DICOM
Conformance Statement

xLNA Enterprise Rel. 2.0
1. DICOM Conformance Statement Overview

xLNA Enterprise System imports X-Ray images from the PACS, performs a ROI analysis to identify and mark the lung nodules, generates the Diagnostic X-Ray report and exports them to PACS.

A table of Supported Networking DICOM Service (SOP) Classes is provided with roles (User/Provider)

![Application Flow Diagram](image)

**Figure 1: Application Flow Diagram**

<table>
<thead>
<tr>
<th>Table 1: Network Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOP Class</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
<tr>
<td><strong>Query/Retrieve</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Transfer</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The services can be specified as a SCU, SCP or as an Option, which means that it is either configurable or that it can be purchased separately.

No Media Storage Application Profiles are supported by the xLNA Enterprise System.
2. TABLE OF CONTENTS

1. DICOM CONFORMANCE STATEMENT OVERVIEW .......................................................... 3
2. TABLE OF CONTENTS .................................................................................................. 4
3. INTRODUCTION .......................................................................................................... 6
4. NETWORKING ............................................................................................................... 8

5. IMPLEMENTATION MODEL ............................................................................................ 8
6. AE SPECIFICATIONS ......................................................................................................... 10
7. SEQUENCING OF REAL WORLD ACTIVITIES ............................................................... 9
8. ASSOCIATION POLICIES ................................................................................................ 25
9. SOP CLASSES ................................................................................................................. 30
10. DICTIONARY .................................................................................................................. 31

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Document Number: XPS 231-060737
DICOM Conformance Statement
4.2.4.2.2. Number of Associations................................................................................................ 30
4.2.4.2.3. Asynchronous Nature ................................................................................................. 31
4.2.4.2.4. Implementation Identifying Information.........................................................................31
4.2.4.2.5. Communication Failure Handling .................................................................................31
4.2.4.3. Association Initiation Policy.............................................................................................31
4.2.4.3.1. (Real-World) Activity – Image Export ...........................................................................33
4.2.4.4. Association Acceptance Policy.........................................................................................35
4.3. NETWORK INTERFACES........................................................................................................36
4.3.1. Physical Network Interfaces..............................................................................................36
4.3.2. Additional Protocols.............................................................................................................36
4.4. CONFIGURATION..................................................................................................................36
4.4.1. AE Title/Presentation Address Mapping .............................................................................36
4.4.1.1. Local AE Titles ..................................................................................................................36
4.4.1.2. Remote AE Title/Presentation Address Mapping ............................................................36
4.4.2. Parameters..........................................................................................................................37
5. MEDIA INTERCHANGE..............................................................................................................38
6. SUPPORT OF CHARACTER SETS .........................................................................................39
7. SECURITY..................................................................................................................................40
8. ANNEXES OF APPLICATION "XLNA" .......................................................................................41
8.1. IOD CONTENTS .....................................................................................................................41
8.1.1. Created SOP Instance .......................................................................................................41
8.1.1.1. List of created SOP Classes .............................................................................................41
8.1.1.2. Digital X-Ray Image Storage - For Pres. SOP..................................................................41
8.1.1.3. Computed Radiography Image Storage SOP Class.........................................................45
8.1.2. Usage of Attributes from Received IOD ............................................................................47
8.1.3. Attribute Mapping ..............................................................................................................47
8.1.4. Coerced/Modified fields.....................................................................................................47
8.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES ..............................................................47
8.3. CODED TERMINOLOGY AND TEMPLATES .....................................................................47
8.4. GRAYSCALE IMAGE CONSISTENCY ..................................................................................47
8.5. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOPS .....................................................48
8.6. PRIVATE TRANSFER SYNTAXES .........................................................................................48
3. INTRODUCTION

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

3.1. Revision History

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

<table>
<thead>
<tr>
<th>Document Version</th>
<th>Date of Issue</th>
<th>Author</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>27 April 2007</td>
<td>PMS CTO</td>
<td>Approved version</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C&amp;S IC2</td>
<td></td>
</tr>
</tbody>
</table>

3.2. Audience

This Conformance Statement is intended for:

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

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

3.3. Remarks

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

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

- **Interoperability**

  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.

  It is the user’s responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**

  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.

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

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

3.4. Definitions, Terms and Abbreviations

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

The following acronyms and abbreviations are used in this document.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Application Entity</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standard Institute</td>
</tr>
<tr>
<td>AP</td>
<td>Application Profile</td>
</tr>
<tr>
<td>CR</td>
<td>Computed Radiography</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital Imaging and Communications in Medicine</td>
</tr>
<tr>
<td>DIMSE</td>
<td>DICOM Message Service Element</td>
</tr>
<tr>
<td>DIMSE-C</td>
<td>DIMSE-Composite</td>
</tr>
<tr>
<td>DIMSE-N</td>
<td>DIMSE-Normalized</td>
</tr>
<tr>
<td>DX</td>
<td>Digital X-Ray</td>
</tr>
<tr>
<td>EBE</td>
<td>DICOM Explicit VR Big Endian</td>
</tr>
<tr>
<td>ELE</td>
<td>DICOM Explicit VR Little Endian</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphic User Interface</td>
</tr>
<tr>
<td>ILE</td>
<td>DICOM Implicit VR Little Endian</td>
</tr>
<tr>
<td>IOD</td>
<td>Information Object Definition</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
</tr>
<tr>
<td>PDU</td>
<td>Protocol Data Unit</td>
</tr>
<tr>
<td>RWA</td>
<td>Real-World Activity</td>
</tr>
<tr>
<td>SC</td>
<td>Secondary Capture</td>
</tr>
<tr>
<td>SCP</td>
<td>Service Class Provider</td>
</tr>
<tr>
<td>SCU</td>
<td>Service Class User</td>
</tr>
<tr>
<td>SOP</td>
<td>Service Object Pair</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol/Internet Protocol</td>
</tr>
<tr>
<td>UID</td>
<td>Unique Identifier</td>
</tr>
<tr>
<td>xLNA</td>
<td>X-Ray Lung Nodule Assessment</td>
</tr>
</tbody>
</table>

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Part 1 – 18 (NEMA PS 3.1–PS 3.18), National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Virginia. 22209, United States of America
Internet: http://medical.nema.org/

Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2007) plus all the supplements and correction items that have been approved as Final Text.
4. NETWORKING

This section contains the networking related services (vs. the media related ones).

4.1. Implementation model

The implementation model consists of three sections:
- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1. Application Data Flow

![Application Data Flow Diagram]

The xLNA Enterprise system is a single Windows based application that provides both user interface, internal database and the network listener.

