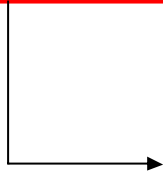


# **HEALTHCARE DICOM Conformance Statement**



## **IMPAX DICOM Services (Release 4.5)**

Document No. 000702, Revision 1.3

## Document Information

<b>Authors</b>	Ron Hitzelberger	Tel: 1 (864) 943-1940 Fax: 1 (864) 943-1018 Email: <a href="mailto:ron.hitzelberger.b@us.agfa.com">ron.hitzelberger.b@us.agfa.com</a>
<b>Editing &amp; Layout</b>	Linda De Wolf	Email: <a href="mailto:linda.dewolf@agfa.com">linda.dewolf@agfa.com</a>
<b>For questions regarding the technical content of this document, please contact:</b>	Europe:	Tel: +32 3 444 8221 Fax: +32 3 444 8211
	USA:	Tel: 1 201 440 2500 x3598
	Japan:	Tel: +81 3 5704 3091 Fax: +81 3 5704 3087

**Issued by:**  
HealthCare  
Glasgow Business Community  
P.O. Box 6020  
640 Technology Drive  
Newark, DE 19714-6020  
USA

Tel: 1 (302) 631-3494  
Fax: 1 (302) 631-3145  
Email: [jim-m.morgan.b@us.agfa.com](mailto:jim-m.morgan.b@us.agfa.com)

Agfa shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this publication. Agfa reserves the right to revise this publication and to make changes to its content at any time, without obligation to notify any person or entity of such revisions and changes. This publication may only be used in connection with the promotion, sales, installation and use of Agfa equipment by Agfa personnel. The information presented herein is sensitive and is classified Company Confidential. Without written authority from the proprietor, further distribution outside the company is not allowed.

**Copyright © May, 05**  
**Healthcare**  
**All rights reserved**

## Table of Contents

---

<b>1</b>	<b>Introduction .....</b>	<b>7</b>
1.1	Intended Audience .....	7
1.1.1	Integration.....	7
1.1.2	Validation .....	7
1.1.3	Future Evolution.....	7
1.2	Purpose of this Document .....	7
1.3	Sources for this Document .....	7
<b>2</b>	<b>Implementation Model.....</b>	<b>8</b>
2.1	Functional Definition of Entities .....	8
2.1.1	Verification.....	9
2.1.2	Modality Worklist Management .....	9
2.1.3	Remote Storage .....	9
2.1.4	Storage Commitment.....	9
2.1.5	Query and Retrieve .....	9
2.1.6	Detached Study Management.....	9
2.1.7	Printing .....	9
<b>3</b>	<b>AE Specifications .....</b>	<b>9</b>
3.1.1	Default Transfer Syntaxes .....	9
3.1.2	Extended Transfer Syntaxes .....	9
3.1.3	Verification as an SCU and SCP .....	10
3.1.4	Modality Worklist Management as an SCU .....	10
3.1.5	Storage as an SCU and SCP .....	10
3.1.5.1	Grayscale Softcopy Presentation State Storage as an SCP .....	11
3.1.5.2	Structured Reporting Storage as an SCU and SCP .....	11
3.1.6	Storage Commitment as an SCU and SCP .....	12
3.1.7	Query/Retrieve as an SCU and SCP .....	12
3.1.8	Detached Study Management as an SCU .....	12
3.1.9	Printing as an SCU.....	12
3.2	Association Establishment Policies .....	13
3.2.1	General.....	13
3.2.2	Number of Associations .....	13

3.2.3	Asynchronous Nature .....	13
3.2.4	Implementation Identifying Information .....	13
3.2.5	Called/Calling Titles .....	13
3.2.6	Association Initiation by Real World Activity .....	13
3.2.6.1	Real World Activity - Verification.....	13
3.2.6.1.1	Associated Real World Activity - Verification.....	13
3.2.6.1.2	Presentation Context Table - Verification .....	13
3.2.6.1.3	SOP Specific Conformance - Verification.....	13
3.2.6.2	Real World Activity - Modality Worklist Management .....	14
3.2.6.2.1	Associated Real World Activity - Modality Worklist Management .....	14
3.2.6.2.2	Presentation Context Table - Modality Worklist Management .....	14
3.2.6.2.3	SOP Specific Conformance - Modality Worklist Management .....	14
3.2.6.3	Real World Activity - Storage .....	14
3.2.6.3.1	Associated Real World Activity - Storage .....	14
3.2.6.3.2	Presentation Context Table - Storage .....	15
3.2.6.3.3	SOP Specific Conformance - Storage .....	15
3.2.6.4	Real World Activity - Storage Commitment .....	15
3.2.6.4.1	Associated Real World Activity - Storage Commitment .....	15
3.2.6.4.2	Presentation Context Table – Storage Commitment .....	15
3.2.6.4.3	SOP Specific Conformance – Storage Commitment .....	15
3.2.6.4.4	Transfer Syntax Selection Policies – Storage Commitment .....	15
3.2.6.5	Real World Activity - Find.....	16
3.2.6.5.1	Associated Real World Activity - Find .....	16
3.2.6.5.2	Presentation Context Table - Find .....	16
3.2.6.5.3	SOP Specific Conformance - Find .....	16
3.2.6.5.4	Presentation Context Acceptance Criterion - Find .....	16
3.2.6.5.5	Transfer Syntax Selection Policies - Find.....	16
3.2.6.5.6	SOP Specific Conformance - Find .....	16
3.2.6.6	Real World Activity - Move.....	17
3.2.6.6.1	Associated Real World Activity - Move .....	17
3.2.6.6.2	Presentation Context Table - Move .....	17
3.2.6.6.3	SOP Specific Conformance - Move .....	17
3.2.6.6.4	Presentation Context Acceptance Criterion - Move .....	17
3.2.6.6.5	Transfer Syntax Selection Policies - Move .....	17
3.2.6.7	Real World Activity - Detached Study Management .....	18
3.2.6.7.1	Associated Real World Activity - Detached Study Management` .....	18
3.2.6.7.2	Presentation Context Table - Detached Study Management .....	18
3.2.6.7.3	SOP Specific Conformance - Detached Study Management .....	18
3.2.6.7.4	Presentation Context Initiate Criterion - Detached Study Management .....	18
3.2.6.7.5	Transfer Syntax Selection Policies - Detached Study Management .....	18
3.2.6.7.6	SOP Specific Conformance - Move .....	18
3.2.6.8	Real World Activity - Printing .....	18
3.2.6.8.1	Associated Real World Activity - Printing .....	19
3.2.6.8.2	Presentation Context Table - Printing .....	19
3.2.6.8.3	SOP Specific Conformance - Printing .....	19
3.2.6.8.3.1	SOP Specific Conformance to Basic Film Session SOP Class.....	19
3.2.6.8.3.2	SOP Specific Conformance to Basic Film Box SOP Class.....	19
3.2.6.8.3.3	SOP Specific Conformance to Basic Grayscale Image Box SOP Class.....	20
3.2.6.8.3.4	SOP Specific Conformance to Basic Color Image Box SOP Class .....	20
3.2.6.8.3.5	SOP Specific Conformance to Basic Annotation Box SOP Class.....	20
3.2.6.8.3.6	SOP Specific Conformance to Printer SOP Class.....	21

