



# DICOM Conformance Statement

## Console Advance

DR-ID 300CL/DR-ID 700CL/

DR-ID 800CL/DR-ID 900CL

for

DICOM Storage

DICOM Storage Commitment

DICOM MWM

DICOM MPPS

DICOM Print

DICOM Query / Retrieve

DICOM Media Storage

DICOM Dose SR

(Standard)

Aug, 2014

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## 1 CONFORMANCE STATEMENT OVERVIEW

Table 1-1 provides an overview of the network services supported by DR-ID 300CL.

The DR-ID 300CL implements the necessary DICOM services to save acquired images to a network storage device.

**TABLE 1-1 NETWORK SERVICES**

| SOP Classes  | User of Service (SCU) | Provider of Service (SCP) |
|--|-----------------------|---------------------------|
| <b>Transfer</b>  |                       |                           |
| Computed Radiography Image Storage                         | Yes                   | Yes                       |
| Digital X-ray Image Storage – For Presentation             | Yes                   | Yes                       |
| Digital X-ray Image Storage – For Processing               | Yes                   | No                        |
| Digital Mammography X-Ray Image Storage – For Presentation | Yes                   | Yes                       |
| Digital Mammography X-Ray Image Storage – For Processing   | Yes                   | No                        |
| X-Ray Radiation Dose SR                                    | Yes                   | No                        |
| <b>Workflow Management</b>                                 |                       |                           |
| Modality Worklist Information Model – FIND                 | Yes                   | No                        |
| Modality Performed Procedure Step                          | Yes                   | No                        |
| Storage Commitment Push Model                              | Yes                   | No                        |
| <b>Query/Retrieve</b>                                      |                       |                           |
| Study Root Query/Retrieve Information Model - FIND         | Yes                   | No                        |
| Study Root Query/Retrieve Information Model - MOVE         | Yes                   | No                        |
| <b>Print Management</b>                                    |                       |                           |
| Basic Grayscale Print Management Meta                      | Yes                   | No                        |

Table 1-2 provides an overview of the Media Storage Application Profiles supported by DR-ID300CL

**TABLE 1- 2 MEDIA SERVICES**

| Media Storage Application Profile | Write Files (FSC) | Read Files (FSR) |
|-----------------------------------|-------------------|------------------|
| <b>DVD</b>                        |                   |                  |
| General Purpose DVD ±RW           | Yes               | Yes              |
| <b>USB drive</b>                  |                   |                  |
| General Purpose USB drive         | Yes               | No               |

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### 3 INTRODUCTION

#### 3.1 REVISION HISTORY

| Document Version | Date of Issue   | Author   | Description                                       |
|------------------|-----------------|----------|---|
| 1.0              | July, 2009      | FUJIFILM | Version for Final Text                            |
| 2.0              | March, 2010     | FUJIFILM | Updated Support Offline-Media                     |
| 3.0              | December, 2010  | FUJIFILM | Updated   |
| 4.0              | June, 2011      | FUJIFILM | Updated   |
| 5.0              | September, 2011 | FUJIFILM | Updated   |
| 6.0              | January,2012    | FUJIFILM | Updated   |
| 7.0              | July, 2012      | FUJIFILM | Updated   |
| 8.0              | November, 2012  | FUJIFILM | Updated Support Query / Retrieve                  |
| 9.0              | March, 2013     | FUJIFILM | Updated   |
| 10.0             | September, 2013 | FUJIFILM | Updated   |
| 11.0             | February, 2014  | FUJIFILM | Updated Support Enhanced General Equipment Module |

#### 3.2 AUDIENCE

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

#### 3.3 REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with FUJIFILM and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between FUJIFILM and non- FUJIFILM equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. FUJIFILM is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

### 3.4 DEFINITIONS, TERMS AND ABBREVIATIONS

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Abbreviations and terms are as follows:

|        |   |
|--------|---|
| AE     | DICOM Application Entity                        |
| CR     | Computed Radiography                            |
| DX     | Digital X-ray                                   |
| FSC    | File-Set Creator                                |
| FSU    | File-Set Updater                                |
| FSR    | File-Set Reader                                 |
| IE     | Information Entity                              |
| IOD    | (DICOM) Information Object Definition           |
| ISO    | International Standard Organization             |
| MG     | Mammography                                     |
| PDU    | DICOM Protocol Data Unit                        |
| SCU    | DICOM Service Class User (DICOM client)         |
| SCP    | DICOM Service Class Provider (DICOM server)     |
| SOP    | DICOM Service-Object Pair                       |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| UID    | Unique Identifier                               |
| VM     | Value Multiplicity                              |
| VR     | Value Representation                            |

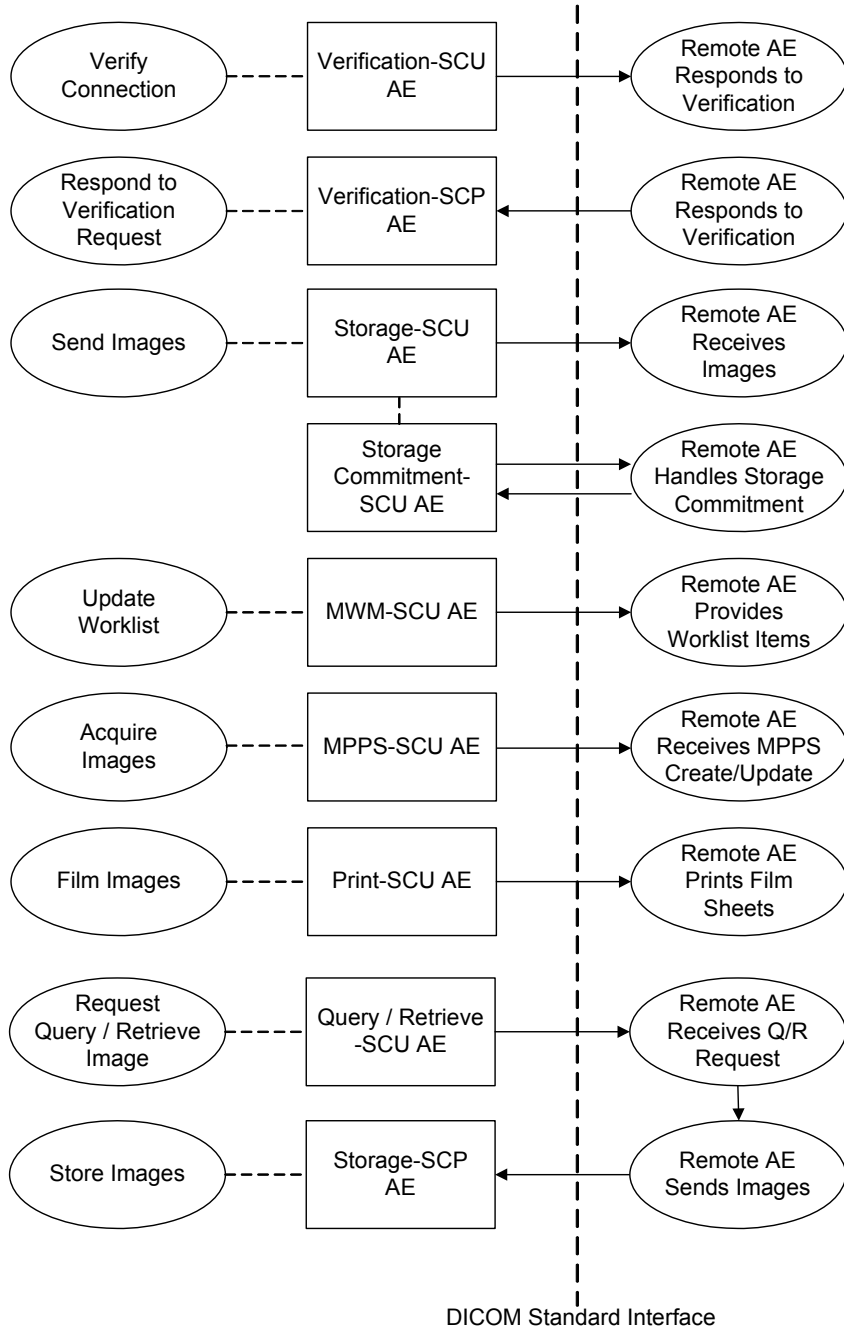
### 3.5 REFERENCES

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2007

## 4 NETWORKING

### 4.1 IMPLEMENTATION MODEL

#### 4.1.1 Application Data Flow



**FIGURE 4.1-1 APPLICATION DATA FLOW DIAGRAM**

- The Verification-SCU AE issues a C-ECHO to verify a DICOM connection to a remote AE. It is associated with the local real-world activity “Verify Connectivity”. “Verify Connectivity” is performed via the Service Tool.
- The Verification SCP AE responds successfully to C-ECHO requests from known AE Titles. It is associated with the local real-world activity “Respond to Verification Request”.
- The Storage-SCU Application Entity sends images to a remote AE. It is associated with the local real-world activity “Send Images”. “Send Images” is performed upon user request for each study completed or for specific images selected. When activated by user’s settings (auto-send), each marked set of images can be immediately stored to a preferred destination whenever a Patient/Study is closed by the user.
- Receiving the storage commitment request from the Storage-SCU AE, the Storage Commitment-SCU AE will request Storage Commitment and record commitment information in the local database if a commitment is successfully obtained.
- The MWM-SCU Application Entity receives Worklist information from a remote AE. It is associated with the local real-world activities “Update Worklist”. When the “Update Worklist” local real-world activity is performed the MWM-SCU Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed as a result of an operator request or can be performed automatically at specific time intervals.
- The MPPS-SCU Application Entity sends MPPS information to a remote AE. When the “Acquire Images” local real-world activity is performed the MPPS-SCU Application Entity creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator action.
- The Print-SCU Application Entity prints images on a remote AE (Printer). It is associated with the local real-world activity “Film Images”. “Film Images” creates a print-job within the print queue containing one or more virtual film sheets composed from images selected by the user.
- The Query/Retrieve-SCU Application Entity queries remote AEs for lists of studies, series and instances and retrieves selected studies, series or instances from lists. It is associated with the local real-world activity “Requests Query/Retrieve”
- The Storage-SCP Application Entity receives incoming images. It is associated with the local real-world activity “Store Images”.

#### 4.1.2 Functional Definition of AEs

##### 4.1.2.1 Functional Definition of Verification-SCU Application Entity

The Verification-SCU AE issues a C-ECHO to verify a DICOM connection to a remote AE. It is performed via the Service Tool.

##### 4.1.2.2 Functional Definition of Verification-SCP Application Entity

The Verification-SCP AE responds successfully to C-ECHO requests from known AE Titles.

#### 4.1.2.3 Functional Definition of Storage-SCU Application Entity

The existence of a send-job queue entry with associated network destination will activate the Storage-SCU AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state. By default, the Storage AE will retry to initiate another association for this send-job automatically.

#### 4.1.2.4 Functional Definition of Storage Commitment-SCU Application Entity

The Storage Commitment-SCU AE receiving the storage commitment request from the Storage-SCU AE, the Storage Commitment-SCU AE will request Storage Commitment and record commitment information in the local database if a commitment is successfully obtained.

#### 4.1.2.5 Functional Definition of MWM-SCU Application Entity

Worklist Update attempts to download a Worklist from a remote node. If the MWM-SCU AE establishes an Association to a remote AE, it will transfer all worklist items via the open Association. During receiving the worklist response items are counted and the query processing is canceled if the configurable limit of items is reached. The results will be displayed in a separate list, which will be cleared with the next Worklist Update.

#### 4.1.2.6 Functional Definition of MPPS-SCU Application Entity

The MPPS-SCU AE creates an MPPS Instance automatically when the user selects and starts a worklist item. And the MPPS data is updated when the user completes the acquisition.

#### 4.1.2.7 Functional Definition of Print-SCU Application Entity

The existence of a print-job in the print queue will activate the Print-SCU AE. An association is established with the printer and the printer's status determined. If the printer is operating normally, the film sheets described within the print-job will be printed. Changes in printer status will be detected (e.g. out of film) and reported to the user. If the printer is not operating normally, the print-job will set to an error state and can be restarted by the user via the job control interface.

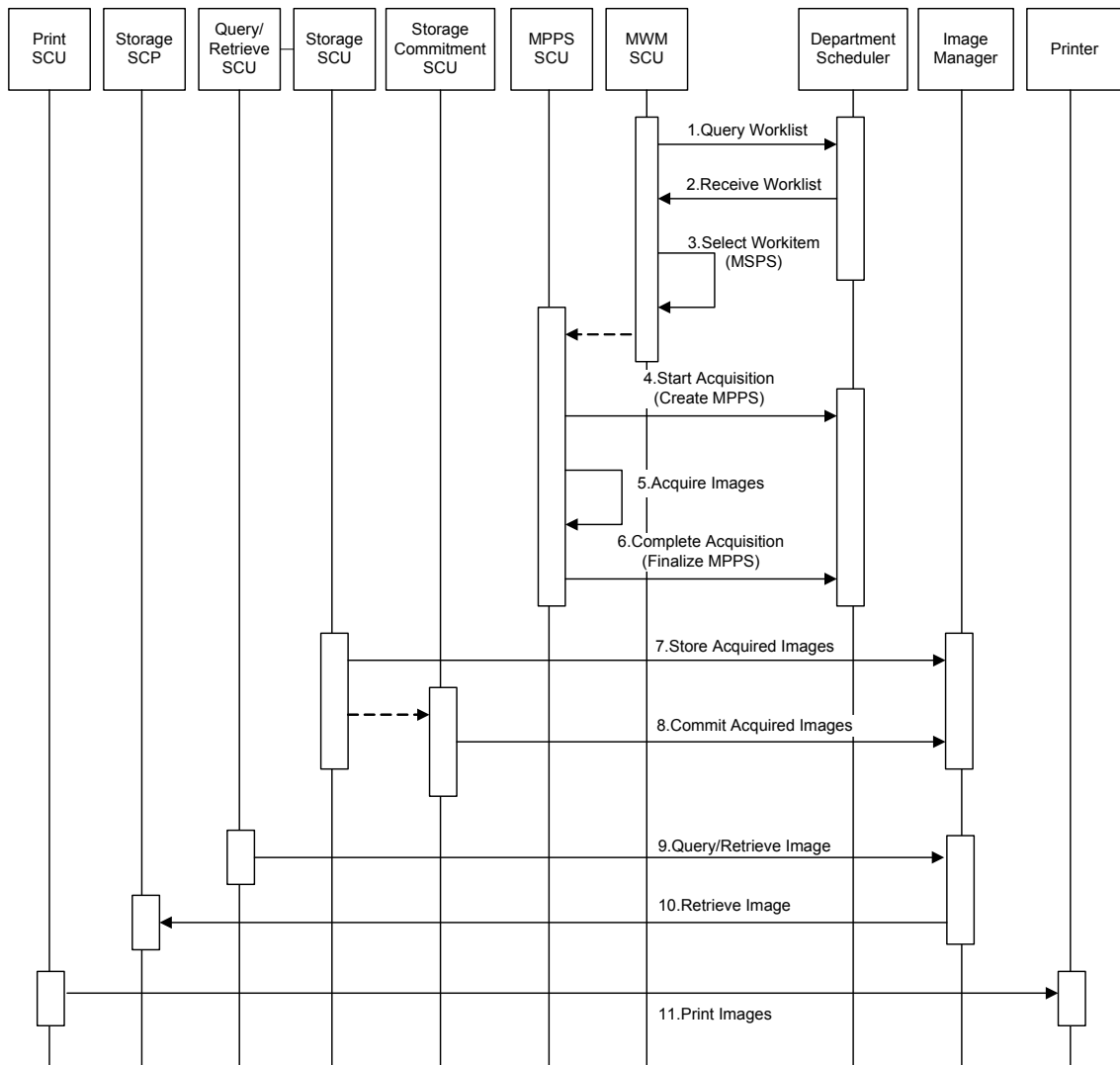
#### 4.1.2.8 Functional Definition of Query/Retrieve-SCU Application Entity

The Query/Retrieve-SCU Application Entity is activated through the user interface when a user selects a remote AE to query (from a pre-configured list), then initiates a query. Queries are performed recursively from the study through the series and instance levels until all matching instances have been listed. And the Query/Retrieve AE is activated through the user interface when a user selects a study, series or instance for retrieval. A connection to the remote AE is established to initiate and monitor the retrieval and the Storage-SCP AE receives the retrieved instances.

#### 4.1.2.9 Functional Definition of Storage-SCP Application Entity

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.

### 4.1.3 Sequencing of Real-World Activities



**FIGURE 4.1-2 SEQUENCING CONSTRAINTS**

Under normal workflow conditions the sequencing constraints illustrated in Figure 4.1-2 apply:

1. Query Worklist
2. Receive Worklist
3. Select Workitem (MSPS)
4. Start Acquisition (Create MPPS)
5. Acquire Images
6. Complete Acquisition (Finalize MPPS)
7. Store Acquired Images
8. Commit Acquired Images
9. Query/Retrieve Images
10. Receive Images
11. Print Images

Other workflow situations (e.g. auto-send) will have other sequencing constraints.

## 4.2 AE SPECIFICATIONS

### 4.2.1 Verification-SCU Application Entity Specification

#### 4.2.1.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-1 SOP CLASSES FOR THE VERIFICATION-SCU AE**

| SOP Class Name | SOP Class UID     | SCU | SCP |
|----------------|-------------------|-----|-----|
| Verification   | 1.2.840.10008.1.1 | Yes | No  |

#### 4.2.1.2 Association Policies

##### 4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-2 DICOM APPLICATION CONTEXT FOR THE VERIFICATION-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

##### 4.2.1.2.2 Number of Associations

DR-ID 300CL initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-3 NUMBER OF ASSOCIATIONS INITIATED FOR THE VERIFICATION -SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

##### 4.2.1.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-4 ASYNCHRONOUS NATURE FOR THE VERIFICATION-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

##### 4.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-5 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE VERIFICATION-SCU AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |



4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Send Images

4.2.1.3.1.1 Description and Sequencing of Activities

The DR-ID 300CL will acquire images and send those images automatically to the pre-set remote host or select images from the list of images thus stored and send them to the specified destination.

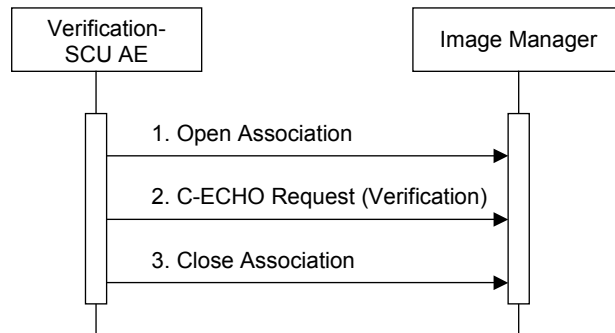


FIGURE 4.2-1 SEQUENCING OF ACTIVITY – VERIFY CONNECTION

A possible sequence of interactions between the Storage-SCU AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in the Figure above:

1. The Verification-SCU AE opens an association with the Image Manager
2. The Verification-SCU AE issues a verification request (C-ECHO) and the Image Manager replies with a C-ECHO response (status success).
3. The Verification-SCU AE closes the association with the Image Manager.

4.2.1.3.1.2 Proposed Presentation Contexts

The Verification-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

TABLE 4.2-6 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY VERIFY CONNECTION

| Presentation Context Table |                   |                           |                   |      |           |
|----------------------------|-------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax            |                   | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                       | UID               | Name List                 | UID List          |      |           |
| Verification               | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

4.2.1.3.1.3 SOP Specific Conformance Verification SOP Classes

The Verification-SCU AE provides standard conformance to the Verification Service Class as an SCU.

The behavior of Verification-SCU AE when encountering status codes in a C-ECHO response is summarized in the table below:

TABLE 4.2-7 VERIFICATION RESPONSE STATUS HANDLING BEHAVIOR

| Service Status | Further Meaning | Error Code             | Behavior  |
|----------------|-----------------|------------------------|---|
| Success        | Success         | 0000                   | The Verification-SCU AE judges the remote AE is present and active on the network.        |
| *              | *               | Any other status code. | The Verification-SCU AE judges the remote AE is not present or not active on the network. |

4.2.1.4 Association Acceptance Policy

The Verification-SCU AE does not accept any association.

4.2.2 Verification-SCP Application Entity Specification

4.2.2.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-8 SOP CLASSES FOR THE VERIFICATION-SCP AE**

| SOP Class Name | SOP Class UID     | SCU | SCP |
|----------------|-------------------|-----|-----|
| Verification   | 1.2.840.10008.1.1 | No  | Yes |

4.2.2.2 Association Policies

4.2.2.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-9 DICOM APPLICATION CONTEXT FOR THE VERIFICATION-SCP AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.2.2.2 Number of Associations

**TABLE 4.2-10 NUMBER OF ASSOCIATIONS ACCEPTED FOR THE VERIFICATION-SCP AE**

|   |           |
|---|-----------|
| Maximum number of simultaneous Associations | Unlimited |
|---|-----------|

4.2.2.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-11 ASYNCHRONOUS NATURE FOR THE VERIFICATION-SCP AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.2.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-12 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE VERIFICATION-SCP AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.2.3 Association Initiation Policy

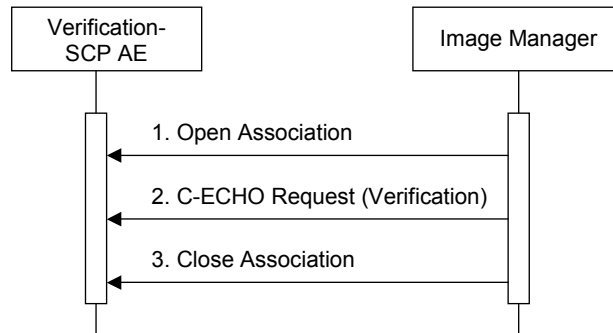
The Verification-SCP AE does not initiate associations.

4.2.2.4 Association Acceptance Policy

4.2.2.4.1 Activity – Respond to Verification Request

4.2.2.4.1.1 Description and Sequencing of Activities

The Verification SCU AE attempts to initiate a new association in order to issue a verification request (C-ECHO) if needed.



**FIGURE 4.2-2 SEQUENCING OF ACTIVITY – RESPOND TO VERIFICATION REQUEST**

A possible sequence of interactions between the Verification-SCP AE and an Image Manager (e.g. a storage or archive device supporting the Verification SOP Classes as an SCU) is illustrated in the Figure above:

1. The Image Manager opens an association with the Verification-SCP AE.
2. The Image Manager issues a verification request (C-ECHO) and the Verification-SCP AE replies with a C-ECHO response (status success).
3. The Image Manager closes the association with the Verification-SCP AE.

**TABLE 4.2-13 ASSOCIATION REJECTION REASONS**

| Result                 | Source  | Reason/Diag                          | Explanation   |
|------------------------|---|--------------------------------------|---|
| 1 – rejected-permanent | DICOM UL service-user                             | 3 – calling-AE-title not- recognized | The association request contained an unrecognized calling AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the association acceptor has not been configured to recognize the AE Title of the association initiator. |
| 1 – rejected-permanent | DICOM UL service-provider (ASCE related function) | 1 – no-reason-given                  | The association request could not be parsed. An association request with the same format will not succeed at a later time.  |

4.2.2.4.1.2 Accepted Presentation Contexts

The Verification-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2-14 ACCEPTED PRESENTATION CONTEXTS FOR ACTIVITY RESPOND TO VERIFICATION REQUEST**

| Presentation Context Table |                   |                           |                   |      |           |
|----------------------------|-------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax            |                   | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                       | UID               | Name List                 | UID List          |      |           |
| Verification               | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP  | None      |

4.2.2.4.1.3 SOP Specific Conformance for Verification SOP Class

The Verification-SCP AE provides standard conformance to the Verification Service Class as an SCP.

4.2.3 Storage-SCU Application Entity Specification

4.2.3.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-15 SOP CLASSES FOR THE STORAGE-SCU AE**

| SOP Class Name   | SOP Class UID                 | SCU | SCP |
|--|-------------------------------|-----|-----|
| Computed Radiography Image Storage                         | 1.2.840.10008.5.1.4.1.1.1     | Yes | No  |
| Digital X-ray Image Storage – For Presentation             | 1.2.840.10008.5.1.4.1.1.1.1   | Yes | No  |
| Digital X-ray Image Storage – For Processing               | 1.2.840.10008.5.1.4.1.1.1.1.1 | Yes | No  |
| Digital Mammography X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.2   | Yes | No  |
| Digital Mammography X-Ray Image Storage – For Processing   | 1.2.840.10008.5.1.4.1.1.1.2.1 | Yes | No  |
| X-Ray Radiation Dose SR                                    | 1.2.840.10008.5.1.4.1.1.88.67 | Yes | No  |

4.2.3.2 Association Policies

4.2.3.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-16 DICOM APPLICATION CONTEXT FOR THE STORAGE-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.3.2.2 Number of Associations

DR-ID 300CL initiates Three Associations at a time for each destination to which a transfer request is being processed in the active job queue list. Three jobs will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-17 NUMBER OF ASSOCIATIONS INITIATED FOR THE STORAGE-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 3 |
|---|---|

4.2.3.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-18 ASYNCHRONOUS NATURE FOR THE STORAGE-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.3.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-19 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE-SCU AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity – Send Images

4.2.3.3.1.1 Description and Sequencing of Activities

The DR-ID 300CL will acquire images and send those images automatically to the pre-set remote host or select images from the list of images thus stored and send them to the specified destination.

