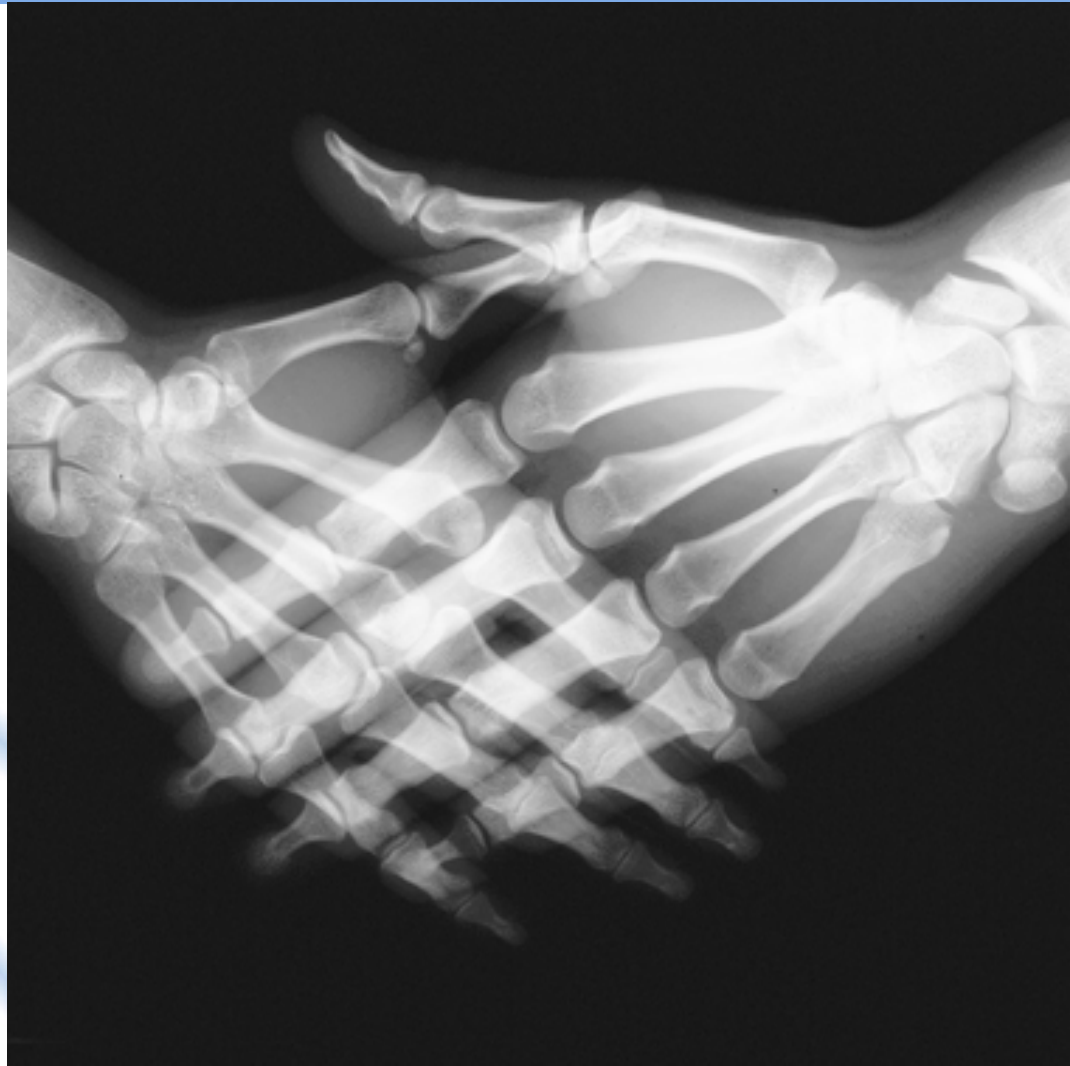# DICOM Conformance Statement

IDS5 7.2, WISE 7.2, ImageServer/s 7.2

SECTRA

DICOM Conformance Statement, IDS5 7.2, WISE 7.2, ImageServer/s 7.2

As part of our commitment to providing the highest quality
products and services, we would like to encourage feedback
on the quality of this documentation.

If you think we can improve this document in any way, then
please send your suggestions to **info.imtec@sectra.se**

Document Title	DICOM Conformance Statement, IDS5 7.2, WISE 7.2, ImageServer/s 7.2
Revision	pacs_doc, tag PACS_7_2
Date	2001-03-19

Table of Contents

1. Introduction

This document will describe the DICOM support in the IDS5, WISE and ImageServer/s products. For a better understanding this first chapter will include a short briefing.

1.1 Products

These three products are the main components in a SECTRA PACS.
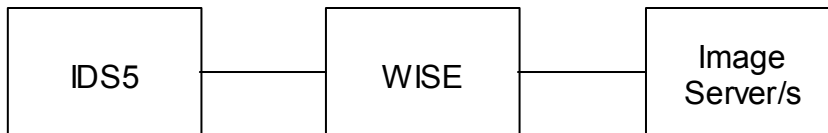
- IDS5 – Workstation, graphical users interface.

- WISE – Database, administration.

- ImageServer/s – Short-term data storage.

They are tightly coupled and are therefore described together in this Conformance Statement. WISE and ImageServer/s have a very tight connection and are from now on called WISE.
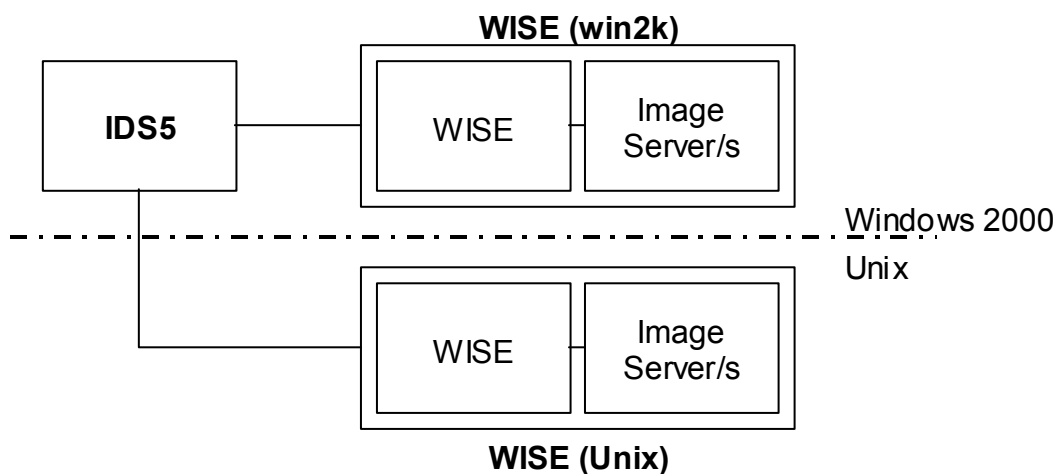
WISE has two different versions, one on Windows 2000 (WISE (win2k)) and another on Unix (WISE (Unix)). These two abbreviations will be used throughout this document. Please consult [5] and [7] for actual Unix version requirements.

IDS5 is only available on Windows 2000.

WARNING! There are some differences in functionality between WISE (win2k) and WISE (Unix), it is therefore recommended to carefully read this document and don't make assumptions about functionality on different platforms.

1.2 DICOM standard

This document should be read together with the DICOM standard [1]. Definitions and terms are used in this document according to the DICOM standard. It is assumed that the reader is familiar with the DICOM standard.

1.3 References

[1]   Digital Imaging and Communications in Medicine (DICOM). NEMA Standard Publications PS 3.1-14 and Supplements.

[2]   IDS5 Installation Guide

[3]   IDS5 System Administrators Guide

[4]   IDS5 User's Documentation

[5]   WISE (Unix) Installation Guide

[6]   WISE (Unix) System Administrators Guide

[7]   ImageServer/s (Unix) Installation Guide

[8]   ImageServer/s (Unix) System Administrators Guide

[9]   LitePACS Installations guide

[10]   LitePACS System Administrators Guide

2. Implementation model

2.1 Application Data Flow Diagram

2.1.1 IDS5 Application Flow Diagram
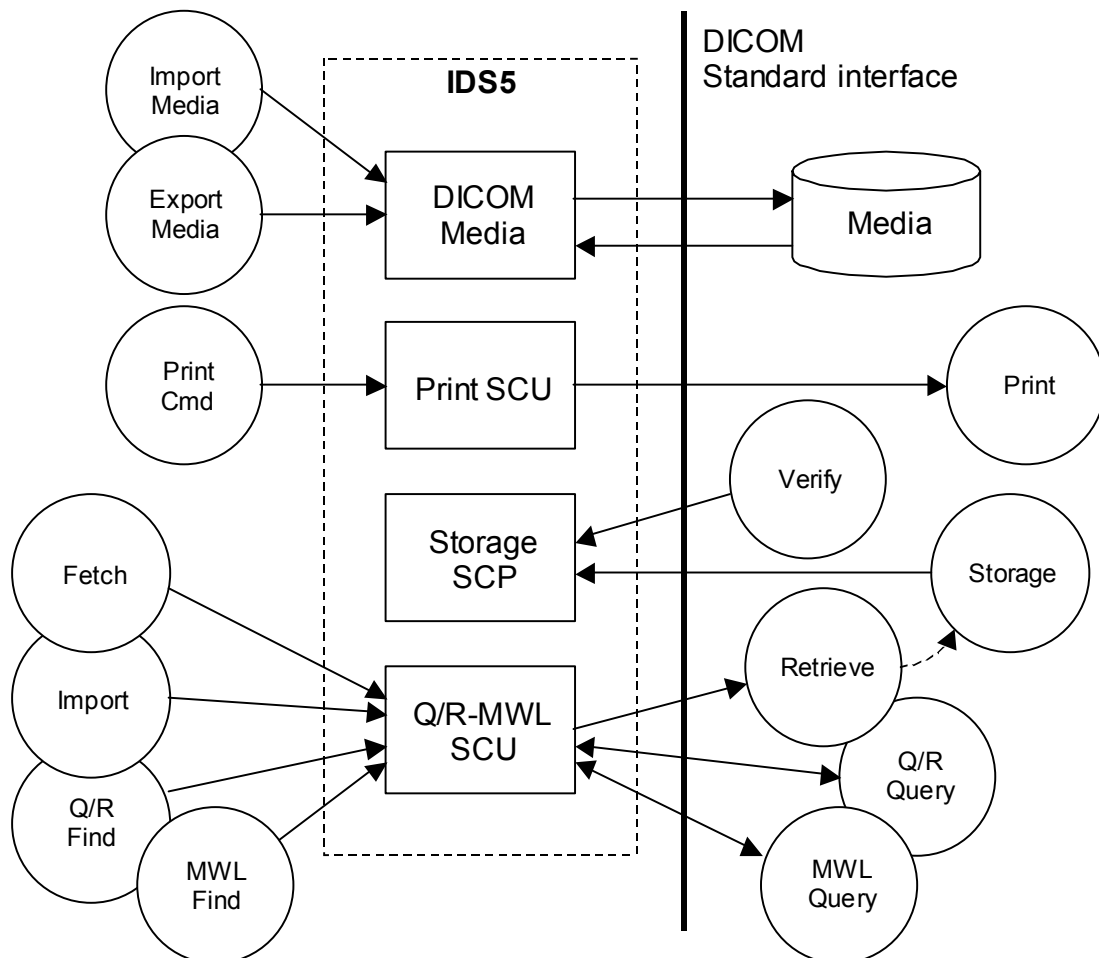
IDS5 is a multi-modality viewing station for radiology images. It provides (among other things) the following features:

- Reply on communication tests from remote applications

- Print images

- Query a Radiology Information System (RIS) for a modality work list

- Query a DICOM archive

- View images fetched to a temporary location from a DICOM archive

- Import images from a DICOM archive to WISE.

IDS5 contains four different Application Entities (AE), DICOM Media, Print SCU, Storage SCP and Q/R-MWL SCU.

Each AE only has one instance.

DICOM Media functionality is described separately in chapter 6.

2.1.2 WISE (Unix) Application Flow Diagram
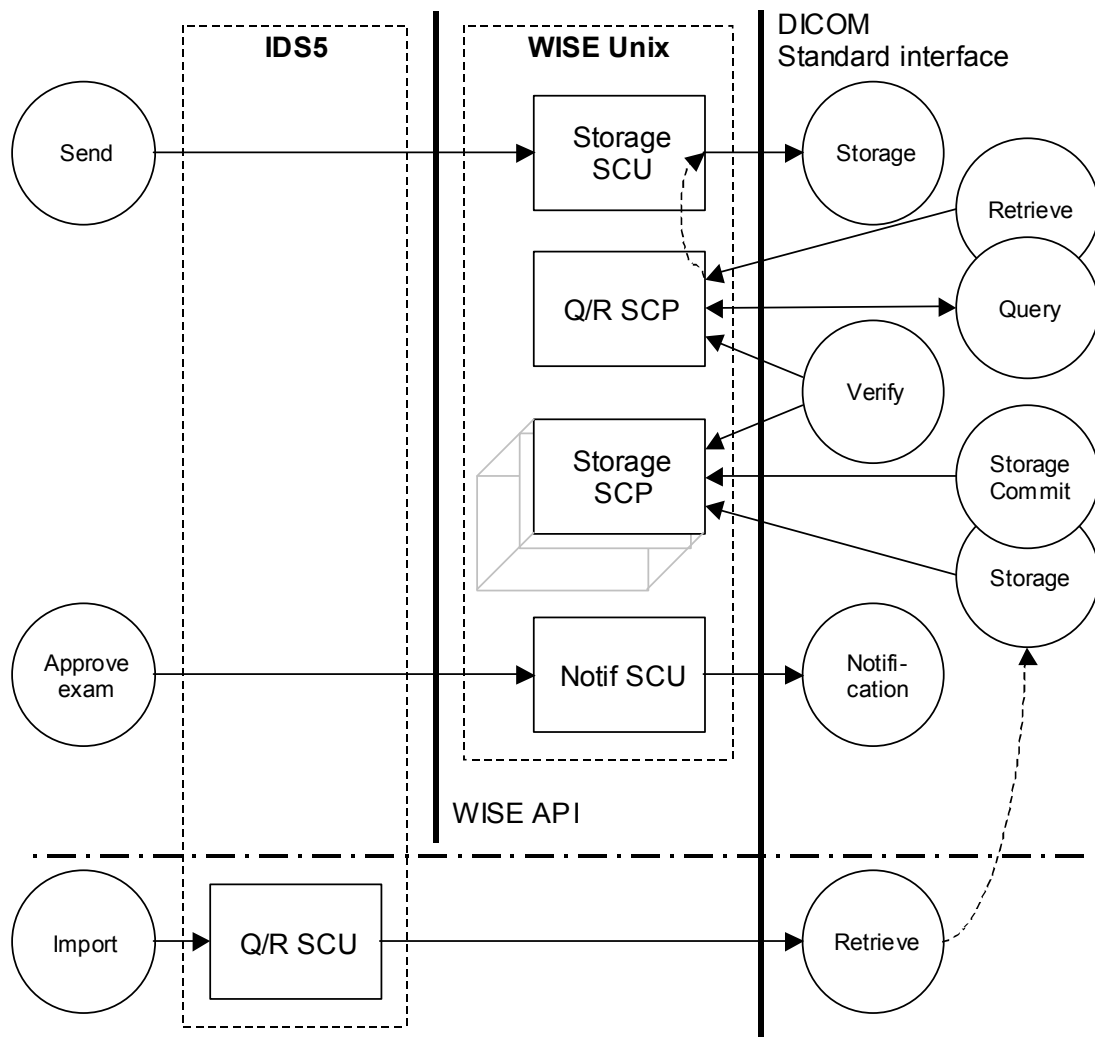
WISE (Unix) provides (among other things) the following features:

- 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 WISE database and retrieve images.

- Send images to a remote application (e.g. a workstation or a DICOM archive).

- Approve exams, which will generate a Study Notification.

WISE (Unix) contains four different Application Entities (AE), Storage SCU, Q/R SCP, Storage SCP, Notif SCU.

Each AE only has one instance **except** from Storage SCP that can have many instances.

2.1.3 WISE (win2k) Application Flow Diagram
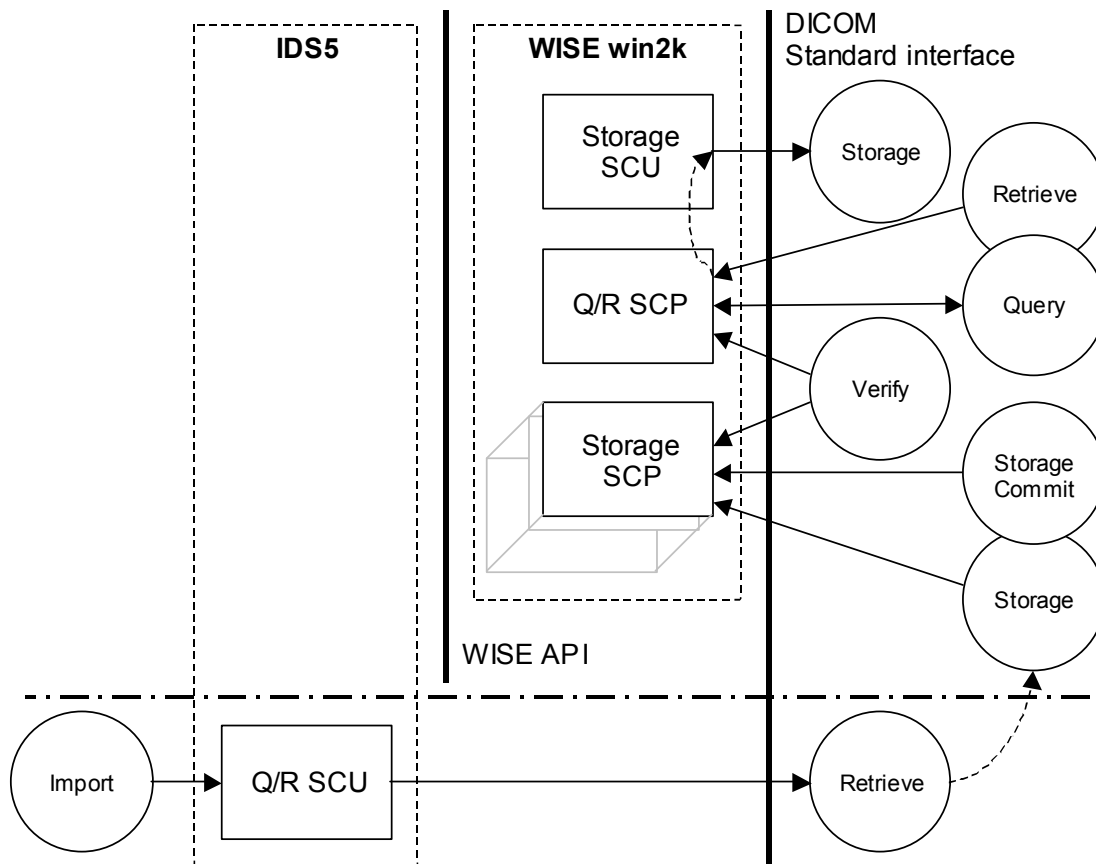
WISE (win2k) provides (among other things) the following features:

- 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 WISE database and retrieve images.

- Send images to a remote application (e.g. a workstation or a DICOM archive).

WISE (win2k) contains three different Application Entities (AE), Storage SCU, Q/R SCP and Storage SCP.

Each AE only has one instance **except** from Storage SCP that can have many instances.

2.2 Functional Definitions of AE's

2.2.1 IDS5 - SOP Classes and Transfer syntaxes supported

The three following tables (Table 1, 2 and 3) use these abbreviations to identify AE:s:

Storage SCP   SP

Q/R-MWL SCU   QU

Print SCU   PU

Table 1.   Supported SOP classes as SCU (IDS5)

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)		
		SP	QU	PU
Study Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	-	Y	-
Study Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	-	Y	-
Modality Worklist Info. Model – FIND	1.2.840.10008.5.1.4.31	-	Y	-
Basic Grayscale Print Mgm Meta	1.2.840.10008.5.1.1.9	-	-	Y
> Basic Film Session	1.2.840.10008.5.1.1.1	-	-	Y
> Basic Film Box	1.2.840.10008.5.1.1.2	-	-	Y
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	-	-	Y
> Printer	1.2.840.10008.5.1.1.16	-	-	Y

The > signs for the Print Management SOP Classes indicates that the SOP Class is mandatory part of the above mentioned meta SOP Class.