3.2.6.8.4	Agfa Printer Type Options .....	21
3.2.6.8.5	Other Printer Type Options.....	22
<b>3.2.7</b>	<b>Association Acceptance Policy .....</b>	<b>23</b>
3.2.7.1	Real World Activity - Verification.....	23
3.2.7.1.1	Associated Real World Activity - Verification.....	23
3.2.7.1.2	Presentation Context Table - Verification .....	23
3.2.7.1.3	SOP Specific Conformance - Verification.....	23
3.2.7.1.4	Presentation Context Acceptance Criterion - Verification .....	23
3.2.7.1.5	Transfer Syntax Selection Policies - Verification.....	23
3.2.7.2	Real World Activity - Storage .....	23
3.2.7.2.1	Associated Real World Activity - Storage .....	23
3.2.7.2.2	Presentation Context Table - Storage .....	24
3.2.7.2.3	SOP Specific Conformance - Storage .....	24
3.2.7.2.4	Presentation Context Acceptance Criterion - Storage .....	24
3.2.7.2.5	Transfer Syntax Selection Policies - Storage .....	24
3.2.7.3	Real World Activity - Storage Commitment .....	25
3.2.7.3.1	Associated Real World Activity - Storage Commitment .....	25
3.2.7.3.2	Presentation Context Table – Storage Commitment .....	25
3.2.7.3.3	SOP Specific Conformance – Storage Commitment .....	25
3.2.7.3.4	Storage Commitment Result.....	25
3.2.7.3.5	Operations – Storage Commitment .....	26
3.2.7.3.6	Transfer Syntax Selection Policies – Storage Commitment .....	26
3.2.7.4	Real World Activity - Find.....	26
3.2.7.4.1	Associated Real World Activity - Find .....	26
3.2.7.4.2	Presentation Context Table - Find .....	26
3.2.7.4.3	SOP Specific Conformance - Find .....	26
3.2.7.4.4	Presentation Context Acceptance Criterion - Find.....	27
3.2.7.4.5	Transfer Syntax Selection Policies - Find.....	27
3.2.7.5	Real World Activity - Move.....	27
3.2.7.5.1	Associated Real World Activity - Move .....	27
3.2.7.5.2	Presentation Context Table - Move .....	27
3.2.7.5.3	SOP Specific Conformance - Move .....	28
3.2.7.5.4	Presentation Context Acceptance Criterion - Move .....	28
3.2.7.5.5	Transfer Syntax Selection Policies - Move .....	28
<b>4</b>	<b>Communications Profiles .....</b>	<b>28</b>
4.1	TCP/IP Stack.....	28
4.1.1	Physical Media Support.....	28
<b>5</b>	<b>Extensions / Specializations / Privatizations.....</b>	<b>28</b>
<b>6</b>	<b>Configuration .....</b>	<b>29</b>
<b>7</b>	<b>Support for Extended Character Sets .....</b>	<b>29</b>
<b>8</b>	<b>Acronyms and Abbreviations .....</b>	<b>29</b>

## Revision Record

---

Revision	Date	Author	Reason for Change
1.0	01 February 2002	Ron Hitzelberger	Updated for R4.5 (Based on Image Vault - Sep 28, 2001 Rev 1.4)
1.1	18 February 2002	Lauren Wasserman	Formatted
1.2	01 March 2002	Ron Hitzelberger	Changes
1.3	02 February 2004	Ron Hitzelberger	Removed SP3/SP4 from Title

# 1 INTRODUCTION

## 1.1 Intended Audience

The user of this document is involved with system integration and/or software design. We assume that the reader is familiar with the terminology and concepts that are used in the DICOM 3.0 standard.

Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement.

Although the use of this conformance statement in conjunction with the DICOM 3.0 standard is intended to facilitate communication with other imaging equipment, it is not sufficient to guarantee, by itself, the inter-operation of the connection. The following issues need to be considered:

### 1.1.1 Integration

The integration of any device into a system of interconnected devices goes beyond the scope of the DICOM 3.0 standard and this conformance statement when *interoperability* is desired. The responsibility for analyzing the applications requirements and developing a solution that integrates the Agfa equipment with other vendors' systems is the user's responsibility and should not be underestimated.

### 1.1.2 Validation

Testing the complete range of possibilities between the Agfa equipment and non-Agfa devices, before the connection is declared operational, is deemed to be a necessity. The user should ensure that any non-Agfa provider accepts full responsibility for all validation required for their connection with the Agfa equipment. The accuracy of image data once it has crossed the interface between the Agfa equipment and the non-Agfa device as well as the stability of the image data for the intended applications is the responsibility of the non-Agfa provider.

### 1.1.3 Future Evolution

As the DICOM 3.0 standard evolves to meet the user's growing requirements and to incorporate new features and technologies, Agfa will follow the evolution of the standard. This evolution of the standard may require changes to devices that have implemented DICOM 3.0. The user should ensure that any non-Agfa provider, who connects with Agfa devices, also plans future evolution of the DICOM standard. A refusal to do so may reflect in the loss of functionality and/or connectivity between the different products.

## 1.2 Purpose of this Document

This document describes the conformance of IMPAX to the ACR-NEMA DICOM (Digital Imaging and Communications in Medicine) standard, and satisfies the DICOM requirement for a vendor conformance specification.

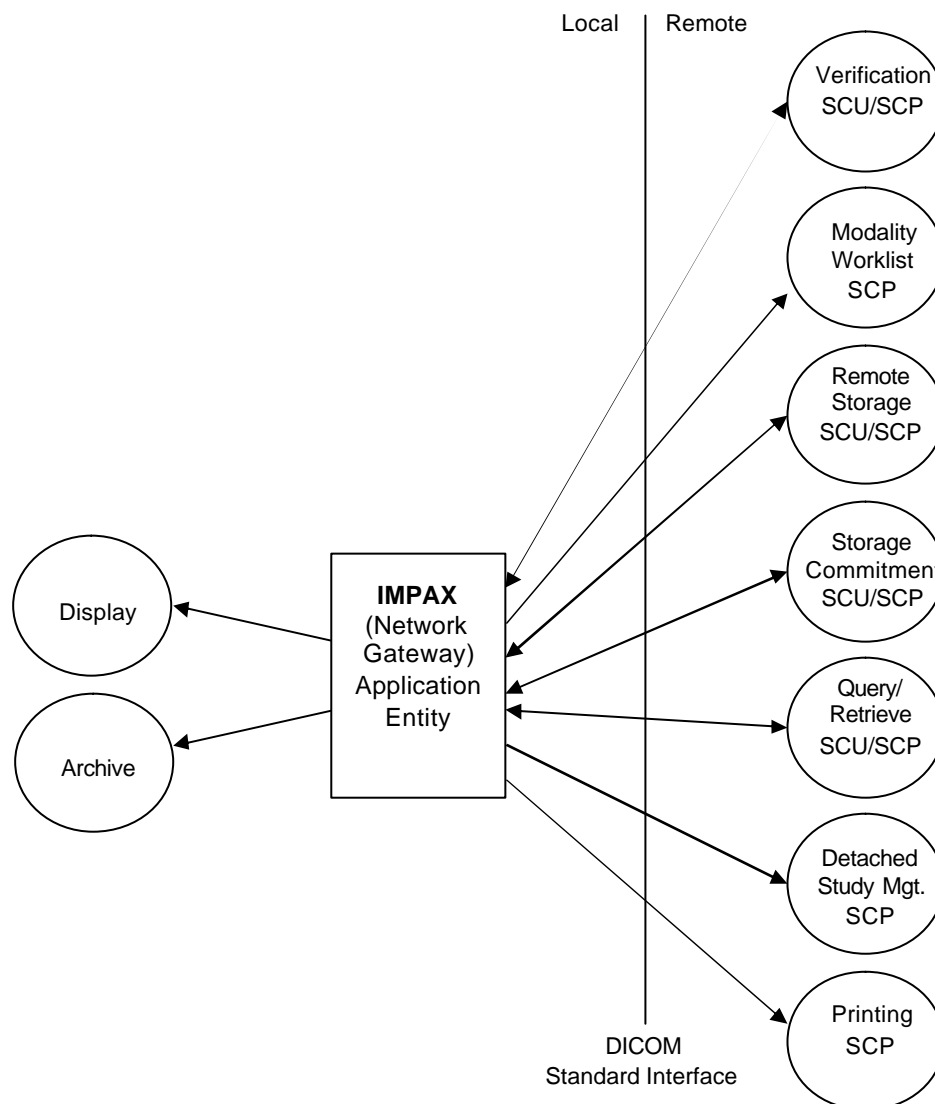
The IMPAX Network Gateway accepts images from modalities and performs verification and routing services. It is the workflow manager of the IMPAX system used for storage, processing, retrieval, printing or otherwise communicating medical image data. The Network Gateway is simply referred to as IMPAX in this document.