The network services are modeled as the following Application Entities (AEs).

Figure 2: Application Data Flow Diagram

The xLNA Enterprise system is a single Windows based application that provides both user interface, internal database and the network listener.
4.1.2. Functional Definition of AEs

This section contains a functional definition for each individual local Application Entity. This describes in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions. In this sense, "DICOM services" refers not only to DICOM Service Classes, but also to lower level DICOM services, such as Association Services.

4.1.2.1. Functional Definition of xLNA DICOM Communication AE

xLNA DICOM Communication AE, as an SCP, waits in the background for connections, will accept associations with Presentation Contexts for the SOP class of the Verification SOP class, and will respond successfully to echo requests. xLNA DICOM Communication AE, as an SCU, is activated through the user interface when a user selects a remote AE and tries to do an application level verification with the Presentation Contexts for Verification Service Class.

4.1.2.2. Functional Definition of xLNA DICOM Query/Retrieve SCU

xLNA DICOM Query/retrieve automatically does query and retrieval of a remote database based CR/DX modality, date setting and query frequency selected.

4.1.2.3. Functional Definition of xLNA DICOM Storage SCP

xLNA DICOM Storage SCP waits in the background for connections, will accept associations with Presentation Contexts for SOP classes of the Storage Service Class, and will store the received instances to the local database where they may subsequently be listed and viewed through the user interface.

4.1.2.4. Functional Definition of xLNA DICOM Storage SCU

xLNA DICOM Storage SCU is activated through the user interface when a user selects instances from the local database, or the currently displayed instance and requests to send them to a Remote AE.

4.1.3. Sequencing of Real World Activities

All SCP activities are performed asynchronously in the background and not dependent on any sequencing.

All SCU activities are initiated in the user interface and another activity may not be initiated until the prior activity has completed.
4.2. **AE Specifications**

The next section in the DICOM Conformance Statement is a set of application entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1. **xLNA DICOM Communication AE**

Detail of this specific Application Entity is specified in this section.

4.2.1.1. **SOP Classes**

This Application Entity provides Standard Conformance to the following SOP Classes.

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification SOP Class</td>
<td>1.2.840.10008.1.1</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.1.2. **Association Policies**

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1. **General**

The DICOM standard application context has specified.

<table>
<thead>
<tr>
<th>Application Context Name</th>
<th>1.2.840.10008.3.1.1.1</th>
</tr>
</thead>
</table>

4.2.1.2.2. **Number of Associations**

The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified.

| Maximum number of simultaneous associations | 1 |

4.2.1.2.3. **Asynchronous Nature**

If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

| Maximum number of outstanding asynchronous transactions | None |
4.2.1.2.4. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 8: DICOM Implementation Class and Version for xLNA DICOM Communication AE

<table>
<thead>
<tr>
<th>Implementation Class UID</th>
<th>Implementation Version Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.276.0.7230010.3.0.3.5.3</td>
<td>OFFIS_DCMTK_353</td>
</tr>
</tbody>
</table>

4.2.1.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in next table.

Table 9: Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Timeout</td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

4.2.1.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 10: DICOM Association Rejection Handling

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – rejected-permanent</td>
<td>1 – DICOM UL service-user</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – temporary-congestion</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – rejected-transient</td>
<td>1 – DICOM UL service-user</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – temporary-congestion</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>
The behavior of the AE on receiving an association abort is summarized in next table.

**Table 11: DICOM Association Abort Handling**

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE for sending an association abort is summarized in next table.

**Table 12: DICOM Association Abort Policies**

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

**4.2.1.3.1. (Real-World) Activity – Verification as SCU**

**4.2.1.3.1.1. Description and Sequencing of Activities**

![Activity Diagram]
### 4.2.1.3.1.2. Proposed Presentation Contexts

**Table 13: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU**

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Extended Negotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification SOP Class</td>
<td>1.2.840.10008.1.1</td>
<td>SCU</td>
<td>None</td>
</tr>
<tr>
<td>JPEG Baseline (Process 1)</td>
<td>1.2.840.10008.1.2.4.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JPEG Extended (Process 2 &amp; 4)</td>
<td>1.2.840.10008.1.2.4.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JPEG Lossless, Non-Hierarchical, FOP (Process 14)</td>
<td>1.2.840.10008.1.2.4.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The proposed presentation contexts are mentioned in the above table. No extended negotiations are supported.

### 4.2.1.3.1.3. SOP Specific Conformance for Verification SOP Class

The behavior of an Application Entity SOP class is summarized as shown in the next table. The standard as well as the manufacturer-specific status codes and their corresponding behavior are specified.

#### 4.2.1.3.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCU

This section includes the dataset-specific behavior, i.e., error codes, error and exception handling, time-outs, etc.

**Table 14: C-ECHO-RQ Status Response**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Confirmation</td>
<td>Confirm the verification request</td>
</tr>
</tbody>
</table>

**Table 15: DICOM Command Communication Failure Behavior**

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>The verification request fails. The reason is logged.</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The verification request fails and association is aborted. The reason is logged</td>
</tr>
<tr>
<td>Association Time-out SCU</td>
<td>The association is released.</td>
</tr>
<tr>
<td>Association aborted</td>
<td>The verification request fails. The reason is logged.</td>
</tr>
</tbody>
</table>
4.2.1.4. Association Acceptance Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

### Table 16: DICOM Association Rejection Handling

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – no-reason-given</td>
<td>1 – DICOM UL service-user</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>7 – called-AE-title-not-recognized</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – temporary-congestion</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>7 – called-AE-title-not-recognized</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – no-reason-given</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – temporary-congestion</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE on receiving an association abort is summarized in next table

### Table 17: DICOM Association Abort Handling

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>4 – unrecognized-PDU parameter</td>
<td></td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>5 – unexpected-PDU parameter</td>
<td></td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>6 – invalid-PDU-parameter value</td>
<td></td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE for sending an association abort is summarized in next table.
Table 18: DICOM Association Abort Policies

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>0 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>2 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
</tbody>
</table>

4.2.1.4.1. (Real-World) Activity – Verification as SCP

4.2.1.4.1.1. Description and Sequencing of Activities

![Diagram](image)

Figure 4: (Real World) Activity - Verification as SCP

4.2.1.4.1.2. Accepted Presentation Contexts

Table 19: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract Syntax</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Verification SOP Class</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Accepted Presentation Contexts are mentioned in the above table. No extended negotiations are supported.

4.2.1.4.1.3. SOP Specific Conformance for Verification SOP Class
This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.
The behavior of an Application Entity SOP class is summarized as shown in next Table. The standard as well as the manufacturer specific status codes and their corresponding behavior is specified.