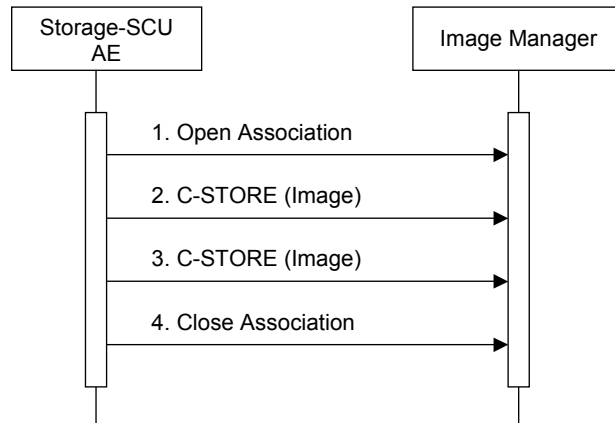


FIGURE 4.2-3 SEQUENCING OF ACTIVITY – SEND IMAGES

A possible sequence of interactions between the Storage-SCU AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage-SCU AE opens an association with the Image Manager
2. An acquired image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
3. Another acquired image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
4. The Storage-SCU AE closes the association with the Image Manager.

NOTE: Many other message sequences are possible depending on the number of images to be stored.

4.2.3.3.1.2 Proposed Presentation Contexts

The Storage-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

TABLE 4.2-20 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES

| Presentation Context Table                     |                               |   |                        |      |           |
|--|-------------------------------|---|------------------------|------|-----------|
| Abstract Syntax                                |                               | Transfer Syntax                                   |                        | Role | Ext. Neg. |
| Name   | UID                           | Name List   | UID List               |      |           |
| Computed Radiography Image Storage             | 1.2.840.10008.5.1.4.1.1.1     | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCU  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital X-ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.1   | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCU  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital X-ray Image Storage – For Processing   | 1.2.840.10008.5.1.4.1.1.1.1.1 | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCU  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |

|  |                               |   |                        |     |      |
|--|-------------------------------|---|------------------------|-----|------|
| Digital Mammography X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.2   | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCU | None |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |     |      |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |     |      |
| Digital Mammography X-Ray Image Storage – For Processing   | 1.2.840.10008.5.1.4.1.1.1.2.1 | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCU | None |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |     |      |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |     |      |
| X-Ray Radiation Dose SR                                    | 1.2.840.10008.5.1.4.1.1.88.67 | Implicit VR Little Endian                         | 1.2.840.10008.1.2      |     |      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |     |      |

NOTE: Multiple Transfer Syntax can be set in an Abstract Syntax, however only one setting that is set first is valid.

#### 4.2.3.3.1.3 SOP Specific Conformance Image Storage SOP Classes

This implementation tries to send all images that belong to a single study over a single association. If some of the images could not be sent successfully, this implementation will terminate the association and try to resend all images over another association.

The behavior of Storage-SCU AE when encountering status codes in a C-STORE response is summarized in the Table below:

**TABLE 4.2-21 STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior  |
|----------------|-----------------|------------------------|---|
| Success        | Success         | 0000                   | The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.  |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application. |

#### 4.2.3.4 Association Acceptance Policy

The Storage-SCU AE does not accept any association.

#### 4.2.4 Storage Commitment-SCU Application Entity Specification

##### 4.2.4.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-22 SOP CLASSES FOR THE STORAGE COMMITMENT-SCU AE**

| SOP Class Name                | SOP Class UID        | SCU | SCP |
|-------------------------------|----------------------|-----|-----|
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Yes | No  |

##### 4.2.4.2 Association Policies

###### 4.2.4.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-23 DICOM APPLICATION CONTEXT FOR THE STORAGE COMMITMENT-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.4.2.2 Number of Associations

The Storage Commitment-SCU AE can initiate up to three associations at a time.

**TABLE 4.2-24 NUMBER OF ASSOCIATIONS INITIATED FOR THE STORAGE COMMITMENT-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous associations | 3 |
|---|---|

The Storage Commitment SCU AE accepts associations to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class.

**TABLE 4.2-25 NUMBER OF ASSOCIATIONS ACCEPTED FOR THE STORAGE COMMITMENT-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous associations | 3 |
|---|---|

4.2.4.2.3 Asynchronous Nature

The Storage Commitment-SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**TABLE 4.2-26 ASYNCHRONOUS NATURE FOR THE STORAGE COMMITMENT-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.4.2.4 Implementation Identifying Information

**TABLE 4.2-27 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE COMMITMENT-SCU AE**

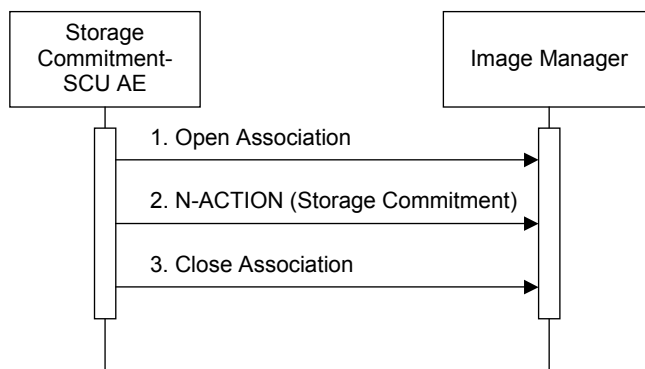
|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.4.3 Association Initiation Policy

4.2.4.3.1 Activity – Commit Sent Images

4.2.4.3.1.1 Description and Sequencing of Activities

If the remote AE is configured as a Storage Commitment-SCP AE, the Storage Commitment-SCU AE will, after all images have been sent, transmit a single storage commitment request (N-ACTION). Upon receiving the N-ACTION response the Storage Commitment-SCU AE will release the association. The notification of storage commitment (N-EVENT-REPORT) will be received over a separate association.



**FIGURE 4.2-4 SEQUENCING OF ACTIVITY – COMMIT SENT IMAGES**

A possible sequence of interactions between the Storage Commitment-SCU AE and an Image Manager (e.g.



a storage or archive device supporting the Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage Commitment-SCU AE opens an association with the Image Manager.
2. A storage commitment request (N-ACTION) is transmitted to the Image Manager to obtain storage commitment of previously transmitted images. The Image Manager replies with an N-ACTION response indicating the request has been received and is being processed.
3. The Storage Commitment-SCU AE closes the association with the Image Manager.

NOTE: The N-EVENT-REPORT will be sent over a separate association initiated by the Image Manager.  
(See Section 4.2.2.4.1)

#### 4.2.4.3.1.2 Proposed Presentation Contexts

The Storage Commitment-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2-28 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY COMMIT SEND IMAGES**

| Presentation Context Table    |                      |                           |                   |      |           |
|-------------------------------|----------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax               |                      | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                          | UID                  | Name List                 | UID List          |      |           |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

#### 4.2.4.3.1.3 SOP Specific Conformance for Storage Commitment SOP Classes

The Storage Commitment-SCU AE provides standard conformance to the Storage Commitment Service Class as an SCU. The Storage Commitment-SCU AE will request storage commitment for instances of the Storage SOP Classes if the remote AE is configured as a Storage Commitment-SCP AE and a presentation context for the Storage Commitment Push Model has been accepted.

The behavior of Storage Commitment-SCU AE when encountering status codes in a N-ACTION response is summarized in the table below:

**TABLE 4.2-29 STORAGE COMMITMENT N-ACTION RESPONSE STATUS HANDLING BEHAVIOR**

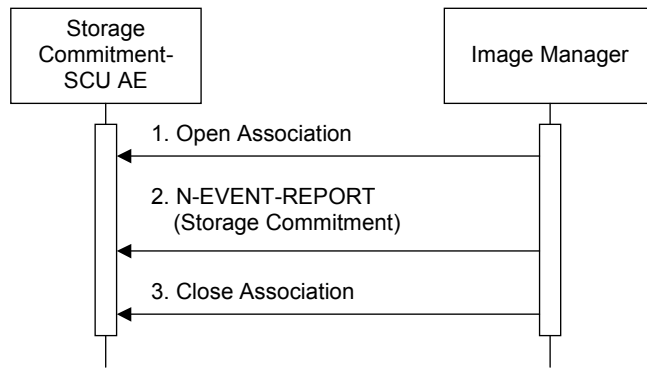
| Service Status | Further Meaning | Error Code             | Behavior  |
|----------------|-----------------|------------------------|---|
| Success        | Success         | 0000                   | The request for storage commitment is considered successfully sent. A timer is started which will expire if no N-EVENT-REPORT for the Transaction UID is received within a configurable timeout period. |
| *              | *               | Any other status code. | The association is aborted and the request for storage commitment is marked as failed.  |

#### 4.2.4.4 Association Initiation Policy

##### 4.2.4.4.1 Activity – Receive Storage Commitment

##### 4.2.4.4.1.1 Description and Sequencing of Activities

The Storage Commitment-SCU AE will accept associations in order to receive responses to a storage commitment request.



**FIGURE 4.2-5 SEQUENCING OF ACTIVITY – RECEIVE STORAGE COMMITMENT**

A possible sequence of interactions between the Storage Commitment-SCU AE and an Image Manager (e.g. a storage or archive device supporting the Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Image Manager opens an association with the Storage Commitment-SCU AE.
2. The Image Manager sends an N-EVENT-REPORT request notifying the Storage-SCU AE of the status of a previous storage commitment request. The Storage-SCU AE replies with an N-EVENT-REPORT response confirming receipt.
3. The Image Manager closes an association with the Storage Commitment-SCU AE.

#### 4.2.4.4.1.2 Proposed Presentation Contexts

The Presentation Contexts shown in the following table are acceptable to the Storage Commitment-SCU AE:

**TABLE 4.2-30 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY RECEIVE STORAGE COMMITMENT**

| Presentation Context Table    |                      |                           |                   |      |           |
|-------------------------------|----------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax               |                      | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                          | UID                  | Name List                 | UID List          |      |           |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

#### 4.2.4.4.1.3 SOP Specific Conformance for Storage Commitment SOP Classes

The behavior of Storage Commitment-SCU AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below.

**TABLE 4.2-31 STORAGE COMMITMENT N-EVENT-REPORT BEHAVIOR**

| Event Type Name                                      | Event Type ID | Behavior  |
|--|---------------|---|
| Storage Commitment Request Successful                | 1             | The Storage Commitment SCU AE permits the operator(s) to delete the Referenced SOP Instances under Referenced SOP Sequence (0008,1199), or deletes the Instances from the local database automatically. |
| Storage Commitment Request Complete – Failures Exist | 2             | The Storage Commitment SCU AE requests the Storage SCU AE to send the Referenced SOP Instances under Failed SOP Sequence (0008,1198).   |

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the table below.

**TABLE 4.2-32 STORAGE COMMITMENT N-EVENT-REPORT RESPONSE STATUS REASONS**

| Service Status | Further Meaning        | Error Code | Reasons  |
|----------------|------------------------|------------|--|
| Success        | Success                | 0000       | The storage commitment result has been successfully received.  |
| Failure        | Unrecognized Operation | 0211H      | The Transaction UID in the N-EVENT-REPORT request is not recognized (was never issued within an N-ACTION request).               |
| Failure        | Resource Limitation    | 0213H      | The Transaction UID in the N-EVENT-REPORT request has expired (no N-EVENT-REPORT was received within a configurable time limit). |
| Failure        | No Such Event Type     | 0113H      | An invalid Event Type ID was supplied in the N-EVENT-REPORT request.   |

| Service Status | Further Meaning        | Error Code             | Reasons   |
|----------------|------------------------|------------------------|---|
| Failure        | Processing Failure     | 0110H                  | An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).   |
| Failure        | Invalid Argument Value | 0115H                  | One or more SOP Instance UIDs with the Referenced SOP Sequence (0008,1199) or Failed SOP Sequence (0008,1198) was not included in the Storage Commitment Request associated with this Transaction UID. The unrecognized SOP Instance UIDs will be returned within the Event Information of the N-EVENT-REPORT response. |
| *              | *                      | Any other status code. | The storage commitment result has some error, so result has not been successfully received.   |

#### 4.2.5 MWM-SCU Application Entity Specification

##### 4.2.5.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-33 SOP CLASSES FOR THE MWM-SCU AE**

| SOP Class Name                             | SOP Class UID          | SCU | SCP |
|--|------------------------|-----|-----|
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | Yes | No  |

##### 4.2.5.2 Association Policies

###### 4.2.5.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-34 DICOM APPLICATION CONTEXT FOR THE MWM-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

###### 4.2.5.2.2 Number of Associations

DR-ID 300CL initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-35 NUMBER OF ASSOCIATIONS INITIATED FOR THE MWM-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

###### 4.2.5.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-36 ASYNCHRONOUS NATURE FOR THE MWM-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.5.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-37 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE MWM-SCU AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.5.3 Association Initiation Policy

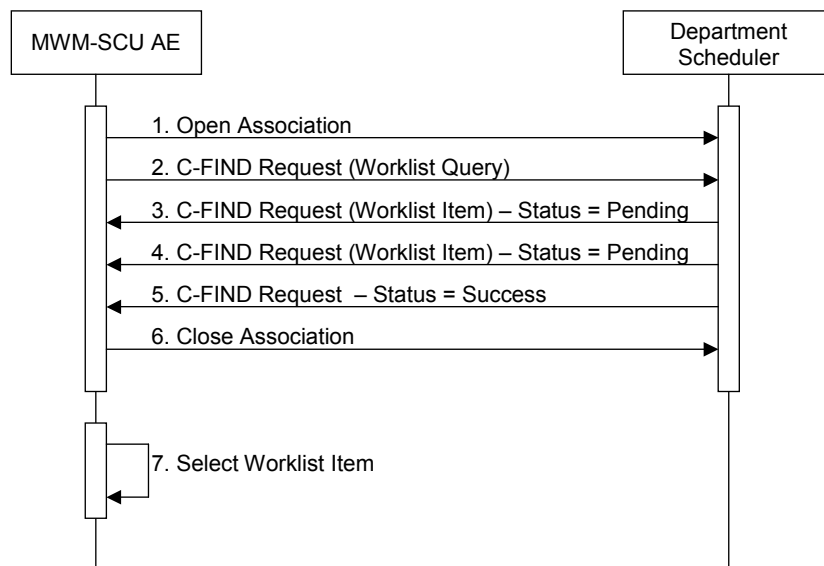
4.2.5.3.1 Activity – Update Worklist

4.2.5.3.1.1 Description and Sequencing of Activities

The request for an Update Worklist is initiated by user interaction, i.e. pressing the buttons “Refresh” or automatically at specific time intervals, configurable by the user.

Upon initiation of the request, the MWM-SCU AE will build an Identifier for the C-FIND request, will initiate an Association to send the request and will wait for Worklist responses. After retrieval of all responses, the MWM-SCU AE will access the local database to add or update patient demographic data. The results will be displayed in a list.

The will initiate an Association in order to issue a C-FIND request according to the Modality Worklist Information Model.



**FIGURE 4.2-6 SEQUENCING OF ACTIVITY – UPDATE WORKLIST**

A possible sequence of interactions between the MWM-SCU AE and a Departmental Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the Figure above:

1. The MWM-SCU AE opens an association with the Department Scheduler.
2. The MWM-SCU AE sends a C-FIND request to the Department Scheduler containing the Worklist Query attributes.
3. The Department Scheduler returns a C-FIND response containing the requested attributes of the first matching worklist item.

4. The Departmental Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Department Scheduler returns another C-FIND response with status Success indicating that no further matching worklist items exist. This example assumes that only 2 worklist items match the Worklist Query.
6. The MWM-SCU AE closes the association with the Department Scheduler.
7. The user selects a worklist item from the Worklist and prepares to acquire new images.

4.2.5.3.1.2 Proposed Presentation Contexts

The MWM-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2-38 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY UPDATE WORKLIST**

| Presentation Context Table                 |                        |                           |                   |      |           |
|--|------------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax                            |                        | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                                       | UID                    | Name List                 | UID List          |      |           |
| Modality Worklist Information Model – FIND | 1.2.840.10008.5.1.4.31 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

4.2.5.3.1.3 SOP Specific Conformance for Modality Worklist SOP Classes

The MWM-SCU AE provides standard conformance to the Modality Worklist SOP Class as an SCU.

The behavior of the MWM-SCU AE when encountering status codes in a Modality Worklist C-FIND response is summarized in the table below.

**TABLE 4.2-39 MODALITY WORKLIST C-FIND RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the matches. Worklist items are available for display or further processing. |
| *              | *               | Any other status code. | The association is aborted using A-ABORT and the status meaning is logged.                         |

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The table below provides a description of the MWM-SCU AE Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

**TABLE 4.2-40 WORKLIST REQUEST IDENTIFIER**

| Module Name<br>Attribute Name           | Tag         | VR | M   | R | D | IOD |
|---|-------------|----|-----|---|---|-----|
| <b>SOP Common</b>                       |             |    |     |   |   |     |
| Specific Character Set                  | (0008,0005) | CS |     | x |   | x   |
| <b>Scheduled Procedure Step</b>         |             |    |     |   |   |     |
| Scheduled Procedure Step Sequence       | (0040,0100) | SQ |     | x |   |     |
| >Scheduled Procedure Step ID            | (0040,0009) | SH |     | x |   | x   |
| >Scheduled Station AE Title             | (0040,0001) | AE | S   | x |   |     |
| >Scheduled Procedure Step Start Data    | (0040,0002) | DA | S/R | x |   |     |
| >Scheduled Procedure Step Start Time    | (0040,0003) | TM |     | x |   |     |
| >Scheduled Performing Physician's Name  | (0040,0006) | PN |     | x |   |     |
| >Scheduled Procedure Step Description   | (0040,0007) | LO |     | x |   | x   |
| >Scheduled Protocol Code Sequence       | (0040,0008) | SQ |     | x |   | x   |
| >>Code Value                            | (0008,0100) | SH |     | x |   | x   |
| >>Coding Scheme Designator              | (0008,0102) | SH |     | x |   | x   |
| >>Coding Scheme Version                 | (0008,0103) | SH |     | x |   | x   |
| >>Code Meaning                          | (0008,0104) | LO |     | x |   | x   |
| >Modality                               | (0008,0060) | CS | S   | x |   | x   |
| <b>Requested Procedure</b>              |             |    |     |   |   |     |
| Requested Procedure ID                  | (0040,1001) | SH | S   | x |   |     |
| Requested Procedure Code Sequence       | (0032,1064) | SQ |     | x |   |     |
| >Code Value                             | (0008,0100) | SH |     | x |   |     |
| >Coding Scheme Designator               | (0008,0102) | SH |     | x |   |     |
| >Coding Scheme Version                  | (0008,0103) | SH |     | x |   |     |
| >Code Meaning                           | (0008,0104) | LO |     | x |   |     |
| Study Instance UID                      | (0020,000D) | UI |     | x |   | x   |
| Referenced Study Sequence               | (0008,1110) | SQ |     | x |   | x   |
| >Referenced SOP Class UID               | (0008,1150) | UI |     | x |   | x   |
| >Referenced SOP Instance UID            | (0008,1155) | UI |     | x |   | x   |
| Requested Procedure Description         | (0032,1060) | LO |     | x |   |     |
| Names of Intended Recipients of Results | (0040,1010) | PN |     | x |   |     |
| <b>Imaging Service Request</b>          |             |    |     |   |   |     |
| Referring Physician's Name              | (0008,0090) | PN |     | x |   |     |
| Referring Physician                     | (0032,1032) | PN |     | x | x |     |
| Requesting Service                      | (0032,1033) | LO |     | x | x |     |
| Accession Number                        | (0008,0050) | SH | S   | x | x | x   |
| Order Enterer's Location (*1)           | (0040,2009) | SH |     | x |   |     |
| <b>Visit Identification</b>             |             |    |     |   |   |     |
| <b>Visit Status</b>                     |             |    |     |   |   |     |
| Current Patient Location (*2)           | (0038,0300) | LO |     | x | x |     |
| Patient's Institution Residence         | (0038,0400) | LO |     | x | x |     |
| <b>Visit Relationship</b>               |             |    |     |   |   |     |
| Referenced Patient Sequence             | (0008,1120) | SQ |     | x |   |     |
| >Referenced SOP Class UID               | (0008,1150) | UI |     | x |   |     |
| >Referenced SOP Instance UID            | (0008,1155) | UI |     | x |   |     |

| Module Name<br>Attribute Name                     | Tag         | VR | M   | R | D | IOD |
|---|-------------|----|-----|---|---|-----|
| <b>Visit Admission</b>                            |             |    |     |   |   |     |
| <b>Patient Relationship</b>                       |             |    |     |   |   |     |
| <b>Patient Identification</b>                     |             |    |     |   |   |     |
| Patient's Name                                    | (0010,0010) | PN | S/* | x | x | x   |
| Patient ID  | (0010,0020) | LO | S   | x | x | x   |
| Other Patient IDs                                 | (0010,1000) | LO |     | x |   |     |
| <b>Patient Demographic</b>                        |             |    |     |   |   |     |
| Patients Birth Date                               | (0010,0030) | DA |     | x | x | x   |
| Patient's Sex                                     | (0010,0040) | CS |     | x | x | x   |
| Ethnic Group                                      | (0010,2160) | SH |     | x |   |     |
| Patient Comments                                  | (0010,4000) | LT |     | x | x |     |
| <b>Patient Medical</b>                            |             |    |     |   |   |     |
| Patient State                                     | (0038,0500) | LO |     | x |   |     |
| Pregnancy Status                                  | (0010,21C0) | US |     | x | x |     |
| Additional Patient History                        | (0010,21B0) | LT |     | x |   |     |
| <b>Radiation Dose (Extended)</b>                  |             |    |     |   |   |     |
| Radiation Dose Sequence                           | (0040,030E) | SQ |     | x |   |     |
| >Exposure Type                                    | (0018,115A) | CS |     | x |   |     |
| >KVp  | (0018,0060) | DS |     | x |   |     |
| >X-ray Tube Current in µA                         | (0018,8151) | DS |     | x |   |     |
| >Exposure Time                                    | (0018,1150) | IS |     | x |   |     |
| >Filter Type                                      | (0018,1160) | LO |     | x |   |     |
| >Filter Material                                  | (0018,7050) | CS |     | x |   |     |
| <b>General Study (Extended)</b>                   |             |    |     |   |   |     |
| Study Description                                 | (0008,1030) | LO |     | x |   |     |
| <b>Image Acquisition Results (Extended)</b>       |             |    |     |   |   |     |
| Study ID  | (0020,0010) | SH |     | x |   |     |
| <b>Basic Film Session Presentation (Extended)</b> |             |    |     |   |   |     |
| Number of Copies                                  | (2000,0010) | IS |     | x |   |     |
| <b>Private</b>                                    |             |    |     |   |   |     |
| Distribution Code                                 | (0009,xx90) | ST |     | x |   |     |

The above table should be read as follows:

- Module Name: The name of the associated module for supported worklist attributes.
- Attribute Name: Attributes supported to build the MWM-SCU AE Worklist Request Identifier.
- Tag: DICOM tag for this attribute.
- VR: DICOM VR for this attribute.
- M: Matching keys for (automatic) Worklist Update. An “S” will indicate that the MWM-SCU AE will supply an attribute value for Single Value Matching, a “R” will indicate Range Matching and a “\*” will denote wildcard matching.
- R: Return keys. An “x” will indicate that the MWM-SCU AE will supply this attribute as Return Key with zero length for Universal Matching.
- D: Displayed keys. An “x” indicates that this worklist attribute is displayed to the user during a patient registration. For example, Patient Name will be displayed when



registering the patient prior to an examination.

IOD: An “x” indicates that this worklist attribute is included into all Object Instances created during performance of the related Procedure Step.

(\*1) With mobile specifications, the “Order Enterer’s Location” cannot be displayed on the worklist screen.

(\*2) Other than mobile specifications, the “Current Patient Location” cannot be displayed on the worklist screen.

With any of these specifications, both (\*1) “Order Enterer’s Location” and (\*2) “Current Patient Location” can be displayed on the Order Information screen.

4.2.5.4 Association Acceptance Policy

The MWM-SCU AE does not accept any association.

4.2.6 MPPS-SCU Application Entity Specification

4.2.6.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-41 SOP CLASSES FOR THE MPPS-SCU AE**

| SOP Class Name                    | SOP Class UID           | SCU | SCP |
|-----------------------------------|-------------------------|-----|-----|
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Yes | No  |

4.2.6.2 Association Policies

4.2.6.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-42 DICOM APPLICATION CONTEXT FOR THE MPPS-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.6.2.2 Number of Associations

DR-ID 300CL initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-43 NUMBER OF ASSOCIATIONS INITIATED FOR THE MPPS-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

4.2.6.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-44 ASYNCHRONOUS NATURE FOR THE MPPS-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.6.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-45 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE MPPS-SCU AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

### 4.2.6.3 Association Initiation Policy

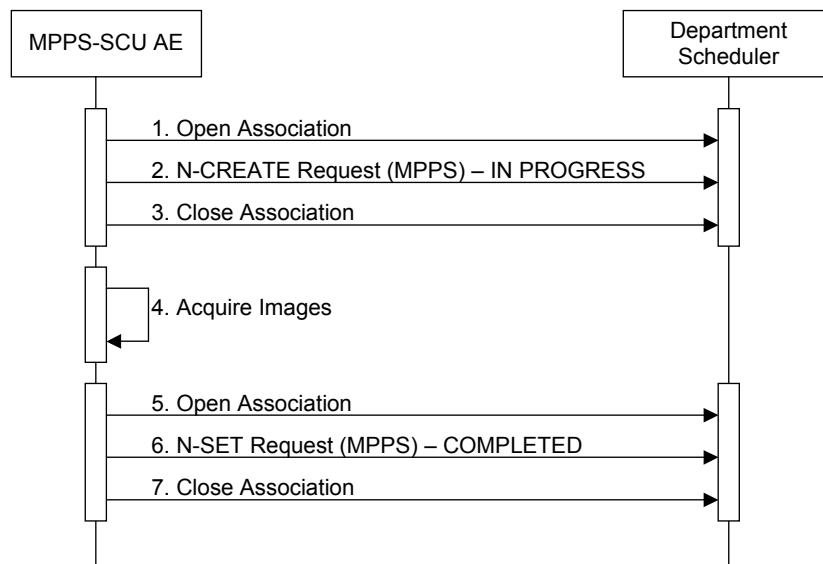
#### 4.2.6.3.1 Activity – Acquire Images

##### 4.2.6.3.1.1 Description and Sequencing of Activities

The MPPS-SCU AE performs the creation of an MPPS instance automatically when the user selects and starts a worklist item. Further updates on the MPPS data can be performed when the user completes the acquisition.

