

# DICOM Conformance Statement

## Philips DICOM Viewer Release 3.0 SP3



**Issued by:**

Philips Healthcare

P.O. Box 10.000  
5680 DA Best  
The Netherlands

Email: [dicom@philips.com](mailto:dicom@philips.com)

Internet: <http://www.healthcare.philips.com/main/about/connectivity>

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# 1. DICOM Conformance Statement Overview

The Philips DICOM Viewer R3.0 is an integrated component, which means that much of its functionality is implemented by various PII software components which are re-used to build the Philips DICOM Viewer for viewing DICOM data. The application consists of a series selector and a series viewer and supports basic image viewing operations like playing movies and adjusting image settings. The Philips DICOM Viewer is a read-only application, i.e., changes made to the images cannot be saved, but they can be exported to the system clipboard and/or an office (i.e., paper) printer.

The Philips DICOM Viewer is a basic viewer for DICOM data. The DICOM data to be viewed can be present (i.e., referred to) in a DICOMDIR, or as a collection of individual DICOM files, which may be stored at any Windows file system location. The Philips DICOM Viewer can be run either from hard disk or from a removable medium such as a CD, a DVD, or a USB device.

The Philips DICOM Viewer does not support DICOM printing nor is able to print to P2P film printers.

When DICOM image information will be distributed by means of CD or DVD, the DICOM viewer can be distributed together with the DICOM image information by copying the viewer onto that CD or DVD.

After inserting the CD/DVD into a system the application may be started up to allow the user to select one of the patient folders on the CD/DVD.

Supported Operating System (OS) are XP (Professional or Home Edition) or VISTA (Home Basic, Home Premium, Business, Enterprise or Ultimate) or WINDOWS 7 (Home Premium, Professional or Ultimate) or Windows 8.

The Philips DICOM Viewer is not intended for official clinical and/or diagnostic purposes, but only for non-clinical and non-diagnostic illustration purposes.

The Philips DICOM Viewer will, for the time being, be delivered with US English user interface texts.

The system supports correct viewing image types simultaneously of different Multi-modality studies.

On-line help and Off-line help (including user documentation) will not be part of this release.

## **Ejection of the removable medium:**

The system shall clear its patient list, pictorial index, image viewer and DICOM information panel when the removable medium containing the current DICOMDIR is ejected from the OS system.

The operator does not need any training specifically for using the Philips DICOM Viewer.

## **NM Layouts for Philips DICOM Viewer**

Based on the data that is loaded the system will automatically activate the preferred layout. The user will have the choice to change the layout from a drop down list of all other available layouts. The NM Layouts are only available with a NM license. Refer to section 7, where this licensing mechanism is explained.

Following is the list of all supported layouts:

1. DISPLAY WB – Dual Intensity Compare  
The same anterior and posterior image is presented twice - with different W/L intensities.
2. DISPLAY WB + STATICS  
In this layout, the number of static views displayed is flexible, depending on the number of static images available, and can be 4 (2rx2c), 6(3rx2c) or 8 (4rx2c).
3. DISPLAY DYNAMIC + STATICS  
In this layout, the number of static views displayed is flexible, depending on the number of static images available, and can be 4 (2rx2c), 6(3rx2c) or 8 (4rx2c).
4. DISPLAY WB + VOLUME  
This layout presents planar Whole Body and transverse, sagittal and coronal slices from a volume.
5. DISPLAY PLANAR + VOLUME  
This layout presents planar static images and transverse, sagittal and coronal slices from a volume.

Up to 4 static images may be displayed.

