TOSHIBA

# DICOM CONFORMANCE STATEMENT
# FOR
# TOSHIBA DIGITAL RADIOGRAPHY SYSTEM
# MODEL ADR-1000A /R1
## (MIIXR0004EAC)

TOSHIBA CORPORATION

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# Table of Contents

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# 1. Introduction

This document is a DICOM Conformance Statement for Toshiba's Digital Radiography Systems. It is intended to provide the reader with the knowledge of how to integrate this product within a DICOM compliant hospital network. It details the DICOM Service Classes, Information Objects, and Communication Protocols which are supported by this product.

If the reader is unfamiliar with DICOM, it is recommended that they read the DICOM Specification (referenced below) prior to reading this conformance statement. Also note that this document is formatted according to the DICOM Specification, Part 2: Conformance.

## 1.1 References

- ACR-NEMA Digital Imaging and Communications in Medicine, DICOM V3.0.

## 1.2 Definitions

- **Association Establishment** - An Association Establishment is the first phase of communication between two DICOM Application Entities. The AEs use the Association Establishment to negotiate how data will be encoded and the type of data to be exchanged.
- **Called Application Entity Title** - The Called AE Title defines the intended receiver of an Association.
- **Calling Application Entity Title** - The Calling AE Title defines the requestor of an Association.
- **DICOM Message Service Element (DIMSE)** - A DIMSE defines the services and protocols utilized by an Application Entity to exchange messages.
- **Information Object Definition (IOD)** - An IOD is a data model which is an abstraction of real-world information. This data model defines the nature and attributes relevant to the class of real-world objects represented.
- **Service Class Provider (SCP)** - A Service Class Provider plays the "server" role to perform operations and invoke notifications during an Association. An example of a Storage Service Class Provider would be an image storage device. In this case, the image storage device is storing the image that was sent by a Service Class User.
- **Service Class User (SCU)** - A Service Class User plays the "client" role to invoke operations and perform notifications during an Association. An example of a Storage Service Class User would be an image acquisition device. In this case, the image acquisition device will create and send a DICOM image by requesting that a Service Class Provider store that image.
- **Service/Object Pair (SOP) Class** - A SOP Class is defined by the union of an Information Object Definition and a set of DIMSE Services. A DICOM Application Entity may support one or more SOP Classes. Each SOP Class is uniquely identified by a SOP Class UID.
- **SOP Instance** - A specific occurrence of a Information Object.
- **Transfer Syntax** - The Transfer Syntax is a set of encoding rules that allow DICOM Application Entities to negotiate the encoding techniques (e.g. data element structure, byte ordering, compression) they are able to support. The Transfer Syntax is negotiated during Association Negotiation.
- **Unique Identifier (UID)** - A Unique Identifier is a globally unique, ISO compliant, ASCII-numeric string. It guarantees uniqueness across multiple countries, sites, vendors and equipment.

## 1.3 Acronyms, Abbreviations and Symbols

- ACC American College of Cardiology
- ACR American College of Radiology
- ASCII American Standard Code for Information Interchange
- AE Application Entity
- ANSI American National Standards Institute
- CEN TC251 Comite Europeen de Normalisation - Technical Committee 251 - Medical Informatics
- DICOM Digital Imaging and Communications in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element - Composite
- DIMSE-N DICOM Message Service Element - Normalized
- HIS Hospital Information System
- HL7 Health Level 7
- IE Information Entity
- IOD Information Object Definition
- ISO International Standards Organization
- JIRA Japan Industries Association of Radiological Systems
- MPPS Modality Performed Procedure Step
- MWM Modality Worklist Management
- NEMA National Electrical Manufacturers Association
- OSI Open Systems Interconnection
- PDU Protocol Data Unit
- RIS Radiology Information System
- SCP Service Class Provider
- SCU Service Class User
- SOP Service-Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