Table 2. Supported SOP classes as SCP (IDS5)

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)		
		SP	QU	PU
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Y	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Y	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Y	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Y	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Y	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Y	-	-
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3	Y	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Y	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y	-	-
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Y	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Y	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Y	-	-
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Y	-	-
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Y	-	-
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Y	-	-
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y	-	-
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Y	-	-
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Y	-	-
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1	Y	-	-
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Y	-	-
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10	Y	-	-
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Y	-	-
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1	Y	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Y	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Y	-	-
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Y	-	-
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Y	-	-
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3	Y	-	-
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Y	-	-
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Y	-	-
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Y	-	-
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Y	-	-
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Y	-	-
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Y	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Y	-	-
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Y	-	-
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Y	-	-
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Y	-	-
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Y	-	-
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Y	-	-
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Y	-	-

Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	Y	-	-
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29	Y	-	-
Stored Print Storage	1.2.840.10008.5.1.1.27	Y	-	-
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1	Y	-	-
Philips Private Volume Storage	1.3.46.670589.5.0.1	Y	-	-
Philips Private 3D Object Storage	1.3.46.670589.5.0.2	Y	-	-
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1	Y	-	-
Philips Private Surface Storage	1.3.46.670589.5.0.3	Y	-	-
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1	Y	-	-
Philips Private Composite Object	1.3.46.670589.5.0.4	Y	-	-
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7	Y	-	-
Philips Private MR Cardio	1.3.46.670589.5.0.8	Y	-	-
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9	Y	-	-
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10	Y	-	-
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11	Y	-	-
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12	Y	-	-
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1	Y	-	-
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2	Y	-	-
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1	Y	-	-

Table 3.   Supported transfer syntaxes (IDS5)

Transfer Syntax Name	Transfer Syntax UID	Supported for AE Y/- (Yes/No)		
		SP	QU	PU
Sectra Compression (**Private Syntax**)	1.2.752.24.3.7.6	Y	-	-
Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	-	-
Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	-	-
JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57	Y	-	-
JPEG Lossless, Hier., First-Order Pred.	1.2.840.10008.1.2.4.70	Y	-	-
Implicit VR Little Endian	1.2.840.10008.1.2	Y	Y	Y
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	Y	-	-
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	Y	-	-
JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55	Y	-	-

2.2.2 WISE (Unix) – SOP Classes and Transfer syntaxes supported

The three following tables (Table 4, 5 and 6) use these abbreviations to identify AE:s:

Storage SCU   SU

Storage SCP   SP

Q/R SCP   QP

Notif SCU   NU

Table 4.   Supported SOP classes as SCU (WISE (Unix))

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)			
		SU	SP	QP	NU

CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Y	-	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y	-	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y	-	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Y	-	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Y	-	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Y	-	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Y	-	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Y	-	-	-
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3	Y	-	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Y	-	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y	-	-	-
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Y	-	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Y	-	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Y	-	-	-
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Y	-	-	-
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Y	-	-	-
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Y	-	-	-
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y	-	-	-
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Y	-	-	-
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Y	-	-	-
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1	Y	-	-	-
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Y	-	-	-
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10	Y	-	-	-
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Y	-	-	-
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1	Y	-	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Y	-	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y	-	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Y	-	-	-
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Y	-	-	-
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Y	-	-	-
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3	Y	-	-	-
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Y	-	-	-
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Y	-	-	-
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Y	-	-	-
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Y	-	-	-
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Y	-	-	-
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Y	-	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Y	-	-	-
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Y	-	-	-
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Y	-	-	-
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Y	-	-	-
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Y	-	-	-
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Y	-	-	-
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Y	-	-	-
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	Y	-	-	-
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29	Y	-	-	-
Stored Print Storage	1.2.840.10008.5.1.1.27	Y	-	-	-
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1	Y	-	-	-
Philips Private Volume Storage	1.3.46.670589.5.0.1	Y	-	-	-

Philips Private 3D Object Storage	1.3.46.670589.5.0.2	Y	-	-	-
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1	Y	-	-	-
Philips Private Surface Storage	1.3.46.670589.5.0.3	Y	-	-	-
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1	Y	-	-	-
Philips Private Composite Object	1.3.46.670589.5.0.4	Y	-	-	-
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7	Y	-	-	-
Philips Private MR Cardio	1.3.46.670589.5.0.8	Y	-	-	-
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9	Y	-	-	-
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10	Y	-	-	-
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11	Y	-	-	-
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12	Y	-	-	-
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1	Y	-	-	-
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2	Y	-	-	-
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1	Y	-	-	-
Basic Study Content Notification	1.2.840.10008.1.9	-	-	-	Y

Table 5. Supported SOP classes as SCP (Wise (Unix))

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)			
		SU	SP	QP	NU
Verification	1.2.840.10008.1.1	-	Y	Y	-
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	-	Y	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	-	Y	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	-	Y	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	-	Y	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	-	Y	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	-	Y	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	-	Y	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	-	Y	-	-
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3	-	Y	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	-	Y	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	-	Y	-	-
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	-	Y	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	-	Y	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	-	Y	-	-
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	-	Y	-	-
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	-	Y	-	-
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	-	Y	-	-
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	-	Y	-	-
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	-	Y	-	-
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	-	Y	-	-
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1	-	Y	-	-
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	-	Y	-	-
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10	-	Y	-	-
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	-	Y	-	-
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1	-	Y	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	-	Y	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	-	Y	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	-	Y	-	-
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	-	Y	-	-
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	-	Y	-	-
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3	-	Y	-	-
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	-	Y	-	-
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	-	Y	-	-
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	-	Y	-	-
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	-	Y	-	-
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	-	Y	-	-
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	-	Y	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	-	Y	-	-
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	-	Y	-	-
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	-	Y	-	-
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	-	Y	-	-
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	-	Y	-	-
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	-	Y	-	-

RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	-	Y	-	-
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	-	Y	-	-
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29	-	Y	-	-
Stored Print Storage	1.2.840.10008.5.1.1.27	-	Y	-	-
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1	-	Y	-	-
Philips Private Volume Storage	1.3.46.670589.5.0.1	-	Y	-	-
Philips Private 3D Object Storage	1.3.46.670589.5.0.2	-	Y	-	-
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1	-	Y	-	-
Philips Private Surface Storage	1.3.46.670589.5.0.3	-	Y	-	-
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1	-	Y	-	-
Philips Private Composite Object	1.3.46.670589.5.0.4	-	Y	-	-
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7	-	Y	-	-
Philips Private MR Cardio	1.3.46.670589.5.0.8	-	Y	-	-
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9	-	Y	-	-
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10	-	Y	-	-
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11	-	Y	-	-
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12	-	Y	-	-
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1	-	Y	-	-
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2	-	Y	-	-
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1	-	Y	-	-
Storage Commitment Push Model	1.2.840.10008.1.20.1	-	Y	-	-
Patient Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	-	-	Y	-
Study Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	-	-	Y	-
Pat/Study Only Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	-	-	Y	-
Patient Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	-	-	Y	-
Study Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	-	-	Y	-
Pat/Study Only Q/R Info. Mo. – MOVE	1.2.840.10008.5.1.4.1.2.3.2	-	-	Y	-

Table 6. Supported transfer syntaxes (Wise (Unix))

Transfer Syntax Name	Transfer Syntax UID	Supported for AE Y/- (Yes/No)			
		SU	SP	QP	NU
Sectra Compression (**Private Syntax**)	1.2.752.24.3.7.6	-	Y	-	-
Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	Y	Y	-
Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	Y	Y	-
JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57	Y	Y	-	-
JPEG Lossless, Hier., First-Order Pred.	1.2.840.10008.1.2.4.70	Y	Y	-	-
Implicit VR Little Endian	1.2.840.10008.1.2	Y	Y	Y	Y
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	Y	Y	-	-
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	Y	Y	-	-
JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55	Y	Y	-	-

2.2.3 Wise (win2k) – Summary of SOP classes supported

The three following tables (Table 7, 8 and 9) use these abbreviations to identify AE:s:

Storage SCU   SU

Storage SCP   SP

Q/R SCP   QP

Table 7. Supported SOP classes as SCU (Wise (win2k))

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)		
		SU	SP	QP
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Y	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Y	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Y	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Y	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Y	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Y	-	-
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3	Y	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Y	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y	-	-
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Y	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Y	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Y	-	-
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Y	-	-
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Y	-	-
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Y	-	-
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y	-	-
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Y	-	-
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Y	-	-
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1	Y	-	-
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Y	-	-

Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10	Y	-	-
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Y	-	-
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1	Y	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Y	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Y	-	-
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Y	-	-
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Y	-	-
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3	Y	-	-
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Y	-	-
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Y	-	-
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Y	-	-
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Y	-	-
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Y	-	-
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Y	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Y	-	-
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Y	-	-
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Y	-	-
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Y	-	-
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Y	-	-
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Y	-	-
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Y	-	-
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	Y	-	-
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29	Y	-	-
Stored Print Storage	1.2.840.10008.5.1.1.27	Y	-	-
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1	Y	-	-
Philips Private Volume Storage	1.3.46.670589.5.0.1	Y	-	-
Philips Private 3D Object Storage	1.3.46.670589.5.0.2	Y	-	-
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1	Y	-	-
Philips Private Surface Storage	1.3.46.670589.5.0.3	Y	-	-
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1	Y	-	-
Philips Private Composite Object	1.3.46.670589.5.0.4	Y	-	-
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7	Y	-	-
Philips Private MR Cardio	1.3.46.670589.5.0.8	Y	-	-
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9	Y	-	-
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10	Y	-	-
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11	Y	-	-
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12	Y	-	-
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1	Y	-	-
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2	Y	-	-
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1	Y	-	-

Table 8.   Supported SOP classes as SCP (WISE (win2k))

