Philips Medical Systems
DICOM Conformance Statement

EasyAccess Modality R 1.1

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1 Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1 Scope and field of application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices.
This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

1.2 Intended use

EasyAccess Modality is the versatile storage and archive unit for digital modalities and workstations. EasyAccess Modality is validated for Philips modalities, for non-Philips modalities some consultancy might be required before connecting to the EasyAccess Modality system. Archiving is done on RAID or DVD media. For viewing the Philips EasyVision line is positioned both for softcopy reading and/or advanced post-processing. As part of the EasyAccess family you can expand EasyAccess Modality if

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1.6 References

[DICOM] The Digital Imaging and Communications in Medicine (DICOM) standard:
NEMA PS 3.X
National Electrical Manufacturers Association (NEMA) Publication Sales
1300 N. 17th Street, Suite 1847
Rosslyn, Va. 22209, United States of America

1.7 Important note to the reader

This 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 a networked 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 analyse 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).

1.8 General Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

ACC	American College of Cardiology
AE	Application Entity
ACR	American College of Radiology
ANSI	American National Standard Institute
BOT	Basic Offset Table
CD-R	CD Recordable
CD-M	CD Medical
DCI	Digital Cardio Imaging
DCR	Dynamic Cardio Review
DICOM	Digital Imaging and Communication in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normalized
ELE	Explicit VR Little Endian
EBE	Explicit VR Big Endian
FSC	File Set Creator
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level Seven
ILE	Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
MPPS	Modality Performed Procedure Step
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RIS	Radiology Information System
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
UID	Unique Identifier
WLM	Worklist Management

2 Implementation model

The EasyAccess Modality Release 1, later referred to as EasyAcces Modality provides the following features:

- It replies on communication tests from remote applications.
- It allows remote applications (modalities and image workstations) to send images to it.
- It allows remote applications to commit storage of sent images.
- It allows remote applications to query the EasyAccess Modality database and retrieve images.
- Send images to a remote application (e.g. a workstation or a DICOM archive).

2.1 Application Data Flow Diagram

EasyAccess Modality behaves as a system with three different Application Entities (AE):

- Storage SCU AE
- Query Retrieve SCP AE
- Storage SCP AE

The related Implementation Model is shown in Figure 2.1 on page 4

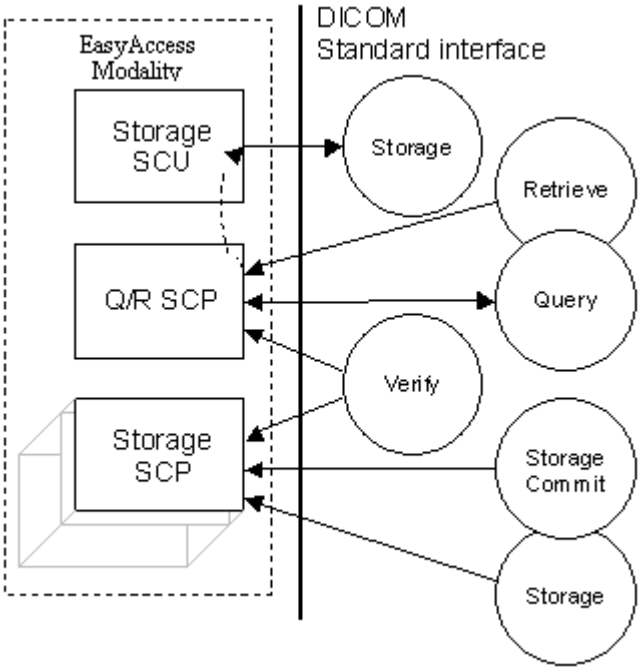

Figure 2.1 Implementation Model

2.2 Functional definition of Application Entities

2.2.1 Storage SCU AE

Storage SCU AE is the AE responsible for sending images to remote applications. There is only one Storage SCU AE. Sending is initiated by a Retrieve operation from Q/R.

2.2.2 Storage SCP AE

Storage SCP is the AE responsible for receiving images. There can be one or two Storage SCP AEs set up depending on the configuration of the system, each with its own AE title. A Storage SCP AE can receive images from remote application entities.