The MPPS-SCU AE will initiate an association to issue an:

- N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation, or an:
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.



**FIGURE 4.2-7 SEQUENCING OF ACTIVITY – ACQUIRE IMAGES**

A possible sequence of interactions between the MPPS SCU AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the MPPS SOP Class as an SCP) is illustrated in the Figure above:

1. The MPPS-SCU AE opens an association with the Department Scheduler.
2. The MPPS-SCU AE sends an N-CREATE request to the Department Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Department Scheduler acknowledges the MPPS creation with an N-CREATE response (status success).
3. The MPPS-SCU AE closes the association with the Department Scheduler.
4. All images are acquired and stored in the local database.
5. The MPPS-SCU AE opens an association with the Department Scheduler.
6. The MPPS-SCU AE sends an N-SET request to the Department Scheduler to update the MPPS instance with status of “COMPLETED” and set all necessary attributes. The Department Scheduler acknowledges the MPPS update with an N-SET response (status success).
7. The MPPS-SCU AE closes the association with the Department Scheduler.

4.2.6.3.1.2 Proposed Presentation Contexts

The MPPS-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2-46 PROPOSED PRESENTATION CONTEXTS FOR ACQUIRE IMAGES**

| Presentation Context Table        |                         |                           |                   |      |           |
|-----------------------------------|-------------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax                   |                         | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                              | UID                     | Name List                 | UID List          |      |           |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

4.2.6.3.1.3 SOP Specific Conformance for MPPS7 SOP Classes

The MPPS-SCU AE provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

The behavior of the MPPS-SCU AE when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in the table below.

**TABLE 4.2-47 MPPS N-CREATE / N-SET RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior  |
|----------------|-----------------|------------------------|---|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully.   |
| *              | *               | Any other status code. | The association is aborted and the MPPS is marked as failed. The status meaning is logged and reported to the user. |

The table below provides a description of the MPPS N-CREATE and N-SET request identifiers sent by the MPPS-SCU AE. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

**TABLE 4.2-48 MPPS N-CREATE / N-SET REQUEST IDENTIFIER**

| Attribute Name                               | Tag         | VR | N-CREATE               | N-SET |
|--|-------------|----|------------------------|-------|
| Specific Character Set                       | (0008,0005) | CS | From MWL               |       |
| <b>Performed Procedure Step Relationship</b> |             |    |                        |       |
| Scheduled Step Attribute Sequence            | (0040,0270) | SQ | From MWL               |       |
| >Study Instance UID                          | (0020,000D) | UI | From MWL               |       |
| >Referenced Study Sequence                   | (0008,1110) | SQ | From MWL               |       |
| >>Referenced SOP Class UID                   | (0008,1150) | UI | From MWL               |       |
| >>Referenced SOP Instance UID                | (0008,1155) | UI | From MWL               |       |
| >Accession Number                            | (0008,0050) | SH | From MWL or User Input |       |
| >Requested Procedure ID                      | (0040,1001) | SH | From MWL               |       |
| >Requested Procedure Description             | (0032,1060) | LO | From MWL               |       |
| >Scheduled Procedure Step ID                 | (0040,0009) | SH | From MWL               |       |
| >Scheduled Procedure Step Description        | (0040,0007) | LO | From MWL               |       |
| >Scheduled Protocol Code Sequence            | (0040,0008) | SQ | From MWL               |       |
| >>Code Value                                 | (0008,0100) | SH | From MWL               |       |
| >>Coding Scheme Designator                   | (0008,0102) | SH | From MWL               |       |
| >>Coding Scheme Version                      | (0008,0103) | SH | From MWL               |       |
| >>Code Meaning                               | (0008,0104) | LO | From MWL               |       |

| Attribute Name                              | Tag         | VR | N-CREATE               | N-SET                     |
|---|-------------|----|------------------------|---------------------------|
| Patient's Name                              | (0010,0010) | PN | From MWL or User Input |                           |
| Patient ID                                  | (0010,0020) | LO | From MWL or User Input |                           |
| Patient's Birth Data                        | (0010,0030) | DA | From MWL or User Input |                           |
| Patient's Sex                               | (0010,0040) | CS | From MWL or User Input |                           |
| Referenced Patient Sequence                 | (0008,1120) | SQ | From MWL               |                           |
| >Referenced SOP Class UID                   | (0008,1150) | UI | From MWL               |                           |
| >Referenced Instance UID                    | (0008,1155) | UI | From MWL               |                           |
| <b>Performed Procedure Step Information</b> |             |    |                        |                           |
| Performed Procedure Step ID                 | (0040,0253) | SH | Automatically created. |                           |
| Performed Station AE Title                  | (0040,0241) | AE | MPPS AE Title          |                           |
| Performed Station Name                      | (0040,0242) | SH | x                      |                           |
| Performed Location                          | (0040,0243) | SH | x                      |                           |
| Performed Procedure Step Start Data         | (0040,0244) | DA | Actual start date      |                           |
| Performed Procedure Step Start Time         | (0040,0245) | TM | Actual start time      |                           |
| Performed Procedure Step Status             | (0040,0252) | CS | IN PROGRESS            | DISCONTINUED or COMPLETED |
| Performed Procedure Step End Date           | (0040,0250) | DA | Zero length            | Actual end date           |
| Performed Procedure Step End Time           | (0040,0251) | TM | Zero length            | Actual end time           |
| Performed Procedure Step Description        | (0040,0254) | LO | x                      | x                         |
| Performed Procedure Type Description        | (0040,0255) | LO | x                      | x                         |
| Comments on the Performed Procedure Step    | (0040,0280) | ST | x                      | x                         |
| Procedure Code Sequence                     | (0008,1032) | SQ | x                      | x                         |
| >Code Value                                 | (0008,0100) | SH | x                      | x                         |
| >Coding Scheme Designator                   | (0008,0102) | SH | x                      | x                         |
| >Coding Scheme Version                      | (0008,0103) | SH | x                      | x                         |
| >Code Meaning                               | (0008,0104) | LO | x                      | x                         |
| <b>Image Acquisition Results</b>            |             |    |                        |                           |
| Modality                                    | (0008,0060) | SH | From MWL               |                           |
| Study ID                                    | (0020,0010) | SH | From MWL               |                           |
| Performed Protocol Code Sequence            | (0040,0260) | SQ | From MWL               | x                         |
| >Code Value                                 | (0008,0100) | SH | From MWL               | x                         |
| >Coding Scheme Designator                   | (0008,0102) | SH | From MWL               | x                         |
| >Coding Scheme Version                      | (0008,0103) | SH | From MWL               | x                         |
| >Code Meaning                               | (0008,0104) | LO | From MWL               | x                         |
| Performed Series Sequence                   | (0040,0340) | SQ | x                      | x                         |
| >Series Description                         | (0008,103E) | LO | x                      | x                         |
| >Retrieve AE Title                          | (0008,0054) | AE | x                      | x                         |
| >Performed Physician's Name                 | (0008,1050) | PN | x                      | x                         |
| >Operator's Name                            | (0008,1070) | PN | x                      | x                         |
| >Protocol Name                              | (0018,1030) | LO | x                      | x                         |
| >Series Instance UID                        | (0020,000E) | UI | x                      | x                         |
| >Referenced Image Sequence                  | (0008,1140) | SQ | x                      | x                         |
| >>Referenced SOP Class UID                  | (0008,1150) | UI | x                      | x                         |
| >>Referenced SOP Instance UID               | (0008,1155) | UI | x                      | x                         |

| Attribute Name  | Tag         | VR | N-CREATE | N-SET |
|---|-------------|----|----------|-------|
| >Referenced Non-Image Composite SOP Instance Sequence   | (0040,0220) | SQ | x        | x     |
| >>Referenced SOP Class UID                              | (0008,1150) | UI | x        | x     |
| >>Referenced SOP Instance UID                           | (0008,1155) | UI | x        | x     |
| <b>X-ray Acquisition Dose (Extended)</b>                |             |    |          |       |
| Image and Fluoroscopy Area Dose Product                 | (0018,115E) | DS | x        | x     |
| Radiation Dose Sequence                                 | (0040,030E) | SQ | x        | x     |
| >Exposure Type  | (0018,115A) | CS | x        | x     |
| >KVp  | (0018,0060) | DS | x        | x     |
| >X-ray Tube Current in $\mu$ A                          | (0018,8151) | DS | x        | x     |
| >Exposure Time  | (0018,1150) | IS | x        | x     |
| >Filter Type  | (0018,1160) | LO | x        | x     |
| >Filter Material  | (0018,7050) | CS | x        | x     |
| <b>Billing and Material Management Codes (Extended)</b> |             |    |          |       |
| Film Consumption Sequence                               | (0040,0321) | SQ | x        | x     |
| >Number of Films  | (2100,0170) | IS | x        | x     |
| >Film Size ID   | (2010,0050) | CS | x        | x     |
| Billing Supplies and Devices Sequence                   | (0040,0324) | SQ | x        | x     |
| >Billing Item Sequence                                  | (0040,0296) | SQ | x        | x     |
| >>Code Value  | (0008,0100) | SH | x        | x     |
| >>Coding Scheme Designator                              | (0008,0102) | SH | x        | x     |
| >>Coding Scheme Version                                 | (0008,0103) | SH | x        | x     |
| >>Code Meaning  | (0008,0104) | LO | x        | x     |
| >Quantity Sequence                                      | (0040,0293) | SQ | x        | x     |
| >>Quantity  | (0040,0294) | DS | x        | x     |
| <b>Private</b>  |             |    |          |       |
| Exposure Status Sequence                                | (0019,XXA0) | SQ | x        | x     |
| >Distance Source to Detector                            | (0018,1110) | DS | x        | x     |
| >Distance Source to Patient                             | (0018,1111) | DS | x        | x     |
| >Exposure   | (0018,1152) | IS | x        | x     |
| >Exposure in $\mu$ As                                   | (0018,1153) | IS | x        | x     |
| >Grid   | (0018,1166) | CS | x        | x     |
| >Estimated Radiographic Magnification Factor            | (0018,1114) | DS | x        | x     |
| >Image Area Dose Product                                | (0018,115E) | DS | x        | x     |
| >Anode Target Material                                  | (0018,1191) | CS | x        | x     |
| >Body Part Thickness                                    | (0018,11A0) | DS | x        | x     |
| >Compression Force                                      | (0018,11A2) | DS | x        | x     |
| >Positioner Primary Angle                               | (0018,1510) | DS | x        | x     |
| >Exposure Division Count                                | (0019,YY71) | IS | x        | x     |
| >Exposure Status  | (0019,YYA1) | CS | x        | x     |
| >Exposure Kind  | (0019,YYA2) | CS | x        | x     |
| >Entrance Dose  | (0040,0302) | US | x        | x     |
| >Organ Dose   | (0040,0316) | DS | x        | x     |
| >Entrance Dose in mGy                                   | (0040,8302) | DS | x        | x     |

4.2.6.4 Association Acceptance Policy

The MWM-SCU AE does not accept any association.

## 4.2.7 Print-SCU Application Entity Specification

### 4.2.7.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-49 META SOP CLASSES FOR THE PRINT-SCU AE**

| SOP Class Name                        | SOP Class UID         | SCU | SCP |
|---------------------------------------|-----------------------|-----|-----|
| Basic Grayscale Print Management Meta | 1.2.840.10008.5.1.1.9 | Yes | No  |

The above Meta SOP Classes are defined by the following set of supported SOP Classes:

**TABLE 4.2-50 SOP CLASSES FOR THE PRINT-SCU AE**

| SOP Class Name            | SOP Class UID           | SCU | SCP |
|---------------------------|-------------------------|-----|-----|
| Basic Film Session        | 1.2.840.10008.5.1.1.1   | Yes | No  |
| Basic Film Box            | 1.2.840.10008.5.1.1.2   | Yes | No  |
| Basic Grayscale Image Box | 1.2.840.10008.5.1.1.4   | Yes | No  |
| Basic Color Image Box     | 1.2.840.10008.5.1.1.4.1 | Yes | No  |
| Printer                   | 1.2.840.10008.5.1.1.16  | Yes | No  |

### 4.2.7.2 Association Policies

#### 4.2.7.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-51 DICOM APPLICATION CONTEXT FOR THE PRINT-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

#### 4.2.7.2.2 Number of Associations

DR-ID 300CL initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-52 NUMBER OF ASSOCIATIONS INITIATED FOR THE PRINT-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

#### 4.2.7.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-53 ASYNCHRONOUS NATURE FOR THE PRINT-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

#### 4.2.7.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-54 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE PRINT-SCU AE**

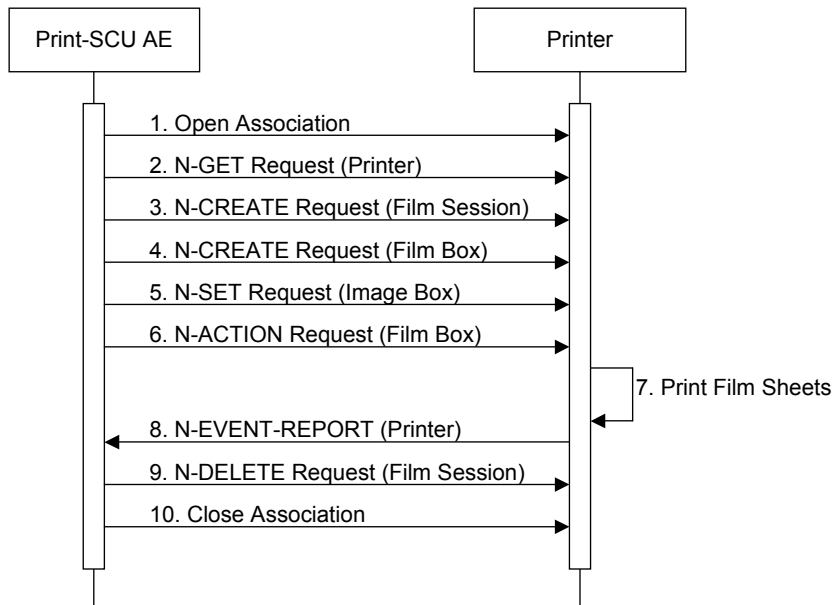
|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.7.3 Association Initiation Policy

4.2.7.3.1 Activity – Film Images

4.2.7.3.1.1 Description and Sequencing of Activities

A user composes images onto film sheets and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies. Each print-job is forwarded to the job queue and processed individually.



**FIGURE 4.2-8 SEQUENCING OF ACTIVITY – FILM IMAGES**

A typical sequence of DIMSE messages sent over an association between Print-SCU AE and a Printer is illustrated in the Figure above:

1. The Print-SCU AE opens an association with the Printer.
2. N-GET on the Printer SOP Class is used to obtain current printer status information. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.
3. N-CREATE on the Film Session SOP Class creates a Film Session.
4. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session.
5. N-SET on the Image Box SOP Class transfers the contents of the film sheet to the printer.
6. N-ACTION on the Film Box SOP Class instructs the Printer to print the Film Box.
7. The printer prints the requested number of film sheets.
8. The Printer asynchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class). If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.
9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. The Print SCU AE closes the association with the Printer.



#### 4.2.7.3.1.2 Proposed Presentation Contexts

The Print-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2-55 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY FILM IMAGES**

| Presentation Context Table            |                       |                           |                   |      |           |
|---------------------------------------|-----------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax                       |                       | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name                                  | UID                   | Name List                 | UID List          |      |           |
| Basic Grayscale Print Management Meta | 1.2.840.10008.5.1.1.9 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

#### 4.2.7.3.1.3 SOP Specific Conformance Printer SOP Class

The Print-SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-GET
- N-EVENT-REPORT

Details of the supported attributes and status handling behavior are described in the following subsections.

##### 4.2.7.3.1.3.1 Printer SOP Class Operation (N-GET)

The Print-SCU AE uses the Printer SOP Class N-GET operation to obtain information about the current printer status. The attributes obtained via N-GET are listed in the Table below:

**TABLE 4.2-56 PRINTER SOP CLASS N-GET REQUEST ATTRIBUTES**

| Attribute Name      | Tag         | VR | Value                | Presence of Value | Source  |
|---------------------|-------------|----|----------------------|-------------------|---------|
| Printer Status      | (2110,0010) | CS | Provided by Printer. | ALWAYS            | Printer |
| Printer Status Info | (2110,0020) | CS | Provided by Printer. | ALWAYS            | Printer |

The Printer Status information is evaluated as follows:

1. If Printer status (2110,0010) is NORMAL, the print-job continues to be printed.
2. If Printer status (2110,0010) is FAILURE or WARNING, the print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job control application.

**TABLE 4.2-57 PRINTER SOP CLASS N-GET RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The request to get printer status information was success.   |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

4.2.7.3.1.3.2 Printer SOP Class Notifications (N-EVENT-REPORT)

The Print-SCU AE is capable of receiving an N-EVENT-REPORT request at any time during an association. The behavior of Print-SCU AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below:

**TABLE 4.2-58 PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOR**

| Event Type Name | Event Type ID | Behavior   |
|-----------------|---------------|--|
| Normal          | 1             | The print-job continues to be printed.   |
| Warning         | 2             | The print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application. |
| Failure         | 3             | The print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application. |

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the table below.

**TABLE 4.2-59 PRINTER SOP CLASS N-EVENT-REPORT RESPONSE STATUS REASONS**

| Service Status | Further Meaning | Error Code             | Reasons  |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The notification event has been successfully received.   |
| *              | *               | Any other status code. | An error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902). |

4.2.7.3.1.4 SOP Specific Conformance Film Session SOP Class

The Print-SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behavior are described in the following subsections.

#### 4.2.7.3.1.4.1 Film Session SOP Class Operation (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

**TABLE 4.2-60 FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES**

| Attribute Name    | Tag         | VR | Value  | Presence of Value | Source |
|-------------------|-------------|----|--|-------------------|--------|
| Number of Copies  | (2000,0010) | IS | 0-9  | ALWAYS            | USER   |
| Print Priority    | (2000,0020) | CS | Specifies the priority of the print job.<br>Enumerated Values:<br>HIGH<br>MED<br>LOW | ALWAYS            | CONFIG |
| Medium Type       | (2000,0030) | CS | CLEAR FILM<br>BLUE FILM  | ALWAYS            | CONFIG |
| Film Destination  | (2000,0040) | CS | PROCESSOR<br>BIN_i   | ALWAYS            | CONFIG |
| Memory Allocation | (2000,0060) | IS | 39219<br>71438   | ALWAYS            | CONFIG |

The behavior of the Print-SCU AE when encountering status codes in an N-CREATE response is summarized in the table below.

**TABLE 4.2-61 FILM SESSION SOP CLASS N-CREATE RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully.  |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

#### 4.2.7.3.1.4.2 Film Session SOP Class Operation (N-DELETE)

The behavior of the Print-SCU AE when encountering status codes in an N-DELETE response is summarized in the table below.

**TABLE 4.2-62 FILM SESSION SOP CLASS N-DELETE RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully.  |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

#### 4.2.7.3.1.5 SOP Specific Conformance Film Box SOP Class

The Print-SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-CREATE
- N-ACTION

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.7.3.1.5.1 Film Box SOP Class Operation (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

**TABLE 4.2-63 FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES**

| Attribute Name                   | Tag         | VR | Value   | Presence of Value | Source |
|----------------------------------|-------------|----|---|-------------------|--------|
| Image Display Format             | (2010,0010) | ST | STANDARD \1,1   | ALWAYS            | USER   |
| Film Orientation                 | (2010,0040) | CS | PORTRAIT<br>LANDSCAPE                                   | ALWAYS            | USER   |
| Film Size ID                     | (2010,0050) | CS | 8INX10IN, 10INX14IN, 11INX14IN,<br>14INX14IN, 14INX17IN | ALWAYS            | USER   |
| Magnification Type               | (2010,0060) | CS | REPLICATE,<br>BILINEAR,<br>CUBIC,<br>NONE               | ALWAYS            | CONFIG |
| Smoothing Type                   | (2010,0080) | CS | SHARP<br>SMOOTH<br>MEDIUM                               | ALWAYS            | CONFIG |
| Border Density                   | (2010,0100) | CS | BLACK<br>WHITE<br>0-300                                 | ALWAYS            | USER   |
| Max Density                      | (2010,0130) | US | 360,300   | ALWAYS            | AUTO   |
| Trim                             | (2010,0140) | CS | NO  | ALWAYS            | AUTO   |
| Configuration Information        | (2010,0150) | ST | "1" - "8",<br>"FINE1" - "FINE8"                         | ALWAYS            | AUTO   |
| Referenced Film Session Sequence | (2010,0500) | SQ |   | ALWAYS            | AUTO   |
| >Referenced SOP Class UID        | (0008,1150) | UI | 1.2.840.10008.5.1.1.1                                   | ALWAYS            | AUTO   |
| >Referenced SOP Instance UID     | (0008,1155) | UI | From created Film Session SOP Instance.                 | ALWAYS            | AUTO   |

The behavior of the Print-SCU AE when encountering status codes in an N-CREATE response is summarized in the table below.

**TABLE 4.2-64 FILM BOX SOP CLASS N-CREATE RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully.  |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

#### 4.2.7.3.1.5.2 Film Box SOP Class Operations (N-ACTION)

An N-ACTION Request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behavior of The Print-SCU AE when encountering status codes in a N-ACTION response is summarized in the table below:

**TABLE 4.2-65 FILM BOX SOP CLASS N-ACTION RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully. The film has been accepted for printing.   |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

#### 4.2.7.3.1.6 SOP Specific Conformance Basic Grayscale Image Box SOP Class

The Print-SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

— N-SET

Details of the supported attributes and status handling behavior are described in the following subsections.

##### 4.2.7.3.1.6.1 Basic Grayscale Image Box SOP Class Operation (N-SET)

The attributes supplied in an N-SET Request are listed in the Table below:

**TABLE 4.2-66 BASIC GRAYSCALE IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES**

| Attribute Name                       | Tag         | VR | Value                                 | Presence of Value | Source |
|--------------------------------------|-------------|----|---------------------------------------|-------------------|--------|
| Smoothing Type                       | (2010,0080) | CS | SHARP<br>SMOOTH<br>MEDIUM             | ALWAYS            | CONFIG |
| Max Density                          | (2010,0130) | US | 360,300                               | ALWAYS            | AUTO   |
| Configuration Information            | (2010,0150) | ST | "1" - "8",<br>"FINE1" - "FINE8"       | ALWAYS            | AUTO   |
| Image Position                       | (2020,0010) | US | 1                                     | ALWAYS            | AUTO   |
| Requested Image Size                 | (2020,0030) | DS | Depend on Image Size and Film Format. | ALWAYS            | AUTO   |
| Requested Decimate/<br>Crop Behavior | (2020,0040) | CS | "CROP" or with no tags.               | ANAP              | AUTO   |
| Basic Grayscale Image<br>Sequence    | (2020,0110) | SQ |                                       | ALWAYS            | AUTO   |
| >Samples Per Pixel                   | (0028,0002) | US | 1                                     | ALWAYS            | AUTO   |
| Photometric Interpretation           | (0028,0004) | CS | MONOCHROME1                           | ALWAYS            | AUTO   |
| Rows                                 | (0028,0010) | US | Depend on Image Size and Film Format. | ALWAYS            | AUTO   |
| Columns                              | (0028,0011) | US | Depend on Image Size and Film Format. | ALWAYS            | AUTO   |
| Bits Allocated                       | (0028,0100) | US | 16                                    | ALWAYS            | AUTO   |
| Bits Stored                          | (0028,0101) | US | 10,12                                 | ALWAYS            | AUTO   |
| High Bit                             | (0028,0102) | US | 9,11                                  | ALWAYS            | AUTO   |
| Pixel Representation                 | (0028,0103) | US | 0                                     | ALWAYS            | AUTO   |
| Pixel Data                           | (7FE0,0010) | OW |                                       | ALWAYS            | AUTO   |

The behavior of the Print-SCU AE when encountering status codes in an N-SET response is summarized in the table below.

**TABLE 4.2-67 BASIC GRAYSCALE IMAGE BOX SOP CLASS N-SET RESPONSE HANDLING BEHAVIOR**

| Service Status | Further Meaning | Error Code             | Behavior   |
|----------------|-----------------|------------------------|--|
| Success        | Success         | 0000                   | The SCP has completed the operation successfully. Image successfully stored in Image Box.  |
| *              | *               | Any other status code. | The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user. |

4.2.7.4 Association Acceptance Policy

The Print-SCU AE does not accept any association.

