DICOM

Conformance Statement

Philips Orthopaedic Applications R 1.2

PHILIPS

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1. DICOM CONFORMANCE STATEMENT OVERVIEW

The Philips Orthopaedic Applications provide an environment for data selection, viewing and reporting, in which specific orthopedic applications can be executed.

This orthopedic software package offers an opportunity to offer products directly to an Orthopaedic surgeon, who usually does not have a PACS or a ViewForum.

The Philips Orthopaedic Applications provide evaluation and planning functionality for Orthopaedic images. They are able to read DICOM files and create Secondary Captures Images.

The main application areas of the Philips Orthopaedic Applications are:

- Leg Osteotomy planning
- Lower extremity measurements
- Hip Implant planning
- Viewing Images
- Generate Reports in Word format by filling in a Word template.

This DICOM Conformance Statement describes the DICOM conformance of the Philips Orthopaedic Applications platform. Application packages specific DICOM conformance is described in chapter 8 in this Conformance Statement.

The Table below presents a overview of all Main Services and the applicable SOP Classes as provided by the Philips Orthopaedic Applications.

Table 1: Main Services of Philips Orthopaedic Applications

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Media Storage Directory Storage	1.2.840.10008.1.3.10	No	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Presentation State	1.2.840.10008.5.1.4.1.1.11.1	No	Yes

The following table lists the Supported Media Storage Application Profiles (with roles).

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC / FSU)	Read Files (FSR)	Supported Media
CD – R Disk			
General Purpose CD-R	NO / NO	YES	CD

The Philips Orthopaedic Applications System provides the following DICOM data exchange features:

- Is able to store DICOM information and reporting output data to the local Hard disk, Memory sticks.
- Is able to read DICOM information from CD ROM, local Hard disk, Memory sticks.
- Is able to generate reporting output data, so customization of report for specific end-users and/or hospitals (e.g. with hospital logo and address) is possible.
- 'Copy-to-clipboard' of images, including planning results and measurement graphics and textual image information, so enables end-users to use parts of the results outside the product domain (e.g. for presentations)
- Provide SC images as output to the database of the hosting system, local Hard disk, Floppy disks, Memory sticks.
- DICOM Secondary Capture is intended to capture an end result from analysis for future reference. Any planning graphics can easily be 'burnt into' the image.

The Philips Orthopaedic Applications supports the next Main Applications.

Table 3: Main Application Areas

Philips Orthopaedic Applications				SOP Class Name
Leg Osteotomy Planning	**Viewing Images**	**Lower Extremity Measurements**	**Hip Implant Planning**	
Yes	Yes	Yes	Yes	CR
Yes	Yes	Yes	Yes	DX
No	Yes	No	No	SC
Yes	Yes	Yes	Yes	XA
Yes	Yes	Yes	Yes	RF

2. TABLE OF CONTENTS

3. INTRODUCTION

The introduction specifies product and relevant disclaimers as well as any general information that the vendor feels is appropriate.

3.1. Revision History

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

Table 4: Revision History

Document Version	Date of Issue	Author	Description
00	11 November 2005	PMS MIT-IO	Initial version of the DICOM Conformance Statement for Philips Orthopaedic Applications R1.2
01	12 December 2005	PMS MIT-IO	Update after DICOM Validation test + Comments on version 00
02	12 December 2005	PMS MIT-IO	Update after first results of the review.
03	14 December 2005	PMS MIT-IO	Final version

3.2. Audience

This DICOM Conformance Statement is intended for:

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

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

3.3. Remarks

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

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

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

- **Validation**
  Philips equipment has been carefully tested to assure that the actual

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

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

3.4. Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

The following acronyms and abbreviations are used in this document.

AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
CD	Compact Disc
CD-R	CD-Recordable
CR	Computed Radiography
DICOM	Digital Imaging and Communications in Medicine
DX	Digital X-Ray
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
IOD	Information Object Definition
NEMA	National Electrical Manufacturers Association
PR	Grayscale Softcopy Presentation State
RF	X-Ray Radiofluoroscopic
RWA	Real-World Activity
SC	Secondary Capture
SOP	Service Object Pair
UID	Unique Identifier
XA	X-Ray Angiographic

3.5. References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), Part 1 – 18 (NEMA PS 3.1-1.2 – PS 3.18-1.2),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Virginia. 22209, United States of America
Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2004) PLUS all the supplements and correction items that have been approved as Final Text

4. NETWORKING

Philips Orthopaedic Applications does not provide any DICOM Networking implementation.