6. SINGLE SERIES CORONAL LAYOUT  
Displays 3x4 volume tilting with image orientation as "Coronal Front".
7. SERIES TSC + MIP – ANATOMICAL AND FUNCTIONAL LAYOUT DEFINITION  
Two series, all 3 orthogonal views (linked), with ability to turn on/off fusion on either series, including rotating MIP.
8. TSC + FUSION 3 ROW – ANATOMICAL AND FUNCTIONAL LAYOUT DEFINITION  
Despite being able to turn fusion on / off in the above displays, an additional layout of this kind is required for the cases where viewers wish to view all 3 planes for anatomical, functional and fusion.
9. TSC + FUSION
10. TSC + FUSION RENDERING
11. SINGLE SERIES N ON 1 – SINGLE SERIES LAYOUT DEFINITION  
Display one or multiple images from 1 orthogonal view (with menu option to change to different orthogonal view and with option to display functional, anatomical or fused as available).
12. SINGLE SERIES TSC+MIP – SINGLE SERIES LAYOUT DEFINITION  
This layout will apply for any single series. If the MIP image is not desirable (e.g. in anatomical review) it can be removed from the layout and the axial image resized.
13. SINGLE SERIES TSC – SINGLE SERIES LAYOUT DEFINITION  
This review is required to duplicate a typical review that is used by the CT viewer. It applies to any single series.
14. 3 SERIES – SERIES LAYOUT DEFINITION
15. 2D – SERIES REVIEW LAYOUT DEFINITION  
The 2D layout is a specific use layout intended for display of Secondary Capture images and display of data from disk as original slices.
16. DYNAMIC TSC + CINE – SERIES REVIEW LAYOUT DEFINITION  
3D Cine will be activated by default.
17. SINGLE MONITOR COMPARISON LAYOUT SERIAL
18. SLAB ANATOMICAL TSC + VOLUME LAYOUT  
The Slab Anatomical TSC + Volume layout uses slab viewers and presents the anatomic study when fusion is inactive.
19. SLAB TSC + FUSION 3 ROW LAYOUT  
The Slab TSC + Fusion 3 row layout uses slab viewers. The anatomical study is used to set the thickness and orientation.
20. STRESS REST THREE VIEW – CARDIAC LAYOUT DEFINITION  
This is a layout specific for Cardiac images.
21. STRESS REST RAW COMPOSITE VIEW  
This is a Cardiac specific layout, which provides the comparison of SA, VLA and HLA Stress/Rest images along with the raw projection image obtained from the Acquisition system.  
SA stands for Short Axis, VLA stands for Vertical Long Axis and HLA stands for Horizontal Long Axis.

Following table shows an overview of all the supported DICOM and Private SOP Classes.

**Table 1: All supported Image SOP Classes**

SOP Class	
Name	UID
Computed Radiography (CR) Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray (DX) Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray (DX) Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray (MG) Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray (MG) Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Computed Tomography (CT) Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced Computed Tomography (Enhanced CT) images Storage.	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-Frame Image (USMF) Storage	1.2.840.10008.5.1.4.1.1.3.1
Magnetic Resonance (MR) Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image (Enhanced MR) Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6

SOP Class	
Name	UID
Ultrasound Image (US) Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image (SC) Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
X-Ray Angiographic Image (XA) Storage	1.2.840.10008.5.1.4.1.1.12.1
Enhanced X-Ray Angiographic (Enhanced XA) images Storage.	1.2.840.10008.5.1.4.1.1.12.1.1
X-Ray Radiofluoroscopic Image Storage (RF)	1.2.840.10008.5.1.4.1.1.12.2
Enhanced X-Ray Radiofluoroscopic (Enhanced XRF) images Storage.	1.2.840.10008.5.1.4.1.1.12.2.1
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image (NM) Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image (PET, PT) Storage	1.2.840.10008.5.1.4.1.1.128
Radiotherapy Image (RT) Storage	1.2.840.10008.5.1.4.1.1.481.1
Philips Private X-Ray Image Storage	1.3.46.670589.2.3.1.1

Note that the PMS DICOM Viewer shall ignore unsupported DICOM SOP classes.

Following table shows an overview of the supported DICOM and Private Presentation State SOP Classes.

**Table 2: Supported Presentation State SOP Classes**

SOP Class	
Name	UID
Grayscale Softcopy Presentation State (GSPS, PS) Storage	1.2.840.10008.5.1.4.1.1.11.1
Philips Private Grayscale Softcopy Presentation State Storage	1.3.46.670589.2.2.1.1

The DICOM Viewer shall apply (one of) the Presentation State(s) that is provided with the image data that is displayed.

Following table shows an overview of the supported DICOM Media Services.

**Table 3: DICOM Media Services**

Media Storage Application Profile	Write Files FSC	Write Files FSU	Read Files FSR
<b>Compact Disk – Recordable</b>			
Basic Cardiac X-Ray Angiographic Studies on CD-R	No	No	Yes
General Purpose CD-R Interchange	No	No	Yes
CT/MR Studies on CD-R	No	No	Yes
<b>DVD</b>			
Basic Cardiac X-Ray Angiographic Studies on DVD	No	No	Yes
General Purpose DVD Interchange	No	No	Yes
CT/MR Studies on DVD Media	No	No	Yes
<b>USB</b>			
General Purpose USB Media Interchange with JPEG	No	No	Yes

Note that the Philips DICOM Viewer supports the following DICOM media: CD-R, CD-RW, DVD+R, DVD-R, DVD+RW and DVD-RW.