# 2. Implementation Model

## 2.1 Application Data Flow Diagram

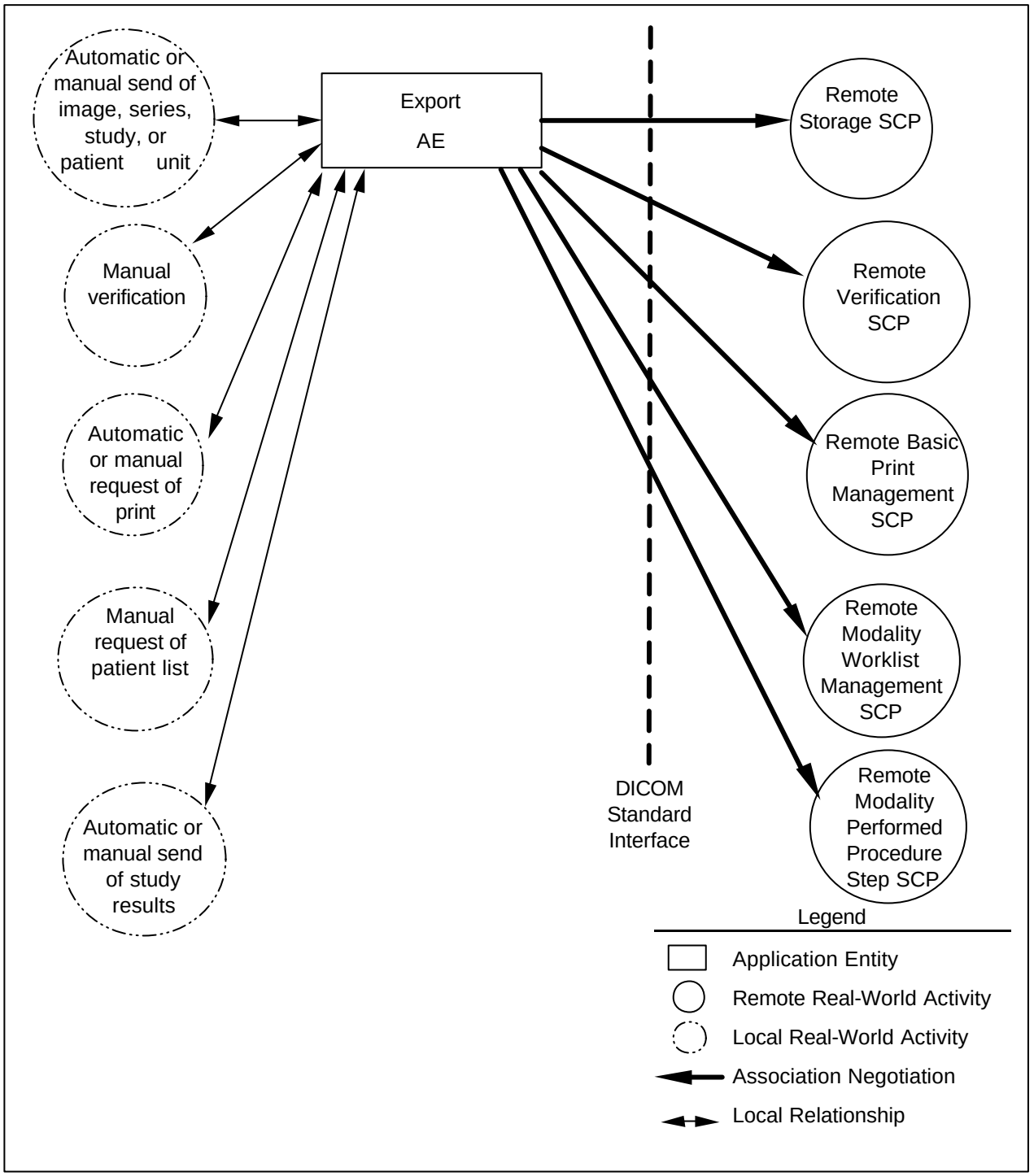


**Figure 1**

## 2.2 Functional Definitions of AE's

### 2.2.1 Export AE

Export AE is used to transmit images to a remote DICOM device. It therefore performs the following tasks:

- Builds DICOM XA/RF/SC Information Objects
- Establishes DICOM Association with a remote DICOM device
- Performs storage of DICOM XA/RF/SC Information Objects to a remote DICOM device

Export AE is used to verify that a remote DICOM device is active on the network. It therefore performs the following tasks:

- Establishes DICOM Association with a remote DICOM device
- Performs verification of a remote DICOM device's presence on network

Export AE is used to transmit request for Print images to a remote DICOM device. It therefore performs the following tasks:

- Builds DICOM Basic Grayscale Print Objects
- Establishes DICOM Association with a remote DICOM device
- Performs transmit of DICOM Basic Grayscale Print Objects to a remote DICOM device

Export AE is used to transmit request for patient list to a remote DICOM device and to retrieve patient list with Procedure Step. It therefore performs the following tasks:

- Establishes DICOM Association with a remote DICOM device
- Performs request of DICOM Modality Worklist Objects to a remote DICOM device
- Retrieves patient list with Scheduled Procedure Step Information from a remote DICOM device

Export AE is used to transmit request for a Modality Performed Procedure Step to a remote DICOM device. It therefore performs the following tasks each time of acquisition:

- Builds DICOM Modality Performed Procedure Step Objects
- Establishes DICOM Association with a remote DICOM device
- Performs transmit of DICOM Modality Performed Procedure Step Objects to a remote DICOM device

## 2.3 Sequencing of Real World Activities

### 2.3.1 Features

#### 2.3.1.1 Automatic or manual send of image, series, study, or patient unit

- The current acquired images are sent automatically at the registration of new patient.
- Operator requests to send images after selecting the transferred images from the patient, study or series list or mini-image screen.
- When the image transfer fails, a request to retry sending is issued manually.
- The requests are placed on a queue, and are executed in the background.

#### 2.3.1.2 Manual verification

- Toshiba Service Personnel can request verification manually on troubleshooting.

#### 2.3.1.3 Automatic or manual request of print

- The number of frames in the rows and columns on each film can be specified as desired, up to a total maximum of 20 frames per film.
- The current acquired images are sent automatically at the registration of new patient.
- If an error occurs during printing, a request to retry printing is issued manually.
- Operator requests to print out images after selecting the transferred images from the patient, study or series list or mini-image screen.
- Print requests are placed on a queue, and are executed in the background.

#### 2.3.1.4 Manual request of patient list

- The automatic request of Modality Worklist Management is performed periodically.
- Operator requests to transmit requiring patient list and retrieves it with Scheduled Procedure Step Information.

#### 2.3.1.5 Automatic or manual send of study results

- The study results are sent automatically each time of acquisition.
- If an error occurs during sending, a request to retry Modality Performance Procedure Step is issued manually.
- The requests are placed on a queue, and are executed in the background.

## 2.3.2 Operation

### 2.3.2.1 Automatic or manual send of image, series, study, or patient unit

- The operation for manual image transferring is described below:
  STEP-1: Select the images, series, studies or the patient to be transferred.
  STEP-2: Select the destination of image transfer and request transfer.
  Regarding automatic send operation it is skipped over STEP-1 and STEP-2.

### 2.3.2.2 Manual verification

- The operation for manual verification is described below:
  STEP-1: Select the destination of verification and request verification.

### 2.3.2.3 Automatic or manual request of print

- The operation for manual print images is described below:
  STEP-1: Select the images, series, studies or the patient to be printed.
  STEP-2: Select the destination of print images and request print out.
  Regarding automatic print operation it is skipped over STEP-1 and STEP-2.

### 2.3.2.4 Manual request of patient list

- The operation for manual transmitting request for patient list is described below:
  STEP-1: Select the condition to be found out.
  STEP-2: Request to transmit request for patient list.
  STEP-3: Select patients to be registered.
  The patient's name, patient ID, patient's birth date, patient's sex, accession number and scheduled performing physicians name are used for the patient registration.

### 2.3.2.5 Automatic or manual send of study results

- The operation for automatic send of study results is described below:
  STEP-1: Send the study results information each time of acquisition.
  Regarding manual send of study results operation it is executed by pressing "retry" button when error is occurred.

# 3. AE Specifications

## 3.1 Export Specification

Export AE provides Standard Conformance to the following DICOM SOP Classes as an SCU:

**Table 1**

| SOP Class Name | SOP Class UID |
|---|---|
| Verification | 1.2.840.10008.1.1 |
| XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 |
| RF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 |
| Modality Worklist Information Model-FIND | 1.2.840.10008.5.1.4.31 |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 |

The SOP Classes listed in **Table 2** indicate the SOP Classes regulated by the Basic Grayscale Print Management Meta SOP Class.

**Table 2**

| SOP Class Name | SOP Class UID |
|---|---|
| Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 |
| Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 |
| Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 |
| Printer SOP Class | 1.2.840.10008.5.1.1.16 |

### 3.1.1 Export Association Establishment Policies

#### 3.1.1.1 Export General

Export AE will utilize and understand the following Application Context Name:

**Table 3**

| | |
|---|---|
| DICOM V3.0 Application Context | 1.2.840.10008.3.1.1.1 |

Export AE supports a minimum PDU size of 16Kbytes and a maximum PDU size of 16Kbytes. The default value is set to 16Kbytes.