5. MEDIA INTERCHANGE

5.1. Implementation Model

The Implementation Model identifies the DICOM Application Entities in a specific implementation, and relates the Application Entities to Real-World Activities.

5.1.1. Application Data Flow

The Philips Orthopaedic Applications Application consists of one single application entity only: the Philips Orthopaedic Applications Application Entity Philips Orthopaedic Applications AE.

Figure 1 shows the Media Interchange Application Data Flow as a functional overview of the Philips Orthopaedic Applications for CD-R.

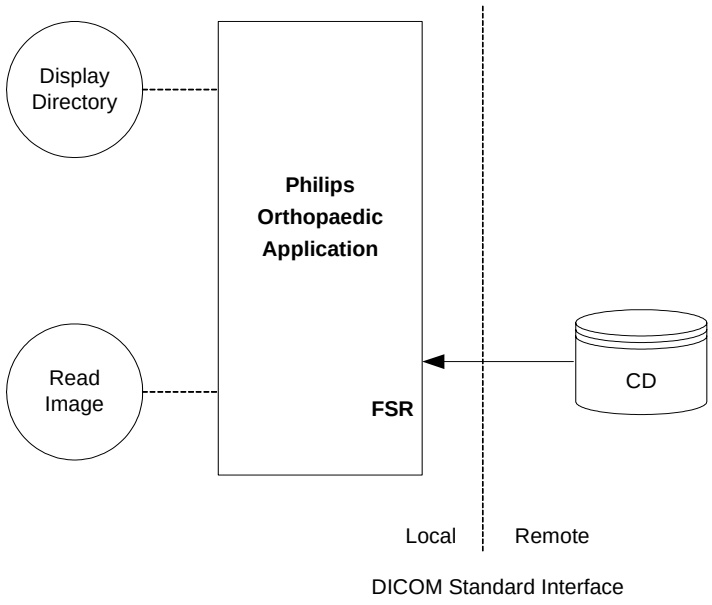

Figure 1: Media Interchange Application Data Flow Diagram

Table 9 shows the AE Related Application Profiles, Real-World Activities, and Roles for CD-R overview of the Philips Orthopaedic Applications and the supporting roles for CD-R.

Table 5: Media Services table

Media Storage Application	Write Files (FSC / FSU)	Read Files (FSR)
General Purpose CD-R	NO / NO	YES

The Philips Orthopaedic Applications will act as a FSR for CD-R, when reading the directory of the medium. Philips Orthopaedic Applications supports the media profiles as shows in the Table below:

Table 6: Media Profiles supported by Philips Orthopaedic Applications

Application Profile	CD
General Purpose	STD-GEN-CD

Supported Photometric Interpretations
The Philips Orthopaedic Applications system supports images with the following DICOM Photometric Interpretations as shows in the Table below:

Table 7: Photometric interpretations supported by Philips Orthopaedic Applications

Photometric Interpretation	Import	Export	Viewing
MONOCHROME1	YES	As RGB	YES
MONOCHROME2	YES	As RGB	YES
RGB	YES	As RGB	YES

5.1.2. Functional Definitions of AE's

This section shall describe in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions.

5.1.2.1. Functional Definition of Philips Orthopaedic Applications

The Philips Orthopaedic Applications AE is the one and only application entity within Philips Orthopaedic Applications. It includes the following service class.

Media Storage Service Class for CD

The Philips Orthopaedic Applications AE can perform the CD-R Media Storage service as SCU, with capabilities for:

- Leg osteotomy planning, Hip implant planning and Lower extremity measurements
- RWA Display Directory (as FSR),
- RWA Read Images (as FSR).