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## 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	Status	Description
00	12-March-2013	Not Auth	Initial version
01	02-September-2013	Authorized	Version updated for SP3

### 3.2. Audience

This Conformance Statement is intended for:

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

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

### 3.3. Remarks

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

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

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

**Table 5: Definitions, Terms and Abbreviations**

Abbreviation/Term	Explanation
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
BOT	Basic Offset Table
CD	Compact Disc
CD-R	CD-Recordable
CD-M	CD-Medical
CR	Computed Radiography
CT	Computed Tomography
DCR	Dynamic Cardio Review
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DVD	Digital Versatile Disc.
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level Seven
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
MRN	Medical Record Number
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RT	Radiotherapy
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol

Abbreviation/Term	Explanation
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound Multi-frame
Viewer	A component that can be show images or data on the screen
WLM	Worklist Management
XA	X-Ray Angiographic

### 3.5. References

- [DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 18 (NEMA PS 3.1- PS 3.18),  
National Electrical Manufacturers Association (NEMA)  
Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America  
Internet: <http://medical.nema.org/>  
Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2011) plus all the supplements and correction items that have been approved as Final Text.

## 4. Networking

The Philips DICOM Viewer has No DICOM networking implementation, so no import or export of DICOM object data over network is possible.

## 5. Media Interchange

### 5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

#### 5.1.1. Application Data Flow Diagram

As shown in Following Figure, the Philips DICOM Viewer is capable of reading data automatically or manually from a DICOMDIR and image data from a CD, DVD or USB device.

The Philips DICOM Viewer shall automatically select DICOM files for which no DICOMDIR is present if no DICOMDIR is found. Automatic selection of DICOM files shall only work for DICOM files which have the “.dcm” extension. Manually selection and browsing images is also possible.

The user may select an image or multiple images from the directory to be displayed in the Philips DICOM Viewer.

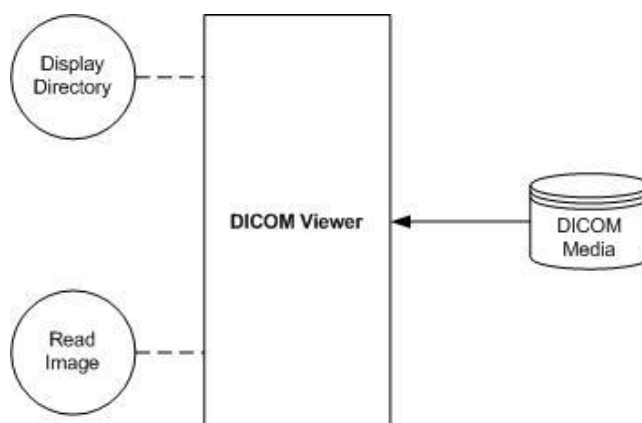


Figure 1: Application Data Flow Diagram

DICOM Media is as specified in following Table.

Table 6: Media Services

Media Storage Application Profile	Write Files FSC	Write Files FSU	Read Files FSR
General Purpose CD-R Interchange	No	No	Yes
General Purpose DVD Interchange with JPEG	No	No	Yes
General Purpose USB Media Interchange with JPEG	No	No	Yes

The Philips DICOM Viewer supports images with the following DICOM photometric interpretations as shown in following Table.

Table 7: Photometric interpretations supported by Philips DICOM Viewer

Photometric Interpretation	Import	Export	Viewing
MONOCHROME1	No	No	Yes
MONOCHROME2	No	No	Yes
YBR_FULL	No	No	Yes
YBR_FULL_422 (see note)	No	No	Yes
RGB	No	No	Yes

Note that if the photometric interpretation YBR\_FULL\_422 is used in combination with transfer syntax JPEG-Lossy then the pixel data is converted to RGB on import.

The supported DICOM media for the Philips DICOM Viewer are CD-R, CD-RW, DVD+R, DVD-R, DVD+RW and DVD-RW.

### 5.1.2. Functional Definitions of AE's

The Philips DICOM Viewer reads the DICOMDIR and image data from selected images. The media must conform to the application profiles as specified in Table 9 and as defined in the DICOM standard.