## 1.3 Sources for this Document

- > ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) V3.0. Current.

## 2 IMPLEMENTATION MODEL

The following diagram represents the Application Entity present in IMPAX's implementation, and graphically depicts the relationship of the AE's use of DICOM to Real-World Activities.



**Figure 2.1 Application data flow diagram.**

### 2.1 Functional Definition of Entities

As a storage facility, IMPAX is a single application entity that stores images sent to it by service class users, takes responsibility for storage of the images, allows queries based on several standard query models, and retrieves requested images.

IMPAX is able to validate images before they are stored internally by querying a service class provider for demographic information. Images found to be registered with the HIS/RIS are stored, while images not found to be registered are automatically corrected, where possible, or set aside for a technician to correct.

### 2.1.1 Verification

The IMPAX AE supports the C-ECHO DIMSE-C service.

### 2.1.2 Modality Worklist Management

The IMPAX AE acts a Service Class Provider of Modality Worklist Management.

### 2.1.3 Remote Storage

The IMPAX AE stores a received image in its entirety, without change, in its internal data store. IMPAX stores each image with the File Meta Information attached to it. It extracts the query information with respect to the Patient, Study, Series and Image, and stores this information within its internal database.

The IMPAX AE alsoacts as a Service Class User of C-STORE to transmit images to other compatible devices.

### 2.1.4 Storage Commitment

The IMPAX AE acts as a Service Class Provider for Storage Commitment to explicitly take responsibility for storing images received.

### 2.1.5 Query and Retrieve

The IMPAX AE responds to C-FIND queries based on the records stored in its database.

The IMPAX AE acts as a Service Class Provider of C-MOVE to retrieve images. It does so by obtaining a reference from the database then obtaining the image object itself from the data store.

### 2.1.6 Detached Study Management

The IMPAX AE acts as a Service Class User of the Detached Study Management SOP Class.

### 2.1.7 Printing

The IMPAX AE provides for color and grayscale printing to Agfa and selected non-Agfa printers.

## 3 AE SPECIFICATIONS

### 3.1.1 Default Transfer Syntaxes

IMPAX supports the default transfer syntax displayed in Table 3.1.

Transfer Syntax	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

**Table 3.1 Default transfer syntax.**

### 3.1.2 Extended Transfer Syntaxes

IMPAX supports the extended transfer syntaxes displayed in Table 3.2 for the purpose of storage and retrieval.

Transfer Syntax	UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2
RLE Lossless, PackBits	1.2.840.10008.1.2.5
JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50
JPEG Process 2,4, extended lossy (12 bit)	1.2.840.10008.1.2.4.51
JPEG Process 14, lossless	1.2.840.10008.1.2.4.57
JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70

**Table 3.2 Extended transfer syntaxes.**

### 3.1.3 Verification as an SCU and SCP

IMPAX provides Standard Conformance to the following DICOM V3.0 SOP Class as an SCU and SCP.

SOP Class	SOP Class UID
Verification	1.2.840.10008.1.1

**Table 3.3 Verification SOP class.**

### 3.1.4 Modality Worklist Management as an SCU

IMPAX provides Standard Conformance to the following DICOM V3.0 **Worklist Management** SOP Class as an SCU.

SOP Class	SOP Class UID
Modality Worklist Info Model –FIND	1.2.840.10008.5.1.4.31

**Table 3.4 Worklist management SOP classes.**

### 3.1.5 Storage as an SCU and SCP

Table 3.5 lists the SOP Classes that are supported by IMPAX for storage services. In general, IMPAX will be extended to support all image SOP classes recognized by DICOM.

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Image Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Greyscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray RadioFluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Visible Light Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.1
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Visible Light Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.2
Structured Report Text Storage	1.2.840.10008.5.1.4.1.1.88.1
Structured Report Audio Storage	1.2.840.10008.5.1.4.1.1.88.2
Structured Report Detail Storage	1.2.840.10008.5.1.4.1.1.88.3
Structured Report Comprehensive Storage	1.2.840.10008.5.1.4.1.1.88.4
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128

**Table 3.5 Storage SOP Classes.**

### 3.1.5.1 Grayscale Softcopy Presentation State Storage as an SCP

IMPAX provides Standard Conformance to the DICOM V3.0 **Grayscale Softcopy Presentation State** SOP Class as an SCP. The Image Storage SOP Classes in Table 3.6 may be referenced by instances of Grayscale Softcopy Presentation State SOP Class.

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray RadioFluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Visible Light Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.1
Visible Light Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.2
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4

**Table 3.6 GSPS SOP classes.**

### 3.1.5.2 Structured Reporting Storage as an SCU and SCP

IMPAX provides Standard Conformance to the following DICOM V3.0 **Structured Reporting** SOP Class as an SCU and SCP.

The following Image Storage SOP Classes may be referenced by instances of Structured Reporting SOP Class.

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray RadioFluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1

SOP Class	SOP Class UID
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Visible Light Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.1
Visible Light Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.77.2
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4

**Table 3.7 SR SOP classes.**

### 3.1.6 Storage Commitment as an SCU and SCP

IMPAX provides Standard Conformance to the following DICOM V3.0 **Storage Commitment** SOP Class as an SCU and SCP.

SOP Class	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

**Table 3.8 Storage Commitment SOP Class.**

### 3.1.7 Query/Retrieve as an SCU and SCP

IMPAX provides Standard Conformance to the following DICOM V3.0 **Query/Retrieve** SOP Class as an SCU and SCP.

SOP Class	SOP Class UID
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2

**Table 3.9 Query/Retrieve SOP classes.**

### 3.1.8 Detached Study Management as an SCU

IMPAX provides Standard Conformance to the following DICOM V3.0 **Detached Study Management** SOP Class as an SCU.

SOP Class	SOP Class UID
Detached Study Management	1.2.840.10008.3.1.2.3.1

**Table 3.10 Detached study management SOP classes.**

### 3.1.9 Printing as an SCU

IMPAX provides Standard Conformance to the following DICOM V3.0 **Print** SOP Class as an SCU.

SOP Class	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Basic Color Image Box	1.2.840.10008.5.1.1.4.1
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
Basic Annotation Box	1.2.840.10008.5.1.1.15
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18
Presentation LUT	1.2.840.10008.5.1.1.23

**Table 3.11 Print SOP classes.**

## 3.2 Association Establishment Policies

### 3.2.1 General

The following Application Context Name will be proposed and recognized by IMPAX:

- > DICOM 3.0 Application Context: 1.2.840.10008.3.1.1.1

IMPAX contains no limitations for maximum PDU size.