5.1.3. Sequencing of Real World Activities

A CD can be read into the Philips Orthopaedic Applications first by reading the DICOMDIR. The Philips Orthopaedic Applications AE cannot compile the updated DICOMDIR. Any required DICOM images into a write session image is stored in file format to harddisk, memory stick or floppy disk.

5.1.4. File Meta Information for Implementation Class and Version

This section shall be used to list the values assigned to the File Meta Information attributes (ref. [DICOM] PS 3.10) that pertain to the Implementation Class and Version.

The Implementation Class UID and the Implementation Version Name in the File Meta Header are as specified for Philips Orthopaedic Applications

Table 8: DICOM Implementation Class and Version for Philips Orthopaedic Applications

Implementation Class and Version	
File Meta Information Version	00, 01
Implementation Class UID	1.3.46.670589.5.4.1
Implementation Version Name	Ortho R 1.2V1L1

5.2. AE Specifications

The next section in the DICOM Conformance Statement contains the specification of the one and only Philips Orthopaedic Applications Application Entity: Philips Orthopaedic Applications AE

5.2.1. Philips Orthopaedic Applications AE

The Philips Orthopaedic Applications AE provides Standard Conformance to the DICOM Media Storage Service and File Format ([DICOM] PS 3.10), the Media Storage Application Profiles STD-GEN-CD ([DICOM] PS 3.11)

Philips Orthopaedic Applications supports multi-patient and multi-session CD-R disks, for Reading.

Supported media by Philips Orthopaedic Applications is CD R / CD RW with the profile: STD-GEN-CD.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in Table 9.

Table 9: AE Related Application Profiles, Real-World Activities, and Roles for CD-R

Supported Application Profile	Real-World Activity	Roles	SC Option
STD-GEN-CD	Display Directory	FSR	Interchange
	Read Images	FSR	Interchange

Only adding on instances is supported for the FSU, deleting is not supported.

5.2.1.1. File Meta Information for the Philips Orthopaedic Applications

The Source Application Entity Title is configurable.

5.2.1.2. Real-World Activities

5.2.1.2.1. Display Directory

When a database open action is initiated on the CD-R then the Philips Orthopaedic Applications acts as an FSR using the interchange option to read the DICOMDIR of the CD-R medium.

This will result in an overview of the patients, studies, series and images on the Philips Orthopaedic Applications screen.

5.2.1.2.1.1. Media Storage Application Profile

As depicted in Table 9, the Philips Orthopaedic Applications supports the RWA Display Directory for the STD-GEN-CD Application Profile.

5.2.1.2.2. Write Images

When an image transfer to hard disk is initiated then the Philips Orthopaedic Applications acts as an FSC or FSU using the interchange option to export SOP Instances from to the local database or file medium.

5.2.1.2.2.1. Media Storage Application Profile

The Philips Orthopaedic Applications supports the RWA Write Images function by sending these images to the local hard disk, memory disk or floppy disk.

6. SUPPORT OF CHARACTER SETS

Any support for character sets beyond the default character repertoire in Network and Media services shall be described here.

Table 10: Supported DICOM Character Sets of Philips Orthopaedic Applications

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Single-byte Character Sets without Code Extensions					
Default repertoire	-	-	ISO-IR 6	G0	ISO 646
Japanese	ISO_IR 13	-	ISO-IR 14	G0	JIS X 0201: Romaji
		-	ISO-IR 13	G1	JIS X 0201: Katakana
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO_IR 101	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 101	G1	Supplementary set of ISO 8859
Latin alphabet No. 3	ISO_IR 109	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO_IR 110	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 110	G1	Supplementary set of ISO 8859
Greek	ISO_IR 126	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 126	G1	Supplementary set of ISO 8859
Arabic	ISO_IR 127	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 127	G1	Supplementary set of ISO 8859
Hebrew	ISO_IR 138	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 138	G1	Supplementary set of ISO 8859
Cyrillic	ISO_IR 144	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 144	G1	Supplementary set of ISO 8859
Latin alphabet No. 5	ISO_IR 148	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 148	G1	Supplementary set of ISO 8859
Thai	ISO_IR 166	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 166	G1	TIS 620-2533 (1990)
Single-byte Character Sets with Code Extensions					
Default repertoire	ISO 2022 IR 6	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
Japanese	ISO 2022 IR 13	ESC 02/08 04/10	ISO-IR 14	G0	JIS X 0201: Romaji
		ESC 02/09 04/09	ISO-IR 13	G1	JIS X 0201: Katakana
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO 2022 IR 101	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/02	ISO-IR 101	G1	Supplementary set of ISO 8859

