATG => CT
Conversion Type	0008,0064	CS		ALWAYS	COPY	WSD copied from source data
Secondary Capture Device Manufacturer	0018,1016	LO		ANAP	COPY	copied from source data
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO		ANAP	COPY	copied from source data
Secondary Capture Device Software Version(s)	0018,1019	LO		ANAP	COPY	copied from source data

Table 15: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED\SECONDARY	ALWAYS	COPY	copied from source data For Stude and Carto Export :DERIVED\SECONDARY\3DSEG For Application Session: DERIVED\SECONDARY
Content Date	0008,0023	DA		VNAP		
Content Time	0008,0033	TM		VNAP		
Acquisition Date	0008,0022	DA		ANAP	COPY	copied from source data
Acquisition Time	0008,0032	TM		ANAP	COPY	copied from source data
Referenced Image Sequence	0008,1140	SQ		ANAP	COPY	copied from source data
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	COPY	copied from source data
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	COPY	copied from source data
Acquisition Number	0020,0012	IS		ANAP	COPY	copied from source data
Instance Number	0020,0013	IS		VNAP	COPY	copied from source data
Image Comments	0020,4000	LT	3Dseg	ANAP	COPY	copied from source data

Table 16: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	COPY	copied from source data
Photometric Interpretation	0028,0004	CS	RGB, MONOCHROME 2	ALWAYS	COPY	copied from source data For Stude And Carto Export : RGB, For Application Session: MONOCHROME2
Planar Configuration	0028,0006	US		ANAP	COPY	copied from source data
Rows	0028,0010	US		ALWAYS	COPY	copied from source data
Columns	0028,0011	US		ALWAYS	COPY	copied from source data
Bits Allocated	0028,0100	US	8	ALWAYS	COPY	8 copied from source data
Bits Stored	0028,0101	US	8	ALWAYS	COPY	8 copied from source data
High Bit	0028,0102	US	7	ALWAYS	COPY	7 copied from source data
Pixel Representation	0028,0103	US		ALWAYS	COPY	copied from source data
Pixel Data	7FE0,0010	OW/OB		ANAP	COPY	copied from source data

Table 17: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP	COPY	copied from source data
Time of Secondary Capture	0018,1014	TM		ANAP	COPY	copied from source data

Table 18: Modality LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS	0	ALWAYS		
Rescale Slope	0028,1053	DS	1	ALWAYS		
Rescale Type	0028,1054	LO	US	ALWAYS		

Table 19: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS	0	ALWAYS		
Window Width	0028,1051	DS	0	ALWAYS		

Table 20: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Creation Date	0008,0012	DA		ANAP	COPY	copied from source data
Specific Character Set	0008,0005	CS		ALWAYS	AUTO	As supported by hosting platform
Instance Creation Time	0008,0013	TM		ANAP	COPY	copied from source data
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	COPY	
SOP Instance UID	0008,0018	UI		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ANAP	COPY	copied from source data

3.1.3.3. CT Image Storage SOP class

Table 21: IOD of Created CT Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Frame of reference	Frame of reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Plane Module	ALWAYS
	Image Pixel Module	ALWAYS
	SOP Common Module	ALWAYS

	CT Image Module	ALWAYS
	Modality LUT Module	USER DEFINED
	SOP Common Module	ALWAYS

Table 22: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	COPY	copied from source data
Patient ID	0010,0020	LO		ALWAYS	COPY	copied from source data
Patient's Birth Date	0010,0030	DA		ALWAYS	COPY	copied from source data
Patient's Sex	0010,0040	CS		ALWAYS	COPY	copied from source data

Table 23: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	COPY	copied from source data
Study Time	0008,0030	TM		ALWAYS	COPY	copied from source data
Accession Number	0008,0050	SH		VNAP		
Referring Physician's Name	0008,0090	PN		VNAP	COPY	copied from source data
Study Instance UID	0020,000D	UI		ALWAYS	COPY	copied from source data
Study ID	0020,0010	SH		ALWAYS	COPY	copied from source data

Table 24: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Description	0008,103E	LO		ANAP	COPY, USER	
Series Date	0008,0021	DA		ANAP		
Series Time	0008,0031	TM		ANAP		
Modality	0008,0060	CS	XA	ALWAYS		
Performing Physician's Name	0008,1050	PN		ANAP	COPY, USER	
Series Instance UID	0020,000E	UI		ALWAYS	COPY	copied from source data
Series Number	0020,0011	IS		VNAP	COPY	copied from source data
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY	copied from source data
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY	copied from source data
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	copied from source data

Table 25: Frame Of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS		
Position Reference Indicator	0020,1040	LO		VNAP		

Table 26: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	VNAP	FIXED	
Institution Name	0008,0080	LO		ANAP	CONFIG	
Manufacturer's Model Name	0008,1090	LO	Interventional Workspot	ANAP	FIXED	
Software Versions	0018,1020	LO	5.4.x	ANAP	FIXED	Where “x” is the detailed application SW version..

Table 27: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY \AXIAL	ANAP	COPY	copied from source data
Content Date	0008,0023	DA		ALWAYS	COPY	copied from source data
Content Time	0008,0033	TM		ALWAYS	COPY	copied from source data
Patient Orientation	0020,0020	CS		EMPTY	COPY	copied from source data
Instance Number	0020,0013	IS		VNAP	COPY	copied from source data

Table 28: Image Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Slice Thickness	0018,0050	DS		VNAP		
Image Position (Patient)	0020,0032	DS		ALWAYS		
Image Orientation (Patient)	0020,0037	DS		ALWAYS		
Slice Location	0020,1041	DS		ANAP		
Pixel Spacing	0028,0030	DS		ALWAYS		

Table 29: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS		
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS		
Rows	0028,0010	US		ALWAYS		
Columns	0028,0011	US		ALWAYS		
Bits Allocated	0028,0100	US	16	ALWAYS		
Bits Stored	0028,0101	US	12	ALWAYS		
High Bit	0028,0102	US	11	ALWAYS		
Pixel Representation	0028,0103	US		ALWAYS		
Pixel Data	7FE0,0010	OW				

Table 30: CT Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL\PRIMARY\AXIAL	ALWAYS		
Rescale Intercept	0028,1052	DS		ALWAYS		
Rescale Slope	0028,1053	DS		ALWAYS		
KVP	0018,0060	DS		VNAP		
Acquisition Number	0020,0012	IS		VNAP		
Rescale Type	0028,1054	LO	US	ALWAYS		

Table 31: Modality LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS	0	ALWAYS		
Rescale Slope	0028,1053	DS	1	ALWAYS		
Rescale Type	0028,1054	LO	US	ALWAYS		

Table 32:SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Creation Date	0008,0012	DA		ANAP	COPY	copied from source data
Instance Creation Time	0008,0013	TM		ANAP	COPY	copied from source data
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.2	ALWAYS	FIXED	
SOP Instance UID	0008,0018	UI		ALWAYS	COPY	copied from source data
Instance Number	0020,0013	IS		ANAP	COPY	copied from source data

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Issued by:

Philips Medical Systems Nederland BV, a Philips Healthcare company,
P.O. Box 10.000
5680 DA Best
The Netherlands

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