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)		
		SU	SP	QP
Verification	1.2.840.10008.1.1	-	Y	Y
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	-	Y	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	-	Y	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	-	Y	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	-	Y	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	-	Y	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	-	Y	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	-	Y	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	-	Y	-
US Multi-Frame Image Storage (Ret.)	1.2.840.10008.5.1.4.1.1.3	-	Y	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	-	Y	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	-	Y	-
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	-	Y	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	-	Y	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	-	Y	-
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	-	Y	-
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	-	Y	-
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	-	Y	-
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	-	Y	-
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	-	Y	-
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	-	Y	-
Cardiac Electophysiology Waveform St.	1.2.840.10008.5.1.4.1.1.9.3.1	-	Y	-
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	-	Y	-
Stand-alone Modality LUT	1.2.840.10008.5.1.4.1.1.10	-	Y	-
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	-	Y	-
Grayscale Softcopy Pres. State Storage	1.2.840.10008.5.1.4.1.1.11.1	-	Y	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	-	Y	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	-	Y	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	-	Y	-
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	-	Y	-
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	-	Y	-
VL Slide-Coordinates Micros. Image St.	1.2.840.10008.5.1.4.1.1.77.1.3	-	Y	-
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	-	Y	-
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	-	Y	-
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	-	Y	-
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	-	Y	-
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	-	Y	-
Stand-alone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	-	Y	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	-	Y	-
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	-	Y	-
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	-	Y	-
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	-	Y	-
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	-	Y	-
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	-	Y	-

RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	-	Y	-
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	-	Y	-
Hardcopy Greyscale Image Storage	1.2.840.10008.5.1.1.29	-	Y	-
Stored Print Storage	1.2.840.10008.5.1.1.27	-	Y	-
Philips Private CX Image Storage	1.3.46.670589.2.4.1.1	-	Y	-
Philips Private Volume Storage	1.3.46.670589.5.0.1	-	Y	-
Philips Private 3D Object Storage	1.3.46.670589.5.0.2	-	Y	-
Philips Private 3D Object 2 Storage	1.3.46.670589.5.0.2.1	-	Y	-
Philips Private Surface Storage	1.3.46.670589.5.0.3	-	Y	-
Philips Private Surface 2 Storage	1.3.46.670589.5.0.3.1	-	Y	-
Philips Private Composite Object	1.3.46.670589.5.0.4	-	Y	-
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7	-	Y	-
Philips Private MR Cardio	1.3.46.670589.5.0.8	-	Y	-
Philips Private CT Synthetic Image St.	1.3.46.670589.5.0.9	-	Y	-
Philips Private MR Synthetic Image St.	1.3.46.670589.5.0.10	-	Y	-
Philips Private MR Cardio Analysis St.	1.3.46.670589.5.0.11	-	Y	-
Philips Private CX Synthetic Image St.	1.3.46.670589.5.0.12	-	Y	-
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1	-	Y	-
Philips Private Gyroscan MR Serie Data	1.3.46.670589.11.0.0.12.2	-	Y	-
Philips Private Specialised XA Storage	1.3.46.670589.2.3.1.1	-	Y	-
Patient Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	-	-	Y
Study Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	-	-	Y
Pat/Study Only Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	-	-	Y
Patient Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	-	-	Y
Study Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	-	-	Y
Pat/Study Only Q/R Info. Mo. – MOVE	1.2.840.10008.5.1.4.1.2.3.2	-	-	Y

Table 9.   Supported Transfer Syntaxes (WISE (win2k))

Transfer Syntax Name	Transfer Syntax UID	Supported for AE Y/- (Yes/No)		
		SU	SP	QP
Sectra Compression (**Private Syntax**)	1.2.752.24.3.7.6	-	Y	-
Explicit VR Little Endian	1.2.840.10008.1.2.1	-	Y	-
Explicit VR Big Endian	1.2.840.10008.1.2.2	-	Y	-
JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57	-	Y	-
JPEG Lossless, Hier., First-Order Pred.	1.2.840.10008.1.2.4.70	-	Y	-
Implicit VR Little Endian	1.2.840.10008.1.2	Y	Y	Y
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	-	Y	-
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	-	Y	-
JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55	-	Y	-

2.2.4 IDS5 – AE descriptions

Storage SCP

Storage SCP is the AE responsible for receiving images. The IDS5 Storage SCP is used **only** for receiving Q/R images fetched from a Q/R SCP. It will only store the images temporary and should not be used for long-term storage.

Each time the IDS5 is exited, all stored images are removed.

Read more about this functionality in [4].

Q/R-MWL SCU

Q/R-MWL handles queries and retrieve requests from an IDS5 user. User can define search criteria and request information from several Q/R SCPs and/or MWL SCPs at the same time.

When responses are received from a Q/R SCP the user can select examinations and import them to the WISE Storage SCP or choose to fetch them temporarily to the IDS5 Storage SCP and view them locally.

Read more about this functionality in IDS5 Storage SCP above and in [4].

Print SCU

Print SCU is the AE responsible for sending print request to DICOM printers. It is connected to the IDS5 product. There is only one Print SCU AE per IDS5.

As described in the IDS5 User's Documentation [4] the IDS5 workstation user chooses images to print from the matrix or image windows. When the user has collected the images to print, he or she issues the print command. This will open the print preview. From the preview the user can do some further arrangement for the print, choose the printer to print to and send the images to this printer. When this happens the Print SCU AE is activated, acts as a SCU and initiates an association with the remote AE, supporting DICOM Print Management as SCP (a DICOM printer).

2.2.5 WISE (Unix) – AE descriptions

Storage SCU

Storage SCU is the AE responsible for sending images to remote applications. There is only one Storage SCU AE. Sending is either initiated by a retrieve operation from Q/R SCP or from an IDS5.

As described in the IDS5 User's Documentation [4] the IDS5 workstation user selects examinations to send from the information window. Then he or she issues the send command by selecting the desired destination. The command is forwarded to WISE, which will activate the Storage SCU AE indicating the examinations and destination that the user has chosen. The Storage SCU AE will then initiate an association with the remote AE, supporting DICOM Storage as SCP.

Storage SCP

Storage SCP is the AE responsible for receiving images. There can be any number of Storage SCP AEs set up, each with its own AE title.

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

Q/R SCP

Q/R SCP is the AE responsible for receiving queries and sending images to other application entities as a response to a move request. The Q/R SCP AE is connected to the WISE 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 WISE 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 WISE 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 Q/R SCP AE will change into a Storage SCU and 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.

Notif SCU

If WISE is configured so, the Notif SCU sends a Basic Study Descriptor instance for a specific Study when the corresponding exam is approved. The Basic Study Descriptor object is typically sent to a RIS to indicate that an exam is made, and to indicate the number of images in the exam.

2.2.6 WISE (win2k) - AE descriptions

Storage SCU

Storage SCU 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.

Storage SCP

Storage SCP is the AE responsible for receiving images. There can be any number of Storage SCP AEs set up, each with its own AE title.

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

Q/R SCP

Q/R SCP is the AE responsible for receiving queries and sending images to other application entities as a response to a move request. The Q/R SCP AE is connected to the WISE 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 WISE 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 WISE 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 Q/R SCP AE will change into a Storage SCU and 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 Sequencing of Real-World Activities

2.3.1 IDS5

IDS5 will perform operations (Print, Send, Approve) on images found in WISE. It can also query DICOM archives and receive images locally for temporary viewing.

2.3.2 WISE (Unix)

WISE receives images and then it can be queried through both Q/R and WISE API. Sending images, storage commitment and notification can be performed on images stored.

2.3.3 WISE (win2k)

WISE receives images and then it can be queried through both Q/R and WISE API. Sending images and storage commitment can be performed on images stored.

3. IDS5 AE Specifications

3.1 Storage SCP AE Specifications (IDS5)

3.1.1 Association Establishment Policies

<u>General</u>

The maximum PDU-length, which a Storage SCP AE will use, is configurable. The default is 28672 bytes. Only Sectra authorized personnel can do configuration.

<u>Number of Associations</u>

Each Storage SCP AE can handle five simultaneous associations at a time by default. This number is configurable. Only Sectra authorized personnel can do configuration.

<u>Asynchronous Nature</u>

A Storage SCP AE will only allow a single outstanding operation on an association. Therefore, a Storage SCP AE will not perform asynchronous operations window negotiation.

<u>Implementation Identifying Information</u>

A Storage SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name of a Storage SCP is "WISTOSCP_7_20".

3.1.2 Association Initiation Policy

The IDS5 Storage SCP will not initiate associations.

3.1.3 Association Acceptance Policy

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: 5).

- For image transfers and if configured so, if the WISE server is not responding.

A Storage SCP AE **accepts** associations for the following events:

- Verification of the DICOM communication between a remote system and a Storage SCP AE.

- Transfer of images from a remote system to the WISE database.

<u>Verification of the Communication</u>

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating and Table 3. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

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

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 3.

Transfer of Images from a Remote System to the local storage

Associated Real-World Activity

A remote system wants to store images temporary on IDS5 workstation.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes can be found by investigating Table 2 and Table 3.Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Storage SOP classes

When images arrive to Storage SCP, they are sorted into temporary directories from their source AE title, Study Instance UID and Series Instance UID. Images with same Series Instance UID will be interpreted as a stack and shown as one in IDS5. Receiving the same image twice will not overwrite the first one; instead a duplicate image will be created. Only information available in images and their preceding queries will be shown and used. Regarding viewing capabilities of IDS5 the following points must be noted

- Multi-frame images in one dimension can be viewed in IDS5; multi dimensional on the other hand cannot be viewed correctly. They will behave as a one-dimensional image; showing them will do so with images in a random order. There is an option when installing the DICOM Storage SCP to split multi-frame images to individual images. If this is used, the images can be viewed as a stack in IDS5. However, moving the images with Q/R will in this case not give multi-frame images but the frames as individual images. If this option is not used (which is the default) multi-frame images are stored unaltered in WISE. For NM multi-frame images only the default is supported, i.e. NM multi-frame images cannot be split up into individual images.

- XA Bi-plane images cannot be viewed.

- IDS5 shows images with non-square pixels as if the pixels where square. It is possible to configure image import in WISE so that non-square pixels are transformed to square pixels.

- Regarding color images, IDS5 can only view those with (0028,0004), Photometric interpretation, equal to RGB with 24 bits (8 bits per channel) or (0028,0004), Photometric interpretation, equal to PALETTE_COLOR.