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 3	ISO 2022 IR 109	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/03	ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO 2022 IR 110	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/04	ISO-IR 110	G1	Supplementary set of ISO 8859
Greek	ISO 2022 IR 126	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/06	ISO-IR 126	G1	Supplementary set of ISO 8859
Arabic	ISO 2022 IR 127	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/07	ISO-IR 127	G1	Supplementary set of ISO 8859
Hebrew	ISO 2022 IR 138	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/08	ISO-IR 138	G1	Supplementary set of ISO 8859
Cyrillic	ISO 2022 IR 144	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/12	ISO-IR 144	G1	Supplementary set of ISO 8859
Latin alphabet No. 5	ISO 2022 IR 148	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/13	ISO-IR 148	G1	Supplementary set of ISO 8859
Thai	ISO 2022 IR 166	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 05/04	ISO-IR 166	G1	TIS 620-2533 (1990)
Multi-byte Character Sets with Code Extensions					
Japanese	ISO 2022 IR 87	ESC 02/04 04/02	ISO-IR 87	G0	JIS X 0208: Kanji
	ISO 2022 IR 159	ESC 02/04 02/08 04/04	ISO-IR 159	G0	JIS X 0212: Supplementary Kanji set
Korean	ISO 2022 IR 149	ESC 02/04 02/09 04/03	ISO-IR 149	G1	KS X 1001: Hangul and Hanja

The preferred character set shall be ISO-IR 100. When an unsupported character set is received it shall be tried and decoded according the preferred character set. Unsupported characters are displayed as “?”.

7. SECURITY

Philips Orthopaedic Applications does not provide any DICOM security implementation.

8. ANNEXES

8.1. IOD Contents

8.1.1. Created SOP Instances

This section specifies each IOD created by Philips Orthopaedic Applications, including the attribute name, tag, VR, and value (range, condition and source).

The Leg Osteotomy Application, Hip implants planning and Lower extremity measurements do not create any SOP Instances. However, they are able to prepare images to be saved as Secondary Capture by the main application. Refer to section 8.1.4 Coerced/Modified fields for further details.

Recommended abbreviations to be used for the IOD tables are:

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

Recommended abbreviations to be used for the module tables 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 Not Always Present
VNAPCV	Value is Not Always Present (attribute sent zero length if Condition applies and no Value is present)
ANAPEV	the Attribute is Not Present if Empty Value

Recommended abbreviations to be used for the source of the data values in the tables 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 source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
USER	the attribute value source is explicit user input

8.1.1.1. Secondary Capture Image IOD

A Secondary Capture Image will adhere to a snapshot image with the next IOD Attributes:

Table 11: Modules of the Secondary Capture Image IOD

Information Entity	Module Name	Reference	Presence of Module
Patient	Patient Module	Table 12	ALWAYS
Study	General Study Module	Table 13	ALWAYS
	Patient Study Module	Table 14	CONDITIONAL
Series	General Series Module	Table 15	ALWAYS
Equipment	General Equipment Module	Table 16	CONDITIONAL
	SC Equipment Module	Table 17	ALWAYS
Image	General Image Module	Table 18	ALWAYS
	Image Pixel Module	Table 19	ALWAYS
	SC Image Module	Table 20	ALWAYS
	SOP Common Module	Table 21	ALWAYS