4.2.8 Q/R-SCU Application Entity Specification

4.2.8.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-68 META SOP CLASSES FOR THE PRINT-SCU AE**

| SOP Class Name                                     | SOP Class UID               | SCU | SCP |
|--|-----------------------------|-----|-----|
| Study Root Query/Retrieve Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Yes | No  |
| Study Root Query/Retrieve Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | No  |

4.2.8.2 Association Policies

4.2.8.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2-69 DICOM APPLICATION CONTEXT FOR THE Q/R-SCU AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.8.2.2 Number of Associations

DR-ID 300CL initiates Four Associations at a time for each destination to which a transfer request is being processed in the active job queue list. Four jobs will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2-70 NUMBER OF ASSOCIATIONS INITIATED FOR THE Q/R-SCU AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 4 |
|---|---|

4.2.8.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-71 ASYNCHRONOUS NATURE FOR THE Q/R-SCU AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.8.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-72 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE Q/R-SCU AE**

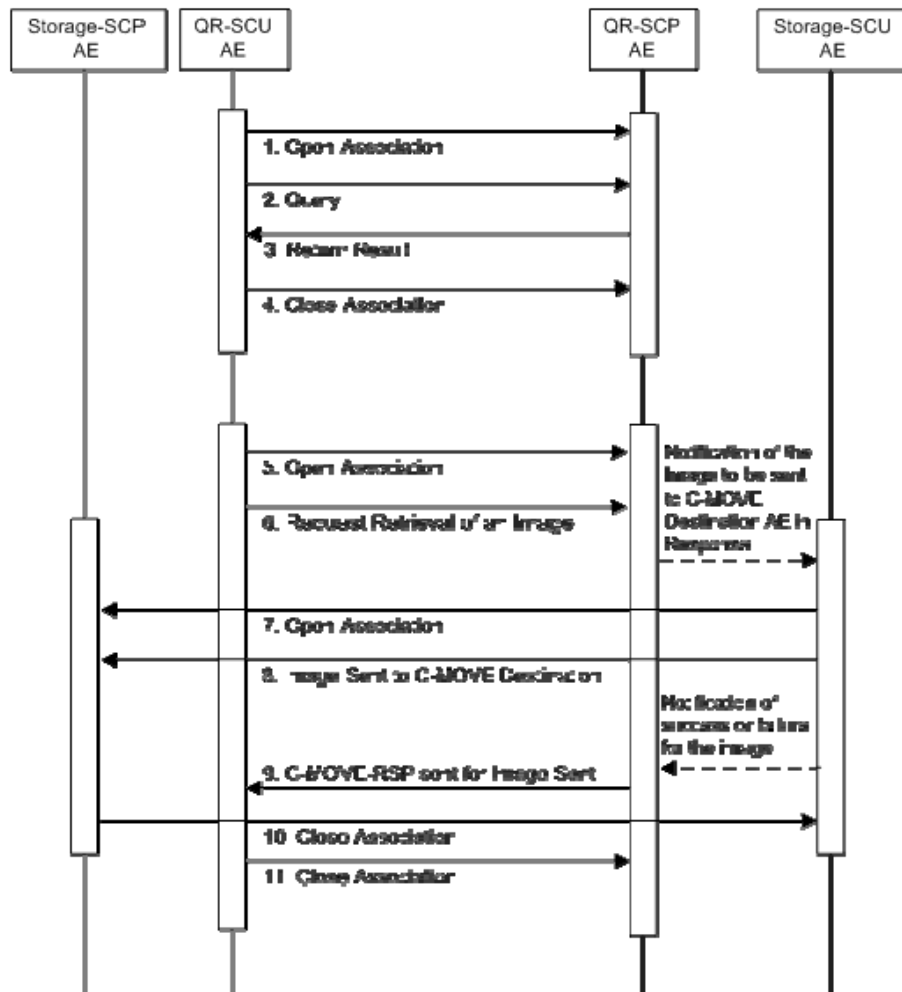
|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

4.2.8.3 Association Initiation Policy

4.2.8.3.1 Activity – Query and Retrieve Image

4.2.8.3.1.1 Description and Sequencing of Activities

The Q/R-SCU AE is activated when the user selects a remote node to query and enters some key information, Patient’s Name, Patient ID, Study Date, Accession Number and Modality. The user can select studies, series and images to be retrieved. The images will be received at the Storage-SCP AE.



**FIGURE 4.2-9 SEQUENCING OF ACTIVITY – QUERY AND RETRIEVE IMAGE**

The following sequencing constraints illustrated in the Figure above:

1. The Q/R-SCU AE opens an association with the Q/R-SCP AE.
2. The Q/R-SCU AE sends a C-FIND-RQ Message.
3. The Q/R-SCP AE returns a C-FIND-RSP Message to the Q/R-SCU AE with matching information. A C-FIND-RSP is sent for each entity matching the identifier specified in the C-FIND-RQ. A final C-FIND-RSP is sent indicating that the matching is complete.
4. The Q/R-SCU AE closes the association.
5. The Q/R-SCU AE opens an association with the Q/R-SCP AE.
6. The Q/R-SCU AE sends a C-MOVE-RQ Message. The Q/R-SCP AE notifies the Storage-SCU AE to send the Composite SOP Instances to the peer C-MOVE Destination AE as indicated in the C-MOVE-RQ.
7. The Storage-SCU AE opens an association with the C-MOVE Destination AE.
8. The Storage-SCU AE sends images to the C-MOVE Destination AE. The Storage-SCU AE indicates to the Q/R-SCP AE whether the transfer succeeded or failed.
9. The Q/R-SCP AE then returns a C-MOVE-RSP indicating this success or failure.
10. The Storage-SCU AE closes the association.
11. The Q/R-SCU AE closes the association.

4.2.8.3.1.2 Proposed Presentation Contexts

The Q/R-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**TABLE 4.2- 73 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY QUERY AND RETRIEVE IMAGE**

| Presentation Context Table                         |                             |                           |                   |      |           |
|--|-----------------------------|---------------------------|-------------------|------|-----------|
| Abstract Syntax                                    |                             | Transfer Syntax           |                   | Role | Ext. Neg. |
| Name   | UID                         | Name List                 | UID List          |      |           |
| Study Root Query/Retrieve Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |
| Study Root Query/Retrieve Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU  | None      |

4.2.8.3.1.3 SOP Specific Conformance Study Root Query/Retrieve Information Model – FIND SOP Class

The Q/R-SCU AE provides standard conformance to the Q/R Find (=Study Root Query/Retrieve Information Model – FIND) SOP Class as an SCU.

The behavior of the Q/R-SCU AE when encountering status codes in a Q/R C-FIND response is summarized in the table below.



**TABLE 4.2- 74 Q/R C-FIND RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning   | Error Code             | Behavior   |
|----------------|---|------------------------|--|
| Success        | Success   | 0000                   | The SCP has completed the matches. Worklist items are available for display or further processing. |
| Pending        | Matches are continuing - Current Match is supplied and any Optional Key were supported in the same manner as Required Keys          | FF00                   | Behavior is continuing to receive the matching result.   |
| Pending        | Matches are continuing -Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier | FF01                   | Behavior is continuing.  |
| Cancel         | Matching terminated due to Cancel request   | FE01                   | Behavior is cancelled.   |
| *              | *   | Any other status code. | The association is aborted using A-ABORT and the status meaning is logged.                         |

All queries are initiated at the highest level of the information model (the STUDY level), and then for each response received, recursively repeated at the next lower levels (the SERIES and then IMAGE levels), in order to completely elucidate the “tree” of instances available on the remote AE.

The table below provides a description of the Q/R-SCU AE C-FIND Request Identifier.

**TABLE 4.2-75 STUDY ROOT REQUEST IDENTIFIER FOR C-FIND**

| Name                   | Tag         | Types of Matching |
|------------------------|-------------|-------------------|
| <b>SOP Common</b>      |             |                   |
| Specific Character Set | (0008,0005) | NONE              |
| Query/Retrieve Level   | (0008,0052) | NONE              |
| Retrieve AE Title      | (0008,0054) | NONE              |
| <b>Study Level</b>     |             |                   |
| Patient’s Name         | (0010,0010) | S,*,U             |
| Patient ID             | (0010,0020) | S,*,U             |
| Patient Birth Date     | (0010,0030) | NONE              |
| Patient Sex            | (0010,0040) | NONE              |
| Study Date             | (0008,0020) | R,U               |
| Study Time             | (0008,0030) | NONE              |
| Accession Number       | (0008,0050) | S,*,U             |
| Study ID               | (0020,0010) | NONE              |
| Modalities In Study    | (0008,0061) | S,*,U/<br>NONE    |
| Study Instance UID     | (0020,000D) | NONE              |
| <b>Series Level</b>    |             |                   |
| Modality               | (0008,0060) | S,U               |

|   |             |      |
|---|-------------|------|
| Series Number                             | (0020,0011) | NONE |
| Series Instance UID                       | (0020,000E) | NONE |
| <b>Image Level</b>                        |             |      |
| SOP Instance UID                          | (0008,0018) | U    |
| Acquisition Device Processing Description | (0018,1400) | NONE |
| Instance Number                           | (0020,0013) | NONE |

The tables should be read as follows:

Types of Matching: The types of Matching supported by the Q/R-SCU AE. An "S" indicates the identifier attribute can specify Single Value Matching, an "R" will indicate Range Matching, a "\*" will denote wildcard matching, a 'U' will indicate universal matching. "NONE" indicates that no matching is supported, but that values for this Element in the database can be returned.

#### 4.2.8.3.1.4 SOP Specific Conformance Study Root Query/Retrieve Information Model - MOVE SOP Classes

The Q/R-SCU AE provides standard conformance to the Q/R Move (=Study Root Query/Retrieve Information Model – MOVE) SOP Class as an SCU.

The behavior of the Q/R-SCU AE when encountering status codes in a Q/R C-MOVE response is summarized in the table below.

**TABLE 4.2- 76 Q/R C-MOVE RESPONSE STATUS HANDLING BEHAVIOR**

| Service Status | Further Meaning                              | Error Code             | Behavior  |
|----------------|--|------------------------|---|
| Success        | Success                                      | 0000                   | The Storage-SCP AE has successfully received the SOP Instance. If all SOP Instances in a move job have status success then the job is marked as complete. |
| Pending        | SubOperations are Continuing                 | FF00                   | Behavior is continuing to receive the SOP Instance until complete.  |
| Warning        | SubOperations Complete - One or More Failure | B000                   | Behavior ends normally, but logs events.  |
| Cancel         | SubOperations terminated due to Cance        | FE00                   | Behavior is cancelled.  |
| *              | *  | Any other status code. | The association is aborted using A-ABORT and the status meaning is logged.  |

#### 4.2.8.4 Association Acceptance Policy

The Q/R-SCU AE does not accept any association.

### 4.2.9 Storage-SCP Application Entity Specification

#### 4.2.9.1 SOP Classes

DR-ID 300CL provides Standard Conformance to the following SOP Classes:

**TABLE 4.2- 77 SOP CLASSES FOR THE STORAGE-SCP AE**

| SOP Class Name   | SOP Class UID                 | SCU | SCP |
|--|-------------------------------|-----|-----|
| Computed Radiography Image Storage                         | 1.2.840.10008.5.1.4.1.1.1     | No  | Yes |
| FUJI Private Computed Radiography Image Storage            | 1.2.392.200036.9125.1.1.2     | No  | Yes |
| Digital X-ray Image Storage – For Presentation             | 1.2.840.10008.5.1.4.1.1.1.1   | No  | Yes |
| Digital X-ray Image Storage – For Processing               | 1.2.840.10008.5.1.4.1.1.1.1.1 | No  | Yes |
| Digital Mammography X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.2   | No  | Yes |
| Digital Mammography X-Ray Image Storage – For Processing   | 1.2.840.10008.5.1.4.1.1.1.2.1 | No  | Yes |

4.2.9.2 Association Policies

4.2.9.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

**TABLE 4.2- 78 DICOM APPLICATION CONTEXT FOR THE STORAGE-SCP AE**

|                          |                       |
|--------------------------|-----------------------|
| Application Context Name | 1.2.840.10008.3.1.1.1 |
|--------------------------|-----------------------|

4.2.9.2.2 Number of Associations

DR-IR 300CL initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

**TABLE 4.2- 79 NUMBER OF ASSOCIATIONS INITIATED FOR THE STORAGE-SCP AE**

|   |   |
|---|---|
| Maximum number of simultaneous Associations | 1 |
|---|---|

4.2.9.2.3 Asynchronous Nature

DR-ID 300CL does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2- 80 ASYNCHRONOUS NATURE FOR THE STORAGE-SCP AE**

|   |   |
|---|---|
| Maximum number of outstanding asynchronous transactions | 1 |
|---|---|

4.2.9.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2- 81 DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE-SCP AE**

|                             |                            |
|-----------------------------|----------------------------|
| Implementation Class UID    | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name | A00                        |

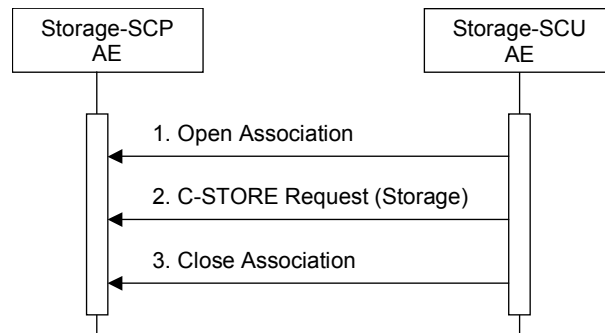
**4.2.9.3 Association Initiation Policy**

The Storage-SCP AE does not initiate associations.

**4.2.9.4 Association Acceptance Policy**

**4.2.9.4.1 Activity - Receive Storage Request**

When the Storage-SCP AE accepts an association, it will respond to storage requests.



**FIGURE 4.2-10 SEQUENCING OF ACTIVITY – STORE IMAGES TO THE LOCAL FILE SYSTEM**

A possible sequence of interactions between the Storage-SCP AE and a Storage-SCU AE is illustrated in Figure above:

1. The Storage-SCU AE opens an association with the Storage-SCP AE.
2. The Storage SCU AE sends images to the Storage SCP AE using a storage request (C-STORE) and the Storage SCP AE replies with a C-STORE response (status success).
3. The Storage-SCU AE closes the association with the Storage-SCP AE.

**4.2.9.4.1.1 Accepted Presentation Contexts**

The default Behavior of the Storage-SCP AE supports the Implicit VR Little Endian and Explicit VR Little Endian Transfer Syntaxes for all Associations.

Any of the Presentation Contexts shown in the following table are acceptable to the Storage-SCP AE for receiving images.

**TABLE 4.2- 82 PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY STORE IMAGES**

| Presentation Context Table                                 |                               |   |                        |      |           |
|--|-------------------------------|---|------------------------|------|-----------|
| Abstract Syntax  |                               | Transfer Syntax                                   |                        | Role | Ext. Neg. |
| Name   | UID                           | Name List   | UID List               |      |           |
| Computed Radiography Image Storage                         | 1.2.840.10008.5.1.4.1.1.1     | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| FUJI Private Computed Radiography Image Storage            | 1.2.392.200036.9125.1.1.2     | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital X-ray Image Storage – For Presentation             | 1.2.840.10008.5.1.4.1.1.1.1   | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital X-ray Image Storage – For Processing               | 1.2.840.10008.5.1.4.1.1.1.1.1 | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital Mammography X-Ray Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.2   | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |
| Digital Mammography X-Ray Image Storage – For Processing   | 1.2.840.10008.5.1.4.1.1.1.2.1 | Implicit VR Little Endian                         | 1.2.840.10008.1.2      | SCP  | None      |
|  |                               | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1    |      |           |
|  |                               | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70 |      |           |

NOTE: Multiple Transfer Syntax can be set in an Abstract Syntax, however only one setting that is set first is valid.

#### 4.2.9.4.1.2 SOP Specific Conformance Image Storage SOP Classes

The associated Activity with the Storage service is the storage of medical image data received over the network on a designated hard disk. The Storage-SCP AE will return a failure status if it is unable to store the image on the local file system.

**TABLE 4.2- 83 THE STORAGE-SCP AE C-STORE RESPONSE STATUS RETURN REASONS**

| <b>Service Status</b> | <b>Further Meaning</b>            | <b>Error Code</b>      | <b>Behavior</b>   |
|-----------------------|-----------------------------------|------------------------|---|
| Success               | Success                           | 0000                   | The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.  |
| Refused               | Out of Resources                  | A700                   | The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure. |
| Error                 | Data Set does not match SOP Class | A900                   | The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.                              |
| *                     | *                                 | Any other status code. | The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application.                                 |

### 4.3 NETWORK INTERFACES

#### 4.3.1 Physical Network Interface

DR-ID 300CL supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

**TABLE 4.3-1 SUPPORTED PHYSICAL NETWORK INTERFACES**

|               |
|---------------|
| 1000 Ethernet |
|---------------|

#### 4.3.2 Additional Protocols

The DR-ID 300CL Storage AE has no additional protocol.

#### 4.3.3 IPv4 and IPv6 Support

The DR-ID 300CL only supports IPv4 connections.

### 4.4 CONFIGURATION

#### 4.4.1 AE Title/Presentation Address Mapping

##### 4.4.1.1 Local AE Titles

The Field Service Engineer can configure the AE Title via the Service/Installation Tool.

**TABLE 4.4-1 AE TITLE CONFIGURATION TABLE**

| Application Entity     | Default AE Title | Default TCP/IP Port                |
|------------------------|------------------|------------------------------------|
| Storage-SCU            | FCR-CSL          | 104                                |
| Storage Commitment-SCU | FCR-CSL          | 104 (for receiving N-EVENT-REPORT) |
| MWM-SCU                | FCR-CSL          | 104                                |
| MPPS-SCU               | FCR-CSL          | 104                                |
| Print-SCU              | FCR-CSL          | 104                                |
| Q/R-SCU                | FCR-CSL          | 104                                |
| Storage-SCP            | FCR-CSL          | 21760                              |

\*When using Referral Viewing Function(Optional), Default AE Title and Default TCP/IP Port have to be set separately from those for FCR-CSL.

##### 4.4.1.2 Remote AE Title/Presentation Address Mapping

###### 4.4.1.2.1 Storage-SCU / Storage Commitment-SCU / Storage-SCP

The AE Title, host name, IP Address and port number of remote applications are configured using the DR-ID 300CL Service Tool. Associations from known AE Titles will be accepted and associations from unknown AE Titles will be rejected (an AE Title is known if it can be selected within the Service Tool). Multiple remote Storage-SCPs can be defined. Each Storage SCP can be configured to receive a storage commitment request.

###### 4.4.1.2.2 MWM-SCU / MPPS-SCU

The DR-ID 300CL Service Tool must be used to set the AE Title, port-numbers, host-names and capabilities of the remote Modality Worklist SCP. Only a single remote Modality Worklist SCP can be defined.

The Service Tool must be used to set the AE Title, port-numbers, host-names and capabilities of the remote MPPS SCP. Only a single remote MPPS SCP can be defined.

4.4.1.2.3 Print-SCU

The DR-ID 300CL Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Print-SCPs. Multiple remote Print-SCPs can be defined.

4.4.1.2.4 Q/R-SCU

The DR-ID 300CL Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Q/R-SCPs. Multiple remote Q/R-SCPs can be defined.

4.4.2 Parameters

A large number of parameters related to acquisition and general operation can be configured using the Service Tool. The Table below only shows those configuration parameters relevant to DICOM communication.

**TABLE 4.4-2 CONFIGURATION PARAMETERS TABLE**

| Parameter  | Configurable (Yes/No) | Default Value             |
|--|-----------------------|---------------------------|
| <b>Storage-SCU Parameters</b>  |                       |                           |
| Supported Transfer Syntaxes (separately configurable for each remote AE).<br>One of Implicit VR Little Endian, Explicit VR Little Endian, or JPEG Lossless   | Yes                   | Implicit VR Little Endian |
| Storage-SCU time-out waiting for a response to a C-STORE-RQ  | Yes                   | 15 s                      |
| Storage-SCU Maximum Output Image Density<br>One of 'ST' or 'HQ / SH'.<br>Here,<br>'ST' indicates the low image density,<br>'HQ / SH' indicates the original image density or the high image density for mammography. | Yes                   | ST                        |
| Storage-SCU Multi-Byte-Character<br>(Remote Storage-SCP capable of using Multi-Byte-Character)   | Yes                   | No                        |
| Maximum number of simultaneously accepted associations by the Storage-SCU AE   | No                    | 3                         |
| <b>Storage Commitment-SCU Parameters</b>   |                       |                           |
| Storage Commitment-SCU time-out waiting for a response to an N-ACTION-RQ   | Yes                   | 15 s                      |
| <b>Storage-SCP Parameters</b>  |                       |                           |
| Maximum number of simultaneously accepted associations by the Storage-SCP AE   | No                    | 1                         |
| <b>MWM-SCU Parameters</b>  |                       |                           |
| Supported Transfer Syntaxes  | No                    | Implicit VR Little Endian |
| MWM-SCU time-out waiting for a response to a C-FIND-RQ   | Yes                   | 15 s                      |
| Maximum number of simultaneously accepted associations by the MWM-SCU AE   | No                    | 1                         |
| <b>MPPS-SCU Parameters</b>   |                       |                           |
| Supported Transfer Syntaxes  | No                    | Implicit VR Little Endian |
| Maximum number of simultaneously accepted associations by the MPPS-SCU AE  | No                    | 1                         |
| <b>Print-SCU Parameters</b>  |                       |                           |
| Supported Transfer Syntaxes  | No                    | Implicit VR Little Endian |
| Print-SCU time-out waiting for a response to each DIMSE  | Yes                   | 15 s                      |

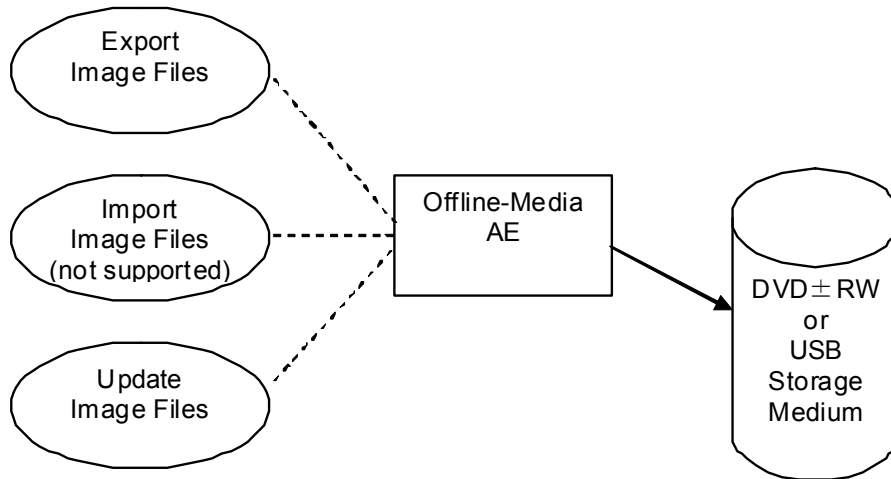


| <b>Parameter</b>   | <b>Configurable<br/>(Yes/No)</b> | <b>Default Value</b> |
|--|----------------------------------|----------------------|
| Print-SCU Multi-Byte-Character   | Yes                              | No                   |
| Maximum number of simultaneously accepted associations by the Storage-SCU AE | No                               | 1                    |

## 5 MEDIA INTERCHANGE

### 5.1 IMPLEMENTATION MODEL

#### 5.1.1 Application Data Flow



**FIGURE 5.1-1 APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE**

- The Offline-Media AE exports images to a DVD±RW or USB Storage medium. It is associated with the local real-world activity “Export Image Files”. “Export Image Files” is performed upon user request for selected studies.
- The DR-ID 300CL does not support Media Storage to import.
- The Offline-Media AE updates images on a DVD±RW or USB Storage medium. It is associated with the local real-world activity “Update Image Files”. “Update Image Files” is performed upon user request for selected studies.

#### 5.1.2 Functional Definition of AEs

##### 5.1.2.1 Functional Definition of Offline-Media Application Entity

###### Export Image Files:

The DR-ID300CL builds DICOM Information Objects for storage and creates a DICOMDIR file that represents the contents of the DICOM Information Objects to be recorded. Then the DR-ID300CL records DICOM Information Objects and the DICOMDIR file to the USB storage medium.

###### Update Image Files:

The DR-ID300CL reads a File-set of the medium and writes it to the local storage device. The DR-ID300CL adds the studies/images to the File-Set, then writes it to the medium and modifies the DICOMDIR file.

### 5.1.3 Sequencing of Real-World Activities

#### 5.1.3.1 Activity – Export Image Files

##### 5.1.3.1.1 Activity – Export Image Files to DVD±RW or USB storage medium

Operator requests to create new File-set(s) onto a storage medium. The requests are placed in a queue and are executed in the background.

The operations for “Export Image Files to Storage medium” are described below:

1. Insert a medium and start mounting media manually if the setting is not automatic
2. Select the studies on the study list of DR-ID300CL to store to the medium.
3. Request to send to the medium.

#### 5.1.3.2 Activity – Import Image Files

The DR-ID 300CL does not support Media Storage to import.

#### 5.1.3.3 Activity – Update Image Files

Operator requests to add new objects to an already existing File-set on the Storage medium. The requests are placed in a queue and are executed in the background.

The operations for “Update Image Files” are described below:

1. Insert a medium that has File-set. And start mounting media manually if the setting is not automatic.
2. Select the studies on the study list of DR-ID300CL to add to the medium..
3. Request to send to the medium..

### 5.1.4 File Meta Information Options

The implementation information written to the File Meta Header in each file is:

**TABLE 5.1-1 DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE**

|                               |                            |
|-------------------------------|----------------------------|
| File Meta Information Version | 1                          |
| Implementation Class UID      | 1.2.392.200036.9125.5342.1 |
| Implementation Version Name   | A00                        |

## 5.2 AE SPECIFICATIONS

### 5.2.1 Offline-Media Application Entity Specification

The Offline-Media Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below:

**TABLE 5.2-1 APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA**

| Application Profiles Supported | Real World Activity | Role | SC Option   |
|--------------------------------|---------------------|------|-------------|
| AUG-GEN-DVD±RW                 | Export Image Files  | FSC  | Interchange |
|                                | Update Image Files  | FSU  | Interchange |
| AUG-GEN-USB                    | Export Image Files  | FSC  | Interchange |
|                                | Update Image Files  | FSU  | Interchange |

5.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is configurable (see section 5.4).