### 3.2.2 Number of Associations

The maximum number of simultaneous associations accepted by IMPAX is configurable at run time, based on the system resources available. By default, the maximum number of associations is set at 32. There is no inherent limit to the number of associations other than limits imposed by the computer operating system.

### 3.2.3 Asynchronous Nature

IMPAX allows a single outstanding operation on any association. Therefore, IMPAX does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

### 3.2.4 Implementation Identifying Information

IMPAX will respond with the following implementation identifying parameters:

- > Implementation Class UID: 1.2.124.113532.1.1
- > Implementation Version Name: MITRA22JAN97

### 3.2.5 Called/Calling Titles

The default calling title that IMPAX will use is the host name of the computer. This parameter can be configured via the GUI. IMPAX is configured to validate the Called Title of the requesting SCU during association negotiation.

### 3.2.6 Association Initiation by Real World Activity

#### 3.2.6.1 Real World Activity - Verification

##### 3.2.6.1.1 Associated Real World Activity - Verification

IMPAX will issue Verification requests in response to UI mediated requests from the user to test the validity of the DICOM connection.

##### 3.2.6.1.2 Presentation Context Table - Verification

IMPAX requests the presentation contexts listed in Table 3.12.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.3	All Table 3.1	SCU	None

*Table 3.12 Presentation contexts.*

##### 3.2.6.1.3 SOP Specific Conformance - Verification

IMPAX provides standard conformance to the DICOM Verification Service Class.

### 3.2.6.2 Real World Activity - Modality Worklist Management

#### 3.2.6.2.1 Associated Real World Activity - Modality Worklist Management

IMPAX will receive unsolicited Study-Scheduled NEVENT-Reports. IMPAX will then request DIMSE-C Modality Worklist - FINDs.

#### 3.2.6.2.2 Presentation Context Table - Modality Worklist Management

IMPAX requests any of the Presentation Contexts listed in Table 3.13 for Modality Worklist Management.

SOP Class	Transfer Syntax	Role	Extended Negotiation
Table 3.4	Table 3.1	SCU	None

**Table 3.13 Presentation contexts.**

#### 3.2.6.2.3 SOP Specific Conformance - Modality Worklist Management

IMPAX provides standard conformance to the DICOM Basic **Worklist Management** Service Class.

IMPAX supports all required matching key types:

Matching Key Types	
SV	Single valued match
WC	Wild card match
SQ	Sequence match
DR	Date range match

**Table 3.14 Matching Key Types.**

IMPAX uses the following elements for this SOP class:

Module	Attribute Name	Tag	Match	Return
SOP Common	Specific Character Set	(0008,0005)		1C
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	SQ	1
	>Scheduled Station AE Title	(0040,0001)	SV	1
	>Scheduled Procedure Step Start Date	(0040,0002)	DR	1
	>Scheduled Procedure Step Start Time	(0040,0003)	DR	1
	>Modality	(0008,0060)	SV	1
Requested Procedure	Requested Procedure ID	(0040,1001)		1
	Requested Procedure Description	(0032,1060)		1C
	Study Instance UID	(0020,000D)	SV	1
	Referenced Study Sequence	(0008,1110)		2
	>Referenced SOP Class UID	(0008,1150)		1C
Imaging Service Request	>Referenced SOP Instance UID	(0008,1155)		1C
	Accession Number	(0008,0050)	SV	2
	Referring Physician's Name	(0008,0090)		2
Patient Identification	Reason for Imaging Service Request	(0040,2001)		3
	Patient Name	(0010,0010)	WC	1
Patient Demographic	Patient ID	(0010,0020)	SV	1
	Patient Birth Date	(0010,0030)		2
	Patient Sex	(0010,0040)		2

**Table 3.15 Modality worklist information model attributes.**

### 3.2.6.3 Real World Activity - Storage

#### 3.2.6.3.1 Associated Real World Activity - Storage

IMPAX will transmit images that have been sent to it previously, driven by user requests.

### 3.2.6.3.2 Presentation Context Table - Storage

IMPAX may request any of the Presentation Contexts listed in Table 3.16 for Storage.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.	All Table 3.2	SCU	None

**Table 3.16 Presentation contexts for storage.**

### 3.2.6.3.3 SOP Specific Conformance - Storage

IMPAX conforms to the DICOM **Storage** Service Class as an SCU.

### 3.2.6.4 Real World Activity - Storage Commitment

#### 3.2.6.4.1 Associated Real World Activity - Storage Commitment

IMPAX stores images that are sent to it from an SCU. In some configurations (e.g. cache-only), IMPAX may send images to another SCP (e.g. a PACS) for permanent storage. The request for storage commitment may then be transmitted from IMPAX together with a list of references to one or more SOP instances. This action is invoked through the DIMSE N-ACTION primitive. The following message is supported:

- > Request Storage Commitment - to request the safekeeping of a set of SOP instances.

#### 3.2.6.4.2 Presentation Context Table – Storage Commitment

IMPAX requests the presentation contexts listed in Table 3.17.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.8	All Table 3.1	SCU	None

**Table 3.17 Presentation contexts.**

#### 3.2.6.4.3 SOP Specific Conformance – Storage Commitment

IMPAX provides standard conformance to the DICOM **Storage Commitment** Service Class.

IMPAX supports the following elements for this SOP class as an SCU. The Transaction UID Attribute (0008,1195) value generated by IMPAX uniquely identifies each Storage Commitment Request.

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

**Table 3.18 Storage commitment request – action information.**

Subsequently, IMPAX expects N-EVENT-REPORT from the SCP. IMPAX returns an N-EVENT-REPORT response primitive with one of the following status codes:

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000		Successful notification.

**Table 3.19 Storage commitment status codes.**

#### 3.2.6.4.4 Transfer Syntax Selection Policies – Storage Commitment

IMPAX supports the Little Endian Implicit Transfer Syntax.

### 3.2.6.5 Real World Activity - Find

#### 3.2.6.5.1 Associated Real World Activity - Find

IMPAX will negotiate requests to an SCP.

#### 3.2.6.5.2 Presentation Context Table - Find

IMPAX will initiate any of the Presentation Contexts listed in Table 3.20 for Query.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.9 Find	All Table 3.1	SCU	See NOTE below

**Table 3.20 Presentation contexts.**

#### **NOTE:**

C-Find Extended Negotiation will be supported. IMPAX will respond with the information in Table 3.21.

Field Name	Value	Description of Field
Relational-queries	1	Relational queries supported

**Table 3.21 Find extended negotiation.**

#### 3.2.6.5.3 SOP Specific Conformance - Find

SOP classes of the **Query/Retrieve** Service Class are implemented via the DIMSE **C-FIND** and **C-MOVE** services as defined in Part 7 of the DICOM standard.

#### 3.2.6.5.4 Presentation Context Acceptance Criterion - Find

IMPAX will initiate one **Find** Presentation Context per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

#### 3.2.6.5.5 Transfer Syntax Selection Policies - Find

IMPAX supports the default transfer syntax of Implicit Little Endian.

#### 3.2.6.5.6 SOP Specific Conformance - Find

IMPAX may request any mandatory search keys during a relational query.

The following four tables describe the search keys for the four levels of query that IMPAX requests.