#### DICOM Media Storage Service Class for CD, DVD and USB device.

The Philips DICOM Viewer can perform the CD-R DICOM Media Storage service as SCU, with capabilities for:  
RWA Display Directory (as FSR),  
RWA Read Images (as FSR).

For DVD the Philips DICOM Viewer can perform the DICOM Media Storage service as SCU, with capabilities for:  
RWA Display Directory (as FSR),  
RWA Read Images (as FSR).

For USB the Philips DICOM Viewer can perform the DICOM Media Storage service as SCU, with capabilities for:  
RWA Display Directory (as FSR),  
RWA Read Images (as FSR).

### 5.1.3. Sequencing of Real World Activities

When the Philips DICOM Viewer has read the DICOMDIR of the media using Display Directory, the user may select and read images from the media using Read Image until the media is ejected.

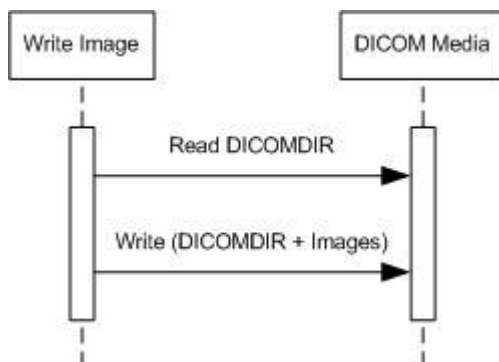


Figure 2: Sequence of RWA of Read Image

### 5.1.4. File Meta Information for Implementation Class and Version

The following values are assigned to the File Meta Information attributes that pertain to the Implementation Class and the Implementation Version Name.

Table 8: DICOM Implementation Class and Version for the Philips DICOM Viewer

File Meta Information Version	00, 01
Implementation Class UID	-
Implementation Version Name	-

## 5.2. AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

### 5.2.1. Philips DICOM Viewer - Specification

The following Table shows for each Application Profile the implemented Real-World Activities, the roles required for these Real-World Activities, and the applicable Service Class Option.

**Table 9: Supported Application Profiles, Real-World Activities, and Roles.**

Supported Application Profile	Real-World Activity	Roles	SC Option
AUG-XABC-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
AUG-GEN-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
AUG-CTMR-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
AUG-CTMR-DVD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
STD-XABC-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
STD-GEN-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
STD-CTMR-CD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		
STD-CTMR-DVD	Display Directory	FSR	Interchange
	Notes: The system shall ignore all unsupported DICOM Transfer Syntaxes.	FSR	Interchange
	Read Image		

#### 5.2.1.1. File Meta Information for the Philips DICOM Viewer

Not applicable, since the Philips DICOM Viewer is neither FSC nor FSU.

## 5.2.1.2. Real-World Activities

### 5.2.1.2.1. Display Directory

Display Directory will read the DICOMDIR from the media and list the contents so the user may select a series of images to view. The Philips DICOM Viewer shall sort the images that are displayed.

Note that the Philips DICOM Viewer will only list images with a DICOM media valid (non-empty) Patient's Name and Patient ID. The Patient's Name, Patient ID, Patient's Birth Date, and Patient's Sex are the only attributes listed for selection.

After selecting a patient the Philips DICOM Viewer will show a collection of pictorials representing the current series of the selected patient. Selecting a pictorial will show the actual patient series' image(s). Image information shall be displayed in the four corners, at the left and right center, and at the top and bottom center of the image display.

The user is able to display relevant DICOM information from patient, study, exam, series, image data for the currently selected image and information for (non-private) DICOM attributes by activate/deactivate the keyboard shortcut F9.

The user is able to change the gray level settings (Window Width, Window Level and contrast and brightness) of the image(s) of CT images according to CT window presets and apply contrast stretching to the image(s).

The user shall be able to select "Full Image Information", by activate/deactivate the keyboard shortcut F11.

The Philips DICOM Viewer clears its Patient List, Pictorial index and DICOM Viewer information panel when the removable medium containing the current DICOMDIR is ejected.

#### 5.2.1.2.1.1. Media Storage Application Profile

There are no extensions or specializations.

Following Table shows an overview of the supported DICOM and Private SOP Classes.