#### 3.1.1.2 Export Number of Associations

Export AE can only establish one association at a time, independent of the number of destinations chosen.

#### 3.1.1.3 Export Asynchronous Nature

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

#### 3.1.1.4 Export Implementation Identifying Information

Export AE specify the following Implementation Identifying Information

- Implementation class UID 2.16.840.1.113669.632.3.1.1.2.7
- Implementation Version name ADR_2_9C

### 3.1.2 Export Association Initiation by Real-World Activity

Export AE initiates an association when the following activity is chosen by the operator:

- "Automatic or manual send of image, series, study or patient unit"
  - Storage - Create and store an XA/RF/SC image to a remote DICOM device
- "Manual verification"
  - Verification - Verify that a remote DICOM device is present on the network

  Verification is initiated manually.
- "Automatic or manual request of print"
  - Print - Request print images to a remote DICOM device
- "Automatic or manual request of patient list"
  - MWM - Request query and retrieve patient list
- "Automatic or manual send of study results"
  - MPPS - Create and send MPPS to a remote DICOM device

#### 3.1.2.1 Export Real-World Activity - Storage

##### 3.1.2.1.1 Export Associated Real-World Activity - Storage

Storage is executed by the Digital Radiography System at the manual selection of the image transferred or at the registration of new patient automatically.

##### 3.1.2.1.2 Export Proposed Presentation Contexts - Storage

Export AE proposes the following Presentation Contexts shown below:

**Table 4**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended Negotiation** |
| **Name** | **UID** | **Name List** | **UID List** | | |
| XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| XA Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| RF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| RF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| RF Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

#### 3.1.2.1.2.1 Export SOP Specific Conformance - XA Image Storage

Export AE operation involves the following sequence of steps for each image transfer.

(1) Association establishment (requestor only)

(2) Data transfer (SCU only)

(3) Association release (requestor only)

Export AE judges that the transfer of one image succeeded when the result of (2) "Data transfer" is "Success" even if the result of (3) "Association release" is "Failure".

XA Information object Definition is described in chapter 8.

XRF Information object Definition is described in chapter 9.

SC Information object Definition is described in chapter 10.

### 3.1.2.2 Export Real-World Activity - Verification

#### 3.1.2.2.1 Export Associated Real-World Activity - Verification

Verification is executed by the Digital Radiography System after the operator selects a destination.

#### 3.1.2.2.2 Export Proposed Presentation Contexts - Verification

Export AE proposes the following Presentation Contexts shown below:

**Table 5**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | | **Extended** |
| **Name** | **UID** | **Name List** | **UID List** | **Role** | **Negotiation** |
| Verification | 1.2.840.10008.1.1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Verification | 1.2.840.10008.1.1 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| Verification | 1.2.840.10008.1.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

### 3.1.2.3 Export Real-World Activity - Print

#### 3.1.2.3.1 Export Associated Real-World Activity - Print

Export AE performs request of printing images automatically or manually to destination device.

#### 3.1.2.3.2 Export Proposed Presentation Contexts - Print

Export AE proposes the following Presentation Contexts shown below:

**Table 6**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | | **Extended** |
| **Name** | **UID** | **Name List** | **UID List** | **Role** | **Negotiation** |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

##### 3.1.2.3.2.1 Export SOP Specific Conformance - Print

Export AE operation involves the following sequence of steps for each request print image.

(1) Association establishment (requestor only)

(2) Request of printing images (SCU only)

(3) Association release (requestor only)

Export AE judges that the request of printing images succeeded when the result of (2) "Request print images" is "Success" even if the result of (3) "Association release" is "Failure".

SOP Specific Conformance Statement is described in 9 DIMSE-Service and Attributes.

See Chapter 9, DIMSE-Service and Attributes.

### 3.1.2.4 Export Real-World Activity - MWM

#### 3.1.2.4.1 Export Associated Real-World Activity - MWM

Export AE performs query and retrieve patient list automatically or manually from destination device.