Table 12: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	0010,0010	PN		VNAP	COPY
Patient ID	0010,0020	LO		VNAP	COPY
Issuer of Patient ID	0010,0021	LO		ANAP	COPY
Patient's Birth Date	0010,0030	DA		VNAP	COPY
Patient’s Birth Time	0010,0032	TM		ANAP	COPY
Patient's Sex	0010,0040	CS		VNAP	COPY
Other Patient IDs	0010,1000	LO		ANAP	COPY
Other Patient Names	0010,1001	PN		ANAP	COPY
Ethnic Group	0010,2160	SH		ANAP	COPY
Patient Comments	0010,4000	LT		ANAP	COPY
Referenced Patient Sequence	0008,1120	SQ		ANAP	COPY
>Referenced SOP Class UID	0008,1150	UI		ANAPEV	COPY
>Referenced SOP Instance UID	0008,1155	UI		ANAPEV	COPY

Table 13: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	0020,000D	UI		ALWAYS	COPY
Study Date	0008,0020	DA		VNAP	COPY
Study Time	0008,0030	TM		VNAP	COPY
Accession Number	0008,0050	SH		VNAP	COPY
Referring Physician’s Name	0008,0090	PN		VNAP	COPY
Study Description	0008,1030	LO		ANAP	COPY
Procedure Code Sequence	0008,1032	SQ	Include macro: Code Sequence Macro	ANAP	COPY
Physician(s) of Record	0008,1048	PN		ANAP	COPY
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	COPY
Referenced Study Sequence	0008,1110	SQ		ANAP	COPY
>Referenced SOP Class UID	0008,1150	UI		ANAPEV	COPY
>Referenced SOP Instance UID	0008,1155	UI		ANAPEV	COPY
Study ID	0020,0010	SH		VNAP	COPY

Table 14: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Admitting Diagnoses Description	0008,1080	LO		ANAP	COPY
Patient's Age	0010,0010	AS		ANAP	COPY
Patient's Size	0010,1020	DS		ANAP	COPY
Patient's Weight	0010,1030	DS		ANAP	COPY
Occupation	0010,2180	SH		ANAP	COPY
Additional Patient's History	0010,21B0	LT		ANAP	COPY

Table 15: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Date	0008,0021	DA		ANAP	COPY
Series Time	0008,0031	TM		ANAP	COPY
Series Description	0008,103E	LO		ANAP	COPY
Performing Physicians' Name	0008,1050	PN		ANAP	COPY
Operators' Name	0008,1070	PN		ANAP	COPY
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	COPY
>Referenced SOP Class UID	0008,1150	UI		ANAPEV	COPY
>Referenced SOP Instance UID	0008,1155	UI		ANAPEV	COPY
Body Part Examined	0018,0015	CS		ANAP	COPY
Protocol Name	0018,1030	LO		ANAP	COPY
Series Instance UID	0020,000E	UI		ALWAYS	AUTO
Series Number	0020,0011	IS		VNAP	AUTO
Laterality	0020,0060	CS		VNAPCV	COPY
Performed Procedure Step Start Date	0040,0244	DA		ANAP	COPY
Performed Procedure Step Start Time	0040,0245	TM		ANAP	COPY
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY
Performed Procedure Step Description	0040,0254	LO		ANAP	COPY
Performed Protocol Code Sequence	0040,0260	SQ	Include macro: Code Sequence Macro	ANAP	COPY
Request Attributes Sequence	0040,0275	SQ		ANAP	COPY
>Scheduled Procedure Step	0040,0007	LO		ANAP	COPY
>Scheduled Protocol Code Sequence	0040,0008	SQ	Include macro: Code Sequence Macro	ANAP	COPY
>Scheduled Procedure Step ID	0040,0009	SH		ANAPEV	COPY
>Requested Procedure ID	0040,1001	SH		ANAPEV	COPY
Comments on the Performed	0040,0280	ST		ANAP	COPY

Table 16: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO
Station Name	0008,1010	SH		ANAP	COPY
Manufacturer's Module Name	0008,1090	LO	Philips Orthopaedic Application	ANAP	AUTO
Software Versions	0018,1020	LO	Original value extended with: Philips Orthopaedic Applications R 1.2V1L1 PMS1.1 MIMIT	ANAP	AUTO

			EVIIMDictionary		

Table 17: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	0008,0060	CS		ANAP	COPY
Conversion Type	0008,0064	CS	WSD	ALWAYS	AUTO