**Table 10: Supported SOP Classes**

SOP Class	
Name	UID
<b>Supported Image Types (SOP Classes)</b>	
Computed Radiography (CR) Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray (DX) Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray (DX) Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray (MG) Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray (MG) Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Computed Tomography (CT) Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced Computed Tomography (Enhanced CT) images Storage.	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-Frame Image (USMF) Storage	1.2.840.10008.5.1.4.1.1.3.1
Magnetic Resonance (MR) Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image (Enhanced MR) Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image (US) Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image (SC) Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4

SOP Class	
Name	UID
<b>Supported Image Types (SOP Classes)</b>	
X-Ray Angiographic Image (XA) Storage	1.2.840.10008.5.1.4.1.1.12.1
Enhanced X-Ray Angiographic (Enhanced XA) images Storage.	1.2.840.10008.5.1.4.1.1.12.1.1
X-Ray Radiofluoroscopic Image Storage (RF)	1.2.840.10008.5.1.4.1.1.12.2
Enhanced X-Ray Radiofluoroscopic (Enhanced XRF) images Storage.	1.2.840.10008.5.1.4.1.1.12.2.1
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image (NM) Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image (PET, PT) Storage	1.2.840.10008.5.1.4.1.1.128
Radiotherapy Image (RT) Storage	1.2.840.10008.5.1.4.1.1.481.1
Philips Private X-Ray Image Storage	1.3.46.670589.2.3.1.1

Following Table shows an overview of the supported DICOM and Private Presentation State SOP Classes

**Table 11: Supported Presentation State SOP Classes**

SOP Class	
Name	UID
Grayscale Softcopy Presentation State (GSPS, PS) Storage	1.2.840.10008.5.1.4.1.1.11.1
Philips Private Grayscale Softcopy Presentation State Storage	1.3.46.670589.2.2.1.1

Note that the DICOM Viewer shall ignore unsupported DICOM SOP classes and unsupported (private) DICOM attributes.

All private attributes (attributes with odd group number – for example, all attributes with group number 0009, 0019, 0021, or 2001) have as attribute name “Unknown”.

The DICOM Viewer shall apply (one of) the presentation state(s) that is provided with the image data that is displayed.

1. Not for XABC AP's.
2. Not for CTMR AP's.
3. Only AUG AP's.
4. Only AUG-GEN AP's.

Following Table shows the Supported Transfer Syntaxes.

**Table 12: Supported Transfer Syntaxes**

Transfer Syntax		Comments
Name	UID	
Implicit VR Little Endian (ILE)	1.2.840.10008.1.2	Default Transfer Syntax for DICOM
Explicit VR Little Endian (ELE)	1.2.840.10008.1.2.1	Default for Basic Directory IOD.
Explicit VR Big Endian (EBE)	1.2.840.10008.1.2.2	
Lossy JPEG Coding Process for 8 Bit Image Compression	1.2.840.10008.1.2.4.50	supported for YBR_FULL_422 color images only.
Lossy JPEG Coding Process for 12 Bit Image Compression (Process 4 only)	1.2.840.10008.1.2.4.51	supported for YBR_FULL_422 color images only.



Transfer Syntax		Comments
Name	UID	
Lossless, Non-Hierarchical, First-Order Prediction JPEG Compression (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	supported for Grayscale images only.
RLE Compression	1.2.840.10008.1.2.5	

### Read Image

Read Image will read image data of the selected image from the media and displays specific data in the Philips DICOM Viewer. Selection of DICOM files shall only work for DICOM files which have the “.dcm “ extension. The Philips DICOM Viewer shall automatically select DICOM files for which no DICOMDIR is present if these files are located in the root directory of the directory where the system resides.

If no DICOM files are present in the root directory of the directory where the Philips DICOM Viewer resides, the Philips DICOM Viewer shall automatically select DICOM files for which no DICOMDIR is present if these files are present in the current working directory, i.e., the current directory from which the Philips DICOM Viewer is started.

The Philips DICOM Viewer applies (one of) the Presentation State(s) that is provided with the image data that is displayed.

#### 5.2.1.2.1.2. Media Storage Application Profile

There are no extensions or specializations for the displayed supported SOP Classes in following Table.