#### 3.1.2.4.2 Export Proposed Presentation Contexts - MWM

Export AE proposes the following Presentation Contexts shown below:

**Table 7**

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name List** | **UID List** | | |
| Modality Worklist Information Model - FIND | 1.2.840.10008.5.1.4.31 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| 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 |
| Modality Worklist Information Model - FIND | 1.2.840.10008.5.1.4.31 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

##### 3.1.2.4.2.1 Export SOP Specific Conformance - MWM

Export AE operation involves the following sequence of steps for each query and retrieve patient list less than 75 matching records. If more than 75 matching records are found in the query, the user will be prompted to limit the search by entering additional search criteria.

(1) Association establishment (requestor only)

(2) Query and retrieve patient list (SCU only)

(3) Association release (requestor only)

Export AE judges that the request of worklist succeeded when the result of (2) "Query and retrieve patient list" is "Success" even if the result of (3) "Association release" is "Failure".

Modality Worklist Information Object Definition is described in chapter 12.

### 3.1.2.5 Export Real-World Activity - MPPS

#### 3.1.2.5.1 Export Associated Real-World Activity - MPPS

Export AE performs send MPPS automatically or manually to destination device.

#### 3.1.2.5.2 Export Proposed Presentation Contexts - MPPS

Export AE proposes the following Presentation Contexts shown below:

**Table 8**

**Presentation Context Table**

| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
|---|---|---|---|---|---|
| **Name** | **UID** | **Name List** | **UID List** | | |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| 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 |
| Modality Performed Procedure Step | 1.2.840.10008.3.1.2.3.3 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |

##### 3.1.2.5.2.1 Export SOP Specific Conformance - MPPS

Export AE operation involves the following sequence of steps for each request MPPS.

(1) Association establishment (requestor only)

(2) Send MPPS (SCU only)

(3) Association release (requestor only)

Export AE judges that the send of MPPS succeeded when the result of (2) "Send MPPS" is "Success" even if the result of (3) "Association release" is "Failure".

MPPS Information Object Definition is described in chapter 13.

### 3.1.3 Export Association Acceptance Policy

Export AE does not accept any associations generated by remote applications.

# 4. Communication Profiles

## 4.1 Supported Communication Stacks

This product provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

## 4.2 OSI Stack

Not applicable to this product.

## 4.3 TCP/IP Stack

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

### 4.3.1 API

Not applicable to this product.

### 4.3.2 Physical Media Support

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

## 4.4 Point-to-Point Stack

Not applicable to this product.

# 5. Extensions/Specializations/Privatizations

Not applicable to this product.

# 6. Configuration

For the Digital Radiography System, the configuration can be set using the Online Setup interface.

Note: Settings and changes are performed by Toshiba Service Personnel at the time of installation of the Digital Radiography System.

## 6.1 AE Title/Presentation Address Mapping

Mapping from the AE titles to the presentation address is as follows:

- One port number and one AE title can be described for one host name
- Each AE title is mapped to one port number

## 6.2 Configurable Parameters

### 6.2.1 Time-out Value, Retry Count, Retry Interval

The time-out value, retry count, and retry interval in each status are shown below:

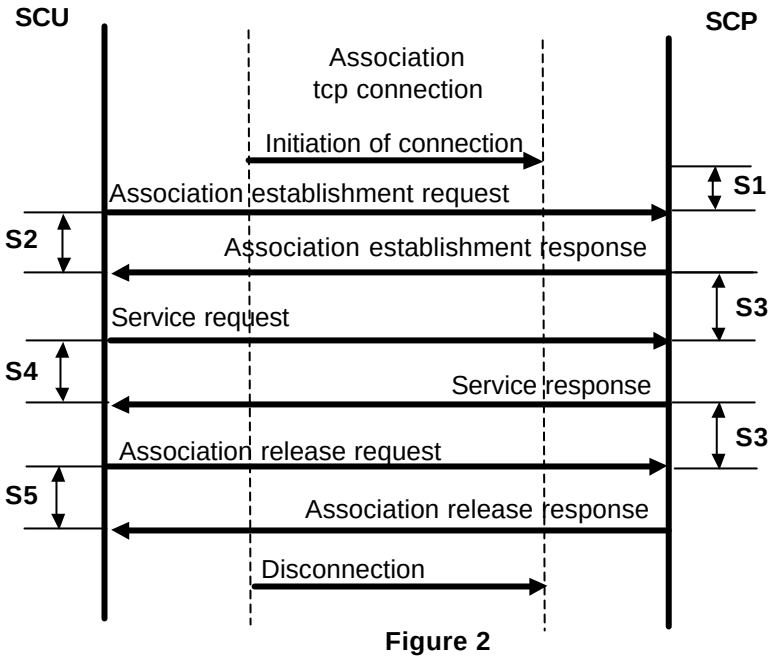


**Figure 2**

**Table 9**

| Item | Status | Time-out Value | Retry Count | Retry Interval | Remarks |
|---|---|---|---|---|---|
| S1 | Association establishment request waiting time | Not set | Not set | Not set | Not applicable to this product. |
| S2 | Association establishment response waiting time | default:<br>15 seconds<br>range:<br>default only | Not set | Not set | Only one parameter can be set in the Digital Radiography System. |
| S3 | Service request waiting time | Not set | Not set | Not set | Not applicable to this product. |
| S4 | Service response waiting time | default:<br>60 seconds<br>range:<br>15 to 300 | Not set | Not set | Only one parameter can be set in the Digital Radiography System. |
| S5 | Association release waiting time | default:<br>15 seconds<br>range:<br>default only | Not set | Not set | Only one parameter can be set in the Digital Radiography System. |

## 6.3 Warning Status Criteria

### 6.3.1 XA/RF/SC Image Storage

#### 6.3.1.1 C-STORE response

If SUCCESS is set, the Digital Radiography System judges that the image transfer succeeded.

If FAIL is set, the Digital Radiography System judges that the image transfer failed.

**Table 10**

| Warning Response Item | Default Value | Parameter setting range |
|---|---|---|
| Coercion of Data Set | FAIL | Not Change |
| Data Set does not match SOP Class | FAIL | Not Change |
| Element discard | FAIL | Not Change |

## 6.3.2 Basic Grayscale Print Management

### 6.3.2.1 Basic Film Session SOP Class

#### 6.3.2.1.1 N-CREATE response

If SUCCESS is set, the Digital Radiography System judges that N-CREATE request succeeded.

If FAIL is set, the Digital Radiography System judges that N-CREATE request failed.

**Table 11**

| Warning response | Default Value | Parameter setting range |
|---|---|---|
| Memory allocation not supported | FAIL | Not Change |

### 6.3.2.2 Basic Film Box SOP Class

#### 6.3.2.2.1 N-CREATE response

If SUCCESS is set, the Digital Radiography System judges that N-CREATE request succeeded.

If FAIL is set, the Digital Radiography System judges that N-CREATE request failed.

**Table 12**

| Warning response | Default Value | Parameter setting range |
|---|---|---|
| Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead. | FAIL | Not Change |

#### 6.3.2.2.2 N-ACTION response

If SUCCESS is set, the Digital Radiography System judges that N-ACTION request succeeded.

If FAIL is set, the Digital Radiography System judges that N-ACTION request failed.

**Table 13**

| Warning response | Default Value | Parameter setting range |
|---|---|---|
| Film Box SOP Instance hierarchy does not contain Image Box SOP Instances(empty page) | FAIL | Not Change |
| Image size is larger than image box size, the image has been demagnified. | FAIL | Not Change |

### 6.3.2.3 Basic Grayscale Image Box SOP Class

#### 6.3.2.3.1 N-SET response

If SUCCESS is set, the Digital Radiography System judges that N-SET request succeeded.

If FAIL is set, the Digital Radiography System judges that N-SET request failed.

**Table 14**

| Warning response | Default Value | Parameter setting range |
|---|---|---|
| Image size is larger than image box size, the image has been demagnified. | FAIL | Not Change |
| Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead. | FAIL | Not Change |

### 6.3.2.4 Printer SOP Class

#### 6.3.2.4.1 N-GET response

If SUCCESS is set, the Digital Radiography System judges that N-GET request succeeded.

If FAIL is set, the Digital Radiography System judges that N-GET request failed.

**Table 15**

| Warning response | Default Value | Parameter setting range |
|---|---|---|
| Attribute list error | FAIL | Not Change |

## 6.4 Implementation Information and Maximum Reception PDU Size

The default values for the Digital Radiography System are used for the Implementation Class UID, the Implementation Version name, and the Maximum length received. They cannot be changed.

**Table 16**

| Parameter | Default |
|---|---|
| Implementation Class UID | 2.16.840.1.113669.632.3.1.1.2.7 |
| Implementation Version name | ADR_2_9C |
| Maximum length received(unit: byte) | 0x4000 |

# 7. Support of Extended Character Sets

This product supports the following character sets:

**Table 17**

| | |
|---|---|
| ● ISO-IR 6 (default) | ISO646 |
| ● ISO-IR 87(Japanese) | JIS X 0208(Kanji) |

# 8. X-Ray Angiographic Information Object Definition

## 8.1 Entity Module Definitions

The information modules for the Digital Radiography System are defined below.