- Images are handled color-by-pixel internally in WISE and IDS5. In certain circumstances image that are sent color-by-plane to WISE/IDS5 are sent color-by-pixel if fetched from IDS5/WISE.

- The first LUT in a Modality LUT sequence (attribute (0028,3000), Modality LUT Sequence, etc.) is handled. The rest (second, third and so on) are ignored.

- IDS5 has full support of DICOM Overlays, however if multiple overlays are present in an image you can only choose between showing no DICOM overlays or all DICOM overlays.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 3.

3.2 Q/R-MWL SCU AE Specification

3.2.1 Association Establishment Policies

General

The maximum PDU size that the Q/R-MWL SCU AE will use is 16384 bytes.

Number of Associations

The Q/R-MWL SCU AE can only handle one association at a time. One Q/R-MWL request is finished before the next is started.

Asynchronous Nature

The Q/R-MWL SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Implementation Identifying Information

The Q/R-MWL SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.25.7 and an implementation version name of "WIQRSCU_7_20".

3.2.2 Association Initiation Policy

Real-World Activity – Q/R Find

Associated Real-World Activity

User creates a search or a worklist containing one or several Q/R SCP:s. Then user defines search criteria to be used and search or worklist search is performed. Several Q/R SCP:s can be queried at the same time.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance

The Q/R-MWL SCU provides standard conformance to the Q/R SOP class.

Real-World Activity – MWL Find

Associated Real-World Activity

User creates a search or a worklist containing one or several MWL SCP:s. Then user defines search criteria to be used and search or worklist search is performed. Several MWL SCP:s can be queried at the same time.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU.

SOP-Specific Conformance

The Q/R-MWL SCU provides standard conformance to the Q/R SOP class.

The following attributes can be used by the Q/R-MWL SCU

Attribute Name	Tag	Used for matching	Required in response	Remarks
Scheduled Procedure Step Sequence	(0040,0100)			
>Scheduled Station AE Title	(0040,0001)	Yes	Yes	
>Modality	(0008,0060)	Yes	Yes	
>Scheduled Station Name	(0040,0010)	Yes	Yes	
>Scheduled Procedure Step Start Date	(0040,0002)	Yes	Yes	
>Scheduled Procedure Step Start Time	(0040,0003)	Yes	Yes	
Patient ID	(0010,0020)	Yes	Yes	
Patient's Name	(0010,0010)	Yes	Yes	
Patient's Birth Date	(0010,0030)	No	Yes	
Patient's Sex	(0010,0040)	No	Yes	
Study Instance UID	(0020,000D)	No	Yes	
Study ID	(0020,0010)	Yes	Yes	
Accession Number	(0008,0050)	No	Yes	
Study Description	(0008,1030)	No	Yes	

Real-World Activity - Import

Associated Real-World Activity

When responses are received from a search, as described in section above, the user can select one or several of the matching studies to fetch them from the Q/R SCP. The images are sent to a configured destination, usually a Storage SCP AE on the WISE.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance

The Q/R-MWL SCU provides standard conformance to the Q/R SOP class.

Real-World Activity - Fetch

Associated Real-World Activity

When responses are received from a search, as described in section above, the user can select one or several of the matching studies to fetch them from the Q/R SCP. The images are sent to IDS5 workstation for temporary storage.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance

The Q/R-MWL SCU provides standard conformance to the Q/R SOP class.

3.2.3 Association Acceptance Policy

The Q/R-MWL SCU AE does not handle incoming associations.

3.3 Print SCU AE Specification

3.3.1 Association Establishment Policies

General

The maximum PDU size that the Print SCU AE will use is 16 Kbytes.

Number of Associations

The Print SCU AE can only handle one association at a time. One print request has to be finished before the next can be started.

Asynchronous Nature

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

Implementation Identifying Information

The Print SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.25.7 and an implementation version name of "WIPRISCU_7_20".

3.3.2 Association Initiation Policy

Real-World Activity - Print Command

Associated Real-World Activity

As described in the IDS5 User's Documentation [4] the IDS5 workstation user chooses images to print from the matrix or image windows. When the user has collected the images to print, he or she issues the print command. This will open the print preview. From the preview the user can do some further arrangement for the print, choose the printer to print to and send the images to this printer. When this happens the Print SCU AE is activated, acts as an SCU and initiates an association with a remote AE, hopefully supporting DICOM Print Management as SCP (a DICOM printer).

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance

The Print SCU AE supports the mandatory SOP classes, which are defined under the Basic Grayscale Print Management Meta SOP Class, see Table 1. No optional SOP classes are supported.

The Print SCU AE uses the following DIMSE Service Elements:

Table 10. DIMSE Service Elements

SOP Class	DIMSE Service Element
Basic Film Session SOP Class	N-CREATE, N-DELETE
Basic Film Box SOP Class	N-CREATE, N-DELETE, N-ACTION
Basic Grayscale Image Box SOP Class	N-SET
Printer SOP Class	N-GET

N-EVENT-REPORT is not supported.

Immediately after establishing an association, the Print SCU AE will execute an N-GET on the Printer SOP Class. This operation can be configured into two modes, one for fetching all available printer attributes and one for fetching a minimal set of printer attributes.

If configured to fetch all attributes, the following attributes will be requested:

Table 11. Attributes, when fetching all available attributes

Attribute name	Tag	Optional according to standard
Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	NO
Printer Name	(2110,0030)	YES
Manufacturer	(0008,0070)	YES
Manufacturer Model Name	(0008,1090)	YES
Device Serial Number	(0018,1000)	YES
Software Versions	(0018,1020)	YES
Date Of Last Calibration	(0018,1200)	YES
Time Of Last Calibration	(0018,1201)	YES

If configured to fetch a minimum set of attributes, the following attributes will be requested:

Table 12. Attributes, when fetching minimum set of attributes

Attribute name	Tag	Optional according to standard
Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	NO
Printer Name	(2110,0030)	YES

If the Printer Status tag is returned as NORMAL, the print job will continue immediately.

If the status is WARNING, the user will be notified and the value of the Printer Status Info tag will be displayed. The print job is then continued.

If the status is FAILURE, the user will be notified and the value of the Printer Status Info tag will be displayed. The print job is then aborted.

The Print SCU AE supports the following SOP class attributes:

Table 13. SOP Class Attributes

SOP Class, DIMSE Service Element	Attribute name	Tag	Optional according to standard	Con-figu-rable	Default value
Basic Film Session N-CREATE	Number of Copies	(2000,0010)	YES	YES	1
Basic Film Session N-CREATE	Print Priority	(2000,0020)	YES	YES	MED

Basic Film Session N-CREATE	Medium Type	(2000,0030)	YES	YES	BLUE FILM
Basic Film Session N-CREATE	Film Destination	(2000,0040)	YES	YES	MAGAZINE
Basic Film Box N-CREATE	Image Display Format	(2010,0010)	NO	NO	STANDARD\1,1
Basic Film Box N-CREATE	Film Orientation	(2010,0040)	YES	YES	PORTRAIT
Basic Film Box N-CREATE	Film Size ID	(2010,0050)	YES	YES	14INX17IN
Basic Film Box N-CREATE	Magnification Type	(2010,0060)	YES	YES	(none)
Basic Film Box N-CREATE	Max Density	(2010,0130)	YES	YES	(none)
Basic Film Box N-CREATE	Configuration Information	(2010,0150)	YES	YES	(none)
Basic Film Box N-CREATE	Smoothing Type	(2010,0080)	YES	YES	(none)
Basic Film Box N-CREATE	Border Density	(2010,0100)	YES	YES	BLACK
Basic Film Box N-CREATE	Empty Image Density	(2010,0110)	YES	YES	BLACK
Basic Film Box N-CREATE	Min Density	(2010,0120)	YES	YES	(none)
Basic Film Box N-CREATE	Trim	(2010,0140)	YES	YES	YES
Basic Grayscale Image Box N-SET	Polarity	(2020,0020)	YES	YES	NORMAL

Several images per film can be printed. They are arranged in IDS5, which composes them and sends them as one big image (Image Display Format "STANDARD\1,1").

3.3.3 Association Acceptance Policy

The Print SCU AE does not handle incoming associations.

4. WISE (Unix) AE Specifications

4.1 Storage SCU AE Specification (WISE (Unix))

4.1.1 Association Establishment Policies

General

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

Number of Associations

The Storage SCU AE can only handle one association at a time. One send-request has to be finished before the next is started.

Asynchronous Nature

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

Implementation Identifying Information

The Storage SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.25.7 and an implementation version name of "UXSTOSCU_7_20".

4.1.2 Association Initiation Policy

Real-World Activity - Send Command

Associated Real-World Activity

As described in the IDS5 User's Documentation [4] the IDS5 workstation user selects examinations to send from the information window. Then he or she issues the send command by selecting the desired destination. The command is forwarded to WISE, which will activate the Storage SCU AE indicating the examinations, and destination that the user has chosen. The Storage SCU AE will then initiate an association with the remote AE, hopefully supporting DICOM Storage as SCP.

Proposed Presentation Contexts

Possible proposed abstract syntaxes and transfer syntaxes can be found by investigating Table 4 and Table 6. At most three transfer syntaxes are proposed at the same time. Implicit Little Endian is always proposed. If the image is internally stored in another transfer syntax, that syntax is proposed too. If configured so, compression transfer syntax will be proposed too.

Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance of the Storage SOP Class

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

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

If annotations have been made in the images using IDS5, the exported images will contain standard DICOM overlays with these annotations.

If configured so, the Storage SCU AE will export Sectra private attributes. These are documented in Appendix C.

4.1.3 Association Acceptance Policy

The Storage SCU AE does not handle incoming associations.

4.2 Storage SCP AE Specification (WISE (Unix))

4.2.1 Association Establishment Policies

<u>General</u>

The maximum PDU-length, which a Storage SCP AE will use, is configurable. The default is 28672 bytes. Only Sectra authorized personnel can do configuration.

<u>Number of Associations</u>

Each Storage SCP AE can handle five simultaneous associations at a time by default. This number is configurable. Only Sectra authorized personnel can do configuration.

Any number of Storage SCP AEs can be set up, meaning that a great number of C-STORE associations can be handled at the same time. Typically one Storage SCP AE per sending application is set up.