A Storage SCP AE also supports verification of the DICOM communication from a remote AE and Storage Commitment of images.

2.2.3 Query Retrieve SCP AE

Q/R SCP is the AE responsible for receiving queries and initiates the sending images to other application entities as a response to a move request. The Q/R SCP AE is connected to the EasyAccess Modality product. There is only one Q/R SCP AE.

When the Q/R SCP AE receives a query (C-FIND request) it will search in the EasyAccess Modality database for information matching the conditions in the request message. It will search both on-line and in the archive. It returns any found information to the requesting remote AE.

When the Q/R SCP AE receives a retrieve request (C-MOVE request) it will search for images in the EasyAccess Modality database identified by the conditions in the request message. It will search both on-line and in the archive. If any images are found the Query Retrieve SCP AE will trigger the Storage SCU AE to send the images found to the requested destination AE. If the retrieve request refers to images in the archive the images will be fetched from the archive and temporarily put on-line.

When the retrieve is done, the temporary images on-line will be removed. Only C-MOVE requests are handled in order to supply retrieve functionality, not C-GET requests.

The Q/R SCP AE supports verification of the DICOM communication from a remote AE.

2.3 Sequences of Real World Activities

EasyAccess Modality receives images.
After Storage of the Images Storage commitment can be performed on the images stored. After Storage it can be queried through the Query Retrieve AE. As a result to the retrieve images can be send.

3 AE Specification

3.1 EasyAccess Modality DICOM Storage SCU AE Specification

The EasyAccess Modality DICOM Storage SCU AE provides Conformance to the following DICOM 3.0 SOP class as an SCU:

Table 1. Supported SOP Classes as SCU

SOP Class Name	UID
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Co-ordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3

RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29
Stored Print Storage	1.2.840.10008.5.1.1.27
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1
Philips Private Volume Storage	1.3.46.670589.5.0.1
Philips Private 3D Object Storage	1.3.46.670589.5.0.2
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1
Philips Private Surface Storage	1.3.46.670589.5.0.3
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1
Philips Private Composite Object Storage	1.3.46.670589.5.0.4
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7
Philips Private MR Cardio	1.3.46.670589.5.0.8
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1

3.1.1 Association Establishment Policies

3.1.1.1 General

The maximum PDU size that the Storage SCU AE will use is 28672 bytes.

3.1.1.2 Number of Associations

The Storage SCU AE can only handle one association at a time.

3.1.1.3 Asynchronous Nature

The Storage SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

3.1.1.4 Implementation Identifying Information

The implementation Class UID is:” 1.2.840.11.3654.2.3.1995.2.12.0 “
The implementation Version Name is:” MIRCTN16NOV2000 “

3.1.2 Association Initiation Policy

The Storage SCU AE does not handle incoming associations.

3.1.3 Association Acceptance Policy

3.1.3.1 The store of images as SCU

3.1.3.1.1 Associated Real-World Activity

Q/R SCP will receive a retrieve request and will initiate a send operation. The Storage SCU AE will then initiate an association with the remote AE.

3.1.3.1.2 Proposed Presentation Context

The EasyAccess Modality DICOM Storage SCU AE will propose the following presentation context:

Table 2. Proposed Presentation context for Storage SCU AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
All SOP classes in table 1.	See Table 1.	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No

Extended negotiation is not supported.

EasyAccess Modality performs a transfer syntax conversion according to the following table:

Transfer syntax Imported Image	**Transfer syntax Exported Image**						
	ILE	**ELE**	**EBE**	**JPEG Lossless, (Process 14)**	**JPEG Lossless, Hier., First-Order Pred.**	**JPEG Baseline (Process 1)**	**JPEG Extended (Process 2 & 4)**
ILE	+	-	-	-	-	-	-
ELE	+	+	-	-	-	-	-
EBE	+	-	+	-	-	-	-
JPEG Lossless, (Process 14)	+	-	-	-	-	-	-
JPEG Lossless, Hier., First-Order Pred.	+	-	-	-	-	-	-
JPEG Baseline (Process 1)	+	-	-	-	-	-	-
JPEG Extended (Process 2 & 4)	+	-	-	-	-	-	-

3.1.3.1.3 SOP Specific Conformance Storage SOP Classes

The Storage SCU provides standard conformance to the Storage SOP class.