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity – Export Image Files

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to a medium.

5.2.1.2.1.1 Media Storage Application Profiles

The Offline-Media Application Entity support the ‘AUG-GEN-DVD±RW’ or ‘AUG-GEN-USB’ Application Profile.

5.2.1.2.2 Activity – Import Image Files

The DR-ID 300CL does not support Media Storage to import.

5.2.1.2.3 Activity – Update Image Files

The Offline-Media Application Entity acts as an FSU when requested to update SOP Instances on a medium.

5.2.1.2.3.1 Media Storage Application Profiles

The Offline-Media Application Entity support the ‘AUG-GEN-DVD±RW’ or ‘AUG-GEN-USB’ Application Profile.

5.3 AUGMENTED AND PRIVATE APPLICATION PROFILES

5.3.1 Augmented Application Profiles

5.3.1.1 Augmented Application Profiles – AUG-GEN-DVD±RW and AUG-GEN-USB

Augmented Application Profiles support Standard Application Profiles, SC IOD and extended Transfer Syntax.

**TABLE 5.3-1 AUGMENTED APPLICATION PROFILES**

| <b>Application Profiles Supported</b> | <b>Standard Profiles Supported</b> |
|---------------------------------------|------------------------------------|
| AUG-GEN-DVD±RW                        | STD-GEN-DVD±RW                     |
| AUG-GEN-USB                           | STD-GEN-USB                        |

5.3.1.1.1 SOP Class Augmentations

The aforementioned Application Profiles support following SOP Class UID and Transfer Syntax.

**TABLE 5.3-2 SOP CLASS AUGMENTATIONS**

| <b>Information Object Definition</b>                 | <b>SOP Class UID</b>        | <b>Transfer Syntax</b>                            | <b>Transfer Syntax UID</b> |
|--|-----------------------------|---|----------------------------|
| Media Storage Directory Storage                      | 1.2.840.10008.1.3.10        | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1        |
|  |                             | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70     |
| Computed Radiography Image Storage                   | 1.2.840.10008.5.1.4.1.1.1   | Implicit VR Little Endian                         | 1.2.840.10008.1.2          |
|  |                             | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1        |
|  |                             | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70     |
| Digital X-ray Image Storage – For Presentation       | 1.2.840.10008.5.1.4.1.1.1.1 | Implicit VR Little Endian                         | 1.2.840.10008.1.2          |
|  |                             | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1        |
|  |                             | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70     |
| Digital Mammography Image Storage – For Presentation | 1.2.840.10008.5.1.4.1.1.1.2 | Implicit VR Little Endian                         | 1.2.840.10008.1.2          |
|  |                             | Explicit VR Little Endian                         | 1.2.840.10008.1.2.1        |
|  |                             | JPEG Lossless Hierarchical First-Order Prediction | 1.2.840.10008.1.2.4.70     |

**5.3.1.1.2 Directory Augmentations**

Not applicable to this product.

**5.3.1.1.3 Other Augmentations**

Not applicable to this product.

**5.3.2 Private Application Profiles**

Not applicable to this product.

**5.4 MEDIA CONFIGURATION**

All local applications use the AE Titles configured via the Service/Installation Tool. The Application Entity Titles configurable for Media Services are listed in the Table below:

**TABLE 5.4-1 AE TITLE CONFIGURATION TABLE**

| <b>Application Entity</b> | <b>Default AE Title</b> |
|---------------------------|-------------------------|
| Offline-Media             | No Default              |

## 6 SUPPORT OF CHARACTER SETS

ISO-IR 100 (Latin Alphabet #1)

ISO-IR 101 (Latin Alphabet #2)

ISO-IR 13/14 (Japanese Katakana: JIS X 0201)

ISO-IR 87 (Japanese Kanji: JIS X 0208)

ISO\_IR 192 (Unicode: UTF-8)

ISO-IR 149 (Korean: EUC-KR)

GB18030

## 7 SECURITY

DR-ID 300CL does not support any specific security measures.

It is assumed that DR-ID 300CL is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- a. Firewall or router protections to ensure that only approved external hosts have network access to DR-ID 300CL.
- b. Firewall or router protections to ensure that DR-ID 300CL only has network access to approved external hosts and services.
- c. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

## 8 ANNEXES

### 8.1 IOD CONTENTS

#### 8.1.1 Created SOP Instances

Table 8.1-1 specifies the attributes of a CR Image transmitted by the Storage-SCU AE.

Table 8.1-2 specifies the attributes of a DX Image for Presentation transmitted by the Storage-SCU AE.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of ...” column are:

|        |  |
|--------|--|
| VNAP   | Value Not Always Present (attribute sent zero length if no value is present) |
| ANAP   | Attribute Not Always Present   |
| ALWAYS | Always Present   |
| EMPTY  | Attribute is sent without a value (attribute always sent zero length)        |

The abbreviations used in the “Source” column:

|        |  |
|--------|--|
| MWL    | the attribute value source Modality Worklist           |
| USER   | the attribute value source is from User input          |
| AUTO   | the attribute value is generated automatically         |
| CONFIG | the attribute value source is a configurable parameter |
| OTHER  | the attribute value source is from other modality      |

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Service/Installation Tool.

The following tables describe just the attributes which DR-ID 300CL generates. The attributes which other modalities or the equipments generated is sent, if they exist, that way.



8.1.1.1 Computed Radiography Image IOD

**TABLE 8.1-1 IOD OF CREATED CR IMAGE STORAGE SOP INSTANCES**

| IE        | Module                 | Usage   | Reference     |
|-----------|------------------------|---|---------------|
| Patient   | Patient                | M   | Table 8.1-5   |
|           | Clinical Trial Subject | U   | Not Supported |
| Study     | General Study          | M   | Table 8.1-6   |
|           | Patient Study          | U   | Table 8.1-7   |
|           | Clinical Trial Study   | U   | Not Supported |
| Series    | General Series         | M   | Table 8.1-8   |
|           | CR Series              | M   | Table 8.1-9   |
|           | Clinical Trial Series  | U   | Not Supported |
| Equipment | General Equipment      | M   | Table 8.1-12  |
| Image     | General Image          | M   | Table 8.1-14  |
|           | Image Pixel            | M   | Table 8.1-15  |
|           | Contrast/bolus         | C - Required if contrast media was used in this image | Table 8.1-16  |
|           | Device                 | U   | Not Supported |
|           | CR Image               | M   | Table 8.1-18  |
|           | Overlay Plane          | C - Required if graphic annotation is present         | Table 8.1-31  |
|           | Modality LUT           | U   | Table 8.1-26  |
|           | VOI LUT                | U   | Table 8.1-27  |
|           | SOP Common             | M   | Table 8.1-29  |
| Extended  | DX Positioning         | -   | Table 8.1-22  |
|           | X-ray Tomo Acquisition | -   | Table 8.1-23  |
|           | X-ray Acquisition Dose | -   | Table 8.1-24  |
|           | X-ray Generation       | -   | Table 8.1-25  |

NOTE: In Extended module, type of all attributes is 3.

The IOD includes Private attributes and standard extended attributes documented in Section 8.2. See 8.2 and 8.5.

8.1.1.2 Digital X-ray Image IOD

**TABLE 8.1-2 IOD OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| IE         | Module                  | Usage   | Reference     |
|------------|-------------------------|---|---------------|
| Patient    | Patient                 | M   | Table 8.1-5   |
|            | Specimen Identification | U   | Not Supported |
|            | Clinical Trial Subject  | U   | Not Supported |
| Study      | General Study           | M   | Table 8.1-6   |
|            | Patient Study           | U   | Table 8.1-7   |
|            | Clinical Trial Study    | U   | Not Supported |
| Series     | General Series          | M   | Table 8.1-8   |
|            | Clinical Trial Series   | U   | Not Supported |
|            | DX Series               | M   | Table 8.1-10  |
|            | Frame of Reference      | U   | Not Supported |
| Equipment  | General Equipment       | M   | Table 8.1-12  |
| Image      | General Image           | M   | Table 8.1-14  |
|            | Image Pixel             | M   | Table 8.1-15  |
|            | Contrast/bolus          | U   | Table 8.1-16  |
|            | Display Shutter         | U   | Not Supported |
|            | Device                  | U   | Not Supported |
|            | Intervention            | U   | Not Supported |
|            | DX Anatomy Imaged       | M   | Table 8.1-17  |
|            | DX Image                | M   | Table 8.1-19  |
|            | DX Detector             | M   | Table 8.1-21  |
|            | X-ray Collimator        | U   | Not Supported |
|            | DX Positioning          | U   | Table 8.1-22  |
|            | X-ray Tomo Acquisition  | U   | Table 8.1-23  |
|            | X-ray Acquisition Dose  | U   | Table 8.1-24  |
|            | X-ray Generation        | U   | Table 8.1-25  |
|            | X-ray Filtration        | U   | Table 8.1-30  |
|            | X-ray Grid              | U   | Not Supported |
|            | Overlay Plane           | C - Required if graphic annotation is present   | Table 8.1-31  |
|            | VOI LUT                 | C - Required if Presentation Intent Type (0008,0068) is FOR PRESENTATION. Shall not be present otherwise. | Table 8.1-27  |
|            | Image Histogram         | U   | Not Supported |
|            | Acquisition Context     | M   | Table 8.1-28  |
| SOP Common | M                       | Table 8.1-29  |               |

NOTE: The IOD includes Private attributes and standard extended attributes documented in Section 8.2. See 8.2 and 8.5.

8.1.1.3 Digital Mammography X-Ray Image Radiography Image IOD

**TABLE 8.1-3 IOD OF CREATED MG IMAGE STORAGE SOP INSTANCES**

| IE         | Module                  | Usage   | Reference   |
|------------|-------------------------|---|---|
| Patient    | Patient                 | M   | Table 8.1-5   |
|            | Specimen Identification | U   | Not Supported   |
|            | Clinical Trial Subject  | U   | Not Supported   |
| Study      | General Study           | M   | Table 8.1-6   |
|            | Patient Study           | U   | Table 8.1-7   |
|            | Clinical Trial Study    | U   | Not Supported   |
| Series     | General Series          | M   | Table 8.1-8   |
|            | Clinical Trial Series   | U   | Not Supported   |
|            | DX Series               | M   | Table 8.1-10  |
|            | Mammography Series      | M   | Table 8.1-11  |
|            | Frame of Reference      | U   | Not Supported   |
| Equipment  | General Equipment       | M   | Table 8.1-12  |
| Image      | General Image           | M   | Table 8.1-14  |
|            | Image Pixel             | M   | Table 8.1-15  |
|            | Contrast/bolus          | U   | Table 8.1-16  |
|            | Display Shutter         | U   | Not Supported   |
|            | Device                  | U   | Not Supported   |
|            | Intervention            | U   | Not Supported   |
|            | DX Anatomy Imaged       | M   | Table 8.1-17<br>Included in the Mammography Image Module. |
|            | DX Image                | M   | Table 8.1-19  |
|            | DX Detector             | M   | Table 8.1-21  |
|            | X-ray Collimator        | U   | Not Supported   |
|            | DX Positioning          | U   | Table 8.1-22  |
|            | X-ray Tomo Acquisition  | U   | Table 8.1-23  |
|            | X-ray Acquisition Dose  | U   | Table 8.1-24  |
|            | X-ray Generation        | U   | Table 8.1-25  |
|            | X-ray Filtration        | U   | Table 8.1-30  |
|            | X-ray Grid              | U   | Not Supported   |
|            | Overlay Plane           | C - Required if graphic annotation is present   | Table 8.1-31  |
|            | VOI LUT                 | C - Required if Presentation Intent Type (0008,0068) is FOR PRESENTATION. Shall not be present otherwise. | Table 8.1-27  |
|            | Image Histogram         | U   | Not Supported   |
|            | Acquisition Context     | M   | Table 8.1-28  |
| SOP Common | M                       | Table 8.1-29  |   |

NOTE: The IOD includes Private attributes and standard extended attributes documented in Section 8.2. See 8.2 and 8.5.

8.1.1.4 X-Ray Radiation Dose SR IOD

**TABLE 8.1-4 IOD OF CREATED X-RAY RADIATION DOSE SR SOP INSTANCES**

| <b>IE</b>          | <b>Module</b>              | <b>Usage</b> | <b>Reference</b> |
|--------------------|----------------------------|--------------|------------------|
| Patient            | Patient                    | M            | Table 8.1-5      |
|                    | Specimen Identification    | U            | Not Supported    |
|                    | Clinical Trial Subject     | U            | Not Supported    |
| Study              | General Study              | M            | Table 8.1-6      |
|                    | Patient Study              | U            | Not Supported    |
|                    | Clinical Trial Study       | U            | Not Supported    |
| Series             | SR Document Series         | M            | Table 8.1-33     |
|                    | Clinical Trial Series      | U            | Not Supported    |
| Frame of Reference | Synchronization            | U            | Not Supported    |
| Equipment          | General Equipment          | M            | Table 8.1-12     |
|                    | Enhanced General Equipment | M            | Table 8.1-13     |
| Document           | SR Document General        | M            | Table 8.1-34     |
|                    | SR Document Content        | M            | Table 8.1-35     |
|                    | SOP Common                 | U            | Table 8.1-29     |

NOTE: The IOD includes Private attributes and standard extended attributes documented in Section 8.2. See 8.2 and 8.5.

8.1.1.5 Patient Module

**TABLE 8.1-5 PATIENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name       | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source    |
|----------------------|-------------|------|--|-------------------|-----------|
| Patient's Name       | (0010,0010) | 2    | Patient's full name.   | VNAP              | USER /MWL |
| Patient ID           | (0010,0020) | 2    | Primary hospital identification number or code for the patient.                        | VNAP              | USER /MWL |
| Patient's Birth Date | (0010,0030) | 2    | Birth date of the patient.   | VNAP              | USER /MWL |
| Patient's Sex        | (0010,0040) | 2    | Sex of the named patient.<br>Enumerated Values:<br>M = male<br>F = female<br>O = other | VNAP              | USER /MWL |
| Other Patient IDs    | (0010,1000) | 3    | Other identification numbers or codes used to identify the patient.                    | ANAP              | MWL       |
| Ethnic Group         | (0010,2160) | 3    | Ethnic group or race of patient.   | ANAP              | MWL       |
| Patient Comments     | (0010,4000) | 3    | User-defined comments about the patient.   | ANAP              | USER /MWL |

8.1.1.6 General Study Module

**TABLE 8.1-6 GENERAL STUDY MODULE OF CREATED SOP INSTANCES**

| Attribute Name             | Tag         | Type | Dicom Attribute Description   | Presence of Value | Source            |
|----------------------------|-------------|------|---|-------------------|-------------------|
| Study Instance UID         | (0020,000D) | 1    | Unique identifier for the Study.  | ALWAYS            | MWL /AUTO /CONFIG |
| Study Date                 | (0008,0020) | 2    | Date the Study started.   | ALWAYS            | AUTO              |
| Study Time                 | (0008,0030) | 2    | Time the Study started.   | ALWAYS            | AUTO              |
| Referring Physician's Name | (0008,0090) | 2    | Name of the patient's referring physician   | VNAP              | MWL               |
| Study ID                   | (0020,0010) | 2    | User or equipment generated Study identifier.   | VNAP              | MWL               |
| Accession Number           | (0008,0050) | 2    | A RIS generated number that identifies the order for the Study.                         | VNAP              | USER /MWL         |
| Study Description          | (0008,1030) | 3    | Institution-generated description or classification of the Study (component) performed. | ANAP              | MWL               |
| Physician(s) of Record     | (0008,1048) | 3    | Names of the physician(s) who are responsible for overall patient care at time of Study | ANAP              | OTHER             |

8.1.1.7 Patient Study Module

**TABLE 8.1-7 PATIENT STUDY MODULE OF CREATED SOP INSTANCES**

| Attribute Name               | Tag         | Type | Dicom Attribute Description                                 | Presence of Value | Source |
|------------------------------|-------------|------|---|-------------------|--------|
| Patient's Age                | (0010,1010) | 3    | Age of Patient.   | ANAP              | USER   |
| Additional Patient's History | (0010,21B0) | 3    | Additional information about the Patient's medical history. | ANAP              | MWL    |

8.1.1.8 General Series Module

**TABLE 8.1-8 GENERAL SERIES MODULE OF CREATED SOP INSTANCES**

| Attribute Name                       | Tag         | Type | Dicom Attribute Description   | Presence of Value  | Source       |
|--------------------------------------|-------------|------|---|--|--------------|
| Modality                             | (0008,0060) | 1    | Type of equipment that originally acquired the data used to create the images in this Series.   | ALWAYS   | AUTO         |
| Operators' Name                      | (0008,1070) | 3    | Name(s) of the operator(s) supporting the Series.   | ANAP   | CONFIG /USER |
| Series Instance UID                  | (0020,000E) | 1    | Unique identifier of the Series.  | ALWAYS   | AUTO         |
| Series Number                        | (0020,0011) | 2    | A number that identifies this Series.   | VNAP   | AUTO         |
| Laterality                           | (0020,0060) | 2C   | Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent.<br>Enumerated Values:<br>R = right<br>L = left                           | VNAP   | AUTO         |
| Series Date                          | (0008,0021) | 3    | Date the Series started.  | ANAP   | AUTO         |
| Series Time                          | (0008,0031) | 3    | Time the Series started.  | ANAP   | AUTO         |
| Series Description                   | (0008,103E) | 3    | User provided description of the Series   | ANAP   | OTHER        |
| Protocol Name                        | (0018,1030) | 3    | User-defined description of the conditions under which the Series was performed.  | ANAP   | OTHER        |
| Body Part Examined                   | (0018,0015) | 3    | Text description of the part of the body examined.<br>Defined Terms:<br>SKULL, CSPINE, TSPINE, LSPINE, SSPINE, COCCYX, CHEST, CLAVICLE, BREAST, ABDOMEN, PELVIS, HIP, SHOULDER, ELBOW, KNEE, ANKLE, HAND, FOOT, EXTREMITY, HEAD, HEART, NECK, LEG, ARM, JAW | ALWAYS<br><br>Values shown below are used. Body part definitions not existing in the DICOM definitions will be added.<br>HEAD, NECK, CHEST, BREAST, ABDOMEN, PELVIS, UP_EXM, LOW_EXM, TEST | USER         |
| Performed Procedure Step ID          | (0040,0253) | 3    | User or equipment generated identifier of that part of a Procedure that has been carried out within this step.  | ANAP   | AUTO         |
| Performed Procedure Step Start Date  | (0040,0244) | 3    | Date on which the Performed Procedure Step started.   | ANAP   | AUTO         |
| Performed Procedure Step Start Time  | (0040,0245) | 3    | Time on which the Performed Procedure Step started.   | ANAP   | AUTO         |
| Performed Procedure Step Description | (0040,0254) | 3    | Institution-generated description or classification of the Procedure Step that was performed.   | ANAP   | AUTO         |

| Attribute Name                        | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|---------------------------------------|-------------|------|--|-------------------|--------|
| Performed Protocol Code Sequence      | (0040,0260) | 3    | Sequence describing the Protocol performed for this Procedure Step. One or more Items may be included in this Sequence.  | ANAP              | AUTO   |
| >Code Value                           | (0008,0100) | 1C   | Required if a sequence item is present.  | ANAP              | AUTO   |
| >Coding Scheme Designator             | (0008,0102) | 1C   | Required if a sequence item is present.  | ANAP              | AUTO   |
| >Coding Scheme Version                | (0008,0103) | 1C   | Required if a sequence item is present.  | ANAP              | AUTO   |
| >Code Meaning                         | (0008,0104) | 1C   | Required if a sequence item is present.  | ANAP              | AUTO   |
| Request Attributes Sequence           | (0040,0275) | 3    | Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items.             | ANAP              | AUTO   |
| >Requested Procedure ID               | (0040,1001) | 1    | Identifier which identifies the Requested Procedure in the Imaging Service Request.                                      | ANAP              | MWL    |
| >Scheduled Procedure Step ID          | (0040,0009) | 1    | Identifier which identifies the Scheduled Procedure Step.  | ANAP              | MWL    |
| >Scheduled Procedure Step Description | (0040,0007) | 3    | Institution-generated description or classification of the Scheduled Procedure Step to be performed.                     | ANAP              | MWL    |
| >Scheduled Protocol Code Sequence     | (0040,0008) | 3    | Sequence describing the Scheduled Protocol following a specific coding scheme. This sequence contains one or more items. | ANAP              | MWL    |
| >>Code Value                          | (0008,0100) | 1C   | Required if a sequence item is present.  | ANAP              | MWL    |
| >>Coding Scheme Designator            | (0008,0102) | 1C   | Required if a sequence item is present.  | ANAP              | MWL    |
| >>Coding Scheme Version               | (0008,0103) | 1C   | Required if a sequence item is present.  | ANAP              | MWL    |
| >>Code Meaning                        | (0008,0104) | 1C   | Required if a sequence item is present.  | ANAP              | MWL    |
| >Referenced Study Sequence            | (0008,1110) | 3    | Uniquely identifies the Study SOP Instances associated with this SOP Instance. One or more items may be included.        | ANAP              | MWL    |
| >>Referenced SOP Class UID            | (0008,1150) | 1    | Uniquely identifies the referenced SOP Class.  | ANAP              | MWL    |
| >>Referenced SOP Instance UID         | (0008,1155) | 1    | Uniquely identifies the referenced SOP Instance.   | ANAP              | MWL    |

8.1.1.9 CR Series Module

**TABLE 8.1-9 CR SERIES MODULE OF CREATED CR IMAGE STORAGE SOP INSTANCES**

| Attribute Name     | Tag         | Type | Dicom Attribute Description  | Presence of Value  | Source |
|--------------------|-------------|------|--|--|--------|
| Body Part Examined | (0018,0015) | 2    | Text description of the part of the body examined.<br>Defined Terms:<br>SKULL, CSPINE, TSPINE, LSPINE, SSPINE, COCCYX, CHEST, CLAVICLE, BREAST, ABDOMEN, PELVIS, HIP, SHOULDER, ELBOW, KNEE, ANKLE, HAND, FOOT, EXTREMITY, HEAD, HEART, NECK, LEG, ARM, JAW  | ALWAYS<br><br>Values shown below are used. Body part definitions not existing in the DICOM definitions will be added.<br>HEAD, NECK, CHEST, BREAST, ABDOMEN, PELVIS, UP_EXM, LOW_EXM, TEST | USER   |
| View Position      | (0018,5101) | 2    | Radiographic view associated with Patient Position (0018,5100).<br>Defined Terms:<br>AP = Anterior/Posterior<br>PA = Posterior/Anterior<br>LL = Left Lateral<br>RL = Right Lateral<br>RLD = Right Lateral Decubitus<br>LLD = Left Lateral Decubitus<br>RLO = Right Lateral Oblique<br>LLO = Left Lateral Oblique | VNAP   | AUTO   |



## 8.1.1.10 DX Series Module

**TABLE 8.1-10 DX SERIES MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| Attribute Name                               | Tag         | Type | Dicom Attribute Description   | Presence of Value       | Source |
|--|-------------|------|---|-------------------------|--------|
| Modality                                     | (0008,0060) | 1    | Type of equipment that originally acquired the data used to create the images in this Series.<br>Enumerated Values:<br>DX,PX,IO,MG  | ALWAYS<br>Value is "DX" | AUTO   |
| Referenced Performed Procedure Step Sequence | (0008,1111) | 1C   | Uniquely identifies the Performed Procedure Step SOP Instance to which the Series is related (e.g. a Modality or General-Purpose Performed Procedure Step SOP Instance). The Sequence shall have one Item.<br>Required if the Modality Performed Procedure Step SOP Class, General Purpose Performed Procedure Step SOP Class is supported. | ANAP                    | AUTO   |
| >Referenced SOP Class UID                    | (0008,1150) | 1C   | Uniquely identifies the referenced SOP Class.<br>Required if Referenced Performed Procedure Step Sequence (0008,1111) is sent.  | ANAP                    | AUTO   |
| >Referenced SOP Instance UID                 | (0008,1155) | 1C   | Uniquely identifies the referenced SOP Instance.<br>Required if Referenced Performed Procedure Step Sequence (0008,1111) is sent.   | ANAP                    | AUTO   |
| Presentation Intent Type                     | (0008,0068) | 1    | Identifies the intent of the images that are contained within this Series.<br>Enumerated Values:<br>FOR PRESENTATION<br>FOR PROCESSING  | ALWAYS                  | CONFIG |

8.1.1.11 Mammography Series Module

**TABLE 8.1-11 MAMMOGRAPY SERIES MODULE OF CREATED MG IMAGE STORAGE SOP INSTANCES**

| Attribute Name                                | Tag         | Type | Dicom Attribute Description   | Presence of Value       | Source |
|---|-------------|------|---|-------------------------|--------|
| Modality                                      | (0008,0060) | 1    | Type of equipment that originally acquired the data used to create the images in this Series.<br>Enumerated Values:<br>MG | ALWAYS<br>Value is "MG" | AUTO   |
| Request Attributes Sequence                   | (0040,0275) | 3    | Sequence that contains attributes from the Imaging Service Request. The sequence may have one or more Items.              | ANAP                    | MWL    |
| >Reason for Requested Procedure Code Sequence | (0040,100A) | 3    | Coded Reason for requesting this procedure.<br>One or more sequence items may be present.                                 | ANAP                    | MWL    |