<u>Asynchronous Nature</u>

A Storage SCP AE will only allow a single outstanding operation on an association. Therefore, a Storage SCP AE will not perform asynchronous operations window negotiation.

<u>Implementation Identifying Information</u>

A Storage SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name of a Storage SCP AE is "UXSTOSCP_7_20.

4.2.2 Association Initiation Policy

The only situation in which a Storage SCP AE will initiate associations with a remote AE is in case a remote application has sent a Storage Commitment N-ACTION and shut down the association instead of waiting for the N-EVENT-REPORT response. This is described in section 0 below.

4.2.3 Association Acceptance Policy

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: 5).

- For image transfers and if configured so, if the WISE server is not responding.

A Storage SCP AE **accepts** associations for the following events:

- Verification of the DICOM communication between a remote system and a Storage SCP AE.

- Transfer of images from a remote system to the WISE database.

- Request for Storage Commitment to store images in WISE.

Verification of the Communication

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

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

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Transfer of Images from a Remote System to the WISE database

Associated Real-World Activity

A remote system wants to store images in the WISE database.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Storage SOP classes

A Storage SCP AE provides standard level 2 (full) conformance to the DICOM Storage Service Class as SCP. Full conformance mean that all type 1, 2 and 3 attributes sent are stored. All private and retired attributes are also stored.

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 [8]) as patient ID. Applications sending images 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!

If the image storage should fail on the WISE side, a status of refused, "Out of resources", will be returned to the association initiator.

WISE can be configured to overwrite images with same SOP Instance UID or to store all images it receives. Default is the second alternative, i.e. not to overwrite images with same SOP Instance UID. This means that if the same image is sent twice to a Storage SCP AE it will be stored two times in WISE. 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.

For more detailed information about the handling of specific attributes by WISE and IDS5, see Appendix A.

If DICOM attributes are illegal, no responsibilities for consequences are taken. The following consequence has been noted:

- If (0020,0011) Series Number is outside the allowed range, $-(2^{32}-1) \leq x \leq (2^{32}-1)$, WISE will truncate all bits above the 32nd position.

Regarding viewing capabilities of IDS5 the following points must be noted

- Multi-frame images in one dimension can be viewed in IDS5; multi dimensional on the other hand cannot be viewed correctly. They will behave as a one-dimensional image;

showing them will do so with images in a random order. There is an option when installing the DICOM Storage SCP to split multi-frame images to individual images. If this is used, the images can be viewed as a stack in IDS5. However, moving the images with Q/R will in this case not give multi-frame images but the frames as individual images. If this option is not used (which is the default) multi-frame images are stored unaltered in WISE. For NM multi-frame images only the default is supported, i.e. NM multi-frame images cannot be split up into individual images.

- IDS5 shows images with non-square pixels as if the pixels where square. It is possible to configure image import in WISE so that non-square pixels are transformed to square pixels.

- Regarding color images, IDS5 can only view those with (0028,0004), Photometric interpretation, equal to RGB with 24 bits (8 bits per channel) or (0028,0004), Photometric interpretation, equal to PALETTE_COLOR.

- Images are handled color-by-pixel internally in WISE and IDS5. In certain circumstances image that are sent color-by-plane to WISE/IDS5 are sent color-by-pixel if fetched from IDS5/WISE.

- The first LUT in a Modality LUT sequence (attribute (0028,3000), Modality LUT Sequence, etc.) is handled. The rest (second, third and so on) are ignored.

- IDS5 has full support of DICOM Overlays, however if multiple overlays are present in an image you can only choose between showing no DICOM overlays or all DICOM overlays.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Request to Commit to Store Images in the WISE Database

Associated Real-World Activity

A remote system makes a request for WISE to commit to store a number of images.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Storage Commit SOP classes

Only the Push model is supported, not the Pull model.

The 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. 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 WISE 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.

- Any time after the images have been committed with Storage Commitment, they can be deleted by a IDS5 user, i.e. a Storage Commitment will not make sure that the images will be stored permanently.

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

- Storage Commitment can be made for images stored on short-term (RAID) or long-term storage (Archive).

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

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

4.3 Q/R SCP AE Specification (WISE (Unix))

4.3.1 Association Establishment Policies

General

The maximum PDU-length that the Q/R SCP AE will use is configurable. Default is 28672 bytes. Only Sectra authorized personnel can do configuration.

Number of Associations

The Q/R SCP AE can handle at most 100 simultaneous associations at a time.

Asynchronous Nature

The Q/R SCP AE will only allow a single outstanding operation on an association. Therefore, the Q/R SCP AE will not perform asynchronous operations window negotiation.

Implementation Identifying Information

The Q/R SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name is "UXQRSCP_7_20".

4.3.2 Association Initiation Policy

The Q/R SCP AE will not initiate any associations. When a retrieve request is forwarded to the Q/R SCP, the images will be copied using the Storage SCU AE.

4.3.3 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 will also reject associations with C-MOVE requests from hosts not present in the /etc/hosts file.

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 WISE database

- Retrieve images from the WISE database

Verification of the Communication

Associated Real-World Activity
A remote system wants to verify the DICOM communication with the Q/R SCP AE.

Accepted Presentation Contexts
The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class
The Q/R SCP AE provides standard conformance to the DICOM Verification Service Class.

Presentation Context Acceptance Criterion
There are no specific rules for acceptance.

Transfer Syntax Selection Policies
The transfer syntax selection is done according to the order in Table 9.

Query of the WISE Database

Associated Real-World Activity
A remote system wants to query the WISE database using the C-FIND command.

Accepted Presentation Contexts
The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP. Extended negotiation is supported.

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

- Fractions of seconds are ignored.

- At most 500 matches are returned. The hit limit can be configured. If there are more items than the hit limit in the WISE database, zero matches are returned.

Appendix B lists all attributes that are supported for search.

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

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 point on the day the query is done is returned.

If no matches are found, a response with *SUCCESS* is sent.

Presentation Context Acceptance Criterion
The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Retrieve Images from the WISE Database

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP. Extended negotiation is supported.

SOP Specific Conformance to MOVE SOP classes

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

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.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

4.4 Notif SCU AE Specification

4.4.1 Association Establishment Policies

General

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

Number of Associations

The Notif SCU AE can only handle one association at a time. One send-request has to be finished before the next is started.

Asynchronous Nature

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

Implementation Identifying Information

The Notif SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.25.7 and an implementation version name of "UXNOTSCU_7_20".

4.4.2 Association Initiation Policy

<u>Real-World Activity - Send Command</u>

Associated Real-World Activity

If WISE is configured so, the Notif SCU sends a Basic Study Descriptor instance for a specific Study when the corresponding exam is approved. The Basic Study Descriptor object is typically sent to a RIS to indicate that an exam is made, and to indicate the number of images in the exam.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 4 and Table 6. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance of the Basic Study Content Notification SOP Class

The Notif SCU sends all type 1 and type 2 attributes of the Basic Study Desctiptor IOD except (0008, 1150) Referenced SOP Class UID (a type 2 attribute). No type 3 attributes are sent.

4.4.3 Association Acceptance Policy

The Notif SCU AE does not handle incoming associations.

5. WISE (win2k) AE Specifications

5.1 Storage SCU AE Specification (WISE (win2k))

5.1.1 Association Establishment Policies

<u>General</u>

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

<u>Number of Associations</u>

The Storage SCU AE can only handle one association at a time. One send request has to be finished before the next is started.

<u>Asynchronous Nature</u>

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

<u>Implementation Identifying Information</u>

The Storage SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.25.7 and an implementation version name of "WISTOSCU_7_20".

5.1.2 Association Initiation Policy

<u>Real-World Activity - Send Command</u>

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, hopefully supporting DICOM Storage as SCP.

Proposed Presentation Contexts

Possible proposed abstract syntaxes and transfer syntaxes can be found by investigating Table 4 and Table 6. At most three transfer syntaxes are proposed at the same time. Implicit Little Endian is always proposed. If the image is internally stored in another transfer syntax, that syntax is proposed too. If configured so, compression transfer syntax will be proposed too.

Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance of the Storage SOP Class

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

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

If annotations has been made in the images using IDS5, the exported images will contain standard DICOM overlays with these annotations.

If configured so, the Storage SCU AE will export private attributes. These are documented in Appendix C.

5.1.3 Association Acceptance Policy

The Storage SCU AE does not handle incoming associations.

5.2 Storage SCP AE Specification (WISE (win2k))

5.2.1 Association Establishment Policies

General

The maximum PDU-length, which a Storage SCP AE will use, is configurable. The default is 28672 bytes. Configuration can only be done by Sectra authorized personnel.

Number of Associations

Each Storage SCP AE can handle five simultaneous associations at a time by default. This number is configurable. Configuration can only be done by Sectra authorized personnel.

Any number of Storage SCP AEs can be set up, meaning that a great number of C-STORE associations can be handled at the same time. Typically one Storage SCP AE per sending application is set up.

Asynchronous Nature

A Storage SCP AE will only allow a single outstanding operation on an association. Therefore, a Storage SCP AE will not perform asynchronous operations window negotiation.

Implementation Identifying Information

A Storage SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name of a Storage SCP AE is "WISTOSCP_7_20".

5.2.2 Association Initiation Policy

Storage SCP will not initiate association.

5.2.3 Association Acceptance Policy

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: 5).

- For image transfers and if configured so, if the WISE server is not responding.

A Storage SCP AE **accepts** associations for the following events:

- Verification of the DICOM communication between a remote system and a Storage SCP AE.

- Transfer of images from a remote system to the WISE database.

- Request for Storage Commitment to store images in WISE.

Verification of the Communication

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

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

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Transfer of Images from a Remote System to the WISE database

Associated Real-World Activity

A remote system wants to store images in the WISE database.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Storage SOP classes

A Storage SCP AE provides standard level 2 (full) conformance to the DICOM Storage Service Class as SCP. Full conformance mean that all type 1, 2 and 3 attributes sent are stored. All private and retired attributes are also stored.

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 [8]) 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!

If the image storage should fail on the WISE side, a status of refused, "Out of resources", will be returned to the association initiator.