When the following attributes are imported with empty values unique attribute values are generated and assigned to these attributes:

- Accession umber
- Study ID
- Series Number

If patient or exam data for exported images has been changed in EasyAccess Modality, the exported images will contain the values from EasyAccess Modality.

When an error message is retrieve form the Storage SCP response system the EasyAccess Modality Storage SCU AE will log these errors.

3.2 EasyAccess Modality DICOM Storage SCP AE Specification

The EasyAccess Modality DICOM Storage SCP AE provides Conformance to the following DICOM 3.0 SOP class as a SCP:

Table 3. Supported SOP Classes as SCP

SOP Class Name	UID
Verification	1.2.840.10008.1.1
Storage Commitment Push Model	1.2.840.10008.1.20.1
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3

RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29
Stored Print Storage	1.2.840.10008.5.1.1.27
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1
Philips Private Volume Storage	1.3.46.670589.5.0.1
Philips Private 3D Object Storage	1.3.46.670589.5.0.2
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1
Philips Private Surface Storage	1.3.46.670589.5.0.3
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1
Philips Private Composite Object Storage	1.3.46.670589.5.0.4
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7
Philips Private MR Cardio	1.3.46.670589.5.0.8
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1

3.2.1 Association Establishment Policies

3.2.1.1 General

The maximum PDU size that the Storage SCP AE will use is configurable. The default is 28672 bytes.

3.2.1.2 Number of Associations

Depending on the number of Storage SCP AE's are available in the system each storage SCP AE can handle one or two association at a time. In case one storage SCP is installed two associations can be active at a time, in case two storage SCP are installed only one association can be handled per SCP AE.

3.2.1.3 Asynchronous Nature

The Storage SCP AE does not support asynchronous operations and will not perform asynchronous window negotiation.

3.2.1.4 Implementation Identifying Information

The implementation Class UID is: “ 1.2.752.24.3.3.25.7 “
The implementation Version Name is: “WISTOSCP_7_20 “

3.2.2 Association Acceptance Policy

3.2.2.1 Verification of the Communication

3.2.2.1.1 Associated Real-World Activity

A remote system wants to verify the DICOM communication with a Storage SCP AE.

3.2.2.1.2 Accepted Presentation Contexts

The EasyAccess Modality DICOM Storage SCP AE will accept the following presentation context for the verification service:

Table 4. Proposed Presentation context for verification Storage SCP AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No

Role is SCP and no extended negotiation is supported.

3.2.2.1.3 SOP Specific Conformance to Verification SOP class

A Storage SCP AE provides standard conformance to the DICOM Verification Service Class.

3.2.2.2 The store of images as SCP

3.2.2.2.1 Associated Real-World Activity

Storage SCP will receive a storage request from a remote AE. A remote system wants to store images in the EasyAccess Modality database.

3.2.2.2.2 Proposed Presentation Context

The EasyAccess Modality DICOM Storage SCP AE will propose the following presentation context:

Table 5. Proposed Presentation context for Store Storage SCP AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
All Storage SOP classes in table 3.	See Table 3.	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57	SCP	No
		JPEG Lossless, Hier., First-Order Pred.	1.2.840.10008.1.2.4.70	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	No
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCP	No

Extended negotiation is not supported.

3.2.2.2.3 SOP Specific Conformance to the storage SCP SOP Classes

A Storage SCP AE **accepts** associations when the remote system request a:

- Verification of the DICOM communication between a remote system and a Storage SCP AE.
- Transfer of images from a remote system to the EasyAccess Modality database.
- Request for Storage Commitment to store images in EasyAccess Modality.