8.1.1.12 General Equipment Module

**TABLE 8.1-12 GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name                | Tag         | Type | Dicom Attribute Description  | Presence of Value                            | Source |
|-------------------------------|-------------|------|--|--|--------|
| Manufacturer                  | (0008,0070) | 2    | Manufacturer of the equipment that produced the composite instances.                                   | ALWAYS<br>Value is<br>"FUJIFILM Corporation" | AUTO   |
| Institution Name              | (0008,0080) | 3    | Institution where the equipment that produced the composite instances is located.                      | ANAP   | CONFIG |
| Station Name                  | (0008,1010) | 3    | User defined name identifying the machine that produced the composite instances.                       | ALWAYS                                       | CONFIG |
| Institutional Department Name | (0008,1040) | 3    | Department in the institution where the equipment that produced the composite instances is located.    | ANAP   | OTHER  |
| Manufacturer's Model Name     | (0008,1090) | 3    | Manufacturer's model name of the equipment that produced the composite instances.                      | ANAP   | AUTO   |
| Software Versions             | (0018,1020) | 3    | Manufacturer's designation of software version of the equipment that produced the composite instances. | ANAP   | AUTO   |

8.1.1.13 Enhanced General Equipment Module

**TABLE 8.1-13 ENHANCED GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name            | Tag         | Type | Dicom Attribute Description  | Presence of Value                            | Source |
|---------------------------|-------------|------|--|--|--------|
| Manufacturer              | (0008,0070) | 1    | Manufacturer of the equipment that produced the composite instances.                                   | ALWAYS<br>Value is<br>"FUJIFILM Corporation" | AUTO   |
| Manufacturer's Model Name | (0008,1090) | 1    | Manufacturer's model name of the equipment that produced the composite instances.                      | ALWAYS                                       | AUTO   |
| Device Serial Number      | (0018,1000) | 1    | Manufacturer's serial number of the equipment that produced the composite instances.                   | ALWAYS                                       | AUTO   |
| Software Versions         | (0018,1020) | 1    | Manufacturer's designation of software version of the equipment that produced the composite instances. | ALWAYS                                       | AUTO   |

8.1.1.14 General Image Module

**TABLE 8.1-14 GENERAL IMAGE MODULE OF CREATED SOP INSTANCES**

| Attribute Name               | Tag         | Type | Dicom Attribute Description  | Presence of Value           | Source       |
|------------------------------|-------------|------|--|-----------------------------|--------------|
| Instance Number              | (0020,0013) | 2    | A number that identifies this image.   | ALWAYS                      | AUTO         |
| Patient Orientation          | (0020,0020) | 2C   | Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (Patient) (0020,0037) and Image Position (Patient) (0020,0032).   | VNAP                        | CONFIG /USER |
| Content Date                 | (0008,0023) | 2C   | The date the image pixel data creation started. Required if image is part of a series in which the images are temporally related.  | ALWAYS                      | AUTO         |
| Content Time                 | (0008,0033) | 2C   | The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related.  | ALWAYS                      | AUTO         |
| Image Type                   | (0008,0008) | 3    | Image identification characteristics.  | ALWAYS<br>See Note 1 below. | AUTO         |
| Acquisition Number           | (0020,0012) | 3    | A number identifying the single continuous gathering of data over a period of time that resulted in this image.  | ANAP                        | AUTO         |
| Acquisition Date             | (0008,0022) | 3    | The date the acquisition of data that resulted in this image started   | ALWAYS                      | AUTO         |
| Acquisition Time             | (0008,0032) | 3    | The time the acquisition of data that resulted in this image started   | ALWAYS                      | AUTO         |
| Derivation Description       | (0008,2111) | 3    | A text description of how this image was derived.  | ANAP                        | AUTO         |
| Source Image Sequence        | (0008,2112) | 3    | A Sequence that identifies the set of Image SOP Class/Instance pairs of the Images that were used to derive this Image. Zero or more Items may be included in this Sequence.   | ANAP                        | AUTO         |
| >Referenced SOP Class UID    | (0008,1150) | 1    | Uniquely identifies the referenced SOP Class.  | ANAP                        | AUTO         |
| >Referenced SOP Instance UID | (0008,1155) | 1    | Uniquely identifies the referenced SOP Instance.   | ANAP                        | AUTO         |
| Image Comments               | (0020,4000) | 3    | User-defined comments about the image.   | ANAP                        | USER         |
| Lossy Image Compression      | (0028,2110) | 3    | Specifies whether an Image has undergone lossy compression.<br>Enumerated Values:<br>00 = Image has NOT been subjected to lossy compression.<br>01 = Image has been subjected to lossy compression.<br>See PS3.3 C.7.6.1.1.5 | ALWAYS<br>Value is "00"     | AUTO         |
| Pixel Spacing                | (0028,0030) | 3    | Extended Attribute.<br>Physical distance, within the patient, between the centers of each pixel.<br>Expressed as a numerical set: space between adjoining rows (delimiter), space between adjoining columns. Unit: mm.       | ALWAYS<br>See Note 2 below. | AUTO         |

**Note 1:**

The Image Type consists of the following elements as per DICOM definitions.

Value 1: Pixel data Characteristics

Value 2: Patient Examination Characteristics

Value 3: Modality Specific Characteristics

Value 4 or after: Other Value “n” (“n” represents a numeric value.)

On the DR-ID 300CL, the above values should be interpreted as described below. Note that each of the elements may be omitted (only delimiters exist). When a portion after a certain element is fully omitted, even delimiters do not exist.

Because Value 1 and Value 2 have DICOM-defined meanings, they comply with the DICOM definitions. If omitted, they will be considered to be “ORIGINAL” or “PRIMARY”.

Value 3 determines image data types such as pre-normalized image, normalized image or processed image. If omitted, it will be considered to be “NORMALIZED”.

Value 4 (Other Value 1) represents processing purpose type of an image. When omitted, it will be considered to be “RT”.

Value 5 (Other Value 2) determines a types of change processing performed on an original image. Value 5 will not be determined if no changes have been made.

Value 6 (Other Value 3) determines a date of the change made on an image with Value 5 (Other Value 2) above. Value 6 will not be determined if no changes have been made.

Value 7 (Other Value 4) determines a type of special processing performed on an image, which will not be determined if no special image processing has been performed.

Value 8 (Other Value 5) determines a date of the special image processing performed with Value 7 (Other Value 4) above. Value 8 will not be determined if no special image processing has been performed.

Value 9 (Other Value 6) determines the distance (nm) between the centers of each pixel when an IP is read.

Each of the values mentioned above will represent the following specific meaning.

**Value 1: (as per DICOM definitions)**

(In cases of Computed Radiography Image Storage and FUJI Private Computed Radiography Image Storage)

**ORIGINAL** An image whose pixel size is based on the original image (pre-normalized image or normalized image).

**DERIVED** An image derived from pixel size of one or more images according to a specific method. (processed image).

(In case of Digital X-ray Image Storage – For Presentation, Digital X-Ray Image Storage – For Processing, Digital

Mammography X-ray Image Storage – For Presentation and Digital Mammography X-Ray Image Storage – For Processing)

**ORIGINAL** An image acquired from normal exposure (with or without image processing having been performed)

**DERIVED** An image created by morphological processing (image stitching, energy subtraction.)

**Value 2: (as per DICOM definitions)**

**PRIMARY** An image generated as a direct result from a patient study.

SECONDARY An image generated after the first patient study.

**Value 3:**

(In cases of Computed Radiography Image Storage and FUJI Private Computed Radiography Image Storage )

PRE\_NORMALIZED A pre-normalized image.

NORMALIZED A normalized image.

POST\_PROCESSED An already processed image.

(In case of Digital X-ray Image Storage – For Presentation, Digital X-Ray Image Storage – For Processing, Digital

Mammography X-ray Image Storage – For Presentation and Digital Mammography X-Ray Image Storage – For Processing)

No value

**Value 4:**

RT Routine exposure image

ES\_L Low-pressure image for energy subtraction processing.

ES\_H High-pressure image for energy subtraction processing.

TO Tomosynthesis exposure image

**Value 5:**

RENORMALIZED A re-normalized image.

MODIFIED\_PARAM An image on which image processing parameters have been modified.

**Value 6 and Value 8:**

Determine in the “YYYYMMDDhhmmss” format a date when image processing was performed.

**Value 7:**

STICHED Image composition processing that generates one image from multiple images.

BONE A bone image based on the energy subtraction processing.

SOFT\_TISSUE Soft tissue image based on the energy subtraction processing.

SLICE Tomosynthesis reconstruction image

**Value 9:**

The distance (nm) between the centers of each pixel when an IP is re

When “RENORMALIZED” has been determined for Value 5, what is determined will not be changed even if parameters were modified.

**Note 2:**

The CR and DX image is a projected image and Imager Pixel Spacing (0018,1164) must be used for the distance between the centers of each pixel. However, because some workstations perform necessary processing based on Pixel Spacing (0028,0030), such distance on the Detector surface is determined for it.

According to DICOM definitions, the Pixel Spacing (0028,0030) is to represent the distance between the centers of each pixel in the “patient’s body”. Because the CR and DX image is a projected image, it is not possible to calculate the distance between the centers of each pixel “in the patient’s body”.

Therefore, the value determined here is not correct in the light of the DICOM definitions. Note that even if the distance, area or dimensions are calculated based on the value presented here, the resultant values thus calculated do not precisely reflect an object in the patient’s body.

(Remember that the CR and DX image is a projected image, which disables measurements of the dimensions of the object precisely reflected by actual dimensions in the patient’s body.)

## 8.1.1.15 Image Pixel Module

TABLE 8.1-15 IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

| Attribute Name             | Tag         | Type | Dicom Attribute Description  | Presence of Value          | Source |
|----------------------------|-------------|------|--|----------------------------|--------|
| Samples per Pixel          | (0028,0002) | 1    | Number of samples (planes) in this image. See PS3.3 C.7.6.3.1.1 for further explanation.   | ALWAYS<br>Value is "1"     | AUTO   |
| Photometric Interpretation | (0028,0004) | 1    | Specifies the intended interpretation of the pixel data. See PS3.3 C.7.6.3.1.2 for further explanation.  | ALWAYS                     | CONFIG |
| Rows                       | (0028,0010) | 1    | Number of rows in the image.   | ALWAYS                     | AUTO   |
| Columns                    | (0028,0011) | 1    | Number of columns in the image   | ALWAYS                     | AUTO   |
| Bits Allocated             | (0028,0100) | 1    | Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See PS 3.5 for further explanation.                                | ALWAYS                     | AUTO   |
| Bits Stored                | (0028,0101) | 1    | Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See PS 3.5 for further explanation.                                      | ALWAYS                     | AUTO   |
| High Bit                   | (0028,0102) | 1    | Most significant bit for pixel sample data. Each sample shall have the same high bit. See PS 3.5 for further explanation.  | ALWAYS                     | AUTO   |
| Pixel Representation       | (0028,0103) | 1    | Data representation of the pixel samples. Each sample shall have the same pixel representation.<br>Enumerated Values:<br>0000H = unsigned integer.<br>0001H = 2's complement | ALWAYS<br>Value is "0000H" | AUTO   |
| Pixel Data                 | (7FE0,0010) | 1C   | A data stream of the pixel samples that comprise the Image.<br>Required if Pixel Data Provider URL (0028,7FE0) is not present.   | ALWAYS                     | AUTO   |

## 8.1.1.16 Contrast/Bolus Module

TABLE 8.1-16 CONTRAST/BOLUS MODULE OF CREATED SOP INSTANCES

| Attribute Name       | Tag         | Type | Dicom Attribute Description | Presence of Value | Source |
|----------------------|-------------|------|-----------------------------|-------------------|--------|
| Contrast/Bolus Agent | (0018,0010) | 2    | Contrast or bolus agent     | EMPTY             | AUTO   |

8.1.1.17 DX Anatomy Imaged Module

**TABLE 8.1-17 DX ANATOMY IMAGED MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| Attribute Name            | Tag         | Type | Dicom Attribute Description   | Presence of Value | Source |
|---------------------------|-------------|------|---|-------------------|--------|
| Image Laterality          | (0020,0062) | 1    | Laterality of (possibly paired) body part (as described in Anatomic Region Sequence (0008,2218)) examined.<br><br>Enumerated Values:<br>R = right<br>L = left<br>U = unpaired<br>B = both left and right    | ALWAYS            | USER   |
| Anatomic Region Sequence  | (0008,2218) | 2    | Sequence that identifies the anatomic region of interest in this Instance (i.e. external anatomy, surface anatomy, or general region of the body).<br><br>Zero or one Item may be present in this Sequence. | VNAP              | USER   |
| >Code Value               | (0008,0100) | 1C   | Required if a sequence item is present.   | ANAP              | AUTO   |
| >Coding Scheme Designator | (0008,0102) | 1C   | Required if a sequence item is present.   | ANAP              | AUTO   |
| >Coding Scheme Version    | (0008,0103) | 1C   | Required if a sequence item is present.   | ANAP              | AUTO   |
| >Code Meaning             | (0008,0104) | 1C   | Required if a sequence item is present.   | ANAP              | AUTO   |



## 8.1.1.18 CR Image Module

TABLE 8.1-18 CR IMAGE MODULE OF CREATED CR IMAGE STORAGE SOP INSTANCES

| Attribute Name                            | Tag         | Type | Dicom Attribute Description   | Presence of Value  | Source       |
|---|-------------|------|---|--|--------------|
| Photometric Interpretation                | (0028,0004) | 1    | Specifies the intended interpretation of the pixel data. Shall have one of the following Enumerated Values:<br>MONOCHROME1<br>MONOCHROME2   | ALWAYS   | CONFIG       |
| KVP                                       | (0018,0060) | 3    | Peak kilo voltage output of the X-ray generator used.   | ANAP   | AUTO         |
| Plate ID                                  | (0018,1004) | 3    | The ID or serial number of the sensing plate upon which the image was acquired.   | ANAP<br>The Following format is applicable to FCR Images.<br>Format is "a*****c"   | AUTO         |
| Exposure Time                             | (0018,1150) | 3    | Time of X-ray exposure in msec.   | ANAP   | AUTO         |
| X-ray Tube Current                        | (0018,1151) | 3    | X-ray Tube Current in mA.   | ANAP   | AUTO         |
| Exposure                                  | (0018,1152) | 3    | The exposure expressed in mAs, for example calculated from Exposure Time and X-ray Tube Current.  | ANAP   | AUTO         |
| Exposure in $\mu$ As                      | (0018,1153) | 3    | The exposure expressed in $\mu$ As, for example calculated from Exposure Time and X-ray Tube Current.   | ANAP   | AUTO         |
| Imager Pixel Spacing                      | (0018,1164) | 3    | Physical distance measured at the front plane of the Image Receptor housing between the center of each pixel. Specified by a numeric pair - row spacing value (delimiter) column spacing value - in mm. | ANAP   | AUTO         |
| Acquisition Device Processing Description | (0018,1400) | 3    | Describes device-specific processing associated with the image (e.g. Organ Description)   | ALWAYS<br>Sets menu name. Exposure menu name.  | CONFIG /USER |
| Acquisition Device Processing Code        | (0018,1401) | 3    | Code representing the device-specific processing associated with the image (e.g. CR Organ Filtering code)   | ALWAYS<br>Sets menu code. Codifies the body part, exposure method and exposure menu.<br>Taken to be FFFF if no value exists. | CONFIG /USER |
| Sensitivity                               | (0018,6000) | 3    | Reading sensitivity.  | ANAP   | AUTO         |

8.1.1.19 DX Image Module

**TABLE 8.1-19 DX IMAGE MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| Attribute Name                    | Tag         | Type | Dicom Attribute Description  | Presence of Value           | Source |
|-----------------------------------|-------------|------|--|-----------------------------|--------|
| Image Type                        | (0008,0008) | 1    | Image identification characteristics.  | ALWAYS<br>See Note 1 below. | AUTO   |
| Samples per Pixel                 | (0028,0002) | 1    | Number of samples in this image. Shall have an Enumerated Value of 1.  | ALWAYS<br>Value is "1"      | AUTO   |
| Photometric Interpretation        | (0028,0004) | 1    | Specifies the intended interpretation of the pixel data. Shall have one of the following Enumerated Values:<br>MONOCHROME1<br>MONOCHROME2  | ALWAYS                      | CONFIG |
| Bits Allocated                    | (0028,0100) | 1    | Number of bits allocated for each pixel sample.<br>Enumerated Values: 8, 16  | ALWAYS<br>Value is "16"     | AUTO   |
| Bits Stored                       | (0028,0101) | 1    | Number of bits stored for each pixel sample.<br>Enumerated Values: 6 to 16   | ALWAYS                      | AUTO   |
| High Bit                          | (0028,0102) | 1    | Most significant bit for pixel sample data. Shall have an Enumerated Value of one less than the value in Bit Stored (0028,0101).   | ALWAYS                      | AUTO   |
| Pixel Representation              | (0028,0103) | 1    | Data representation of the pixel samples. Shall have the Enumerated Value:<br>0000H = Unsigned Integer.  | ALWAYS<br>Value is "0000H"  | AUTO   |
| Pixel Intensity Relationship      | (0028,1040) | 1    | The relationship between the Pixel sample values and the X-ray beam intensity.<br>Enumerated Values:<br>LIN = Linearly proportional to X-ray beam intensity<br>LOG = Logarithmically proportional to X-ray beam intensity<br>See PS3.3 C.8.11.3.1.2 for further explanation.   | ALWAYS<br>Value is "LOG"    | AUTO   |
| Pixel Intensity Relationship Sign | (0028,1041) | 1    | The sign of the relationship between the Pixel sample values stored in Pixel Data (7FE0,0010) and the X-ray beam intensity.<br>Enumerated Values:<br>1 = Lower pixel values correspond to less X-ray beam intensity<br>-1 = Higher pixel values correspond to less X-ray beam intensity<br>See PS3.3 C.8.11.3.1.2 for further explanation. | ALWAYS<br>Value is "1"      | AUTO   |

| Attribute Name                            | Tag         | Type | Dicom Attribute Description   | Presence of Value                                    | Source       |
|---|-------------|------|---|--|--------------|
| Rescale Intercept                         | (0028,1052) | 1    | The value b in the relationship between stored values (SV) in Pixel Data (7FE0,0010) and the output units specified in Rescale Type (0028,1054).<br>Output units = m*SV + b.<br>Enumerated Value: 0<br>See PS3.3 C.8.11.3.1.2 for further explanation.  | ALWAYS<br><br>Value is "0"                           | AUTO         |
| Rescale Slope                             | (0028,1053) | 1    | m in the equation specified by Rescale Intercept (0028,1052).<br>Enumerated Value: 1<br>See PS3.3 C.8.11.3.1.2 for further explanation.   | ALWAYS<br><br>Value is "1"                           | AUTO         |
| Rescale Type                              | (0028,1054) | 1    | Specifies the output units of Rescale Slope (0028,1053) and Rescale Intercept (0028,1052).<br>Enumerated Value: US = Unspecified<br>See PS3.3 C.8.11.3.1.2 for further explanation.   | ALWAYS<br><br>Value is "US"                          | AUTO         |
| Presentation LUT Shape                    | (2050,0020) | 1    | Specifies an identity transformation for the Presentation LUT, other than to account for the value of Photometric Interpretation (0028,0004), such that the output of all grayscale transformations defined in the IOD containing this Module are defined to be P-Values.<br>Enumerated Values:<br>IDENTITY - output is in P-Values - shall be used if Photometric Interpretation (0028,0004) is MONOCHROME2.<br>INVERSE - output after inversion is in P-Values - shall be used if Photometric Interpretation (0028,0004) is MONOCHROME1.<br>See PS3.3 C.8.11.3.1.2 for further explanation. | ALWAYS<br><br>Value is "INVERSE"                     | AUTO         |
| Lossy Image Compression                   | (0028,2110) | 1    | Specifies whether an Image has undergone lossy compression.<br>Enumerated Values:<br>00 = Image has NOT been subjected to lossy compression.<br>01 = Image has been subjected to lossy compression.<br>See PS3.3 C.7.6.1.1.5 for further explanation.   | ALWAYS<br><br>Value is "00"                          | AUTO         |
| Derivation Description                    | (0008,2111) | 3    | A text description of how this image was derived.   | ANAP   | AUTO         |
| Acquisition Device Processing Description | (0018,1400) | 3    | Indicates any visual processing performed on the images prior to exchange.<br>See PS3.3 C.8.11.3.1.3 for further explanation.   | ALWAYS<br><br>Sets menu name.<br>Exposure menu name. | CONFIG /USER |

| Attribute Name                     | Tag         | Type | Dicom Attribute Description   | Presence of Value   | Source       |
|------------------------------------|-------------|------|---|---|--------------|
| Acquisition Device Processing Code | (0018,1401) | 3    | Code representing the device-specific processing associated with the image (e.g. Organ Filtering code)  | ALWAYS<br><br>Sets menu code. Codifies the body part, exposure method and exposure menu. Taken to be FFFF if no value exists. | CONFIG /USER |
| Patient Orientation                | (0020,0020) | 1    | Patient direction of the rows and columns of the image.<br>See PS3.3 C.7.6.1.1.1 for further explanation.   | ALWAYS  | CONFIG /USER |
| Burned In Annotation               | (0028,0301) | 1    | Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired.<br>Enumerated Values:<br>YES<br>NO   | ALWAYS<br><br>Value is "NO"   | AUTO         |
| VOI LUT Sequence                   | (0028,3010) | 1C   | Defines a sequence of VOI LUTs. See PS3.3 C.8.11.3.1.5 for further explanation.<br>Required if Presentation Intent Type (0008,0068) is FOR PRESENTATION and Window Center (0028,1050) is not present. May also be present if Window Center (0028,1050) is present.            | ANAP  | AUTO         |
| >LUT Descriptor                    | (0028,3002) | 1C   | Specifies the format of the LUT Data in this Sequence.<br>See PS3.3 C.8.11.3.1.5 for further explanation.<br>Required if the VOI LUT Sequence (0028,3010) is sent.  | ANAP  | AUTO         |
| >LUT Explanation                   | (0028,3003) | 3    | Free form text explanation of the meaning of the LUT.   | ANAP  | AUTO         |
| >LUT Data                          | (0028,3006) | 1C   | LUT Data in this Sequence.<br>Required if the VOI LUT Sequence (0028,3010) is sent.   | ANAP  | AUTO         |
| Window Center                      | (0028,1050) | 1C   | Defines a Window Center for display. See PS3.3 C.8.11.3.1.5 for further explanation.<br>Required if Presentation Intent Type (0008,0068) is FOR PRESENTATION and VOI LUT Sequence (0028,3010) is not present. May also be present if VOI LUT Sequence (0028,3010) is present. | ALWAYS  | AUTO         |
| Window Width                       | (0028,1051) | 1C   | Window Width for display. See PS3.3 C.8.11.3.1.5 for further explanation.<br>Required if Window Center (0028,1050) is sent.   | ALWAYS  | AUTO         |

**Note 1:**

See 8.1.1.10 Note however that Value 1 and Value 3 are as follows.

**Value 1: (as per DICOM definitions)**

|          |  |
|----------|--|
| ORIGINAL | Normalized image (an exposed image that has been subjected to image processing, such as gradation processing.) |
| DERIVED  | An image created through morphological processing (long-view image, energy subtraction image).                 |

**Value 3:**

None.