WISE can be configured to overwrite images with same SOP Instance UID or to store all images it receives. Default is the second alternative, i.e. not to overwrite images with same SOP Instance UID. This means that if the same image is sent twice to a Storage SCP AE it will be stored two times in WISE. 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.

For more detailed information about the handling of specific attributes by WISE and IDS5, see Appendix A.

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

Regarding viewing capabilities of IDS5 the following points must be noted

- Multi-frame images in one dimension can be viewed in IDS5; multi dimensional on the other hand cannot be viewed correctly. They will behave as a one-dimensional image; showing them will do so with images in a random order. There is an option when installing the DICOM Storage SCP to split multi-frame images to individual images. If this is used, the images can be viewed as a stack in IDS5. However, moving the images with Q/R will in this case not give multi-frame images but the frames as individual images. If this option is not used (which is the default) multi-frame images are stored unaltered in WISE. For NM multi-frame images only the default is supported, i.e. NM multi-frame images cannot be split up into individual images.

- IDS5 shows images with non-square pixels as if the pixels where square. It is possible to configure image import in WISE so that non-square pixels are transformed to square pixels.

- Regarding color images, IDS5 can only view those with (0028,0004), Photometric interpretation, equal to RGB with 24 bits (8 bits per channel) or (0028,0004), Photometric interpretation, equal to PALETTE_COLOR.

- Images are handled color-by-pixel internally in WISE and IDS5. In certain circumstances image that are sent color-by-plane to WISE/IDS5 are sent color-by-pixel if fetched from IDS5/WISE.

- The first LUT in a Modality LUT sequence (attribute (0028,3000), Modality LUT Sequence, etc.) is handled. The rest (second, third and so on) are ignored.

- IDS5 has full support of DICOM Overlays, however if multiple overlays are present in an image you can only choose between showing no DICOM overlays or all DICOM overlays.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Request to Commit to Store Images in the WISE Database

Associated Real-World Activity

A remote system makes a request for WISE to commit to store a number of images.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Storage Commit SOP classes

Only the Push model is supported, not the Pull model.

The 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. 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 WISE 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.

- Any time after the images have been committed with Storage Commitment, they can be deleted by a IDS5 user, i.e. a Storage Commitment will not make sure that the images will be stored permanently.

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

- Storage Commitment can be made for images stored on short-term (RAID) or long-term storage (Archive).

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

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

5.3 Q/R SCP AE Specification (WISE (win2k))

5.3.1 Association Establishment Policies

General

The maximum PDU-length that the Q/R SCP AE will use is configurable. Default is 28672 bytes. Configuration can only be done by Sectra authorized personnel.

Number of Associations

The Q/R SCP AE can handle at most 100 simultaneous associations at a time.

Asynchronous Nature

The Q/R SCP AE will only allow a single outstanding operation on an association. Therefore, the Q/R SCP AE will not perform asynchronous operations window negotiation.

Implementation Identifying Information

The Q/R SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name is "WINQRSCP_7_20".

5.3.2 Association Initiation Policy

The Q/R SCP AE will not initiate any associations. When a retrieve request is forwarded to the Q/R SCP, the images will be copied using the Storage SCU AE.

5.3.3 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 will also reject associations with C-MOVE requests from hosts not present in the /etc/hosts file.

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 WISE database

- Retrieve images from the WISE database

Verification of the Communication

Associated Real-World Activity

A remote system wants to verify the DICOM communication with the Q/R SCP AE.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

The Q/R SCP AE provides standard conformance to the DICOM Verification Service Class.

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Query of the WISE Database

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP. Extended negotiation is supported.

SOP Specific Conformance to FIND 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 WISE database matches, zero matches are returned.

Appendix B summarizes which keys can be used for searching.

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

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 point on the day the query is done is returned.

In case of no matching examinations, a response of *SUCCESS* is sent.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

Retrieve Images from the WISE Database

Associated Real-World Activity

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

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 8 and Table 9. Role is SCP. Extended negotiation is supported.

SOP Specific Conformance to MOVE SOP classes

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

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.

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 9.

6. DICOM Media AE Specification

The DICOM Media AE (located in IDS5), provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10 in [1]). The functionality is intended for the CD-R media but the implementation has left the actual CD creation to any third party product that can write a directory structure to a CD.

6.1 File Meta Information

The Implementation Class UID is 1.2.752.24.3.3.25.7 and the Implementation Version Name in the File Meta Header is "WIMEFSCR_7_20".

6.2 Media related Real-World activities

6.2.1 Import Media

IDS5 can choose to import a complete or parts of a complete file set acting as FSR. User will be presented with a tree structure presenting the selected file-set and can select which part to import.

Read more about this functionality in [4].

DICOMDIR keys

The mandatory DICOMDIR keys are required to present the tree structure in a correct way. This structure will show Patients, Studies and Series.

Optional key are displayed if available.

6.2.2 Export Media

IDS5 can create a complete Multi patient file set to be written on CD acting as FSC.

Read more about this functionality in [4].

Creating DICOMDIR

All values needed for DICOMDIR file will be fetched from WISE, if a value does not exist; actual image file will be checked for information. If WISE data is used, image file will be updated according to it. This will ensure that the same information that is written in DICOMDIR file is in the image file.

7. Communication Profiles

7.1 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.

7.2 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.

7.2.1 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.

7.3 OSI Stack

Not supported.

7.4 Point-To-Point Stack

Not supported.

8. Extensions / Specializations / Privatizations

8.1 Transfer Syntaxes

The Sectra Compression Transfer Syntax can be used between different components of Sectra PACS. The UID of the Transfer Syntax is 1.2.752.24.3.7.6.

8.2 Private Attributes

See Appendix C.

9. Configuration

9.1 IDS5

Configuration files are found in the XXX\Sectra\IDS\Config\… directory where XXX is specified at installation. See installation guide for IDS5 [2].

9.1.1 Storage SCP

More information about configuration for Storage SCP can be found in IDS5 System Administrators Guide [3].

Configuration file

The file ctnstore_scp.def contains configuration for Storage SCP.

AE title

Default AE Title is first part of host name in uppercase with an additional Storage behind it.

Exampel: host = john.net => AE title = JOHNSTORE

Port

Default port is 7820.

9.1.2 Q/R-MWL SCU

More information about configuration for Storage SCP can be found in IDS5 System Administrators Guide [3].

Configuration file

The file data_cache.def contains configuration for Q/R-MWL SCU.

9.1.3 Print SCU

More information about configuration for Storage SCP can be found in IDS5 System Administrators Guide [3].

Configuration file

The file dicom_printer.def contains configuration for Print SCU.

AE Title

The default AE title is DICOM_PRINT_SCU.

Remote AE

The remote Applications Entity's AE-title, host name and port number are specified the above-mentioned configuration file. Each remote AE is specified in its own section of the file. Default AE title is PRINT_SERVER_SCP.

9.1.4 DICOM Media

More information about configuration for DICOM Media can be found in IDS5 System Administrators Guide [3].

Configuration file

The file cd_export_import.def contains configuration for DICOM Media.

9.2 WISE (Unix)

9.2.1 Storage SCU

Configuration is specified in the teleradiology section of the WISE System Administrator's Guide [6].

Configuration file

The file `/etc/opt/sectra/wise_send.rc` contains configuration for Storage SCU.

Remote AE

The remote Applications Entity's AE-title, host name and port number are specified the configuration file `/etc/opt/sectra/wise_send.def` using the tool `wm_config_telerad`. More details can be found in the teleradiology section of the WISE System Administrator's Guide [6].

9.2.2 Storage SCP

AE title

The AE title of each AE can be configured. This is done running the administration program `/opt/sectra/bin/dcm_adm` as described in the ImageServer/S Installation Guide [7]. Any number of AEs can be set up. The default AE title is `DICOM_STORAGE`.

Port

The listen port of each AE can be also configured with the administration program `/opt/sectra/bin/dcm_adm`. You can either set a listen port yourself or let the program automatically select a free listen port.

Remote AE

The remote Applications Entity's AE-title does not have to be specified. A Storage SCP AE will accept any AE-title. However the remote hosts host name must be known to the Storage SCP hosts, e.g. be present in the `/etc/hosts` file.

9.2.3 Q/R SCP

The AEs reference standard configuration files used by the MergeCOM Tool Kit and the program `/opt/sectra/config/si_setup`. For further information see the ImageServer/S (Unix) Installation Guide [7] and System Administrator's Guide [8].

AE title

The AE title can be configured. This is done when running the setup program `/opt/sectra/config/si_setup` as described in the WISE Installation Guide [6]. Default is `QR_SCP_WISE`. This AE title is also used when the Q/R SCP turns into a Storage SCU as a result of a C-MOVE request.

Port

The listen port of the Q/R SCP AE can also be configured. This is specified in the `qr_scp.pro` file located in `/etc/opt/sectra/qr_wise`. The default is 7632.

Remote AE

The remote Applications Entity's AE-title, host name and port number are specified in the `qr_scp.app` file located in `/etc/opt/sectra/qr_wise`. The remote host's host name must be known to the Q/R SCP host, e.g. be present in the `/etc/hosts` file. Note that all C-MOVE destinations also have to be specified. The setup is described in detail in the ImageServer4/S Installation Guide [7].

9.2.4 Notif SCU

Configuration is described in the WISE System Administrator's Guide [6].

Configuration file

The file `/etc/opt/sectra/wise_ris.def` contains configuration for Notif SCU.

Remote AE

The remote Application Entity's AE-title, host name and port number are specified in the above-mentioned file. The default value of the AE-title is SCN_SCP.

9.3 WISE (win2k)

Configuration files can be found in XXX\Sectra\LitePACS\Config\… where XXX is specified at installation. See installation guides for LitePACS.

9.3.1 Storage SCU

Configuration file

The file `ctn_qrscu.def` contains configuration for Storage SCU.

Remote AE

Storage SCP must recognize remote hosts.

9.3.2 Storage SCP

Configuration file

The file `ctn_store.def` contains configuration for Storage SCP.

AE title

Default AE title is DICOM_STORAGE.

Port

Default port is 7810.

Remote AE

Storage SCP must recognize remote hosts.

9.3.3 Q/R SCP

Configuration file

The file `ctn_qrscp.def` contains configuration for Q/R SCP.

AE title
Default AE title is DICOM_QR_SCP.

Port
Default port is 7840.