**Table 13: All Supported SOP Classes**

SOP Class	
Name	UID
Computed Radiography Image (CR) Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Computed Tomography (CT) Image Storage	1.2.840.10008.5.1.4.1.1.2
Enhanced Computed Tomography (Enhanced CT) images Storage.	1.2.840.10008.5.1.4.1.1.2.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-Frame Image (USMF) Storage	1.2.840.10008.5.1.4.1.1.3.1
Magnetic Resonance (MR) Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image (Enhanced MR) Storage	1.2.840.10008.5.1.4.1.1.4.1
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image (US) Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image (SC) Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
X-Ray Angiographic Image (XA) Storage	1.2.840.10008.5.1.4.1.1.12.1
Enhanced X-Ray Angiographic (Enhanced XA) images Storage.	1.2.840.10008.5.1.4.1.1.12.1.1
X-Ray Radiofluoroscopic Image (XRF) Storage	1.2.840.10008.5.1.4.1.1.12.2
Enhanced X-Ray Radiofluoroscopic (Enhanced RF) images Storage.	1.2.840.10008.5.1.4.1.1.12.2.1
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image (NM) Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography Image (PET) Storage	1.2.840.10008.5.1.4.1.1.128
Philips Private X-Ray Image Storage	1.3.46.670589.2.3.1.1

SOP Class	
Name	UID
<b>Supported Presentation State Types (SOP Classes)</b>	
Grayscale Softcopy Presentation State (PS) Storage	1.2.840.10008.5.1.4.1.1.11.1
Philips Private Grayscale Softcopy Presentation State Storage	1.3.46.670589.2.2.1.1

Note that the Philips DICOM Viewer shall ignore all unsupported DICOM SOP classes and unsupported (private) DICOM attributes. CT localizer images with Value 4 of Image Type (0008,0008) equal to “ES” or “PS” are not viewable by the Philips DICOM Viewer.

The Philips DICOM Viewer shall apply (one of) the presentation state(s) that is provided with the image data that is displayed.

1. Not for XABC AP's.
2. Not for CTMR AP's.
3. Only AUG AP's.
4. Only AUG-GEN AP's.

Following Table shows the Supported Transfer Syntaxes.

**Table 14: Supported Transfer Syntaxes**

Transfer Syntax		Comments
Name	UID	
Implicit VR Little Endian (ILE)	1.2.840.10008.1.2	
Explicit VR Little Endian (ELE)	1.2.840.10008.1.2.1	Default for Basic Directory IOD.
Explicit VR Big Endian (EBE)	1.2.840.10008.1.2.2	
Lossy JPEG Coding Process for 8-Bit Images	1.2.840.10008.1.2.4.50	YBR_FULL_422 color images only.
Lossy JPEG Coding Process for 12-Bit Images	1.2.840.10008.1.2.4.51	YBR_FULL_422 color images only.
Lossless, Non-Hierarchical, First-Order Prediction JPEG Compression	1.2.840.10008.1.2.4.70	Grayscale images only.
RLE Compression	1.2.840.10008.1.2.5	

Note that the Philips DICOM Viewer shall ignore all unsupported DICOM and Private Transfer Syntaxes.

### Export

The user shall not be able to Export a selected image or movie from the Philips DICOM Viewer to a DICOM Node or DICOM Media.

### Storage

The user shall not be able to store a selected image from the Philips DICOM Viewer to a DICOM Storage.

### Printing

The user shall not be able to print a selected image from the Philips DICOM Viewer to a DICOM Printer. The user shall not be able to print to P2P film printers.

### Patient List

The Philips DICOM Viewer shall present an overview of the selected patients in a patient list. The displayed Attributes in the Patients list shall allow the user to select a patient for further investigation.

**Table 15: Displayed Patient list attributes.**

Patient List shall display:			
ATTRIBUTE	VR	TAG	COMMENT
Patient's Name	PN	(0010,0010)	-

Patient's ID	LO	(0010,0020)	-
Patient's Birth Date	DA	(0010,0030)	-
Patient's Sex	CS	(0010,0040)	-

The Philips DICOM Viewer shall present an overview of the selected Patients History in a patient list. The displayed Attributes in the Patients Demographics list shall allow the user to select patient history which contains an overview of all the data related to the selected patient as found in the selected DICOMDIR or DICOM files containing at least the following information.