4.2.1.4.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCP
This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 20: C-ECHO-RSP Status Response

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Confirmation</td>
<td>Confirm the verification request</td>
</tr>
</tbody>
</table>

Table 21: DICOM Command Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>The verification request fails. The reason is logged.</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The verification request fails and association is aborted. The reason is logged.</td>
</tr>
<tr>
<td>Association Time-out SCU</td>
<td>The association is released.</td>
</tr>
<tr>
<td>Association aborted</td>
<td>The verification request fails. The reason is logged.</td>
</tr>
</tbody>
</table>

4.2.2. xLNA DICOM QueryRetrieve SCU
Detail of this specific Application Entity is specified in this section.

4.2.2.1. SOP Classes
This Application Entity provides Standard Conformance to the following SOP Classes.
Table 22: SOP Classes for xLNA DICOM QueryRetrieve SCU

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Query/Retrieve Information Model - FIND SOP Class</td>
<td>1.2.840.10008.5.1.4.1.2.2.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Study Root Query/Retrieve Information Model - MOVE SOP Class</td>
<td>1.2.840.10008.5.1.4.1.2.2.2</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.2.2. Association Policies
Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.2.2.1. General
The DICOM standard application context has specified.

Table 23: DICOM Application Context

<table>
<thead>
<tr>
<th>Application Context Name</th>
<th>1.2.840.10008.3.1.1.1</th>
</tr>
</thead>
</table>

4.2.2.2.2. Number of Associations
The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified.

Table 24: Number ofAssociations as an Association Initiator for xLNA DICOM QueryRetrieve SCU

<table>
<thead>
<tr>
<th>Maximum number of simultaneous associations</th>
<th>1</th>
</tr>
</thead>
</table>

Table 25: Number of Associations as an Association Acceptor for xLNA DICOM QueryRetrieve SCU

<table>
<thead>
<tr>
<th>Maximum number of simultaneous associations</th>
<th>1</th>
</tr>
</thead>
</table>

4.2.2.2.3. Asynchronous Nature
If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

Table 26: Asynchronous Nature as an Association Initiator for xLNA DICOM QueryRetrieve SCU

<table>
<thead>
<tr>
<th>Maximum number of outstanding asynchronous transactions</th>
<th>None</th>
</tr>
</thead>
</table>

4.2.2.2.4. Implementation Identifying Information
The value supplied for Implementation Class UID and version name are documented here.

Table 27: DICOM Implementation Class and Version for xLNA DICOM QueryRetrieve SCU

<table>
<thead>
<tr>
<th>Implementation Class UID</th>
<th>1.2.276.0.7230010.3.0.3.5.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Version Name</td>
<td>OFFIS_DCMTK_353</td>
</tr>
</tbody>
</table>

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Document Number: XPS 231-060737
xLNA Enterprise System 2.0

27 Apr 2007
4.2.2.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in next table.

Table 28: Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Timeout</td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

4.2.2.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table.

Table 29: DICOM Association Rejection Handling

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – rejected-permanent</td>
<td>1 – DICOM UL service-user</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – temporary-congestion</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – rejected-transient</td>
<td>1 – DICOM UL service-user</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – application-context-name-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – calling-AE-title-not-recognized</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – temporary-congestion</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE on receiving an association abort is summarized in next table.

Table 30: DICOM Association Abort Handling

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>
The behavior of the AE for sending an association abort is summarized in next table.

### Table 31: DICOM Association Abort Policies

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

### 4.2.2.3.1. (Real-World) Activity – FIND As SCU

#### 4.2.2.3.1.1. Description and Sequencing of Activities

- Local AE initiates an association to a remote entity
• Local AE sends C_FIND_RQ with the query conditions from the GUI input of xLNA Enterprise system.
• After receiving the C_FIND responses from the Remote AE, the local AE displays query results on the GUI of xLNA Enterprise system.
• Local application entity then closes the association by sending A_RELEASE_RQ and receiving back A_RELEASE_RSP from Remote AE.

4.2.2.3.1.2. Proposed Presentation Contexts

Table 32: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Extended Negotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Name List</td>
<td>UID</td>
<td></td>
</tr>
<tr>
<td>Study Root Query/Retrieve Information Model - FIND SOP Class</td>
<td>JPEG Baseline (Process 1)</td>
<td>1.2.840.10008.1.2.4.50</td>
<td>SCU</td>
</tr>
<tr>
<td></td>
<td>JPEG Extended (Process 2 &amp; 4)</td>
<td>1.2.840.10008.1.2.4.51</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JPEG Lossless, Non-Hierarchical, FOP (Process 14)</td>
<td>1.2.840.10008.1.2.4.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td></td>
</tr>
</tbody>
</table>

The above table shows the proposed presentation context
No extended negotiations are supported.

4.2.2.3.1.3. SOP Specific Conformance for Study Root Query/Retrieve Information Model - FIND SOP Class

The xLNA DICOM Query/Retrieve SCU provides standard conformance to Query/Retrieve Service Class.

4.2.2.3.1.3.1. Dataset Specific Conformance for Study Root Q/R Information Model - FIND SOP Class SCU

This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 33: Supported Query Keys for

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Type Of Matching</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Query/Retrieve Level</td>
<td>0008,0052</td>
<td>CS</td>
<td>Single Value</td>
<td>Study level</td>
</tr>
</tbody>
</table>

Q/R Study level (Study Root)

<table>
<thead>
<tr>
<th>Study Instance UID</th>
<th>0020,000D</th>
<th>UI</th>
<th>Universal</th>
<th>Study level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Date</td>
<td>0008,0020</td>
<td>DA</td>
<td>Universal</td>
<td>Study level</td>
</tr>
<tr>
<td>Study Time</td>
<td>0008,0030</td>
<td>TM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accession Number</td>
<td>0008,0050</td>
<td>SH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modalities in Study</td>
<td>0008,0061</td>
<td>CS</td>
<td>Universal</td>
<td>Study level, CR, DX</td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>VR</td>
<td>Type Of Matching</td>
<td>Comment</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------</td>
<td>----</td>
<td>-----------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Referring Physician's Name</td>
<td>0008,0090</td>
<td>PN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Description</td>
<td>0008,1030</td>
<td>LO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient's Name</td>
<td>0010,0010</td>
<td>PN</td>
<td>Single Value,Universal,WildCard</td>
<td>Study level</td>
</tr>
<tr>
<td>Patient ID</td>
<td>0010,0020</td>
<td>LO</td>
<td>Single Value,Universal,WildCard</td>
<td>Study level</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
<td>0010,0030</td>
<td>DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient's Sex</td>
<td>0010,0040</td>
<td>CS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Patient IDs</td>
<td>0010,1000</td>
<td>LO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Patient Names</td>
<td>0010,1001</td>
<td>PN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study ID</td>
<td>0020,0010</td>
<td>SH</td>
<td>Universal</td>
<td>Study level</td>
</tr>
</tbody>
</table>