Description	Tag
Patient Name	(0x0010,0x0010)
Patient ID	(0x0010,0x0020)

**Table 3.22 Patient level attributes.**

Description	Tag
Study Instance UID	(0x0020,0x000D)
Study ID	(0x0020,0x0010)
Study Date	(0x0008,0x0020)
Study Time	(0x0008,0x0010)
Accession Number	(0x0008,0x0050)

**Table 3.23 Study level attributes.**

Description	Tag
Series Instance UID	(0x0020,0x000E)
Series Number	(0x0020,0x0011)
Modality	(0x0008,0x0060)
Station Name	(0x0008,0x1010)

**Table 3.24 Series level attributes.**

Description	Tag
SOP Instance UID	(0x0008,0x0018)
Image Number	(0x0020,0x0013)

**Table 3.25 Image level attributes.**

- > IMPAX automatically adds a wildcard "\*" to matching keys with a VR of PN. The user is not required to add one manually.
- > The following matching keys are available from the User Interface within IMPAX during a relational query: Patient\_id, patient\_name, accession\_number, patient\_location, referring physician, and modality.
- > A number of predefined time constraints are available in the User Interface. These include LAST 2 DAYS, LAST 7 DAYS, LAST 21 DAYS, etc. The ranges defined include the current day PLUS the LAST 2 DAYS, etc.
- > No matching keys are available during a hierarchical query.
- > Within the application, the exact Patient ID has to be entered in the Patient\_id field.
- > Within the application, IMPAX also has a facility to carryout extensive custom queries. These are not DICOM queries and are to be used only when querying within the cluster.

### 3.2.6.6 Real World Activity - Move

#### 3.2.6.6.1 Associated Real World Activity - Move

IMPAX will initiate retrieve requests to an SCP.

#### 3.2.6.6.2 Presentation Context Table - Move

IMPAX will initiate any of the Presentation Contexts listed in Table 3.26 for Move.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.9 Move	Table 3.1	SCU	None

**Table 3.26 Presentation contexts.**

#### 3.2.6.6.3 SOP Specific Conformance - Move

IMPAX will try to establish an association with the move destination specified in the **Move** request. One or more of the Presentation Contexts listed in the **Store** section of this document may be negotiated in this association.

#### 3.2.6.6.4 Presentation Context Acceptance Criterion - Move

IMPAX will accept any number of **Move** Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

#### 3.2.6.6.5 Transfer Syntax Selection Policies - Move

IMPAX supports the default transfer syntax of Implicit Little Endian.

### 3.2.6.7 Real World Activity - Detached Study Management

#### 3.2.6.7.1 Associated Real World Activity - Detached Study Management

IMPAX will receive DIMSE N-EVENT-REPORT. The following message is supported:

- > Study Scheduled - to signal that the study has been scheduled to occur.

#### 3.2.6.7.2 Presentation Context Table - Detached Study Management

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.10	All Table 3.1	SCU	None

*Table 3.27 Presentation contexts.*

#### 3.2.6.7.3 SOP Specific Conformance - Detached Study Management

IMPAX provides standard conformance to the DICOM **Detached Study Management** Service Class.

IMPAX supports the following elements for this SOP class:

Event Type Name	Attribute Name	Tag
Study Scheduled	Specific Character Set	(0008,0005)
	Referenced Patient Sequence	(0008,1120)
	>Referenced SOP Class UID	(0008,1150)
	>Referenced SOP Instance UID	(0008,1155)
	Referenced Visit Sequence	(0008,1125)
	>Referenced SOP Class UID	(0008,1150)
	>Referenced SOP Instance UID	(0008,1155)
	Scheduled Study Start Date	(0032,1000)
	Scheduled Study Start Time	(0032,1001)
	Scheduled Study Location	(0032,1020)
	Requested Procedure Description	(0032,1060)
	Requested Procedure Code Sequence	(0032,1064)
	>Code Value	(0008,0100)
	>Coding Scheme Designator	(0008,0102)
>Code Meaning	(0008,0104)	

*Table 3.28 Detached study management object N-Event-report attributes.*

IMPAX returns one of the following status codes:

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000		Operation performed properly.

*Table 3.29 Detached study management status codes.*

#### 3.2.6.7.4 Presentation Context Initiate Criterion - Detached Study Management

IMPAX will always issue a Presentation Context for the Detached Study Management SOP Class.

#### 3.2.6.7.5 Transfer Syntax Selection Policies - Detached Study Management

IMPAX supports only the Little Endian Implicit Transfer Syntax.

#### 3.2.6.7.6 SOP Specific Conformance - Move

IMPAX provides standard conformance as an SCU.

#### 3.2.6.8 Real World Activity - Printing

IMPAX provides standard conformance as an SCU.

### 3.2.6.8.1 Associated Real World Activity - Printing

IMPAX issues print requests based on user interface mediated requests.

### 3.2.6.8.2 Presentation Context Table - Printing

IMPAX may request any of the Presentation Contexts listed in Table 3.30.

SOP Class	Transfer Syntax	Role	Extended Negotiation
Table 3.11	Table 3.1	SCU	None

**Table 3.30 Presentation contexts.**

### 3.2.6.8.3 SOP Specific Conformance - Printing

IMPAX provides standard conformance to the DICOM Print Service Classes by supporting a number of distinct Service classes described below.

#### 3.2.6.8.3.1 SOP Specific Conformance to Basic Film Session SOP Class

IMPAX requests the following attributes of the Basic Film Session SOP Class. Values and ranges are configured to match the capabilities of the printer, and the preferences of the particular user.

Attribute Name	Tag	Possible Values
Number of copies	(2000,0010)	1 – 99
Print Priority	(2000,0020)	MED
Medium Type	(2000,0030)	BLUE FILM, CLEAR FILM, PAPER (See Table 3.37and Table 3.38)
Film Destination	(2000,0040)	MAGAZINE, PROCESSOR, BIN i <sup>1</sup> (See Table 3.37and Table 3.38)
Film Session Label	(2000,0050)	Always blank

**Table 3.31 Attributes for a Basic Film Session.**

#### 3.2.6.8.3.2 SOP Specific Conformance to Basic Film Box SOP Class

IMPAX requests the following attributes of the Basic Film Box SOP Class. Values and ranges are configured to match the capabilities of the printer, and the preferences of the particular user. When images are positioned on a film box with empty boxes in between the images, IMPAX will ignore these empty film boxes and print them immediately beside one another.

Attribute name	Tag	Possible Values
Image Display Format	(2010,0010)	STANDARD\C,R, <sup>2</sup> SLIDE, SUPERSLIDE (See Table 3.37and Table 3.38)
Referenced Film Session Sequence	(2010,0500)	
Referenced Basic Image Box Sequence	(2010,0510)	
Film Orientation	(2010,0040)	LANDSCAPE, PORTRAIT
Film Size ID	(2010,0050)	See Table 3.37and Table 3.38
Magnification Type	(2010,0060)	See Table 3.37and Table 3.38
Max Density	(2010,0130)	See Table 3.37and Table 3.38
Configuration Information	(2010,0150)	CS_TABLE=NN\PERCEPTION_LUT=XXX <sup>3</sup>
Annotation Display Format ID	(2010,0030)	ANNOTATION
Border Density	(2010,0100)	See Table 3.37and Table 3.38
Empty Image Display	(2010,0110)	See Table 3.37and Table 3.38
Min. Density	(2010,0120)	See Table 3.37and Table 3.38
Trim	(2010,0140)	YES, NO

**Table 3.32 Attributes for a Basic Film Box.**

<sup>1</sup> Represents the bin number. It may have values 1 – 30 (see Table 3.38).