Remote AE
Storage SCP must recognize remote hosts.

10.   Support of Extended Character Sets

All AE provide support for ISO_IR 100 extended character set **except** Print SCU AE.

However, note that all text in the images is passed to the printer in the image data itself. This means that all overlay text appears on the printed medium in the same way as on the screen. IDS5 handles most character repertoires used in Western Europe.

Appendix A. Attribute List for Storage SCP

This list contains the DICOM attributes that are used by a Storage SCP AE by default. Please note that the default behavior can be changed for both WISE and IDS5. The comments give indication what the attributes are used for. If an attribute is not present in this list it is still stored by WISE but ignored by IDS5.

For the Print SCU AE attributes, see 3.3 Print SCU AE Specification. For supported attributes as keys for the Q/R SCP AE in a C-FIND request, see appendix B.

Table 14. Attribute List for a Storage **SCP AE**

DICOM Attribute	Comment
(0008,0005) Specific Character Set	"ISO_IR 100" is supported.
(0008,0008) Image Type	1. Is used for determining default window setting in IDS5 if no window is included in the image. 2. Third value used by `w_store` in default scanogram finding method, and method "-S A"
(0008,0018) SOP Instance UID	1. Stored in WISE image data (max 64 characters) 2. Required attribute for compression. 3. Used in `w_store` to overwrite equivalent image (if `-k` is not specified).
(0008,0020) Study Date	1. Stored in WISE examination data if value not found in RIS 2. Shown in all IDS5 image windows if present and (0008,0023) and (0008,0022) and (0008,0021) not present.
(0008,0021) Series Date	Shown in all IDS5 image windows if present and (0008,0023) and (0008,0022) not present.
(0008,0022) Acquisition Date	Shown in all IDS5 image windows if present and (0008,0023) not present.
(0008,0023) Image Date	If present, shown in all IDS5 image windows.
(0008,0030) Study Time	1. Stored in WISE examination data if value not found in RIS 2. Shown in all IDS5 image windows if present and (0008,0033) and (0008,0022) and (0008,0021) not present.
(0008,0031) Series Time	Shown in all IDS5 image windows if present and (0008,0033) and (0008,0032) not present.
(0008,0032) Acquisition Time	Shown in all IDS5 image windows if present and (0008,0033) not present.
(0008,0033) Image Time	If present, shown in all IDS5 image windows.

(0008,0050) Accession Number	1. Stored in WISE examination data (max 16 characters). 2. Default attribute for examination number in WISE. Used for connecting the image to RIS entities.
(0008,0060) Modality	1. Stored in WISE series data (max 32 characters). 2. Stored in WISE exam data (max 16 characters). 3. Defines modality for modality specific settings in IDS5 (e.g. information in images and selecting default print partition).
(0008,0080) Institution Name	Stored in WISE examination data (max 32 characters).
(0008,1030) Study Description	Stored in WISE examination data (max 64 characters).
(0008,1140) Referenced Image Sequence	Used by WISE in default method for locating scanograms.
(0008,1155) Referenced SOP Instance UID	Used by WISE in default method for locating scanograms.
(0010,0010) Patient Name	Stored in WISE patient data if value not found in RIS (max 64 characters).
(0010,0020) Patient ID	1. Must be set. If not, (0010,0010) Patient Name is used as Patient ID in WISE. If both (0010,0020) Patient ID and (0010,0010) Patient Name are empty, the request number is used as Patient ID in WISE. 2. Stored in WISE patient data if value not found in RIS (max 64 characters). 3. Used as request number in WISE if attribute for request number (default: (0020,0010) Study ID) is empty.
(0010,0030) Patient's Birth Date	Stored in WISE patient data if value not found in RIS.
(0018,0010) Contrast/Bolus Agent	Shown in IDS5 image window for all CT images
(0018,0015) Body Part Examined	Stored in WISE examination data (max 32 characters).
(0018,0020) Scanning Sequence	Shown in IDS5 image window for all MR images if (0018,0024) not present.
(0018,0024) Sequence Name	If present, shown in IDS5 image window for all MR images
(0018,0050) Slice Thickness	Shown in IDS5 image window for all CT and MR images
(0018,0060) KVP	Shown in IDS5 image window for all CT images
(0018,0080) Repetition Time	Shown in IDS5 image window for all MR images
(0018,0081) Echo Time	Shown in IDS5 image window for all MR images
(0018,0083) Number of Averages	Shown in IDS5 image window for all MR images

(0018,1041) Contrast/Bolus Volume	Shown in IDS5 image window for all CT and MR images
(0018,1100) Reconstruction Diameter	Shown in IDS5 image window for all CT and MR images
(0018,1120) Gantry/Detector Tilt	Shown in IDS5 image window for all CT images
(0018,1150) Exposure Time	Shown in IDS5 image window for all CT images
(0018,1151) X-ray Tube Current	Shown in IDS5 image window for all CT images
(0018,1164) Imager Pixel Spacing	Used for calibrating the image in IDS5 if (0028,0030) is not set.
(0018,1210) Convolution Kernel	Shown in IDS5 image window for all CT images
(0018,1602) Shutter Left Vertical Edge	Is used for IDS5 cropping.
(0018,1604) Shutter Right Vertical Edge	Is used for IDS5 cropping.
(0018,1606) Shutter Upper Horizontal Edge	Is used for IDS5 cropping.
(0018,1608) Shutter Lower Horizontal Edge	Is used for IDS5 cropping.
(0018,1610) Center of Circular Shutter	If present and (0018,1602) - (0018,1608) not present, defines an IDS5 square cropping.
(0018,1612) Radius of Circular Shutter	If present and (0018,1602) - (0018,1608) not present, defines an IDS5 square cropping.
(0018,5100) Patient Position	Shown in IDS5 image window for all CT and MR images
(0020,000D) Study Instance UID	Stored in WISE examination data (max 64 characters).
(0020,000E) Series Instance UID	1. Stored in WISE series data (max 64 characters). 2. Is used for non-default method for identifying scanogram images if "-S U" option is used with w_store. 3. By default, must be equal for all images within a stack.
(0020,0010) Study ID	1. Stored in WISE examination data (max 16 characters). 2. Default attribute for request number in WISE. Used for connecting the image to RIS entities.
(0020,0011) Series Number	1. Stored in WISE series data 2. Is used for non-default method for identifying scanogram images if "-S S" option is used with w_store.
(0020,0013) Instance (Image) Number	1. Stored in WISE image data 2. Is used for non-default method for identifying scanogram images if "-S I" option is used with w_store. 3. Shown in IDS5 image window for all CT and MR images
(0020,0020) Patient Orientation	Always shown in IDS5 image windows for showing anatomical orientation of the image (anterior, posterior, right, left, head, foot). If not present, this information is calculated from tags (0020,0032) and (0020,0037).

(0020,0032) Image Position (Patient)	Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0037) and (0028,0030).
(0020,0037) Image Orientation (Patient)	Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0032) and (0028,0030).
(0020,0052) Frame of Reference UID	Is used for non-default method for identifying scanogram images if "-S A" option is used with w_store.
(0028,0002) Samples per Pixel	If not set, 1 is assumed in IDS5.
(0028,0004) Photometric Interpretation	MONOCHROME1, MONOCHROME2, PALETTE_COLOR and RGB are supported by IDS5. If this attribute is not set, MONOCHROME2 is used by IDS5.
(0028,0006) Planar Configuration	If not set, 000 is assumed by IDS5.
(0028,0008) Number of Frames	If not set, 1 is assumed by IDS5.
(0028,0010) Rows	Must be set to be viewable in IDS5.
(0028,0011) Columns	Must be set to be viewable in IDS5
(0028,0030) Pixel Spacing	1. Used for calibrating the image in IDS5. If empty (0018,1164) is used. 2. Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0032) and (0020,0037). 3. An images with non-square pixels can be transformed to an image with square pixels during image import. IDS5 can only handle images with square pixels.
(0028,0034) Pixel Aspect Ratio	Not used. 1/1 assumed by IDS5. There are possibilities to convert non-square pixels to square pixels in image import.
(0028,0100) Bits Allocated	Must be set to be viewable in IDS5
(0028,0101) Bits Stored	Must be set and less than (0028,0100) Bits Allocated to be viewable in IDS5.
(0028,0102) High Bit	1. If not set, (Bit Stored)-1 is used by IDS5. 2. If set, must be between greater than 0 and less than or equal to Bits Allocated. If not, (Bits Stored)-1 is used by IDS5.
(0028,0103) Pixel Representation	If not set, 0000H (unsigned integer) is assumed by IDS5.
(0028,1050) Window Center	If not set, the default in IDS is half the bit depth.
(0028,1051) Window Width	If not set, the default in IDS5 is the bit depth.
(0028,1052) Rescale Intercept	Is used for calculating Hounsfield units of CT images in IDS5.
(0028,1053) Rescale Slope	Is used for calculating Hounsfield units of CT images in IDS5.
(0028,3000) Modality LUT Sequence	The first LUT in a sequence is used by IDS5, the rest is ignored.

(0028,3002) LUT Descriptor	Must be set if (0028,3000) Modality LUT Sequence is used.
(0028,3006) LUT Data	Must be set if (0028,3000) Modality LUT Sequence is used.
(7FE0,0010) Pixel Data	Must be set.

Appendix B. Key List for Q/R C-FIND Requests

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 15. 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 16. 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 17. SERIES Level

Key	Tag	Type		Comment
		Pat	Study	
Modality	(0008,0060)	R	R	
Body Part Examined	(0018,0015)	O	O	
Series Number	(0020,0011)	R	R	
Series Instance UID	(0020,000E)	U	U	

Table 18. IMAGE Level

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

Appendix C. Sectra Private Attributes

If configured so, the Store SCU AE can include some Private Attributes in images exported from it. This table documents these attributes.

Tag	Name	VR	VM	Description
(0009,00xx)	Private creator code	LO	1	Value: SECTRA_Ident_01
(0009,xx01)	Request number	LO	1	Unique id of request for this image
(0009,xx02)	Examination number	LO	1	Unique id of examination for this image
(0029,00yy)	Private creator code	LO	1	Value: SECTRA_ImageInfo_01
(0029,yy01)	Image info	OB	1	Image settings made on an IDS workstation

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