### Table 34: C-FIND-RQ Status Response

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Matching is complete</td>
<td>The find results are displayed.</td>
</tr>
<tr>
<td>Refused</td>
<td>A700</td>
<td>Out of Resources</td>
<td>No find results are displayed. The reason is logged.</td>
</tr>
<tr>
<td>Failed</td>
<td>A900</td>
<td>Identifiers does not match SOP class</td>
<td>No find results are displayed. The reason is logged.</td>
</tr>
<tr>
<td></td>
<td>Cxxx</td>
<td>Unable to process</td>
<td>No find results are displayed. The reason is logged.</td>
</tr>
<tr>
<td>Cancel</td>
<td>FE00</td>
<td>Matching terminated due to Cancel Request</td>
<td>No find results are displayed. The reason is logged.</td>
</tr>
<tr>
<td>Pending</td>
<td>FF00</td>
<td>Matches are continuing – Current match is supplied</td>
<td>The find command continues.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and any optional keys were supported in the same</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>manner as required keys.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FF01</td>
<td>Matches are continuing – Warning that one or more</td>
<td>The find command continues.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>optional keys were not supported for existence and/or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>matching for this identifier</td>
<td></td>
</tr>
</tbody>
</table>

### Table 35: DICOM Command Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>N/A</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The query fails and the association is aborted.</td>
</tr>
<tr>
<td></td>
<td>The reason is logged.</td>
</tr>
<tr>
<td>Association Time-out</td>
<td>The association is released.</td>
</tr>
<tr>
<td>SCU</td>
<td></td>
</tr>
<tr>
<td>Association aborted</td>
<td>The query fails.</td>
</tr>
<tr>
<td></td>
<td>The reason is logged.</td>
</tr>
</tbody>
</table>

### 4.2.2.3.2. (Real-World) Activity – MOVE As SCU

#### 4.2.2.3.2.1. Description and Sequencing of Activities
• Local AE initiates an association to a remote entity
• Local AE sends a C_MOVE_RQ to the remote AE automatically.
• Remote entity responds with C_MOVE operation
• Local AE receives DICOM images and stores them to local database.

4.2.2.3.2.2. Proposed Presentation Contexts

Table 36: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Extended Negotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>UID</td>
<td>Name List</td>
<td>UID List</td>
</tr>
<tr>
<td>Study Root Query/Retrieve Information Model - MOVE SOP Class</td>
<td>1.2.840.10008.5.1.4.1.2.2.2</td>
<td>JPEG Baseline (Process 1)</td>
<td>1.2.840.10008.1.2.4.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JPEG Extended (Process 2 &amp; 4)</td>
<td>1.2.840.10008.1.2.4.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JPEG Lossless, Non-Hierarchical, FOP (Process 14)</td>
<td>1.2.840.10008.1.2.4.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
</tbody>
</table>

The above table shows the proposed presentation context
No extended negotiations are supported.
4.2.2.3.2.3. SOP Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class

The xLNA DICOM Query/Retrieve SCU provides standard conformance to Query/Retrieve Service Class

4.2.2.3.2.3.1. Dataset Specific Conformance for Study Root Query/Retrieve Information Model - MOVE SOP Class SCU

This section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 37: Identifiers for MOVE SCU

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Information Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Query/Retrieve Level</td>
<td>0008,0052</td>
<td>CS</td>
<td>Q/R Study level (Study Root)</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>0020,000D</td>
<td>UI</td>
<td>Study Level</td>
</tr>
</tbody>
</table>

Table 38: C-MOVE-RQ Status Response

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Sub-operations</td>
<td>The move job is marked as completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>complete-No</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Failures</td>
<td></td>
</tr>
<tr>
<td>Refused</td>
<td>A701</td>
<td>Out of Resources-</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to calculate</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>number of matches</td>
<td>The reason is logged.</td>
</tr>
<tr>
<td></td>
<td>A702</td>
<td>Out of Resources-</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to perform</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sub-operations</td>
<td>The reason is logged.</td>
</tr>
<tr>
<td></td>
<td>A801</td>
<td>Move Destination</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unknown</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged.</td>
<td></td>
</tr>
<tr>
<td>Failed</td>
<td>A900</td>
<td>Identifier does not</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>match SOP class</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cxxx</td>
<td>Unable to process</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The association is released.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged.</td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>FE00</td>
<td>Sub-operations</td>
<td>The move job is marked as failed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>terminated due to</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cancel Indication</td>
<td>The reason is logged.</td>
</tr>
<tr>
<td></td>
<td>B000</td>
<td>Sub-operations</td>
<td>The move job is marked as completed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>complete – One or</td>
<td>The association is released.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>more Failures</td>
<td>The reason is logged.</td>
</tr>
<tr>
<td>Pending</td>
<td>FF00</td>
<td>Sub-operations</td>
<td>The move job continues.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>are continuing.</td>
<td></td>
</tr>
</tbody>
</table>

Table 39: DICOM Command Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>The move job fails in case of association setup. The reason is logged.</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The move job fails and the association is aborted. The reason is logged.</td>
</tr>
<tr>
<td>Association Time-out SCU</td>
<td>N/A</td>
</tr>
<tr>
<td>Association aborted</td>
<td>The move job fails. The reason is logged and.</td>
</tr>
</tbody>
</table>
4.2.2.4. Association Acceptance Policy
The xLNA DICOM Query/Retrieve SCU does not accept associations.

4.2.3. xLNA DICOM Storage SCP
Detail of this specific Application Entity is specified in this section.

4.2.3.1. SOP Classes
This Application Entity provides Standard Conformance to the following SOP Classes.

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computed Radiography Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Pres. SOP</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.3.2. Association Policies
Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.3.2.1. General
The DICOM standard application context has specified.

<table>
<thead>
<tr>
<th>Application Context Name</th>
<th>1.2.840.10008.3.1.1.1</th>
</tr>
</thead>
</table>

4.2.3.2.2. Number of Associations
The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified.

<table>
<thead>
<tr>
<th>Maximum number of simultaneous associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

4.2.3.2.3. Asynchronous Nature
If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

<table>
<thead>
<tr>
<th>Maximum number of outstanding asynchronous transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>
4.2.3.2.4. Implementation Identifying Information
The value supplied for Implementation Class UID and version name are documented here.