<sup>2</sup> Film contains equal size rectangular image boxes with R rows of image boxes and C columns of image boxes. R and C are integers.

<sup>3</sup> NN represents the color separation table value; XXX represents the Look Up Table value. NN and XXX are integers. Please refer to Table 3.37 and Table 3.38 for acceptable values.

### 3.2.6.8.3.3 SOP Specific Conformance to Basic Grayscale Image Box SOP Class

The following attributes are requested. Values and ranges depend on the characteristics of the images stored in IMPAX.

Attribute name	Tag	Possible Values
Image Position	(2020,0010)	1,2,...
Preformatted Grayscale Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	
>Photometric Interpretation	(0028,0004)	MONOCHROME1, MONOCHROME2
>Rows	(0028,0010)	>0
>Columns	(0028,0011)	>0
>Pixel Aspect Ratio	(0028,0034)	1
>Bits Allocated	(0028,0100)	8, 16
>Bits Stored	(0028,0101)	8, 12
>High Bit	(0028,0102)	7, 11
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	
Polarity	(2020,0020)	REVERSE, NORMAL
Requested Image Size	(2020,0030)	Length in mm of image rows
Magnification Type	(2010,0060)	See Table 3.37and Table 3.38
Smoothing Type	(2010,0080)	See Table 3.37and Table 3.38

**Table 3.33 Attributes for a Basic Grayscale Image Box.**

### 3.2.6.8.3.4 SOP Specific Conformance to Basic Color Image Box SOP Class

The following attributes are requested. Values and ranges depend on the characteristics of the images stored in IMPAX.

Attribute name	Tag	Possible Values
Image Position	(2020,0010)	1,2,...
Preformatted Color Image Sequence	(2020,0111)	
>Samples Per Pixel	(0028,0002)	
>Photometric Interpretation	(0028,0004)	PALETTE COLOR, RGB, YBR_FULL, YBR_FULL_422
>Planar Configuration	(0028,0006)	
>Rows	(0028,0010)	>0
>Columns	(0028,0011)	>0
>Pixel Aspect Ratio	(0028,0034)	
>Bits Allocated	(0028,0100)	8, 16
>Bits Stored	(0028,0101)	8, 12
>High Bit	(0028,0102)	7, 11
>Pixel Representation	(0028,0103)	0
>Pixel Data	(7FE0,0010)	
Polarity	(2020,0020)	REVERSE, NORMAL
Requested Image Size	(2020,0030)	Length in mm of image rows
Magnification Type	(2010,0060)	See Table 3.37and Table 3.38
Smoothing Type	(2010,0080)	See Table 3.37and Table 3.38

**Table 3.34 Attributes for a Basic Color Image Box.**

### 3.2.6.8.3.5 SOP Specific Conformance to Basic Annotation Box SOP Class

The following attributes are requested.

Attribute Name	Tag	Possible Values
Annotation Position	(2030,0010)	
Text String	(2030,0020)	

**Table 3.35 Attributes for an Annotation Box.**

### 3.2.6.8.3.6 SOP Specific Conformance to Printer SOP Class

The following attributes are requested.

Attribute Name	Tag	Possible Values
Printer Status	(2010,0010)	NORMAL, WARNING, FAILURE
Printer Status Info	(2110,0020)	Additional info when Printer Status is WARNING or FAILURE
Printer Name	(2110,0030)	User defined name identifying the printer.
Manufacturer	(0008,0070)	Manufacturer's model number of the printer
Manufacturer Model Name	(0008,1090)	Manufacturer's model number of the printer

Table 3.36 Attributes for Printer SOP Class.

### 3.2.6.8.4 Agfa Printer Type Options

The following attributes are configurable for Agfa printer types.

Agfa Printer Type	LR3300 / LR5200	DRYSTAR 2000	DRYSTAR 3000	DRYSTAR 4500	SI100 / SI400
<b>Media</b>	Any 8x10" Any 11x14" Any 14x14" Any 14x17" Blue Film 8x10" Blue Film 11x14" Blue Film 14x14" Blue Film 14x17" Clear Film 8x10" Clear Film 11x14" Clear Film 14x14" Clear Film 14x17"	Any 8x10" Blue Film 8x10" Clear Film 8x10" Paper 8x10"	Any 11x14" Any 14x14" Any 14x17" Blue Film 11x14" Blue Film 14x14" Blue Film 14x17" Clear Film 11x14" Clear Film 14x14" Clear Film 14x17" Paper 11x14" Paper 14x14" Paper 14x17"	Any 8x10" Any 10x12" Blue Film 8x10" Blue Film 10x12" Clear Film 8x10" Clear Film 10x12" Paper 8x10" Paper 10x12"	Blue Film 8x10" Blue Film 10x12" Blue Film 11x14" Blue Film 14x17" Clear Film 8x10" Clear Film 10x12" Clear Film 11x14" Clear Film 14x17" Paper A4 Paper B Paper A
<b>Magnification / Smoothing / Min Value / Max Value / Default Value</b>	Bilinear/None/0/0/0 Cubic/Sharp/100/299/140 Cubic/Smooth/0/0/0 Replicate/None/0/0/0				Bilinear/Smooth/0/0/0 Cubic/Normal/0/0/0 None/None/0/0/0 Replicate/Sharp/0/0/0
<b>Destination</b>	Magazine Processor	Processor			Magazine Processor
<b>Taste LUT</b>	75 – 220 Kanamori Linear	75 – 220 Kanamori Linear	75 – 220 Kanamori Linear	75 – 220 Kanamori Linear GSDF	75 – 220 Kanamori Linear
<b>Format</b>	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\5,5 STANDARD\5,6 STANDARD\6,4 STANDARD\6,5	SLIDE STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\5,6 SUPERSLIDE	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\5,5 STANDARD\5,6 STANDARD\6,4 STANDARD\6,5	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\5,5 STANDARD\5,6 STANDARD\6,4 STANDARD\6,5	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6
<b>Printable Area</b>	Landscape; Portrait				
<b>Density; Border Density; Empty Image Density Ranges</b>	10 – 350				0 - 3

Table 3.37 Agfa Printer Options



### 3.2.6.8.5 Other Printer Type Options

The following attributes are configurable for non-Agfa printer types.