A Storage SCP AE **rejects** associations in the following situations:

- Association requests from applications that do not address it, i.e. specify an incorrect called AE title.
- Association requests from hosts with host names not known to the Storage SCP AE host.
- For image transfers if it is already processing the maximum number of associations that it can handle (default: 2).

When the EasyAccess Modality receives no data for 60 seconds, a Time-out is reached. The EasyAccess Modality will abort the connection.

A Storage SCP AE provides standard level 2 (full) conformance to the DICOM Storage Service Class as SCP. Full conformance means that all type 1, 2 and 3 attributes sent are stored. All private and retired attributes are also stored.
When an image data set was sent to the EasyAccess Modality with a space or bracket character in the study ID attribute the EasyAccess Modality system removes the character.

A Storage SCP AE needs a value of the attribute (0010,0020), Patient ID. If the attribute is empty it will use the attribute (0010,0010), Patient Name, as patient ID. If the patient name is empty as well it will use the request number (see Administrators Guide) as patient ID. Applications sending image to a Storage SCP AE must take care when filling in the Patient ID attribute. If it is not filled in, there is a risk that images of different patients can be mixed! For other attribute restrictions see table 6.

Table 6. Attribute restriction for a Storage SCP AE

DICOM Attribute	Comment
(0008,0050) Accession Number	Stored in EasyAccess Modality examination data (max 16 characters).
(0008,0060) Modality	Stored in EasyAccess Modality series data (max 32 characters). Stored in EasyAccess Modality exam data (max 16 characters).
(0008,0080) Institution Name	Stored in EasyAccess Modality examination data (max 32 characters).
(0008,1030) Study Description	Stored in EasyAccess Modality examination data (max 64 characters).
(0018,0015) Body Part Examined	Stored in EasyAccess Modality examination data (max 32 characters).
(0020,000D) Study Instance UID	Stored in EasyAccess Modality examination data (max 64 characters).
(0020,000E) Series Instance UID	Stored in EasyAccess Modality series data (max 64 characters).
(0020,0010) Study ID	Stored in EasyAccess Modality examination data (max 16 characters).

If the image storage should fail on the EasyAccess Modality side, a status of refused, “Out of resources”, will be returned to the association initiator.

EasyAccess Modality can be configured to overwrite images with same SOP Instance UID or to store all images it receives. Default is the second alternative, not to overwrite images with same SOP Instance UID. When the same image is sent twice to a Storage SCP AE it will be stored two times in EasyAccess Modality. This implicates that two images with the same SOP Instance UID will be sent if a MOVE request is received by the Q/R SCP AE on that image.

If DICOM objects are illegal, no responsibilities for consequences are taken.

3.2.2.3 Storage commitment of images as SCP

3.2.2.3.1 Associated Real-World Activity

Storage SCP will receive a storage request from a remote AE. A remote system wants to store images in the EasyAccess Modality database.

3.2.2.3.2 Proposed Presentation Context

The EasyAccess Modality DICOM Storage SCU AE will propose the following presentation context:

Table 7. Proposed Presentation context for Storage Commitment Storage SCP AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No

Extended negotiation is not supported.

3.2.2.3.3 SOP Specific Conformance to the Storage Commitment SOP Classes

Storage SCP AE provides standard conformance to the Storage Commitment Push Model SOP.
Notes about the implementation:

- An attempt will be made to transmit the N-EVENT-REPORT-RQ message on the same association as the N-ACTION-RQ message was received. If the association is down, the Storage SCP AE will open a new association to the Storage Commitment SCU and send the N-EVENT-REPORT-RQ message on the new association (request is sent to the system with the same AE title as the system that has sent the N_ACTION_RQ). The time between the reception of the N-ACTION-RQ message and the sending of the N-EVENT-REPORT-RQ message is dependent on the EasyAccess Modality server load, but it can be expected to be short (seconds). To minimize possible error situations the SCU is recommended to keep the association open after the N-ACTION is sent.

- Committed images can be retrieved using DICOM Query/Retrieve towards a Q/R SCP AE connected to the same EasyAccess Modality server. If a Q/R SCP is connected towards the EasyAccess Modality server at time of commitment, the AE title of it will be returned in the N-EVENT-REPORT message sent to the SCU.