### 8.1.1 XA IOD Modules

**Table 18**

| Information Entity | Module | Reference | Usage[1] |
|---|---|---|---|
| Patient | Patient Module | 8.2.1 | M |
| Study | General Study Module | 8.2.2 | M |
| Study | Patient Study Module | Not Used | U |
| Series | General Series Module | 8.2.3 | M |
| Equipment | General Equipment Module | 8.2.4 | M |
| Image | General Image Module | 8.2.5 | M |
| Image | Image Pixel Module | 8.2.6 | M |
| Image | Contrast/bolus Module | Not Used | C |
| Image | Cine Module | Not Used | C |
| Image | Multi-frame Module | Not Used | C |
| Image | Frame Pointers Module | Not Used | U |
| Image | Mask Module | Not Used | C |
| Image | Display Shutter Module | Not Used | U |
| Image | Device Module | Not Used | U |
| Image | Therapy Module | Not Used | U |
| Image | X-ray Image Module | 8.2.7 | M |
| Image | X-ray Acquisition Module | 8.2.8 | M |
| Image | X-ray Collimator Module | Not Used | U |
| Image | X-ray Table Module | Not Used | C |
| Image | XA Positioner Module | 8.2.9 | M |
| Image | Overlay Plane Module | Not Used | U |
| Image | Multi-Frame Overlay Module | Not Used | C |
| Image | Curve Module | Not Used | U |
| Image | Modality LUT Module | Not Used | C/U |
| Image | VOI LUT Module | 8.2.10 | U |
| Image | SOP Common Module | 8.2.11 | M |

[1] M=Mandatory, C=Conditional, U=User option

## 8.2 Information Object Definitions

### 8.2.1 Patient Module

**Table 19**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Patient's Name | (0010, 0010) | 2 | Always set except for urgent patient |
| Patient ID | (0010, 0020) | 2 | Always set |
| Patient's Birth Date | (0010, 0030) | 2 | Always set |
| Patient's Birth Time | (0010, 0032) | 3 | Always set , Length=0 |
| Patient's Sex | (0010, 0040) | 2 | Always set |
| Patient Comments | (0010,4000) | 3 | Not set when no entry is made |

### 8.2.2 General Study Module

**Table 20**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Study Instance UID | (0020, 000D) | 1 | Always set |
| Study Date | (0008, 0020) | 2 | Always set |
| Study Time | (0008, 0030) | 2 | Always set |
| Referring Physician's Name | (0008, 0090) | 2 | Length=0 when no entry is made |
| Study ID | (0020, 0010) | 2 | Always set |
| Accession Number | (0008, 0050) | 2 | Length=0 when no entry is made |
| Study Description | (0008, 1030) | 3 | Always set |
| Name of Physician(s) Reading Study | (0008, 1060) | 3 | Length=0 when no entry is made |

### 8.2.3 General Series Module

**Table 21**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Modality | (0008, 0060) | 1 | Always set ("XA") |
| Series Instance UID | (0020, 000E) | 1 | Always set |
| Series Number | (0020, 0011) | 2 | Always set, Length=0 |
| Series Date | (0008, 0021) | 3 | Always set |
| Series Time | (0008, 0031) | 3 | Always set |
| Performing Physician's Name | (0008, 1050) | 3 | Length=0 when no entry is made |
| Protocol Name | (0018, 1030) | 3 | Always set |
| Series Description | (0008,103E) | 3 | Length=0 when no entry is made |
| Body Part Examined | (0018,0015) | 3 | Always set, Length=0 |
| Performed Procedure Step ID | (0040,0253) | 3 | Always set, Length=0 |
| Performed Procedure Step Start Date | (0040,0244) | 3 | Always set |
| Performed Procedure Start Time | (0040,0245) | 3 | Always set |

### 8.2.4 General Equipment Module

**Table 22**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Manufacturer | (0008, 0070) | 2 | Always set |
| Institution Name | (0008, 0080) | 3 | Always set |
| Station Name | (0008, 1010) | 3 | Always set |
| Manufacture's Model Name | (0008, 1090) | 3 | Always set("ADR-1000A") |
| Device Serial Number | (0018, 1000) | 3 | Always set |