Other Printers	FN-PS551	IMATION	KODAKCP	LaserShare	SONY 8800
<b>Media</b>	Blue Film 8x10" Blue Film 11x14" Blue Film 14x14" Blue Film 14x17" Clear Film 8x10" Clear Film 11x14" Clear Film 14x14" Clear Film 14x17"	Blue Film 8x10" Blue Film 11x14" Blue Film 14x17" Clear Film 8x10" Clear Film 11x14" Clear Film 14x17"	Blue Film 8x10" Blue Film 11x14" Blue Film 14x14" Blue Film 14x17" Clear Film 8x10" Clear Film 11x14" Clear Film 14x14" Clear Film 14x17"	Blue Film 8x10" Blue Film 11x14" Blue Film 14x14" Blue Film 14x17" Clear Film 8x10" Clear Film 11x14" Clear Film 14x14" Clear Film 14x17" Paper Film 8x10" Paper Film 11x14" Paper Film 14x14" Paper Film 14x17"	Clear Film Letter Clear Film A4 Paper Letter Paper A4
<b>Magnification/ Smoothing/ Min/ Max/ Default</b>	Cubic/Medium/0/300/14 Cubic/Sharp/0/300/140 Cubic/Smooth/0/300/140 None/Medium/0/300/140 None/Sharp/0/300/140 None/Smooth/0/300/140	Bilinear/None/0/0/0 Cubic/Sharp/1/15/1 Replicate/None/0/0/0	Bilinear/None/0/0/0 Cubic/Normal/0/0/0 Replicate/None/0/0/0	Bilinear/None/0/300/0 Cubic/None/0/300/0 None/None/0/300/0	Bilinear/None/0/0/0 None/None/0/0/0 Replicate/None/0/0/0
<b>Destination</b>	BIN_1 - BIN_30 Proc.	Magazine Proc.	Not Used	Magazine Proc.	Processor
<b>Taste LUT</b>	1 - 8	0,0 - 0,15	0,1,2,3,4,5,6	0 Linear	Kanamori; Linear; OEM001; OEM002; OEM003; OEM004; OEM101; OEM102
<b>Format</b>	ROW1,2 ROW1,3,3 ROW2,3 ROW2,4,4 ROW3,2 ROW3,3,2 ROW3,3,3,2 ROW4,4,2 ROW4,4,2,2 ROW4,4,4,2 ROW4,4,4,4,2 STANDARD\1,1 STANDARD\1,2 STANDARD\1,3 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\2,4 STANDARD\3,1 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,2 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\6,4	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\5,4	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\2,4 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,2 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,3 STANDARD\5,4 STANDARD\5,6 STANDARD\5,7 STANDARD\6,4 STANDARD\6,5 STANDARD\7,5	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\5,3 STANDARD\5,4 STANDARD\5,5 STANDARD\5,6 STANDARD\6,4 STANDARD\6,5	STANDARD\1,1 STANDARD\1,2 STANDARD\1,3 STANDARD\1,4 STANDARD\1,5 STANDARD\1,6 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\2,4 STANDARD\2,5 STANDARD\2,6 STANDARD\3,1 STANDARD\3,2 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\3,6 STANDARD\4,1 STANDARD\4,2 STANDARD\4,3 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,1 STANDARD\5,2 STANDARD\5,3 STANDARD\5,4 STANDARD\5,5 STANDARD\5,6 STANDARD\6,1 STANDARD\6,2 STANDARD\6,3 STANDARD\6,4 STANDARD\6,5 STANDARD\6,6
<b>Printable Area</b>	Landscape, Portrait				

Density; Border Density; Empty Image Density Range	0 - 300	0 - 320	0 - 399	10 - 350	0 - 400
--	---------	---------	---------	----------	---------

**Table 3.38 Other OEM Printer Options.**

### 3.2.7 Association Acceptance Policy

#### 3.2.7.1 Real World Activity - Verification

##### 3.2.7.1.1 Associated Real World Activity - Verification

IMPAX will respond to **Verification** requests to provide an SCU with the ability to determine if IMPAX is receiving DICOM requests.

##### 3.2.7.1.2 Presentation Context Table - Verification

IMPAX will accept any of the Presentation Contexts listed in Table 3.39 for Verification.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.3	All Table 3.1	SCP	None

**Table 3.39 Presentation contexts.**

##### 3.2.7.1.3 SOP Specific Conformance - Verification

IMPAX provides standard conformance to the DICOM **Verification** Service Class. IMPAX returns one of the following status codes:

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Success	Success	0000		Operation performed properly.

**Table 3.40 Verification status codes.**

##### 3.2.7.1.4 Presentation Context Acceptance Criterion - Verification

IMPAX will always accept a Presentation Context for the Verification SOP Class with the default DICOM transfer syntax listed in Table 3.1.

##### 3.2.7.1.5 Transfer Syntax Selection Policies - Verification

Since no DICOM data object is associated with a **Verification** command, only the default DICOM transfer syntax is required/supported.

### 3.2.7.2 Real World Activity - Storage

#### 3.2.7.2.1 Associated Real World Activity - Storage

IMPAX will store images that are sent to it from an SCU. All images received by IMPAX can be retrieved at a later time from IMPAX; however, the rate of return of the images will vary depending the state of the images. The images can be in one of three states:

- > Online: The image is immediately available.
- > Nearline: The image is automatically available; however, there may be a small delay in the retrieval time.
- > Offline: The image requires manual assistance to become online. The retrieval request will return a failure code.

### 3.2.7.2.2 Presentation Context Table - Storage

IMPAX will accept any of the Presentation Contexts listed in Table 3.41 for Storage.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All from Table 3.	Table 3.2	SCP	See NOTE below

**Table 3.41 Presentation contexts.**

#### NOTE:

Storage Extended Negotiation will be supported. IMPAX will respond with the information in Table 3.42.

Field Name	Value	Description of Field
Level of Support	2	Level 2 (FULL) SCP
Element Coercion	0	Does not coerce any element

**Table 3.42 Storage extended negotiation.**

### 3.2.7.2.3 SOP Specific Conformance - Storage

IMPAX conforms to the DICOM **Storage** Service Class at Level 2 (Full). No elements are discarded or coerced by IMPAX. In the event of a successful **C-STORE** operation, the image has been written to internal storage, and can be retrieved at any later time.

IMPAX returns one of the following status codes:

Service Status	Further Meaning	Protocol Codes	Description
Refused	Out of resources	A700	Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions.
	SOP Class not supported	A800	Indicates that the SOP Class of the Image in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context.
Error	Data set does not match SOP Class	A900	Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Failed	C000	The operation was not successful.
	Unable to register object, study locked; no new objects allowed	C005	Indicates that no new objects can be added to this study because it has been locked.
	Cannot understand	C005	Indicates that the Data Set cannot be parsed into elements.
Warning	Data set does not match SOP Class	B007	Indicates that the Data Set does not match the SOP Class, but that the image was stored anyway.
	Duplicate SOP Instance UID	D000	Indicates that the SOP Instance UID of the specified image is already stored in the database.
Success	Success	0000	Operation performed properly.

**Table 3.43 C-STORE status codes.**

### 3.2.7.2.4 Presentation Context Acceptance Criterion - Storage

IMPAX will accept any number of **Storage** Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

### 3.2.7.2.5 Transfer Syntax Selection Policies - Storage

IMPAX supports all transfer syntaxes listed in Table 3.2. By default, IMPAX sends the IOD using the transfer syntax that was used when the image was originally stored.

If the C-STORE SCP supports a limited number of Transfer Syntaxes, IMPAX can be configured on a per-destination basis to convert the IOD from the original transfer syntax to Implicit Little Endian.

### 3.2.7.3 Real World Activity - Storage Commitment

#### 3.2.7.3.1 Associated Real World Activity - Storage Commitment

IMPAX stores images that are sent to it from an SCU. The request for storage commitment may then be transmitted to IMPAX together with a list of references to one or more SOP instances. IMPAX will receive and respond to DIMSE N-ACTION. The following message is supported:

- > Request Storage Commitment - to request the safekeeping of a set of SOP instances.

#### 3.2.7.3.2 Presentation Context Table – Storage Commitment

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.8	All Table 3.1	SCP	None

*Table 3.44 Presentation contexts.*

#### 3.2.7.3.3 SOP Specific Conformance – Storage Commitment

IMPAX supports the following elements for this SOP class as an SCP:

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

*Table 3.45 Storage commitment request – action information.*

#### 3.2.7.3.4 Storage Commitment Result

If IMPAX determines that it has successfully completed storage commitment, IMPAX issues an N-EVENT-REPORT to the SCU including references to the successfully stored SOP Instances contained in the N-ACTION.