Table 45: DICOM Implementation Class and Version for xLNA DICOM Storage SCP

<table>
<thead>
<tr>
<th>Implementation Class UID</th>
<th>1.2.276.0.7230010.3.0.3.5.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Version Name</td>
<td>OFFIS_DCMTK_353</td>
</tr>
</tbody>
</table>

4.2.3.2.5. Communication Failure Handling
The behavior of the AE during communication failure is summarized in next table.

Table 46: Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Timeout</td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

4.2.3.3. Association Initiation Policy
The xLNA DICOM Storage SCP does not initiate associations.
4.2.3.4. Association Acceptance Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

**Table 47: DICOM Association Rejection Handling**

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – no-reason-given</td>
<td>1 – DICOM UL service-user</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 – application-context-name-not-supported</td>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 – calling-AE-title-not-recognized</td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 – called-AE-title-not-recognized</td>
<td>1 – temporary-congestion</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 – called-AE-title-not-recognized</td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – no-reason-given</td>
<td>2 – DICOM UL service-provider (presentation related function)</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 – protocol-version-not-supported</td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – DICOM UL service-user</td>
<td>1 – DICOM UL service-user</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – no-reason-given</td>
<td>2 – protocol-version-not-supported</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – temporary-congestion</td>
<td>2 – local-limit-exceeded</td>
<td>Association is not established.</td>
<td>The reason is logged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The behavior of the AE on receiving an association abort is summarized in next table

**Table 48: DICOM Association Abort Handling**

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>1 – unrecognized-PDU</td>
<td>1 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>2 – unexpected-PDU</td>
<td>1 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>4 – unrecognized-PDU parameter</td>
<td>4 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>5 – unexpected-PDU parameter</td>
<td>5 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>6 – invalid-PDU-parameter value</td>
<td>6 – reason-not-specified</td>
<td>Association is not established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE for sending an association abort is summarized in next table.
Table 49: DICOM Association Abort Policies

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

4.2.3.4.1. (Real-World) Activity – Image Import

4.2.3.4.1.1. Description and Sequencing of Activities

- Remote AE initiates a DICOM association with the Local AE
- Local AE (Storage SCP) responds to the Remote AE and selects a matching Presentation Context.
- Remote AE sends a C-STORE-RQ
- Local AE accepts the request and stores incoming DICOM image, CR or DX image, into the local database

Figure 7: (Real World) Activity - Image Import
4.2.3.4.1.2. Accepted Presentation Contexts

Table 50: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract Syntax</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Computed Radiography Image Storage SOP Class</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Pres. SOP</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The supported presentation contexts are shown in the above table. No extended negotiations are supported.

4.2.3.4.1.3. SOP Specific Conformance for Storage SOP Classes

The xLNA DICOM Storage SCP conforms to the SOP Storage Class at Level 1 (base). It does not provide Digital Signature support. No elements are discarded or coerced by xLNA Enterprise System. When a C_STORE operation is successful, images are saved to the xLNA local database. Any image whose SOP Instance UID (0008, 0018) already exists in the local database will not be imported into the database.

The xLNA DICOM Storage SCP responds to a C_STORE_RQ with one of the response codes listed in the table below.

Table 51: C-STORE-RSP Status Response

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Storage is complete</td>
<td>The image(s) will be stored in the local database</td>
</tr>
<tr>
<td>Refused</td>
<td>A700</td>
<td>Out of Resources</td>
<td>The local database is full.</td>
</tr>
<tr>
<td>Error</td>
<td>A900</td>
<td>Data set does not match the SOP class</td>
<td>The SOP class of the image(s) does not match the negotiated abstract syntax.</td>
</tr>
<tr>
<td></td>
<td>C000</td>
<td>Cannot understand</td>
<td>The image(s) cannot be parsed.</td>
</tr>
<tr>
<td>Warning</td>
<td>B000</td>
<td>Coercion of Data Elements</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>B006</td>
<td>Elements discarded</td>
<td>NA</td>
</tr>
</tbody>
</table>
Table 52: DICOM Command Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>The store job fails in case of association setup.</td>
</tr>
<tr>
<td></td>
<td>The reason is logged.</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The store job fails and association is aborted</td>
</tr>
<tr>
<td></td>
<td>The reason is logged</td>
</tr>
<tr>
<td>Association Time-out SCU</td>
<td>The association is released.</td>
</tr>
<tr>
<td>Association aborted</td>
<td>The store job fails.</td>
</tr>
<tr>
<td></td>
<td>The reason is logged.</td>
</tr>
</tbody>
</table>

4.2.4. xLNA DICOM Storage SCU

Detail of this specific Application Entity is specified in this section.

4.2.4.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 53: SOP Classes for xLNA DICOM Storage SCU

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computed Radiography Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Pres. SOP</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.4.2. Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.4.2.1. General

The DICOM standard application context has specified.

Table 54: DICOM Application Context

<table>
<thead>
<tr>
<th>Application Context Name</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2.840.10008.3.1.1.1</td>
</tr>
</tbody>
</table>

4.2.4.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified.

Table 55: Number of Associations as an Association Initiator for xLNA DICOM Storage SCU

<table>
<thead>
<tr>
<th>Maximum number of simultaneous associations</th>
<th>1</th>
</tr>
</thead>
</table>
Table 56: Number of Associations as an Association Acceptor for xLNA DICOM Storage SCU

| Maximum number of simultaneous associations | 0 |

4.2.4.2.3. Asynchronous Nature
If the implementation supports negotiation of multiple outstanding transactions this is stated here, along with the maximum number of outstanding transactions supported.

Table 57: Asynchronous Nature as an Association Initiator for xLNA DICOM Storage SCU

| Maximum number of outstanding asynchronous transactions | None |

4.2.4.2.4. Implementation Identifying Information
The value supplied for Implementation Class UID and version name are documented here.

Table 58: DICOM Implementation Class and Version for xLNA DICOM Storage SCU

| Implementation Class UID | 1.2.276.0.7230010.3.0.3.5.3 |
| Implementation Version Name | OFFIS_DCMTK_353 |

4.2.4.2.5. Communication Failure Handling
The behavior of the AE during communication failure is summarized in next table.