Table 18: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	0008,0008	CS	Derived, Secondary	ALWAYS	AUTO
Acquisition Date	0008,0022	DA		ANAP	COPY
Content Date	0008,0023	DA		VNAPCV	COPY
Acquisition Time	0008,0032	TM		ANAP	COPY
Content Time	0008,0033	TM		VNAPCV	COPY
Derivation Description	0008,2111	ST		ANAP	AUTO
Instance Number	0020,0013	IS	1	VNAP	AUTO
Patient Orientation	0020,0020	CS		VNAPCV	AUTO
Image Comments	0020,4000	LT		ANAP	COPY
Burned in Annotation	0028,0301	CS	Original value extended with: CAPTURE, and for Leg Osteotomy Application and Hip implant planning: CUTNPASTE_SIMULATION; CAPTURE	ANAP	AUTO

Table 19: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	0028,0002	US	3	ALWAYS	AUTO
Photometric Interpretation	0028,0004	CS	RGB	ALWAYS	AUTO
Planar Configuration	0028,0006	US	0	ANAPEV	AUTO
Row	0028,0010	US		ALWAYS	AUTO
Columns	0028,0011	US		ALWAYS	AUTO
Pixel Aspect Ratio	0028,0034	IS		ANAPEV	COPY
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO
Bits Stored	0028,0101	US	8	ALWAYS	AUTO
High Bit	0028,0102	US	7	ALWAYS	AUTO
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO
Pixel Data	7FE0,0010	OW		ALWAYS	AUTO

Table 20: SC Image Module Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Date of Secondary Capture	0018,1012	DA		ANAP	AUTO
Time of Secondary Capture	0018,1014	TM		ANAP	AUTO

Table 21: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character SET	0008,0005	CS		ANAPEV	AUTO
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO

Table 22: Code Sequence Macro

Attribute Name	Tag	VR	Value	Presence of Value	Source
Code Value	0008,0100	SH		ALWAYS	COPY
Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY
Coding Scheme Version	0008,0103	SH		ANAPEV	COPY
Code Meaning	0008,0104	LO		ALWAYS	COPY
Mapping Resource	0008,0105	CS		ANAPEV	COPY
Context Group Version	0008,0106	DT		ANAPEV	COPY
Context Group Local Version	0008,0107	DT		ANAPEV	COPY
Context Group Extension Flag	0008,010B	CS		ANAP	COPY
Context Group Extension Creator UID	0008,010D	UI		ANAPEV	COPY
Context Identifier	0008,010F	CS		ANAP	COPY

(*) Have the same aspect ratio as on screen, preserving image resolution.
E.g. an image of (512 x 1024) in a viewer of (200 x 100) will result in an SC image of (2048 x 1024).

PIXEL SIZE CALIBRATION:

- X-ray (XA, RF) images however generally have no pixel size defined; as they are projection images, the pixel size for different anatomical details may be different (geometrical enlargement).
  The user may decide to define the pixel size of X-ray images (though it has a very limited meaning). This makes it possible to obtain meaningful measurements.
- CR and DX usually do have defined pixel size. But as this is the plate pixel size, Philips Orthopaedic Applications offer the scaling functionality
- Philips Orthopaedic Applications Images will be exported as SC images DICOM file, without Greyscale Softcopy Presentation State.
- The stored SC image will be stored as a RGB image and contain pixel data, as viewed on the screen (everything burnt in).
- Virtually be placed in a new series in the same examination as the original image.
- Philips Orthopaedic Applications Attributes will be as described in Annexes.

8.1.2. Usage of Attributes from Received IOD's

The Philips Orthopaedic Applications system supports the DICOM image SOP Classes as mentioned in the following table:

Table 23: Supported SOP Classes

SOP Class		Comments
Name	**UID**	
Media Storage Directory Storage	1.2.840.10008.1.3.10	For image selection
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	CR
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DX
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SC
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	XA
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	RF

The following table lists the Supported Media Storage Application Profiles (with roles).