- The optional Storage Media File-Set ID & UID attributes will never by filled in by the Storage SCP AE

3.2.3 Association Initiation Policy

The Storage SCP AE can open a new association to the Storage Commitment SCU and send the N-EVENT-REPORT-RQ message on the new association. See section 3.2.2.3.3.

3.3 EasyAccess Modality DICOM Query Retrieve AE Specification

The EasyAccess Modality DICOM Query Retrieve SCP AE provides Conformance to the following DICOM 3.0 SOP class as a SCP:

Table 8. Supported SOP Classes as SCP

SOP Class Name	UID
Patient Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Pat/Study Only Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Pat/Study Only Q/R Info. Mo. – MOVE	1.2.840.10008.5.1.4.1.2.3.2

3.3.1 Association Establishment Policies

3.3.1.1 General

The maximum PDU size that the Query Retrieve SCP AE will use is configurable. The default is 28672 bytes.

3.3.1.2 Number of Associations

The Query Retrieve SCP AE's can handle two associations at a time.

3.3.1.3 Asynchronous Nature

The Query Retrieve SCP AE does not support asynchronous operations and will not perform asynchronous window negotiation.

3.3.1.4 Implementation Identifying Information

The implementation Class UID is: “ 1.2.752.24.3.3.25.7 “
The implementation Version Name is: “WISQRSCP_7_20 “

3.3.2 Association Acceptance Policy

The Q/R SCP AE will reject associations from applications that do not address it, i.e. specify an incorrect called AE title.

The Q/R SCP AE accepts associations for the following events:

- Verification of the DICOM communication between a remote system and the Q/R SCP AE
- Query of the EasyAccess Modality database
- Retrieve images from the EasyAccess Modality database

3.3.2.1 Verification of the Communication

3.3.2.1.1 Associated Real-World Activity

A remote system wants to verify the DICOM communication with a Query Retrieve SCP AE.

3.3.2.1.2 Accepted Presentation Contexts

The EasyAccess Modality DICOM Query Retrieve SCP AE will accept the following presentation context for the verification service:

Table 9. Proposed Presentation context for verification Query Retrieve SCP AE

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No

Role is SCP and no extended negotiation is supported.

3.3.2.1.3 SOP Specific Conformance to Verification SOP class

A Query Retrieve SCP AE provides standard conformance to the DICOM Verification Service Class.

3.3.2.2 Query of the EasyAccess Modality

3.3.2.2.1 Associated Real-World Activity

A remote system wants to query the EasyAccess Modality database using the C-FIND command.

3.3.2.2.2 Proposed Presentation Context

The EasyAccess Modality DICOM Query Retrieve SCP AE will propose the following presentation context:

Table 10. Proposed Presentation context for Store Storage SCP AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
All SOP classes in table 7.	See Table 7.	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No

Extended negotiation is not supported.

3.3.2.2.3 SOP Specific Conformance to the Query Retrieve SCP SOP Classes

The Q/R SCP AE provides standard conformance to the DICOM FIND SOP classes as SCP with the exceptions below:

- Fractions of seconds are ignored.
- At the most 500 matches are returned. This hit limit can be configured. If more items than the hit limit in the EasyAccess Modality database matches, zero matches are returned.
- The Query response can contain additional attributes that aren't requested in the query request.
- Illegal DICOM query requests are accepted by the EasyAccess Modality.

Case insensitive matching is used for patient name. For all other attributes, case sensitive matching is used.

These tables contain the DICOM keys that are supported by the Q/R SCP AE in C-FIND requests. The three columns under Type corresponds to the different information models: **Pat** = Patient Root, **Study** = Study Root and **P/S O** = Patient/Study Only. The contents of the Type columns specify the key type according to the DICOM Standard, where **U** = Unique**, R** = Required and **O** = Optional. A minus sign indicates that the key is not supported for the specific level and information model.