Table 59: Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Timeout</td>
<td>The reason is logged</td>
</tr>
</tbody>
</table>

4.2.4.3. Association Initiation Policy
This describes the conditions under which the AE will initiate an association.

The behavior of the AE during association rejection is summarized in next table

Table 60: DICOM Association Rejection Handling

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – rejected-permanent</td>
<td>1 – DICOM UL service-user</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – application-context-name-not-supported</td>
<td>2 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>3 – calling-AE-title-not-recognized</td>
<td>3 – application-context-name-not-supported</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>7 – called-AE-title-not-recognized</td>
<td>7 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>2 – DICOM UL service-provider (ACSE related function)</td>
<td>1 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>2 – protocol-version-not-supported</td>
<td>2 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>3 – DICOM UL service-provider (presentation related function)</td>
<td>1 – temporary-congestion</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
<tr>
<td>2 – local-limit-exceeded</td>
<td>2 – no-reason-given</td>
<td>Association is not established. The reason is logged</td>
<td></td>
</tr>
</tbody>
</table>
The behavior of the AE on receiving an association abort is summarized in next table.

Table 61: DICOM Association Abort Handling

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>

The behavior of the AE for sending an association abort is summarized in next table.

Table 62: DICOM Association Abort Policies

<table>
<thead>
<tr>
<th>Source</th>
<th>Reason/Diagnosis</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – DICOM UL service-user</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td>2 – DICOM UL service-provider</td>
<td>0 – reason-not-specified</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>1 – unrecognized-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>2 – unexpected-PDU</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>4 – unrecognized-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>5 – unexpected-PDU parameter</td>
<td>Association is not established. The reason is logged</td>
</tr>
<tr>
<td></td>
<td>6 – invalid-PDU-parameter value</td>
<td>Association is not established. The reason is logged</td>
</tr>
</tbody>
</table>
4.2.4.3.1. (Real-World) Activity – Image Export

4.2.4.3.1.1. Description and Sequencing of Activities

![Diagram](image.png)

- Local AE (Storage SCU) initiates an association to Remote AE.
- Local AE sends a C-STORE-RQ to the Remote AE for exporting the CR and DX images.
- Remote AE responds to storage request with appropriate responses.
- Local AE closes the association.

4.2.4.3.1.2. Proposed Presentation Contexts

Table 63: Proposed Presentation Contexts for (Real-World) Activity – Image Export

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract Syntax</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Pres. SOP</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The proposed presentation contexts are mentioned in the above table. No extended negotiations are supported.
4.2.4.3.1.3. SOP Specific Conformance for Storage SOP Classes
The xLNA DICOM Storage SCU provides standard conformance to the Storage Service Class.
The maximum PDU size used by xLNA DICOM SCU is 64K.

Table 64: C-STORE-RQ Status Response

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Code</th>
<th>Further Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>0000</td>
<td>Storage is complete</td>
<td>Continues with next store until completed thereafter the store job is marked as completed and the association is released.</td>
</tr>
<tr>
<td>Refused</td>
<td>A7xx</td>
<td>Out of Resources</td>
<td>The store job fails and the association is released. The reason is logged.</td>
</tr>
<tr>
<td>Error</td>
<td>A9xx</td>
<td>Data set does not match SOP class</td>
<td>The store job fails and the association is released. The reason is logged.</td>
</tr>
<tr>
<td></td>
<td>Cxxx</td>
<td>Cannot understand</td>
<td>The store job fails and the association is released. The reason is logged.</td>
</tr>
<tr>
<td>Warning</td>
<td>B000</td>
<td>Coercion of Data Elements</td>
<td>Continues with next store until completed thereafter the store job is marked as completed and the association is released.</td>
</tr>
<tr>
<td></td>
<td>B006</td>
<td>Elements discarded</td>
<td>Continues with next store until completed thereafter the store job is marked as completed and the association is released.</td>
</tr>
<tr>
<td></td>
<td>B007</td>
<td>Data set does not match SOP class</td>
<td>Continues with next store until completed thereafter the store job is marked as completed and the association is released.</td>
</tr>
</tbody>
</table>

Table 65: DICOM Command Communication Failure Behavior

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTIM Time-out</td>
<td>The store job fails in case of association setup. The reason is logged.</td>
</tr>
<tr>
<td>Reply Time-out</td>
<td>The store job fails and association is aborted. The reason is logged.</td>
</tr>
<tr>
<td>Association Time-out</td>
<td>The association is released.</td>
</tr>
<tr>
<td>SCU</td>
<td></td>
</tr>
<tr>
<td>Association abort ed</td>
<td>The store job fails. The reason is logged.</td>
</tr>
</tbody>
</table>
4.2.4.4. Association Acceptance Policy

The xLNA DICOM Storage SCU does not accept associations.
4.3. Network Interfaces

4.3.1. Physical Network Interfaces

The xLNA Enterprise System provides DICOM 3.0 TCP/IP Network Communication Support as defined in the Part 8 of the DICOM standard. The DICOM implementation operates on the top of the TCP/IP stack, and does not have specific requirement regarding the physical network media. The default connection port is the Ethernet.

Supported physical media include:
- IEEE 802.3-1995 (Fast Ethernet) 100Base-TX
- IEEE 802.3-1995 10Base-TX
- IEEE 802.3 1000BASE-X (Fiber Optic Gigabit Ethernet)

Common network media supported by DICOM include Token Ring, FDDI, ATM, ISDN, T1, T3 and other types of digital or digital Audio lines.

4.3.2. Additional Protocols

xLNA Enterprise System supports TCP/IP.

4.4. Configuration

Any implementation’s DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration is addressed in this section.

4.4.1. AE Title/Presentation Address Mapping

The Local AE title can be configured by authorized personnel only. Configurations may be changed through the GUI of the xLNA System Configuration program.

4.4.1.1. Local AE Titles

The local AE title mapping and configuration are specified.

<table>
<thead>
<tr>
<th>Application Entity</th>
<th>Default AE Title</th>
<th>Default TCP/IP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>xLNA DICOM Query/Retrieve SCU</td>
<td>xLNA DICOM Query/Retrieve SCU</td>
<td>1949</td>
</tr>
<tr>
<td>xLNA DICOM Storage SCP</td>
<td>xLNA DICOM Storage SCP</td>
<td>1949</td>
</tr>
<tr>
<td>xLNA DICOM Storage SCU</td>
<td>xLNA DICOM Storage SCU</td>
<td>1949</td>
</tr>
<tr>
<td>xLNA DICOM communication AE</td>
<td>xLNA DICOM communication AE</td>
<td>1849</td>
</tr>
</tbody>
</table>

The TCP/IP port of the AEs can be configurable between 104 to 65535

4.4.1.2. Remote AE Title/Presentation Address Mapping

Configuration of remote host names and port numbers shall be specified here.
### 4.4.2. Parameters

The specification of important operational parameters, their default value and range (if configurable) is specified here.