8.1.1.20 Mammography Image Module

**TABLE 8.1-20 MAMMOGRAPHY IMAGE MODULE OF CREATED MG IMAGE STORAGE SOP INSTANCES**

| Attribute Name             | Tag         | Type | Dicom Attribute Description  | Presence of Value                        | Source       |
|----------------------------|-------------|------|--|--|--------------|
| Positioner Type            | (0018,1508) | 1    | Enumerated Values:<br>MAMMOGRAPHIC<br>NONE   | ALWAYS<br><br>Value is<br>"MAMMOGRAPHIC" | AUTO         |
| Positioner Primary Angle   | (0018,1510) | 3    | Position in degrees of the X-Ray beam vector in the coronal anatomical plane as if the patient were standing where movement of the X-Ray source from right to vertical is positive, and vertical is zero.      | EMPTY                                    | AUTO         |
| Positioner Secondary Angle | (0018,1511) | 3    | Position in degrees of the X-Ray beam vector in the sagittal anatomical plane as if the patient were standing where movement of the X-Ray source from anterior to posterior is positive, and vertical is zero. | EMPTY                                    | AUTO         |
| Image Laterality           | (0020,0062) | 1    | Laterality of the region examined.<br>Enumerated Values:<br>R = right<br>L = left<br>B = both (e.g. cleavage)  | ALWAYS                                   | CONFIG /USER |
| Organ Exposed              | (0040,0318) | 1    | Organ to which Organ Dose (0040,0316) applies.<br>Enumerated Value:<br>BREAST  | ALWAYS<br><br>Value is "BREAST"          | AUTO         |
| Implant Present            | (0028,1300) | 3    | Whether or not an implant is present.<br>Enumerated Values:<br>YES<br>NO   | ANAP                                     | USER         |
| Anatomic Region Sequence   | (0008,2218) | 1    | Sequence that identifies the anatomic region of interest in this Instance (i.e. external anatomy, surface anatomy, or general region of the body).<br>Only a single Item shall be permitted in this sequence.  | ALWAYS                                   | CONFIG /USER |
| >Code Value                | (0008,0100) | 1C   | Required if a sequence item is present.  | ALWAYS                                   | USER         |
| >Coding Scheme Designator  | (0008,0102) | 1C   | Required if a sequence item is present.  | ALWAYS                                   | USER         |
| >Coding Scheme Version     | (0008,0103) | 1C   | Required if a sequence item is present. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.                                  | ANAP                                     | USER         |

| Attribute Name               | Tag         | Type | Dicom Attribute Description   | Presence of Value         | Source |
|------------------------------|-------------|------|---|---------------------------|--------|
| >Code Meaning                | (0008,0104) | 1C   | Required if a sequence item is present.   | ALWAYS                    | USER   |
| Partial View                 | (0028,1350) | 3    | Indicates whether this image is a partial view, that is a subset of a single view of the breast.<br><br>Enumerated Values: YES, NO<br><br>If this Attribute is absent, then the image may or may not be a partial view. | ANAP<br><br>Value is "NO" | AUTO   |
| View Code Sequence           | (0054,0220) | 1    | Sequence that describes the projection of the anatomic region of interest on the image receptor. Only a single Item shall be permitted in this Sequence.  | ALWAYS                    | USER   |
| >Code Value                  | (0008,0100) | 1C   | Required if a sequence item is present.   | ALWAYS                    | USER   |
| >Coding Scheme Designator    | (0008,0102) | 1C   | Required if a sequence item is present.   | ALWAYS                    | USER   |
| >Coding Scheme Version       | (0008,0103) | 1C   | Required if a sequence item is present. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.   | ANAP                      | USER   |
| >Code Meaning                | (0008,0104) | 1C   | Required if a sequence item is present.   | ALWAYS                    | USER   |
| >View Modifier Code Sequence | (0054,0222) | 2    | View modifier. Zero or more Items may be included in this Sequence.   | VNAP                      | USER   |
| >>Code Value                 | (0008,0100) | 1C   | Required if a sequence item is present.   | ANAP                      | USER   |
| >>Coding Scheme Designator   | (0008,0102) | 1C   | Required if a sequence item is present.   | ANAP                      | USER   |
| >>Coding Scheme Version      | (0008,0103) | 1C   | Required if a sequence item is present. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously.   | ANAP                      | USER   |
| >>Code Meaning               | (0008,0104) | 1C   | Required if a sequence item is present.   | ANAP                      | USER   |

8.1.1.21 DX Detector Module

**TABLE 8.1-21 DX DETECTOR MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| Attribute Name             | Tag          | Type | Dicom Attribute Description   | Presence of Value                  | Source |
|----------------------------|--------------|------|---|------------------------------------|--------|
| Detector Type              | (0018,7004)  | 2    | The type of detector used to acquire this image.<br>Defined Terms:<br>DIRECT = X-ray photoconductor<br>SCINTILLATOR = Phosphor used<br>STORAGE = Storage phosphor<br>FILM = Scanned film/screen   | ALWAYS                             | AUTO   |
| Detector Configuration     | (0018,7005)  | 3    | The physical configuration of the detector.<br>Defined Terms:<br>AREA = single or tiled detector<br>SLOT = scanned slot, slit or spot   | ALWAYS<br><br>Value is "AREA"      | AUTO   |
| Detector Description       | (0018,7006)  | 3    | Free text description of detector.  | ANAP                               | CONFIG |
| Detector ID                | (0018, 700A) | 3    | The ID or serial number of the detector used to acquire this image.   | ANAP                               | CONFIG |
| Sensitivity                | (0018,6000)  | 3    | Detector sensitivity in manufacturer specific units.  | ANAP                               | AUTO   |
| Field of View Shape        | (0018,1147)  | 3    | Shape of the Field of View, that is the image pixels stored in Pixel Data (7FE0,0010).<br>Enumerated Values:<br>RECTANGLE<br>ROUND<br>HEXAGONAL   | ALWAYS<br><br>Value is "RECTANGLE" | AUTO   |
| Field of View Dimension(s) | (0018,1149)  | 3    | Dimensions in mm of the Field of View, that is the image pixels stored in Pixel Data (7FE0,0010). If Field of View Shape (0018,1147) is:<br>RECTANGLE: row dimension followed by column.<br>ROUND: diameter.<br>HEXAGONAL: diameter of a circumscribed circle.  | ALWAYS                             | AUTO   |
| Imager Pixel Spacing       | (0018,1164)  | 1    | Physical distance measured at the front plane of the detector housing between the center of each image pixel specified by a numeric pair - row spacing value(delimiter) column spacing value in mm. See PS3.3 10.7.1.3 for further explanation of the value order.<br><br>The value of this attribute shall never be adjusted to account for correction for the effect of geometric magnification or calibration against an object of known size;<br>Pixel Spacing (0028,0030) is specified for that purpose. | ALWAYS                             | AUTO   |



## 8.1.1.22 DX Positioning Module

TABLE 8.1-22 DX POSITIONING MODULE OF CREATED SOP INSTANCES

| Attribute Name                              | Tag         | Type | Dicom Attribute Description  | Presence of Value   | Source |
|---|-------------|------|--|---|--------|
| Positioner Type                             | (0018,1508) | 2    | Defined Terms:<br>CARM, COLUMN,<br>MAMMOGRAPHIC,<br>PANORAMIC, CEPHALOSTAT,<br>RIGID, NONE   | VNAP<br>When CR or DX is<br>used for Modality<br>(0008,0060), value is<br>"NONE" or<br>"COLUMN"<br>When MG is used for<br>Modality (0008,0060),<br>value is<br>"MAMMOGRAPHIC" | AUTO   |
| Distance Source to Patient                  | (0018,1111) | 3    | Distance in mm from source to the table, support or bucky side that is closest to the Imaging Subject, as measured along the central ray of the X-Ray beam.<br><br>See C.8.11.7 Mammography Image Module for explanation if Positioner Type (0018,1508) is MAMMOGRAPHIC. | ANAP  | AUTO   |
| Distance Source to Detector                 | (0018,1110) | 3    | Distance in mm from source to detector center.<br><br>See C.8.11.7 Mammography Image Module for explanation if Positioner Type (0018,1508) is MAMMOGRAPHIC.  | ANAP  | AUTO   |
| Estimated Radiographic Magnification Factor | (0018,1114) | 3    | Ratio of Source Image Receptor Distance (SID) over Source Object Distance (SOD).   | ANAP  | AUTO   |
| Body Part Thickness                         | (0018,11A0) | 3    | The average thickness in mm of the body part examined when compressed, if compression has been applied during exposure.  | ANAP  | AUTO   |
| Compression Force                           | (0018,11A2) | 3    | The compression force applied to the body part during exposure, measured in Newtons.   | ANAP  | AUTO   |

## 8.1.1.23 X-ray Tomo Acquisition Module

TABLE 8.1-23 X-RAY TOMO ACQUISITION MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES

| Attribute Name    | Tag         | Type | Dicom Attribute Description   | Presence of Value | Source |
|-------------------|-------------|------|---|-------------------|--------|
| Tomo Layer Height | (0018,1460) | 1    | Distance in mm between the table surface and the sharp image plane.         | ALWAYS            | AUTO   |
| Tomo Angle        | (0018,1470) | 3    | Angle span in degrees of rotation of X-ray Source during X-ray acquisition. | ANAP              | AUTO   |

|                                       |             |   |   |  |      |
|---------------------------------------|-------------|---|---|--|------|
| Tomography Time                       | (0018,1480) | 3 | Time in seconds the source has taken to rotate the Tomo Angle during X-ray acquisition.   | ANAP   | AUTO |
| Tomography Type                       | (0018,1490) | 3 | Type of tomography.<br>Defined Terms:<br>LINEAR<br>SPIRAL<br>POLYCYCLOIDAL<br>CIRCULAR  | ANAP<br>Only in case of Tomosynthesis.<br><br>Value is "LINEAR"        | AUTO |
| Tomography Class                      | (0018,1491) | 3 | Form of tomography:<br>Defined Terms:<br>MOTION<br>TOMOSYNTHESIS  | ANAP<br>Only in case of Tomosynthesis.<br><br>Value is "TOMOSYNTHESIS" | AUTO |
| Number of Tomosynthesis Source Images | (0018,1495) | 3 | The number of source images used to construct this tomosynthetic image. Only meaningful if Tomo Class (0018,1491) is TOMOSYNTHESIS. These may be listed in Source Image Sequence (0008,2112) of the General Image Module. | ANAP   | AUTO |

8.1.1.24 X-ray Acquisition Dose Module

**TABLE 8.1-24 X-RAY ACQUISITION DOSE MODULE OF CREATED SOP INSTANCES**

| Attribute Name                | Tag         | Type | Dicom Attribute Description   | Presence of Value | Source |
|-------------------------------|-------------|------|---|-------------------|--------|
| KVP                           | (0018,0060) | 3    | Peak kilo voltage output of the X-ray generator used.   | ANAP              | AUTO   |
| X-ray Tube Current            | (0018,1151) | 3    | X-ray Tube Current in mA.   | ANAP              | AUTO   |
| X-Ray Tube Current in $\mu$ A | (0018,8151) | 3    | X-Ray Tube Current in $\mu$ A.  | ANAP              | AUTO   |
| Exposure Time                 | (0018,1150) | 3    | Duration of X-ray exposure in msec.   | ANAP              | AUTO   |
| Exposure Time in $\mu$ S      | (0018,8150) | 3    | Duration of X-Ray exposure in $\mu$ sec.  | ANAP              | AUTO   |
| Exposure                      | (0018,1152) | 3    | The exposure expressed in mAs, for example calculated from Exposure Time and X-ray Tube Current.      | ANAP              | AUTO   |
| Exposure in $\mu$ As          | (0018,1153) | 3    | The exposure expressed in $\mu$ As, for example calculated from Exposure Time and X-ray Tube Current. | ANAP              | AUTO   |
| Distance Source to Detector   | (0018,1110) | 3    | Distance in mm from source to detector center.  | ANAP              | AUTO   |

| Attribute Name                          | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|---|-------------|------|--|-------------------|--------|
| Distance Source to Patient              | (0018,1111) | 3    | Distance in mm from source to the table, support or bucky side that is closest to the Imaging Subject, as measured along the central ray of the X-Ray beam.  | ANAP              | AUTO   |
| Image and Fluoroscopy Area Dose Product | (0018,115E) | 3    | X-ray dose, measured in dGy*cm*cm, to which the patient was exposed for the acquisition of this image plus any nondigitally recorded fluoroscopy which may have been performed to prepare for the acquisition of this image. | ANAP              | AUTO   |
| Body Part Thickness                     | (0018,11A0) | 3    | The average thickness in mm of the body part examined when compressed, if compression has been applied during exposure.  | ANAP              | AUTO   |
| Entrance Dose                           | (0040,0302) | 3    | Average entrance dose value measured in dGy at the surface of the patient during the acquisition of this image.  | ANAP              | AUTO   |
| Entrance Dose in mGy                    | (0040,8302) | 3    | Average entrance dose value measured in mGy at the surface of the patient during the acquisition of this image.  | ANAP              | AUTO   |
| Organ Dose                              | (0040,0316) | 3    | Average organ dose value measured in dGy during the acquisition of this image.   | ANAP              | AUTO   |
| Anode Target Material                   | (0018,1191) | 3    | The primary material in the anode of the X-ray source.<br>Defined Terms:<br>TUNGSTEN<br>MOLYBDENUM<br>RHODIUM  | ANAP              | AUTO   |
| Filter Material                         | (0018,7050) | 3    | The X-Ray absorbing material used in the filter. May be multi-valued.<br>Defined Terms:<br>MOLYBDENUM<br>ALUMINUM<br>COPPER<br>RHODIUM<br>NIOBIUM<br>EUROPIUM<br>LEAD  | ANAP              | AUTO   |
| Filter Thickness Minimum                | (0018,7052) | 3    |  | ANAP              | AUTO   |
| Filter Thickness Maximum                | (0018,7054) | 3    |  | ANAP              | AUTO   |

### 8.1.1.25 X-ray Generation Module

**TABLE 8.1-25 X-RAY GENERATION MODULE OF CREATED SOP INSTANCES**

| Attribute Name                    | Tag         | Type | Dicom Attribute Description   | Presence of Value | Source |
|-----------------------------------|-------------|------|---|-------------------|--------|
| KVP                               | (0018,0060) | 3    | Peak kilo voltage output of the X-ray generator used.   | ANAP              | AUTO   |
| X-ray Tube Current                | (0018,1151) | 3    | X-ray Tube Current in mA.   | ANAP              | AUTO   |
| X-Ray Tube Current in $\mu$ A     | (0018,8151) | 3    | X-Ray Tube Current in $\mu$ A.  | ANAP              | AUTO   |
| Exposure Time                     | (0018,1150) | 3    | Duration of X-ray exposure in msec.   | ANAP              | AUTO   |
| Exposure Time in $\mu$ S          | (0018,8150) | 3    | Duration of X-Ray exposure in $\mu$ sec.  | ANAP              | AUTO   |
| Exposure                          | (0018,1152) | 3    | The exposure expressed in mAs, for example calculated from Exposure Time and X-ray Tube Current.  | ANAP              | AUTO   |
| Exposure in $\mu$ As              | (0018,1153) | 3    | The exposure expressed in $\mu$ As, for example calculated from Exposure Time and X-ray Tube Current.   | ANAP              | AUTO   |
| Exposure Control Mode             | (0018,7060) | 3    | Type of exposure control.<br>Defined Terms:<br>MANUAL<br>AUTOMATIC  | ANAP              | AUTO   |
| Exposure Control Mode Description | (0018,7062) | 3    | Text description of the mechanism of exposure control.<br>May describe the number and type of exposure sensors or position of the sensitive area of the imaging detector. | ANAP              | AUTO   |
| Anode Target Material             | (0018,1191) | 3    | The primary material in the anode of the X-ray source.<br>Defined Terms:<br>TUNGSTEN<br>MOLYBDENUM<br>RHODIUM   | ANAP              | AUTO   |

8.1.1.26 Modality LUT Module

**TABLE 8.1-26 MODALITY LUT MODULE OF CREATED CR IMAGE STORAGE SOP INSTANCES**

| Attribute Name    | Tag         | Type | Dicom Attribute Description   | Presence of Value      | Source |
|-------------------|-------------|------|---|------------------------|--------|
| Rescale Intercept | (0028,1052) | 1C   | The value b in relationship between stored values (SV) and the output units specified in Rescale Type (0028,1054).<br>Output units = m*SV + b.<br>Required if Modality LUT Sequence (0028,3000) is not present. Shall not be present otherwise. | ALWAYS<br>Value is "0" | AUTO   |
| Rescale Slope     | (0028,1053) | 1C   | m in the equation specified by Rescale Intercept (0028,1052).<br>Required if Rescale Intercept is present.  | ALWAYS<br>Value is "1" | AUTO   |

| Attribute Name | Tag         | Type | Dicom Attribute Description  | Presence of Value       | Source |
|----------------|-------------|------|--|-------------------------|--------|
| Rescale Type   | (0028,1054) | 1C   | Specifies the output units of Rescale Slope (0028,1053) and Rescale Intercept (0028,1052).<br>See PS3.3 C.11.1.1.2 for further explanation.<br>Required if Rescale Intercept is present. | ALWAYS<br>Value is "US" | AUTO   |

### 8.1.1.27 VOI LUT Module

**TABLE 8.1-27 VOI LUT MODULE OF CREATED SOP INSTANCES**

| Attribute Name   | Tag         | Type | Dicom Attribute Description  | Presence of Value  | Source |
|------------------|-------------|------|--|--|--------|
| VOI LUT Sequence | (0028,3010) | 1C   | Defines a sequence of VOI LUTs. One or more Items shall be present.<br>Required if Window Center (0028,1050) is not present. May be present otherwise. | ANAP   | AUTO   |
| >LUT Descriptor  | (0028,3002) | 1    | Specifies the format of the LUT Data in this Sequence.<br>See C.11.2.1.1 for further explanation.  | ANAP<br>$2^n \setminus 0 \setminus 16$<br>$n$ : Bit Depth of image | AUTO   |
| >LUT Explanation | (0028,3003) | 3    | Free form text explanation of the meaning of the LUT.  | ANAP   | AUTO   |
| >LUT Data        | (0028,3006) | 1    | LUT Data in this Sequence.   | ANAP   | AUTO   |

### 8.1.1.28 Acquisition Context Module

**TABLE 8.1-28 ACQUISITION CONTEXT MODULE OF CREATED DX IMAGE STORAGE SOP INSTANCES**

| Attribute Name               | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|------------------------------|-------------|------|--|-------------------|--------|
| Acquisition Context Sequence | (0040,0555) | 2    | A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items may be included in this sequence. | EMPTY             | AUTO   |

### 8.1.1.29 SOP Common Module

**TABLE 8.1-29 SOP COMMON MODULE OF CREATED SOP INSTANCES**

| Attribute Name   | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|------------------|-------------|------|--|-------------------|--------|
| SOP Class UID    | (0008,0016) | 1    | Uniquely identifies the SOP Class. See PS3.3 C.12.1.1.1 for further explanation. See also PS 3.4.    | ALWAYS            | AUTO   |
| SOP Instance UID | (0008,0018) | 1    | Uniquely identifies the SOP Instance. See PS3.3 C.12.1.1.1 for further explanation. See also PS 3.4. | ALWAYS            | AUTO   |

| Attribute Name         | Tag         | Type | Dicom Attribute Description   | Presence of Value   | Source |
|------------------------|-------------|------|---|---|--------|
| Specific Character Set | (0008,0005) | 1C   | Character Set that expands or replaces the Basic Graphic Set.<br>Required if an expanded or replacement character set is used.<br>See PS3.3 C.12.1.1.2 for Defined Terms. | ANAP<br><br>European languages:<br>ISO_IR 100 \ ISO_IR 101<br>Alphanumerics:<br>No Tag<br>Japanese (Backslash is half-size):<br>Half-size kana only:<br>ISO_IR 13<br>Half-size kana + kanji:<br>ISO 2022 IR 13 \ ISO 2022 IR 87<br>Unicode (UTF-8):<br>ISO_IR 192<br>Korean(EUC-KR):<br>ISO 2022 IR 149<br>Chinese Simplified:<br>GB18030 | CONFIG |

8.1.1.30 X-ray Filtration Module

TABLE 8.1-30 X-RAY FILATRATION MODULE OF CREATED SOP INSTANCES

| Attribute Name           | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|--------------------------|-------------|------|--|-------------------|--------|
| Filter Material          | (0018,7050) | 3    | The X-Ray absorbing material used in the filter. May be multi-valued.<br>Defined Terms:<br>MOLYBDENUM<br>ALUMINUM<br>COPPER<br>RHODIUM<br>NIOBIUM<br>EUROPIUM<br>LEAD                    | ANAP              | CONFIG |
| Filter Thickness Minimum | (0018,7052) | 3    | The minimum thickness in mm of the X-Ray absorbing material used in the filters. May be multi-valued, with values corresponding to the respective values in Filter Material (0018,7050). | ANAP              | CONFIG |
| Filter Thickness Maximum | (0018,7054) | 3    | The maximum thickness in mm of the Xray absorbing material used in the filters. May be multi-valued, with values corresponding to the respective values in Filter Material (0018,7050).  | ANAP              | CONFIG |

8.1.1.31 Overlay Plane Module

**TABLE 8.1-31 OVERLAY PLANE MODULE OF CREATED SOP INSTANCES**

| Attribute Name         | Tag         | Type | Dicom Attribute Description  | Presence of Value            | Source |
|------------------------|-------------|------|--|------------------------------|--------|
| Overlay Rows           | (60xx,0010) | 1    | Number of Rows in Overlay.   | ALWAYS                       | AUTO   |
| Overlay Columns        | (60xx,0011) | 1    | Number of Columns in Overlay.  | ALWAYS                       | AUTO   |
| Overlay Type           | (60xx,0040) | 1    | Indicates whether this overlay represents a region of interest or other graphics.<br>Enumerated Values:<br>G = Graphics<br>R = ROI.  | ALWAYS<br><br>Value is "G"   | AUTO   |
| Overlay Origin         | (60xx,0050) | 1    | Location of first overlay point with respect to pixels in the image, given as row\column. The upper left pixel of the image has the coordinate 1\1. Column values greater than 1 indicate the overlay plane origin is to the right of the image origin. Row values greater than 1 indicate the overlay plane origin is below the image origin. Values less than 1 indicate the overlay plane origin is above or to the left of the image origin.<br>Note: Values of 0\0 indicate that the overlay pixels start 1 row above and one column to the left of the image pixels. | ALWAYS<br><br>Value is "1\1" | AUTO   |
| Overlay Bits Allocated | (60xx,0100) | 1    | Number of Bits Allocated in the Overlay.<br>The value of this Attribute shall be 1.<br>Note: Formerly the standard described embedding the overlay data in the Image Pixel Data (7FE0,0010), in which case the value of this Attribute was required to be the same as Bits Allocated (0028,0100). This usage has been retired. See PS 3.3 2004.  | ALWAYS<br><br>Value is "1"   | AUTO   |

| Attribute Name       | Tag         | Type | Dicom Attribute Description  | Presence of Value                 | Source |
|----------------------|-------------|------|--|-----------------------------------|--------|
| Overlay Bit Position | (60xx,0102) | 1    | <p>The value of this Attribute shall be 0.</p> <p>Note: Formerly the standard described embedding the overlay data in the Image Pixel Data (7FE0,0010), in which case the value of this Attribute specified the bit in which the overlay was stored. This usage has been retired. See PS 3.3 2004.</p>   | <p>ALWAYS</p> <p>Value is "0"</p> | AUTO   |
| Overlay Data         | (60xx,3000) | 1    | <p>Overlay pixel data.</p> <p>The order of pixels sent for each overlay is left to right, top to bottom, i.e., the upper left pixel is sent first followed by the remainder of the first row , followed by the first pixel of the 2nd row, then the remainder of the 2nd row and so on.</p> <p>Overlay data shall be contained in this Attribute. See C.9.2.1.1 for further explanation.</p> | ALWAYS                            | AUTO   |

8.1.1.32 Exposure Index Module



**TABLE 8.1-32 EXPOSURE INDEX MODULE OF CREATED SOP INSTANCES**

| Attribute Name        | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|-----------------------|-------------|------|--|-------------------|--------|
| Exposure Index        | (0018,1411) | 3    | Measure of the detector response to radiation in the relevant image region of an image acquired with a digital x-ray imaging system as defined in IEC 62494-1.<br>Notes: 1. A string rather than binary Value Representation is used for this Attribute, in order to allow the sender to control the precision of the value as suggested in the report of AAPM Task Group 116.<br>2. This index value is scaled as defined by IEC 62494-1. | ALWAYS            | AUTO   |
| Target Exposure Index | (0018,1412) | 3    | The target value used to calculate the Deviation Index (0018,1413) as defined in IEC 62494-1.  | ALWAYS            | AUTO   |
| Deviation Index       | (0018,1413) | 3    | A scaled representation of the difference of the Exposure Index compared to the Target Exposure Index as defined in IEC 62494-1 and the report of AAPM TG 116.   | ALWAYS            | AUTO   |

8.1.1.33 X-Ray Radiation Dose SR Module

**TABLE 8.1-33 SR SERIES MODULE OF CREATED X-RAY RADIATION DOSE SR SOP INSTANCES**

| Attribute Name | Tag         | Type | Dicom Attribute Description                       | Presence of Value | Source |
|----------------|-------------|------|---|-------------------|--------|
| Modality       | (0008,0060) | 1    | Modality type. Enumerated Value: SR = SR Document | ALWAYS            | AUTO   |

| Attribute Name                      | Tag         | Type | Dicom Attribute Description  | Presence of Value | Source |
|-------------------------------------|-------------|------|--|-------------------|--------|
| Referenced Study Component Sequence | (0008,1111) | 2    | Uniquely identifies the Performed Procedure Step SOP Instance for which the Series is created. Zero or one item shall be present in the sequence. Notes: 1. The Performed Procedure Step referred to by this Attribute is the Step during which this Document is generated. 2. If this Document is generated during the same Modality or General Purpose Performed Procedure Step as the evidence in the current interpretation procedure, this attribute may contain reference to that Modality or General Purpose Performed Procedure Step. 3. This Attribute is not used to convey reference to the evidence in the current interpretation procedure. See Current Requested Procedure Evidence Sequence (0040,A375). 4. This Sequence may be sent zero length if the Performed Procedure Step is unknown. | VNAP              | AUTO   |
| Series Instance UID                 | (0020,000E) | 1    | Unique identifier of the Series. Note: No SR-specific semantics are specified.   | ALWAYS            | AUTO   |
| Series Number                       | (0020,0011) | 1    | A number that identifies the Series. Note: No SR-specific semantics are specified.   | ALWAYS            | AUTO   |

**TABLE 8.1-34 SR DOCUMENT GENERAL MODULE OF CREATED X-RAY RADIATION DOSE SR SOP INSTANCES**

| Attribute Name                    | Tag         | Type | Dicom Attribute Description   | Presence of Value             | Source |
|-----------------------------------|-------------|------|---|-------------------------------|--------|
| Content Date                      | (0008,0023) | 1    | The date the document content creation started.   | ALWAYS                        | AUTO   |
| Content Time                      | (0008,0033) | 1    | The time the document content creation started.   | ALWAYS                        | AUTO   |
| Instance Number                   | (0020,0013) | 1    | A number that identifies the SR Document.   | ALWAYS                        | AUTO   |
| Performed Procedure Code Sequence | (0040,A372) | 2    | A Sequence that conveys the codes of the performed procedures pertaining to this SOP Instance. Zero or more Items may be included in this sequence.   | EMPTY                         | AUTO   |
| Completion Flag                   | (0040,A491) | 1    | The estimated degree of completeness of this SR Document with respect to externally defined criteria in a manner specified in the Conformance Statement. Note: It may be desirable to make these criteria adaptable to local policies or user decisions. Enumerated Values: PARTIAL = Partial content. COMPLETE = Complete content. | ALWAYS<br>Value is "COMPLETE" | AUTO   |

| Attribute Name    | Tag         | Type | Dicom Attribute Description  | Presence of Value             | Source |
|-------------------|-------------|------|--|-------------------------------|--------|
| Verification Flag | (0040,A493) | 1    | Indicates whether this SR Document is Verified. Enumerated Values: UNVERIFIED = Not attested to. VERIFIED = Attested to by a Verifying Observer Name (0040,A075) who is accountable for its content. Note: The intent of this specification is that the "prevailing final version" of an SR Document is the version having the most recent Verification DateTime (0040,A030), Completion Flag (0040,A491) of COMPLETE and Verification Flag (0040,A493) of VERIFIED. | ALWAYS<br>Value is "VERIFIED" | AUTO   |