Table 24: Media Services

Media Storage Application Profile	Write Files (FSC / FSU)	Read Files (FSR)	Supported Media
CD – R Disk			
General Purpose CD-R	NO / NO	YES	CD

8.1.2.1. Folder Contents

The work list is put together using the following attributes.

Table 25: Folder Contents

UI Field	DICOM Attribute		Comments
	Name	**Tag**	
Patient			
Patient Name	Patient's Name	(0010,0010)	For viewing.
Patient ID	Patient ID	(0010,0020)	For viewing.
Date of birth	Patient's Birth Date	(0010,0030)	For viewing.
Study			
Accession number	Accession Number	(0008,0050)	Per Series data object.
Series			
Series date	Series Date	(0008,0021)	-
Series time	Series Time	(0008,0031)	-
Modality	Modality	(0008,0060)	Defined values: CR, DX, OT, RF, XA
Series number	Series Number	(0020,0011)	-
Image			
Image date	Content Date	(0008,0023)	For viewing.
Image time	Content Time	(0008,0033)	For viewing.
Image number	Instance Number	(0020,0013)	-
Number of frames	Number of Frames	(0028,0008)	Per multi-frame image data object.
Presentation State Label	Content Label	(0070,0080)	Only for Presentation

UI Field	DICOM Attribute		Comments
	Name	Tag	
Patient			
Created by	Content Creator's Name	(0070,0084)	Only for Presentation
Creation date	Presentation Creation Date	(0070,0082)	Only for Presentation
Creation time	Presentation Creation Time	(0070,0083)	Only for Presentation
Frame			
Frame number	Frame number	(2001,107C)	-

8.1.2.2. Supported SOP Classes

8.1.2.2.1. Leg Osteotomy planning

The Leg Osteotomy application supports the following SOP classes.

Table 26: Supported SOP Classes

SOP Class		Comments
Name	UID	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	CR
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DX
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	RF
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	XA

Note that only single frame images are supported. Multi-frame images will be omitted.

The following sections list the attributes that are used explicitly (i.e. apart from DICOM mandatory attributes).

8.1.2.2.2. Lower extremity measurements

The Lower extremity measurements application supports the following SOP classes.

Table 27: Supported SOP Classes

SOP Class		Comments
Name	UID	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	CR
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DX
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	RF
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	XA

Note that only single frame images are supported. Multi-frame images will be omitted. The following sections list the attributes that are used explicitly (i.e. apart from the DICOM mandatory attributes).

8.1.2.2.3. Hip Implant planning

The Hip implant planning application supports the following SOP classes.

Table 28: Supported SOP Classes

SOP Class		Comments
Name	**UID**	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	CR
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DX
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	RF
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	XA

Note that only single frame images are supported. Multi-frame images will be omitted. The following sections list the attributes that are used explicitly (i.e. apart from the DICOM mandatory attributes).

8.1.2.2.4. Viewing

The viewing application supports the following SOP classes.

Table 29: Supported SOP Classes

SOP Class		Comments
Name	**UID**	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	CR
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	DX
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	RF
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	XA
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SC

8.1.2.3. Information per SOP Class

8.1.2.3.1. Computed Radiography Image

The following table lists the input requirements for a Computed Radiography image.

Table 30: Computed Radiography Image

DICOM Attribute		Comments
Name	**Tag**	
Patient module		
Patient's Name	(0010,0010)	Info for viewing and report
Patient ID	(0010,0020)	Info for viewing and report
Patient's Birth Date	(0010,0030)	Info for viewing and report
Patient's Sex	(0010,0040)	Info for report
General Study module		
Referring Physician's Name	(0008,0090)	Info for report
Study Date	(0008,1020)	Info for report
Study Description	(0008,1030)	Info for report

DICOM Attribute		Comments
Name	Tag	
Patient module		
Image Pixel module		
Pixel Spacing	(0028,0030)	Additional calibration data - info for viewing
Pixel Data	(7FE0,0010)	Info for viewing
SOP Common module		
SOP Class UID	(0008,0016)	Required. Enumerated value: 1.2.840.10008.5.1.4.1.1.1

8.1.2.3.2. Digital X-Ray Image

The following table lists the input requirements for a Digital X-Ray image.