#### Table 67: Configuration Parameters table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Configurable</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>General DIMSE level time-out values</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out waiting for response to TCP/IP connect request. (Low-level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out for waiting for data between TCP/IP packets. (Low-level timeout)</td>
<td>No</td>
<td>1000 s</td>
</tr>
<tr>
<td>Any changes to default TCP/IP settings, such as configurable stack parameters.</td>
<td>No</td>
<td>30 s</td>
</tr>
<tr>
<td><strong>AE Specific Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size constraint in maximum object size (see note 1)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Maximum PDU size the AE can receive</td>
<td>No</td>
<td>32 KB</td>
</tr>
<tr>
<td>Maximum PDU size the AE can send</td>
<td>No</td>
<td>16 KB</td>
</tr>
<tr>
<td>AE specific DIMSE level time-out values</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>STORAGE –SCP support SOP Class</td>
<td>Yes</td>
<td>1.2.840.10008.5.1.4.1.1 / 1.2.840.10008.5.1.4.1.1.1</td>
</tr>
<tr>
<td>STORAGE –SCU support SOP Class</td>
<td>Yes</td>
<td>1.2.840.10008.5.1.4.1.1 / 1.2.840.10008.5.1.4.1.1.1</td>
</tr>
<tr>
<td>QUERY-RETRIEVE_SCU support SOP Class</td>
<td>No</td>
<td>1.2.840.10008.5.1.4.1.2.2.2.2</td>
</tr>
<tr>
<td>STORAGE-SCP/STORAGE-SCU/QUERY-RETRIEVE-SCU Transfer Syntax</td>
<td>Yes</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
</tbody>
</table>
5. MEDIA INTERCHANGE

Not Applicable.
6. SUPPORT OF CHARACTER SETS

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

Table 68: Supported DICOM Character Sets of xLNA System

<table>
<thead>
<tr>
<th>Character Set Description</th>
<th>Defined Term</th>
<th>ESC Sequence</th>
<th>ISO Registration Number</th>
<th>Code Element</th>
<th>Character Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB18030</td>
<td>GB18030</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>GB18030</td>
</tr>
<tr>
<td>Latin alphabet No. 1</td>
<td>ISO_IR 100</td>
<td>-</td>
<td>ISO-IR 6</td>
<td>G0</td>
<td>ISO 646</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ISO-IR 100</td>
<td>G1</td>
<td>Supplementary set of ISO 8859</td>
</tr>
</tbody>
</table>
7. Security

Not Applicable.
8. ANNEXES OF APPLICATION "xLNA"

8.1. IOD Contents

8.1.1. Created SOP Instance

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:
- ALWAYS: The module is always present
- CONDITIONAL: The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:
- ALWAYS: The attribute is always present with a value
- EMPTY: The attribute is always present without any value (attribute sent zero length)
- VNAL: The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
- ANA: The attribute is present under specified condition – if present then it will always have a value
- ANAPCV: The attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
- ANAPEV: The attribute is present under specified condition – if present then it will not have any value

The abbreviations used in the Module table for the column "Source" are:
- AUTO: The attribute value is generated automatically
- CONFIG: The attribute value source is a configurable parameter
- COPY: The attribute value source is another SOP instance
- FIXED: The attribute value is hard-coded in the application
- IMPLICIT: The attribute value source is a user-implicit setting
- MPPS: The attribute value is the same as that use for Modality Performed Procedure Step
- MWL: The attribute value source is a Modality Worklist
- USER: The attribute value source is explicit user input

8.1.1.1. List of created SOP Classes

Table 69: List of created SOP Classes

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital X-Ray Image Storage - For Pres. SOP</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
</tr>
<tr>
<td>Computed Radiography Image Storage SOP Class</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
</tr>
</tbody>
</table>

xLNA system generates the bar coded image and report document for the CR and DX Image SOP classes.

8.1.1.2. Digital X-Ray Image Storage - For Pres. SOP
The following tables lists the DICOM attributes created by the xLNA application for the Digital X-Ray bar coded image and Digital X-Ray Report document.

### Table 70: IOD of Created Digital X-Ray Image Storage - For Pres. SOP Instances

<table>
<thead>
<tr>
<th>Information Entity</th>
<th>Module</th>
<th>Presence Of Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image</td>
<td>X-Ray Generation Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>DX Anatomy Imaged Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>DX Detector Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>DX Positioning Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>DX Series Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>X-Ray Acquisition Dose Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>X-Ray Grid Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>DX Image Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Patient</td>
<td>Patient Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Study</td>
<td>General Study Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Study</td>
<td>Patient Study Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>General Series Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Equipment</td>
<td>General Equipment Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>General Image Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>Image Pixel Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>VOI LUT Module</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td>Additional Module</td>
<td>Additional Module</td>
<td>OPTIONAL</td>
</tr>
</tbody>
</table>

### Table 71: DX Anatomy Imaged Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic Region</td>
<td>0008,2218</td>
<td>SQ</td>
<td>VNAP</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatomic Region</td>
<td>0008,2220</td>
<td>SQ</td>
<td>ANAP</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code Value</td>
<td>0008,0100</td>
<td>SH</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coding Scheme Design</td>
<td>0008,0102</td>
<td>SH</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code Meaning</td>
<td>0008,0104</td>
<td>LO</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image Laterality</td>
<td>0020,0062</td>
<td>CS</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 72: DX Detector Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imager Pixel Spacing</td>
<td>0018,1164</td>
<td>DS</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field of View Origin</td>
<td>0018,7030</td>
<td>DS</td>
<td>ANAPEV</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field of View Rotation</td>
<td>0018,7032</td>
<td>DS</td>
<td>ANAPEV</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field of View Horizontal Flip</td>
<td>0018,7034</td>
<td>CS</td>
<td>ANAPEV</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detector Type</td>
<td>0018,7004</td>
<td>CS</td>
<td>VNAP</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>0018,6000</td>
<td>DS</td>
<td>ANAP</td>
<td>AUTO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 73: DX Positioning Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
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### Table 74: DX Series Module

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>Referenced SOP Class UID 0008,1150 UI ANAPEV AUTO
>Referenced SOP Instance UID 0008,1155 UI ANAPEV AUTO

Table 75: DX Image Module

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Table 76: Patient Module

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<td>AUTO</td>
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<td>LO</td>
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<td>ALWAYS</td>
<td>AUTO</td>
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<td>Patient's Birth Date</td>
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<td>ALWAYS</td>
<td>AUTO</td>
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<tr>
<td>Patient's Sex</td>
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Table 77: General Study Module

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<td>SH</td>
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### Table 78: General Series Module

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<td>CHEST or THORAX</td>
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### Table 79: General Equipment Module

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### Table 80: General Image Module

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### Table 81: Image Pixel Module

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### Table 82: SOP Common Module

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<td>UI</td>
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### Table 83: VOI LUT Module

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### Table 85: Additional Module

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### 8.1.1.3. Computed Radiography Image Storage SOP Class

The following tables lists the DICOM attributes created by the xLNA application for the Computed Radiography bar coded image and Computed Radiography Report document.