In the event that IMPAX cannot commit to storing SOP Instances, IMPAX issues an N-EVENT-REPORT to the SCU including references to the failed SOP Instances contained in the N-ACTION.

The N-EVENT-REPORT contains the Transaction UID value contained in the initiating N-ACTION. The N-EVENT-REPORT is sent on a separate association from the N-ACTION operation.

IMPAX supports the Event Information as specified in Table 3.46.

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
Storage Commitment Request Complete – Failure Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
>Failure Reason	(0008,1197)		

*Table 3.46 Storage commitment result – event information.*

### 3.2.7.3.5 Operations – Storage Commitment

If configured with off-line storage, IMPAX commits to permanently storing a SOP Instance, unless it is manually deleted from IMPAX. Off-line storage capacity varies based on an individual IMPAX's configuration.

In a cache-only configuration, IMPAX commits to storing a SOP Instance as long as there is available disk space. In this configuration, IMPAX may delete SOP Instances based on a user request or based on autopilot cache management rules.

SOP Instances can be retrieved from IMPAX via C-FIND (see Section 3.2.7.4) and C-MOVE (see Section 3.2.7.5).

### 3.2.7.3.6 Transfer Syntax Selection Policies – Storage Commitment

IMPAX supports only the Little Endian Implicit Transfer Syntax.

### 3.2.7.4 Real World Activity - Find

#### 3.2.7.4.1 Associated Real World Activity - Find

IMPAX will respond to query requests that are sent to it from an SCU.

#### 3.2.7.4.2 Presentation Context Table - Find

IMPAX will accept any of the Presentation Contexts listed in Table 3.47 for Query.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.9 Find	All Table 3.1	SCP	See NOTE below

**Table 3.47 Presentation contexts.**

#### **NOTE:**

C-Find Extended Negotiation will be supported. IMPAX will respond with the information in Table 3.48.

Field Name	Value	Description of Field
Relational-queries	1	Relational queries supported

**Table 3.48 Find extended negotiation.**

### 3.2.7.4.3 SOP Specific Conformance - Find

SOP classes of the **Query/Retrieve** Service Class are implemented via the DIMSE **C-FIND** and **C-MOVE** services as defined in Part 7 of the DICOM standard.

IMPAX supports hierarchical queries. IMPAX supports relational queries. IMPAX, by default, supports all mandatory search keys.

Description	Tag
Patient Name	(0x0010, 0x0010)
Patient ID	(0x0010, 0x0020)

**Table 3.49 Patient level attributes.**

Description	Tag
Study Instance UID	(0x0020, 0x000D)
Study ID	(0x0020, 0x0010)
Study Date	(0x0008, 0x0020)
Study Time	(0x0008, 0x0010)
Accession Number	(0x0008, 0x0050)
Station Name	(0x0008, 0x1010)
Study Description	(0x0008, 0x1030)

**Table 3.50 Study level attributes.**

Description	Tag
Series Instance UID	(0x0020, 0x000E)
Series Number	(0x0020, 0x0011)
Modality	(0x0008, 0x0060)
Series Description	(0x0008, 0x103e)

**Table 3.51 Series level attributes.**

Description	Tag
SOP Instance UID	(0x0008, 0x0018)
Image Number	(0x0020, 0x0013)

**Table 3.52 Image level attributes.**

IMPAX returns one of the following status codes to a C-FIND request:

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Refused	Out of Resources	A700		
Failed	Identifier does not match SOP Class	A900		The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C001		For some reason (database off-line?) we cannot process this request at this time.
Cancel	Matching terminated due to Cancel Request	FE00		The original requester canceled this operation.
Pending	Pending	FF00		All Optional Keys are supported in the same manner as Required Keys.
	Pending	FF01		The matching operation is continuing. Warning that one or more Optional Keys were not supported in the same manner as Required Keys.
Success	Success	0000		Operation performed properly.

**Table 3.53 C-FIND status codes.**

#### 3.2.7.4.4 Presentation Context Acceptance Criterion - Find

IMPAX will accept any number of **Find** Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

#### 3.2.7.4.5 Transfer Syntax Selection Policies - Find

IMPAX currently only supports the default transfer syntax of Implicit Little Endian.

#### 3.2.7.5 Real World Activity - Move

##### 3.2.7.5.1 Associated Real World Activity - Move

IMPAX will respond to retrieve requests that are sent to it from an SCU.

##### 3.2.7.5.2 Presentation Context Table - Move

IMPAX will accept any of the Presentation Contexts listed in Table 3.54 for Query.

SOP Class	Transfer Syntax	Role	Extended Negotiation
All Table 3.9 Move	Table 3.1	SCP	None

**Table 3.54 Presentation contexts.**

### 3.2.7.5.3 SOP Specific Conformance - Move

IMPAX will try to establish an association with the Move destination specified in the **Move** request. One or more of the Presentation Contexts listed in the **Store** section of this document (refer to Section 3.2.6.3.2), may be negotiated in this association.

IMPAX returns one of the following status codes to a C-MOVE request:

Service Status	Further Meaning	Protocol Codes	Description
Refused	Out of Resources	A701	Unable to calculate number of matches.
	Out of Resources	A702	Unable to perform storage of images to move destination.
Failed	Move destination unknown	A801	The destination of this move request is unknown.
	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to process	C002	Indicates that IMPAX cannot process this request at this time.
Cancel	Storage terminated due to Cancel Request	FE00	The original requester canceled this operation.
Warning	Warning	B000	Storage complete with one or more failures.
Pending	Pending	FF00	The storage operation is continuing.
	Pending for a long time	FF02	This operation is expected to require a long period of time to complete. The SCU may break the association at any time, but the operation will continue to completion.
Success	Success	0000	Operation performed properly.

*Table 3.55 C-MOVE status codes.*

### 3.2.7.5.4 Presentation Context Acceptance Criterion - Move

IMPAX will accept any number of **Move** Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

### 3.2.7.5.5 Transfer Syntax Selection Policies - Move

By default, IMPAX sends the IOD using the transfer syntax that was used when the image was originally stored.

If the C-MOVE destination supports a limited number of Transfer Syntaxes, IMPAX can be configured on a per-destination basis to convert the IOD from the original transfer syntax to Implicit Little Endian.

## 4 COMMUNICATIONS PROFILES

IMPAX provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

### 4.1 TCP/IP Stack

IMPAX inherits its TCP/IP stack from the computer system upon which it executes.

#### 4.1.1 Physical Media Support

IMPAX is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it executes.

## 5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

Not applicable.

## 6 CONFIGURATION

IMPAX obtains configuration information from the following sources:

- > Mapping from Application Entity Title to Presentation Address is provided by the database and configured with the Service Tools program. Along with this mapping, the database stores those AE Titles that are allowed to communicate with IMPAX.
- > Hardcopy Parameters must be configured for installed printers from the IMPAX Printer Setup utility.

## 7 SUPPORT FOR EXTENDED CHARACTER SETS

IMPAX is known to support the following character sets:

- > ISO-IR 6 (default): Basic G0 Set
- > ISO-IR 100: Latin Alphabet No. 1

## 8 ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this document:

<b>ACR</b>	American College of Radiology
<b>AE</b>	Application Entity
<b>DICOM</b>	Digital Imaging and Communications in Medicine
<b>NEMA</b>	National Electrical Manufacturers Association
<b>PDU</b>	Protocol Data Unit
<b>SCP</b>	Service Class Provider
<b>SCU</b>	Service Class User
<b>SCP</b>	Service Class Provider
<b>SOP</b>	Service-Object Pair
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>UID</b>	Unique Identifier