Table 31: Digital X-Ray Image

DICOM Attribute		Comments
Name	Tag	
Patient module		
Patient's Name	(0010,0010)	Info for viewing and report
Patient ID	(0010,0020)	Info for viewing and report
Patient's Birth Date	(0010,0030)	Info for viewing and report
Patient's Sex	(0010,0040)	Info for report
General Study module		
Referring Physician's Name	(0008,0090)	Info for report
Study Date	(0008,1020)	Info for report
Study Description	(0008,1030)	Info for report
Image Pixel module		
Pixel Spacing	(0028,0030)	Additional calibration data - info for viewing
Pixel Data	(7FE0,0010)	Info for viewing
SOP Common module		
SOP Class UID	(0008,0016)	Required. Enumerated value: 1.2.840.10008.5.1.4.1.1.1.1

8.1.2.3.3. X-Ray Radiofluoroscopic image

The following table lists the input requirements for an X-Ray Radiofluoroscopic image. Multi frame (with more then 1 frame) images are only accepted for viewing. Single frame and 1-frame Multi frame images can be viewed and reported.

Table 32: X-Ray Radiofluoroscopic Image

DICOM Attribute		Comments
Name	Tag	
Patient module		
Patient's Name	(0010,0010)	Info for viewing and report
Patient ID	(0010,0020)	Info for viewing and report
Patient's Birth Date	(0010,0030)	Info for viewing and report
Patient's Sex	(0010,0040)	Info for report
General Study module		

DICOM Attribute		Comments
Name	Tag	
Patient module		
Referring Physician's Name	(0008,0090)	Info for report
Study Date	(0008,1020)	Info for report
Study Description	(0008,1030)	Info for report
Image Pixel module		
Pixel Spacing	(0028,0030)	Additional calibration data - info for viewing
Pixel Data	(7FE0,0010)	Info for viewing
SOP Common module		
SOP Class UID	(0008,0016)	Required. Enumerated values: 1.2.840.10008.5.1.4.1.1.12.2
Multi- Frame Module		
Number of Frames	(0028,0008)	Optional: 1

8.1.2.3.4. X-Ray Angiographic Image

The following table lists the input requirements for an X-Ray Angiographic image.
Multi frame (with more then 1 frame) images are only accepted for viewing.
Multi frame with 1 frame, Single frame can be viewed and reported.

Table 33: X-Ray Angiographic Image

DICOM Attribute		Comments
Name	Tag	
Patient module		
Patient's Name	(0010,0010)	Info for viewing and report
Patient ID	(0010,0020)	Info for viewing and report
Patient's Birth Date	(0010,0030)	Info for viewing and report
Patient's Sex	(0010,0040)	Info for report
General Study module		
Referring Physician's Name	(0008,0090)	Info for report
Study Date	(0008,1020)	Info for report
Study Description	(0008,1030)	Info for report
Image Pixel module		
Pixel Spacing	(0028,0030)	Additional calibration data - info for viewing
Pixel Data	(7FE0,0010)	Info for viewing
SOP Common module		
SOP Class UID	(0008,0016)	Required. Enumerated values: 1.2.840.10008.5.1.4.1.1.12.1

8.1.3. Attribute Mapping

Not applicable.

8.1.4. Coerced/Modified fields

When creating a Secondary Capture, the attribute Software Version(s) (0018,1020) is coerced by changing the original value and extend it with "Philips Orthopaedic Applications R 1.2V1L1", "PMS1.1 MIMIT EVIIMDictionary" and the attribute

Derivation Description (0008,2111) is coerced by changing the original value and extend it with “CAPTURE”.

In case of creating a simulation image in the Leg Osteotomy Application and Hip implant plannning, the attribute Derivation Description (0008,2111) is coerced by extending the original value with “CUTNPASTE_SIMULATION”.

8.2. Data Dictionary of Private Attributes

Not applicable.

8.3. Coded Terminology and Templates

Not applicable.

8.4. Grayscale Image consistency

Not applicable.

8.5. Standard Extended/Specialized/Private SOPs

Not applicable.

8.6. Private Transfer Syntaxes

Not applicable.