### Table 86: IOD of Created Computed Radiography Image Storage SOP Class Instances

<table>
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</tr>
<tr>
<td>Study</td>
<td>General Study Module</td>
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<tr>
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<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>General Series Module</td>
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</tr>
<tr>
<td>Series</td>
<td>CR Series Module</td>
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<tr>
<td>Equipment</td>
<td>General Equipment Module</td>
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<tr>
<td>Image</td>
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<tr>
<td>Image</td>
<td>Contrast/Bolus Module</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>CR Image Module</td>
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### Table 87: Patient Module

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<td>AUTO</td>
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<td>Patient's Birth Date</td>
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<td>VNAPE</td>
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### Table 88: General Study Module

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<tr>
<td>Study Instance UID</td>
<td>0020,000D</td>
<td>UI</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
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</tbody>
</table>
### Table 89: General Series Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality</td>
<td>0008,0060</td>
<td>CS</td>
<td>CR</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>0020,000E</td>
<td>UI</td>
<td>VHAP</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Series Number</td>
<td>0020,0011</td>
<td>IS</td>
<td>VNAP</td>
<td>AUTO</td>
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<td></td>
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<tr>
<td>Patient Position</td>
<td>0018,5100</td>
<td>CS</td>
<td>HFDR</td>
<td>ANAPCV</td>
<td>AUTO</td>
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<tr>
<td>Laterality</td>
<td>0020,0060</td>
<td>CS</td>
<td>L, R</td>
<td>ANAPCV</td>
<td>AUTO</td>
<td></td>
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<tr>
<td>Series Description</td>
<td>0008,103E</td>
<td>LO</td>
<td>ANAP</td>
<td>AUTO</td>
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### Table 90: CR Series Module

<table>
<thead>
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<th>Attribute Name</th>
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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Part Examined</td>
<td>0018,0015</td>
<td>CS</td>
<td>CHEST, THORAX</td>
<td>VNAP</td>
<td></td>
<td></td>
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<tr>
<td>View Position</td>
<td>0018,5101</td>
<td>CS</td>
<td></td>
<td>VNAP</td>
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### Table 91: General Equipment Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
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<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>0008,0070</td>
<td>LO</td>
<td>EDDA</td>
<td>VNAP</td>
<td>AUTO</td>
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</tr>
<tr>
<td>Manufacturer's Model Name</td>
<td>0008,1090</td>
<td>LO</td>
<td>IQQA-Chest</td>
<td>ANAP</td>
<td>AUTO</td>
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### Table 92: General Image Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instance Number</td>
<td>0020,0013</td>
<td>IS</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Content Date</td>
<td>0008,0023</td>
<td>DA</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
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<tr>
<td>Content Time</td>
<td>0008,0033</td>
<td>TM</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
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<tr>
<td>Patient Orientation</td>
<td>0020,0020</td>
<td>CS</td>
<td>F, L</td>
<td>ALWAYS</td>
<td>AUTO</td>
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### Table 93: CR Image Module

<table>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photometric Interpretation</td>
<td>0028,0004</td>
<td>CS</td>
<td>MONOCHROME2</td>
<td>ALWAYS</td>
<td>AUTO</td>
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### Table 94: Image Pixel Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples per Pixel</td>
<td>0028,0002</td>
<td>US</td>
<td>1</td>
<td>ALWAYS</td>
<td>AUTO</td>
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<tr>
<td>Rows</td>
<td>0028,0010</td>
<td>US</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Columns</td>
<td>0028,0011</td>
<td>US</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Bits Allocated</td>
<td>0028,0100</td>
<td>US</td>
<td>16</td>
<td>ALWAYS</td>
<td>AUTO</td>
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<tr>
<td>Bits Stored</td>
<td>0028,0101</td>
<td>US</td>
<td>12</td>
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<td>AUTO</td>
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<tr>
<td>High Bit</td>
<td>0028,0102</td>
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<td>11</td>
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<tr>
<td>Pixel Representation</td>
<td>0028,0103</td>
<td>US</td>
<td>0000</td>
<td>ALWAYS</td>
<td>AUTO</td>
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<tr>
<td>Pixel Data</td>
<td>7FE0,0010</td>
<td>O</td>
<td>W/ OB</td>
<td>ALWAYS</td>
<td>AUTO</td>
<td></td>
</tr>
<tr>
<td>Planar Configuration</td>
<td>0028,0006</td>
<td>US</td>
<td></td>
<td>ANAPEV</td>
<td>AUTO</td>
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Table 95: SOP Common Module

<table>
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<th>Attribute Name</th>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Specific Character Set</td>
<td>0008,0005</td>
<td>CS</td>
<td>ISO_IR 100,</td>
<td>VNAEP AUTO</td>
<td>AUTO</td>
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<tr>
<td>SOP Class UID</td>
<td>0008,0016</td>
<td>UI</td>
<td>1.2.840.10008.5.1.4.1.1.1,</td>
<td>ALWAYS AUTO</td>
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<td>SOP Instance UID</td>
<td>0008,0018</td>
<td>UI</td>
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Table 96: VOI LUT Module

<table>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window Center</td>
<td>0028,1050</td>
<td>DS</td>
<td>2048</td>
<td>ANAPEV AUTO</td>
<td>AUTO</td>
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</tr>
<tr>
<td>Window Width</td>
<td>0028,1051</td>
<td>DS</td>
<td>4096</td>
<td>ANAPEV AUTO</td>
<td>AUTO</td>
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Table 97: Additional Module

<table>
<thead>
<tr>
<th>Attribute Name</th>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Pixel Spacing</td>
<td>0028,0030</td>
<td>DS</td>
<td>1,1</td>
<td>VNAEP AUTO</td>
<td>AUTO</td>
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</tbody>
</table>

8.1.2. Usage of Attributes from Received IOD

Not Applicable

8.1.3. Attribute Mapping

Not Applicable.

8.1.4. Coerced/Modified fields

None.

8.2. Data Dictionary of Private Attributes

Any private attributes shall be specified, including its VR and VM. Private SOP classes and transfer syntaxes shall be listed.

8.3. Coded Terminology and Templates

Not Applicable.

8.4. Grayscale Image consistency

Any support for the DICOM Grayscale Standard Display Function will be specified in this section.
8.5. **Standard Extended/Specialized/Private SOPs**  
Not Applicable

8.6. **Private Transfer Syntaxes**  
Not Applicable.