**TABLE 8.1-35 SR DOCUMENT CONTENT MODULE OF CREATED SOP INSTANCES**

| Attribute Name  | Tag | Type | Dicom Attribute Description | Presence of Value | Source |
|---|-----|------|-----------------------------|-------------------|--------|
| Include Document Content Macro TABLE 8.1-34. with a Value Type (0040,A040) of CONTAINER |     |      |                             |                   |        |
| Include Document Relationship Macro TABLE 8.1-35.                                       |     |      |                             |                   |        |

**TABLE 8.1-36 DOCUMENT CONTENT MACRO ATTRIBUTES**

| Attribute Name                | Tag         | Type | DICOM Attribute Description  | Presence of Value   | Source |
|-------------------------------|-------------|------|--|---|--------|
| Value Type                    | (0040,A040) | 1    | The type of the value encoded in this Content Item.  | ALWAYS<br>Defined terms:<br>"TEXT"<br>"NUM"<br>"CODE"<br>"DATETIME"<br>"UIDREF"<br>"IMAGE"<br>"CONTAINER" | AUTO   |
| Concept Name<br>Code Sequence | (0040,A043) | 1C   | Code describing the concept represented by this Content Item. Also conveys the value of Document Title and section headings in documents. Only a single Item shall be permitted in this sequence.<br>Required if Value Type (0040,A040) is TEXT, NUM, CODE, DATETIME, DATE, TIME, UIDREF or PNAME.<br>Required if Value Type (0040,A040) is CONTAINER and a heading is present, or this is the Root Content Item.<br>Required if Value Type (0040,A040) is COMPOSITE, IMAGE, WAVEFORM, SCOOD, SCOOD3D or TCOORD, and the Purpose of Reference is conveyed in the Concept Name. | ALWAYS  | AUTO   |
| Text Value                    | (0040,A160) | 1C   | This is the value of the Content Item. Required if Value Type (0040,A040) is TEXT.   | ANAP  | AUTO   |

| Attribute Name   | Tag         | Type | DICOM Attribute Description   | Presence of Value | Source |
|--|-------------|------|---|-------------------|--------|
|  |             |      | Text data which is unformatted and whose manner of display is implementation dependent.<br>The text value may contain spaces, as well as multiple lines separated by either LF, CR, CR LF or LF CR, but otherwise no format control characters (such as horizontal or vertical tab and form feed) shall be present, even if permitted by the Value Representation of UT.<br>The text shall be interpreted as specified by Specific Character Set (0008,0005) if present in the SOP Common Module.<br>Note: The text may contain single or multibyte characters and use code extension techniques as described in PS 3.5 if permitted by the values of Specific Character Set (0008,0005). |                   |        |
| DateTime   | (0040,A120) | 1C   | This is the value of the Content Item. Required if Value Type (0040,A040) is DATETIME.  | ANAP              | AUTO   |
| UID  | (0040,A124) | 1C   | This is the value of the Content Item. Required if Value Type (0040,A040) is UIDREF.  | ANAP              | AUTO   |
| Include 'Numeric Measurement Macro' TABLE 8.1-36 if and only if Value Type (0040,A040) is NUM. |             |      |   |                   |        |
| Include 'Code Macro' TABLE 8.1-37 if and only if Value Type (0040,A040) is CODE.               |             |      |   |                   |        |
| Include 'Image Reference Macro' TABLE 8.1-38 if and only if Value Type (0040,A040) is IMAGE.   |             |      |   |                   |        |
| Include 'Container Macro' TABLE 8.1-39 if and only if Value Type (0040,A040) is CONTAINER.     |             |      |   |                   |        |

**TABLE 8.1-37 DOCUMENT RELATIONSHIP MACRO ATTRIBUTES**

| Attribute Name          | Tag         | Type | DICOM Attribute Description  | Presence of Value | Source |
|-------------------------|-------------|------|--|-------------------|--------|
| Observation<br>DateTime | (0040,A032) | 1C   | The date and time on which this Content Item was completed. For the purpose of recording measurements or logging events, completion time is defined as the time of data acquisition of the measurement, or the time of occurrence of the event.<br>Required if the date and time are different from the Content Date (0008,0023) and Content Time (0008,0033) or the Observation DateTime (0040,A032) defined in higher items. May be present otherwise.<br>Note: When Content Items are | ALWAYS            | AUTO   |

| Attribute Name  | Tag         | Type | DICOM Attribute Description  | Presence of Value  | Source |
|---|-------------|------|--|--|--------|
|   |             |      | copied into successor reports, the Content Date(0008,0023) and Content Time(0008,0033) of the new report are likely to be different than the date and time of the original observation. Therefore this attribute may need to be included in any copied Content Items to satisfy the condition.   |  |        |
| Content Sequence  | (0040,A010) | 1C   | A potentially recursively nested Sequence of Items that conveys content that is the Target of Relationships with the enclosing Source Content Item. One or more Items shall be included in this sequence. Required if the enclosing Content Item has relationships. Notes: 1. If this Attribute is not present then the enclosing Item is a leaf. 2. The order of Items within this Sequence is semantically significant for presentation. | ALWAYS   | AUTO   |
| >Relationship Type  | (0040,A010) | 1    | The type of relationship between the (enclosing) Source Content Item and the Target Content Item. IODs specify additional constraints on Relationships (including lists of Enumerated Values).<br>Defined Terms:<br>CONTAINS<br>HAS PROPERTIES<br>HAS OBS CONTEXT<br>HAS ACQ CONTEXT<br>INFERRED FROM<br>SELECTED FROM<br>HAS CONCEPT MOD  | ALWAYS<br><br>VALUE is<br><br>"HAS CONCEPT MOD" or<br><br>"CONTAINS" | AUTO   |
| >Include Document Relationship Macro TABLE 8.1-36 if the Target Content Item is included by-value in the Source Content Item. The Macro shall not be present if the relationship is by-reference. |             |      |  |  |        |
| >Include Document Content Macro TABLE 8.1-35 if the Target Content Item is included by-value in the Source Content Item. The Macro shall not be present if the relationship is by-reference.      |             |      |  |  |        |

**TABLE 8.1-38 NUMERIC MESUREMENT MACRO ATTRIBUTES**

| Attribute Name          | Tag         | Type | DICOM Attribute Description  | Presence of Value | Source |
|-------------------------|-------------|------|--|-------------------|--------|
| Measured Value Sequence | (0040,A300) | 2    | This is the value of the Content Item. Shall consist of a Sequence of Items conveying the measured | ALWAYS            | AUTO   |

| Attribute Name                   | Tag         | Type | DICOM Attribute Description   | Presence of Value | Source |
|----------------------------------|-------------|------|---|-------------------|--------|
|                                  |             |      | value(s), which represent integers or real numbers and units of measurement. Zero or one Item shall be included in this sequence.   |                   |        |
| >Numeric Value                   | (0040,A30A) | 1    | Numeric measurement value. Only a single value shall be present.  | ALWAYS            | AUTO   |
| >Measurement Units Code Sequence | (0040,08EA) | 1    | Units of measurement. Only a single Item shall be included in this sequence.  | ALWAYS            | AUTO   |
| >>Code Value                     | (0008,0100) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO   |
| >>Coding Scheme Designator       | (0008,0102) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO   |
| >>Coding Scheme Version          | (0008,0103) | 1C   | Required if a sequence item is present. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. | ALWAYS            | AUTO   |
| >> Code Meaning                  | (0008,0104) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO   |

**TABLE 8.1-39 CODE MACRO ATTRIBUTES**

| Attribute Name            | Tag         | Type | DICOM Attribute Description   | Presence of Value | Source     |
|---------------------------|-------------|------|---|-------------------|------------|
| Concept Code Sequence     | (0040,A168) | 1    | This is the value of the Content Item. Only a single Item shall be included in this sequence.   | ALWAYS            | AUTO/ USER |
| >Code Value               | (0008,0100) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO       |
| >Coding Scheme Designator | (0008,0102) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO       |
| >Coding Scheme Version    | (0008,0103) | 1C   | Required if a sequence item is present. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. | ALWAYS            | AUTO       |
| > Code Meaning            | (0008,0104) | 1    | Required if a sequence item is present.   | ALWAYS            | AUTO       |

**TABLE 8.1-40 IMAGE REFERENCE MACRO ATTRIBUTES**

| Attribute Name          | Tag         | Type | DICOM Attribute Description                                  | Presence of Value | Source |
|-------------------------|-------------|------|--|-------------------|--------|
| Referenced SOP Sequence | (0008,1199) | 1    | References to Composite Object SOP Class/SOP Instance pairs. | ALWAYS            | AUTO   |

| Attribute Name               | Tag         | Type | DICOM Attribute Description                            | Presence of Value | Source |
|------------------------------|-------------|------|--|-------------------|--------|
|                              |             |      | Only a single Item shall be included in this Sequence. |                   |        |
| >Referenced SOP Class UID    | (0008,1150) | 1    | Uniquely identifies the referenced SOP Class.          | ANAP              | AUTO   |
| >Referenced SOP Instance UID | (0008,1155) | 1    | Uniquely identifies the referenced SOP Instance.       | ANAP              | AUTO   |

**TABLE 8.1-41 CONTAINER MACRO ATTRIBUTES**

| Attribute Name            | Tag         | Type | DICOM Attribute Description   | Presence of Value              | Source |
|---------------------------|-------------|------|---|--------------------------------|--------|
| Continuity of Content     | (0040,A050) | 1    | This flag specifies for a CONTAINER whether or not its contained Content Items are logically linked in a continuous textual flow, or are separate items.<br>Enumerated Values:<br>SEPARATE<br>CONTINUOUS  | ALWAYS<br>VALUE is<br>SEPARATE | AUTO   |
| Content Template Sequence | (0040,A504) | 1C   | Template that describes the content of this Content Item and its subsidiary Content Items.<br>Only a single Item shall be included in this sequence.<br>Required if a template was used to define the content of this Item, and the template consists of a single CONTAINER with nested content, and it is the outermost invocation of a set of nested templates that start with the same CONTAINER | ALWAYS                         | AUTO   |
| >Mapping Resource         | (0008,0105) | 1    | Mapping Resource that defines the template. See Section 8.4. Defined Terms: DCMR = DICOM Content Mapping Resource   | ALWAYS                         | AUTO   |
| >Template Identifier      | (0040,DB00) | 1    | Template identifier.  | ALWAYS                         | AUTO   |

### 8.1.2 Used Fields in received IOD by application

The DR-ID 300CL storage application does not receive SOP Instances.

### 8.1.3 Attribute mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in the following table.

**TABLE 8.1-42 ATTRIBUTE MAPPING BETWEEN MODALITY WORKLIST, IMAGE AND MPPS**

| <b>Modality Worklist</b>              | <b>Image IOD</b>                      | <b>MPPS IOD</b>                       |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Specific Character Set                | Specific Character Set                | Specific Character Set                |
| -                                     | -                                     | Scheduled Step Attribute Sequence     |
| Study Instance UID                    | Study Instance UID                    | >Study Instance UID                   |
| Referenced Study Sequence             | >Referenced Study Sequence            | >Referenced Study Sequence            |
| >Referenced SOP Class UID             | >>Referenced SOP Class UID            | >>Referenced SOP Class UID            |
| >Referenced SOP Instance UID          | >>Referenced SOP Instance UID         | >>Referenced SOP Instance UID         |
| Accession Number                      | Accession Number                      | >Accession Number                     |
| Requested Procedure ID                | Requested Procedure ID                | >Requested Procedure ID               |
| Requested Procedure Description       | -                                     | >Requested Procedure Description      |
| >Scheduled Procedure Step ID          | >Scheduled Procedure Step ID          | >Scheduled Procedure Step ID          |
| >Scheduled Procedure Step Description | >Scheduled Procedure Step Description | >Scheduled Procedure Step Description |
| >Scheduled Protocol Code Sequence     | >Scheduled Protocol Code Sequence     | >Scheduled Protocol Code Sequence     |
| >>Code Value                          | >>Code Value                          | >>Code Value                          |
| >>Coding Scheme Designator            | >>Coding Scheme Designator            | >>Coding Scheme Designator            |
| >>Coding Scheme Version               | >>Coding Scheme Version               | >>Coding Scheme Version               |
| >>Code Meaning                        | >>Code Meaning                        | >>Code Meaning                        |
| Patient's Name                        | Patient's Name                        | Patient's Name                        |
| Patient ID                            | Patient ID                            | Patient ID                            |
| Patient's Birth Data                  | Patient's Birth Data                  | Patient's Birth Data                  |
| Patient's Sex                         | Patient's Sex                         | Patient's Sex                         |
| Referenced Patient Sequence           | -                                     | Referenced Patient Sequence           |
| >Referenced SOP Class UID             | -                                     | >Referenced SOP Class UID             |
| >Referenced Instance UID              | -                                     | >Referenced Instance UID              |
| Modality                              | Modality                              | Modality                              |
| Requested Procedure ID                | Study ID                              | Study ID                              |
| >Scheduled Protocol Code Sequence     | Performed Protocol Code Sequence      | Performed Protocol Code Sequence      |
| >>Code Value                          | >Code Value                           | >Code Value                           |
| >>Coding Scheme Designator            | >Coding Scheme Designator             | >Coding Scheme Designator             |
| >>Coding Scheme Version               | >Coding Scheme Version                | >Coding Scheme Version                |
| >>Code Meaning                        | >Code Meaning                         | >Code Meaning                         |

### 8.1.4 Coerced/Modified Fields

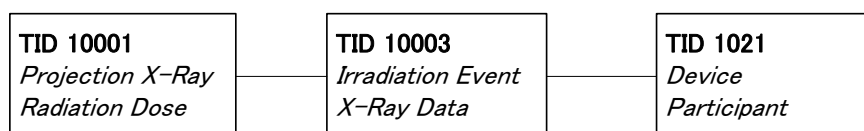
Not applicable.



## 8.1.5 STRUCTURED REPORT DOCUMENT INFORMATIONS

### 8.1.5.1 X-Ray Radiation Dose Report

#### 8.1.5.1.1 Template Structure



#### 8.1.5.1.2 TID10001 Projection X-Ray Radiation Dose Structure

**TABLE 8.1-43 PROJECTION X-RAY RADIATION DOSE STRUCTURE**

| NL | Rel with Parent | Concept Name                                    | VM  | Presence of Value | Value  |
|----|-----------------|---|-----|-------------------|--|
|    |                 | EV (113701, DCM, "X-Ray Radiation Dose Report") | 1   | ALWAYS            |  |
| >  | HAS CONCEPT MOD | EV (121058, DCM, " Procedure reported")         | 1   | ALWAYS            | DT (113704, DCM, "Projection X-Ray")                     |
| >> | HAS CONCEPT MOD | EV (G-C0E8, SRT, "Has Intent")                  | 1   | ALWAYS            |  |
| >  | CONTAINS        | DTID (10003) Irradiation Event X-Ray Data       | 1-n | ALWAYS            |  |
| >  | CONTAINS        | EV (113854, DCM, "Source of Dose Information")  | 1-n | ALWAYS            | DCID (10020) Source of Projection X-Ray Dose Information |

#### 8.1.5.1.3 TID10003 Irradiation Event X-Ray Data

**TABLE 8.1-44 IRRADIATION EVENT X-RAY DATA**

| NL | Rel with Parent | Concept Name                                      | VM | Presence of Value | Value                                       |
|----|-----------------|---|----|-------------------|---|
|    |                 | EV (113706, DCM, " Irradiation Event X-Ray Data") | 1  | ALWAYS            |   |
| >  | HAS CONCEPT MOD | EV (113764, DCM, "Acquisition Plane")             | 1  | ALWAYS            | DCID (10003) Equipment Plane Identification |
| >  | CONTAINS        | DT (111526, DCM, "DateTime Started")              | 1  | ALWAYS            |   |
| >  | CONTAINS        | EV (113721, DCM, "Irradiation Event Type")        | 1  | ALWAYS            | DCID (10002) Irradiation Event Types        |

| NL | Rel with Parent | Concept Name                                   | VM  | Presence of Value  | Value                               |
|----|-----------------|--|-----|--|-------------------------------------|
| >  | CONTAINS        | EV (113769, DCM, "Irradiation Event UID")      | 1   | ALWAYS   |                                     |
| >  | CONTAINS        | EV (113854, DCM, "Source of Dose Information") | 1   | ALWAYS   |                                     |
| >  | CONTAINS        | EV (122130, DCM, "Dose Area Product")          | 1   | ALWAYS   | Units = EV (dGycm2, UCUM, "dGycm2") |
| >  | CONTAINS        | EV (113733, DCM, "KVP")                        | 1-n | ANAP   | Units = EV (kV, UCUM, "kV")         |
| >  | CONTAINS        | EV (113734, DCM, "X-Ray Tube Current")         | 1-n | ANAP   | Units = EV (mA, UCUM, "mA")         |
| >  | CONTAINS        | EV (113735, DCM, "Exposure Time")              | 1   | ANAP   | Units = EV (ms, CUM, "ms")          |
| >  | CONTAINS        | EV (113736, DCM, "Exposure")                   | 1-n | ANAP   | Units = EV (uAs, UCUM, "uAs")       |
| >  | CONTAINS        | EV (123014, DCM, ("Target Region"))            | 1   | ANAP   | DCID (4031) Common Anatomic Regions |
| >  | CONTAINS        | DTID (1021) Device Participant                 | 1   | ALWAYS   |                                     |
| >  | CONTAINS        | EV (113795, DCM, "Acquired Image")             | 1-n | ALWAYS<br><br>IFF Image Object is created for this irradiation event |                                     |

8.1.5.1.4 TID1021 Device Participant

TABLE 8.1-45 DEVICE PARTICIPANT

| NL | Rel with Parent | Concept Name                                 | VM | Presence of Value | Value |
|----|-----------------|--|----|-------------------|-------|
|    |                 | EV (113876, DCM, "Device Role in Procedure") | 1  | ALWAYS            |       |
| >  | HAS PROPERTIES  | EV (113878, DCM, "Device Manufacturer")      | 1  | ALWAYS            |       |
| >  | HAS PROPERTIES  | EV (113879, DCM, "Device Model Name")        | 1  | ALWAYS            |       |
| >  | HAS PROPERTIES  | EV (113880, DCM, "Device Serial Number")     | 1  | ALWAYS            |       |

## 8.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

TABLE 8.2-1 DATA DICTIONARY OF PRIVATE ATTRIBUTES

| Attribute Name                            | Tag         | VR | VM | Notes                          |
|---|-------------|----|----|--------------------------------|
| Private Creator                           | (0009,00xx) | LO | 1  | Value is "FDMS 1.0"            |
| Image UID                                 | (0009,xx05) | OW | 1  |                                |
| Route Image UID                           | (0009,xx06) | OW | 1  |                                |
| Image Display Information Version No.     | (0009,xx08) | UL | 1  |                                |
| Patient Information Version No.           | (0009,xx09) | UL | 1  |                                |
| Exposure Unit Type Code                   | (0009,xx10) | CS | 1  |                                |
| Kanji Hospital Name                       | (0009,xx80) | LO | 1  |                                |
| Distribution Code                         | (0009,xx90) | ST | 1  |                                |
| Kanji Department Name                     | (0009,xx92) | SH | 1  |                                |
| Blackening Process Flag                   | (0009,xxF0) | CS | 1  |                                |
| Processing Information Flag               | (0009,xxF1) | ST | 1  |                                |
| Normalization Flag                        | (0009,xxF2) | CS | 1  |                                |
| Tone characteristic                       | (0009,xxF3) | CS | 1  |                                |
| Window Value Fixed Flag                   | (0009,xxF4) | CS | 1  |                                |
| Referenced Image for Tomo Preset Sequence | (0009,xxF8) | SQ | 1  |                                |
| >Referenced SOP Class UID                 | (0008,1150) | UI | 1  |                                |
| >Referenced SOP Instance UID              | (0008,1155) | UI | 1  |                                |
| Private Creator                           | (0019,00xx) | LO | 1  | Value is "FDMS 1.0"            |
| Kanji Body Part for Exposure              | (0019,xx15) | LO | 1  |                                |
| Stereo Angle                              | (0019,xx20) | FL | 1  |                                |
| Kanji Menu Name                           | (0019,xx32) | LO | 1  |                                |
| Image Processing Type                     | (0019,xx40) | CS | 1  |                                |
| Height of the center slice                | (0019,xx45) | DS | 1  |                                |
| Slice range                               | (0019,xx46) | DS | 1  |                                |
| Spacing of the slices                     | (0019,xx47) | DS | 1  |                                |
| EDR Mode                                  | (0019,xx50) | CS | 1  |                                |
| Radiographer's Code                       | (0019,xx60) | SH | 1  |                                |
| Split Exposure Format                     | (0019,xx70) | IS | 1  |                                |
| No. of Split Exposure Frames              | (0019,xx71) | IS | 1  |                                |
| Reading Position Specification            | (0019,xx80) | IS | 1  |                                |
| Reading Sensitivity Center                | (0019,xx81) | IS | 1  |                                |
| Film Annotation Character String 1        | (0019,xx90) | SH | 1  |                                |
| Film Annotation Character String 2        | (0019,xx91) | SH | 1  |                                |
| Private Creator                           | (0021,00xx) | LO | 1  | Value is "FDMS 1.0"            |
| FCR Image ID                              | (0021,xx10) | CS | 1  | Applicable only to FCR Images. |
| Set No.                                   | (0021,xx30) | CS | 1  |                                |
| Image No. in the Set                      | (0021,xx40) | IS | 1  |                                |
| Pair Processing Information               | (0021,xx50) | CS | 1  |                                |
| Equipment Type-Specific Information       | (0021,xx80) | OB | 1  |                                |
| Private Creator                           | (0025,00xx) | LO | 1  | Value is "FDMS 1.0"            |
| Relative Light Emission Amount Sk         | (0025,xx10) | US | 1  |                                |

| Attribute Name                         | Tag         | VR | VM | Notes   |
|--|-------------|----|----|---|
| Term of Correction for Each IP Type St | (0025,xx11) | US | 1  |   |
| Reading Gain Gp                        | (0025,xx12) | US | 1  |   |
| Private Creator                        | (0029,00xx) | LO | 1  | Value is "FDMS 1.0"   |
| Image Scanning Direction               | (0029,xx20) | CS | 1  |   |
| Extended Reading Size Value            | (0029,xx30) | CS | 1  |   |
| Mag./Reduc. Ratio                      | (0029,xx34) | US | 1  |   |
| Line Density Code                      | (0029,xx44) | CS | 1  |   |
| Data Compression Code                  | (0029,xx50) | CS | 1  |   |
| Requesting Physician                   | (0032,1032) | PN | 1  |   |
| Requesting Service                     | (0032,1033) | LO | 1  |   |
| Study Comments                         | (0032,4000) | LT | 1  |   |
| Protocol Context Sequence              | (0040,0440) | SQ | 1  |   |
| Value Type                             | (0040,A040) | CS | 1  |   |
| Verifying Observer Name                | (0040,A075) | PN | 1  |   |
| Image Display Format                   | (2010,0010) | ST | 1  |   |
| Annotation Display Format ID           | (2010,0030) | CS | 1  |   |
| Film Orientation                       | (2010,0040) | CS | 1  |   |
| Border Density                         | (2010,0100) | CS | 1  |   |
| Trim                                   | (2010,0140) | CS | 1  |   |
| Private Creator                        | (2011,00xx) | LO | 1  | Value is "FDMS 1.0"   |
| Image Position Specifying Flag         | (2011,xx11) | CS | 1  |   |
| Image Position                         | (2020,0010) | US | 1  |   |
| Private Creator                        | (50F1,00xx) | LO | 1  | Value is "FDMS 1.0"   |
| Subtraction Registration Result        | (50F1,xx07) | CS | 1  |   |
| Energy Subtraction Param.2             | (50F1,xx08) | CS | 1  |   |
| Afin Conversion Coefficient            | (50F1,xx09) | SL | 4  |   |
| FNC Parameters                         | (50F1,xx0A) | ST | 1  | Type of attribute is "1C" in FUJI Private CR Image Storage SOP Class. |
| CRF Parameters                         | (50F1,xx0B) | SS | 1  | Type of attribute is "1C" in FUJI Private CR Image Storage SOP Class  |
| Film Output Format                     | (50F1,xx10) | CS | 1  |   |
| Image Processing Modification Flag     | (50F1,xx20) | CS | 1  |   |

### 8.3 CODED TERMINOLOGY AND TEMPLATES

The DR-ID 300CL CR Storage AE does not support the use of Coded Terminology and Templates.

### 8.4 GRAYSCALE IMAGE CONSISTENCY

The DR-ID 300CL does not support DICOM Grayscale Standard Display Function.

## 8.5 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES

### 8.5.1 Standard Extended SOP Class – Computed Radiography Image Storage

The Computed Radiography Image Storage SOP Class is extended to create a Standard Extended SOP Class by addition of standard and private attributes to the created SOP Instances as documented in Sections 8.1 and 8.2.

### 8.5.2 Standard Extended SOP Class – Digital X-ray Image Storage for Presentation

The Digital X-ray Image Storage SOP Class is extended to create a Standard Extended SOP Class by addition of standard and private attributes to the created SOP Instances as documented in Sections 8.1 and 8.2.

### 8.5.3 Standard Extended SOP Class – Digital Mammography X-Ray Image Storage

The Digital Mammography X-Ray Image Storage SOP Class is extended to create a Standard Extended SOP Class by addition of standard and private attributes to the created SOP Instances as documented in section 8.1 and 8.2.

## 8.6 PRIVATE TRANSFER SYNTAXES

No Private Transfer Syntaxes are supported.





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