Table 11. PATIENT Level

Key	Tag	Type		Comment
		Pat	P/S O	
Patient's Name	(0010,0010)	R	R	
Patient ID	(0010,0020)	U	U	
Patient's Birth Date	(0010,0030)	O	O	

Table 12. STUDY Level

Key	Tag	Type			Comment
		Pat	Study	P/S O	
Study Date	(0008,0020)	R	R	R	Range matching is supported
Study Time	(0008,0030)	R	R	R	Range matching is supported
Accession Number	(0008,0050)	R	R	R	
Study Description	(0008,1030)	O	O	O	
Patient's Name	(0010,0010)	-	R	-	
Patient ID	(0010,0020)	-	R	-	
Patient's Birth Date	(0010,0030)	-	O	-	
Study ID	(0020,0010)	R	R	R	
Study Instance UID	(0020,000D)	U	U	U	

Table 13. SERIES Level

Key	Tag	Type		Comment
		Pat	Study	
Modality	(0008,0060)	R	R	
Series Number	(0020,0011)	R	R	
Series Instance UID	(0020,000E)	U	U	

Table 14. IMAGE Level

Key	Tag	Type		Comment
		Pat	Study	
Instance (Image) Number	(0020,0013)	R	R	
SOP Instance UID	(0008,0018)	U	U	

Range matching is supported for both Study Date and Study Time. If both Study Date and Study Time is specified as a range, e.g. date1 – date2 and time1 – time2, all studies between date1.time1 and date2.time2 are returned. I.e. the result is **not** all studies between two time points on consecutive dates. If this is required, the SCU must do a query on date range only, requiring time in return and filter out the required studies himself. If Study Date is not specified and Study Time is specified as a range an implicit Study Date of today is assumed, i.e. all studies between the two time points on the day the query is done is returned.

The EasyAcces Query Retrieve SCP AE returns te following status responses:

- In case of no matching examinations, a response of *SUCCESS* is returned to the association initiator.
- If the association to the move destination is rejected a response “Unable to process” (C001) is returned to the association initiator.
- If the move destination is unknown (not defined in the configuration file) a response “Destination unknown” (A801) is returned to the association initiator.
- For other errors a response "Out of resources" (A702) is returned to the association initiator.

3.3.2.3 Retrieve of the EasyAccess Modality

3.3.2.3.1 Associated Real-World Activity

A remote application entity wishes to retrieve images from the EasyAccess Modality database using the C-MOVE command.

3.3.2.3.2 Proposed Presentation Context

The EasyAccess Modality DICOM Query Retrieve SCU AE will propose the following presentation context:

Table 15. Proposed Presentation context for Storage Commitment Query Retrieve SCP AE

Presentation Context table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	No
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	No
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No

Extended negotiation is not supported.

3.3.2.3.3 SOP Specific Conformance to the Query Retrieve MOVE SOP Classes

The Q/R SCP AE provides standard conformance to the DICOM MOVE SOP classes as SCP.

3.3.3 Association Initiation Policy

The Query Retrieve SCP AE doesn't initiates association.

4 Communication Profiles

4.1 Supported Communication Stacks

All AEs described in this conformance statement provide DICOM 3.0 TCP/IP Network

Communication Support as defined in part eight of the DICOM Standard.

4.2 TCP/IP Stack

The AEs uses the TCP/IP stack built into their respective operating system. For more information about operating systems consult their manuals.

4.2.1 Physical Media Support

All AEs are neutral to the physical medium over which TCP/IP executes. They can e.g. be used with fiber optics, token ring, Ethernet and twisted pair.

4.3 OSI Stack

Not supported.

4.4 Point-To-Point Stack

Not supported.

5 Configuration

5.1 *EasyAccess Modality*

5.1.1 Storage SCP

5.1.1.1 AE title

Default AE title is DICOM_STORAGE.

5.1.1.2 Port

Default port is 7810.

5.1.2 Q/R SCP

5.1.2.1 AE title

Default AE title is DICOM_QR_SCP.

5.1.2.2 Port

Default port is 7840.

6 Support of Extended Character Sets

All AE provide support for ISO_IR 100 extended character set.