**Table 16: Displayed Patient Demographics History attributes.**

Patient Demographics History shall display:			
ATTRIBUTE	VR	TAG	COMMENT
Patient's Name	PN	(0010,0010)	-
Patient's ID	LO	(0010,0020)	-
Patient's Birth Date	DA	(0010,0030)	-
Patient's Sex	CS	(0010,0040)	-

## 5.3. Augmented and Private Application Profiles

### 5.3.1. Augmented Application Profiles

#### 5.3.1.1. AUG-XABC-CD

##### 5.3.1.1.1. SOP Class Augmentations

Additional to the standard AP the AUG-XABC-CD AP also includes the standard Grayscale Softcopy Presentation State Storage SOP class.

##### 5.3.1.1.2. Directory Augmentations

None.

##### 5.3.1.1.3. Other Augmentations

None.

#### 5.3.1.2. AUG-GEN-CD

##### 5.3.1.2.1. SOP Class Augmentations

Additional to the standard AP the AUG-GEN-CD AP also includes the standard Grayscale Softcopy Presentation State Storage SOP class and the private Specialized PresentatioAUGn State Storage and X-Ray Specialized Image Storage SOP classes.

##### 5.3.1.2.2. Directory Augmentations

None.

##### 5.3.1.2.3. Other Augmentations

None.

#### 5.3.1.3. AUG-CTMR-CD

##### 5.3.1.3.1. SOP Class Augmentations

Additional to the standard AP the AUG-CTMR-CD AP also includes the standard Grayscale Softcopy Presentation State Storage SOP class.

##### 5.3.1.3.2. Directory Augmentations

None.

##### 5.3.1.3.3. Other Augmentations

None.

#### **5.3.1.4. AUG-CTMR-CD**

##### **5.3.1.4.1. SOP Class Augmentations**

Additional to the standard AP the AUG-CTMR-DVD AP also includes the standard Grayscale Softcopy Presentation State Storage SOP class.

##### **5.3.1.4.2. Directory Augmentations**

None.

##### **5.3.1.4.3. Other Augmentations**

None.

#### **5.3.2. Private Application Profiles**

None.

### **5.4. Media Configuration**

Not applicable.

## 6. Support of Character Sets

The Philips DICOM Viewer supports the following character repertoires.

**Table 17: Supported Character Sets of the Philips DICOM Viewer**

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
<b>Single-byte Character Sets without Code Extensions</b>					
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)
<b>Single-byte Character Sets with Code Extensions</b>					
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
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)
<b>Multi-byte Character Sets with Code Extensions</b>					
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

When an unsupported character set is received it shall be tried and decoded according to the preferred character set: ISO-IR 100.

Unsupported characters shall be displayed as “?”.

## 7. Security

The system shall provide the following security measures:

### Encryption of textual resources

The system's textual resources shall be encrypted.

### Data Consistency (Hazard)

The system shall not modify any persistent image and/or patient data.

### Image Processing

The system shall be able to display images with the following image types and presentation types.

### Gamma Correction

The system shall apply a linear gamma correction. Best image display results are obtained on monitors that are calibrated according to the DICOM Grayscale standard [DICOM Standard Part 14: Grayscale Standard Display Function, PS 3.14.

### Licensing Mechanism

It shall be possible to enable and disable advanced NM features based on license.

With this mechanism the NM features can only be applied on the data on the CD and not on data located elsewhere (accessed via browse tool)

This license is generated based on the data for which the advanced features are to be enabled. For Example, DICOM Viewer will be burned to the media with a set of patient data and corresponding license file. This license file for the exporting data will be generated during the export to media workflow. DICOM Viewer will enable its advanced features when it finds an appropriate license file for the data.

In case the user has a real Portal licence for his/her NM feature, a check file will be burned together with the DICOM Viewer on the CD.

### 7.1. Security Profiles

Not applicable.

### 7.2. Association Level Security

Not applicable.

### 7.3. Application Level Security

Not applicable.

## **8. Annexes**

### **8.1. IOD Contents**

#### **8.1.1. Created SOP Instance**

Not applicable, since the Philips DICOM Viewer does not create any SOP instances.

#### **8.1.2. Usage of Attributes from Received IOD**

The Philips DICOM Viewer will only accept IOD's from DICOM valid media.

#### **8.1.3. Attribute Mapping**

Not applicable.

#### **8.1.4. Coerced/Modified fields**

The Philips DICOM Viewer will not coerce or modify any fields.

### **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**

The Philips DICOM Viewer supports Standard Extended, Specialized, and Private SOP classes as per Table 13.

### **8.6. Private Transfer Syntaxes**

The Philips DICOM Viewer does not support any private transfer syntaxes.