### 8.2.5 General Image Module

**Table 23**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Image Number | (0020, 0013) | 2 | Always set |
| Patient Orientation | (0020, 0020) | 2C | Always set, Length=0 |
| Image Date | (0008, 0023) | 2C | Always set |
| Image Time | (0008, 0033) | 2C | Always set |
| Image Type | (0008, 0008) | 3 | Always set ("ORIGINAL\PRIMARY\SINGLE PLANE"/ "DERIVED\SECONDARY\SINGLE PLANE") |
| Image Comments | (0020, 4000) | 3 | Always set, Length=0 |

### 8.2.6 Image Pixel Module

**Table 24**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Samples per Pixel | (0028, 0002) | 1 | Always set (0x0001) |
| Photometric Interpretation | (0028, 0004) | 1 | Always set ("MONOCHROME2") |
| Rows | (0028, 0010) | 1 | Always set (0x0400) |
| Columns | (0028, 0011) | 1 | Always set (0x0400/0x0500) |
| Bits Allocated | (0028, 0100) | 1 | Always set (0x0010/0x0008) |
| Bits Stored | (0028, 0101) | 1 | Always set (0x000A/0x0008) |
| High Bit | (0028, 0102) | 1 | Always set (0x0009/0x0007) |
| Pixel Representation | (0028, 0103) | 1 | Always set (0x0000) |
| Pixel Data | (7FE0, 0010) | 1 | Always set |

### 8.2.7 X-ray Image Module

**Table 25**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Image Type | (0008, 0008) | 1 | Always set ("ORIGINAL\PRIMARY\SINGLE PLANE"/ "DERIVED\SECONDARY\SINGLE PLANE") |
| Pixel Intensity Relationship | (0028, 1040) | 1 | Always set ("LOG") |
| Samples per Pixel | (0028, 0002) | 1 | Always set (0x0001) |
| Photometric Interpretation | (0028, 0004) | 1 | Always set ("MONOCHROME2") |
| Bits Allocated | (0028, 0100) | 1 | Always set (0x0010/0x0008) |
| Bits Stored | (0028, 0101) | 1 | Always set (0x000A/0x0008) |
| High Bit | (0028, 0102) | 1 | Always set (0x0009/0x0007) |
| Pixel Representation | (0028, 0103) | 1 | Always set (0x0000) |

### 8.2.8 X-ray Acquisition Module

**Table 26**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| KVP | (0018, 0060) | 2 | Always set, Length=0 |
| Radiation Setting | (0018, 1155) | 1 | Always set |
| X-ray Tube Current | (0018, 1151) | 2C | Always set, Length=0 |
| Exposure Time | (0018, 1150) | 2C | Always set, Length=0 |
| Intensifier Size | (0018, 1162) | 3 | Always set[mm] |

### 8.2.9 XA Positioner Module

**Table 27**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Positioner Primary Angle | (0018, 1510) | 2 | Always set, Length=0 |
| Positioner Secondary Angle | (0018, 1511) | 2 | Always set, Length=0 |

### 8.2.10 VOI LUT Module

**Table 28**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Window Center | (0028, 1050) | 3 | Always set |
| Window Width | (0028, 1051) | 1C | Always set |

### 8.2.11 SOP Common Module

**Table 29**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Specific Character Set | (0008, 0005) | 1C | User selective (“\ISO 2022 IR 87”) |
| SOP Class UID | (0008, 0016) | 1 | Always set ("1.2.840.10008.5.1.4.1.1.12.1") |
| SOP Instance UID | (0008, 0018) | 1 | Always set |
| Instance Number | (0020, 0013) | 3 | Always set |

# 9. X-Ray Radiofluoroscopic Information Object Definition

## 9.1 Entity Module Definitions

The information modules for the Digital Radiography System are defined below.

### 9.1.1 XRF IOD Modules

**Table 30**

| Information Entity | Module | Reference | Usage[1] |
|---|---|---|---|
| Patient | Patient Module | 8.2.1 | M |
| Study | General Study Module | 8.2.2 | M |
| Study | Patient Study Module | Not Used | U |
| Series | General Series Module | 9.2.3 | M |
| Equipment | General Equipment Module | 9.2.4 | M |
| Image | General Image Module | 9.2.5 | M |
| Image | Image Pixel Module | 9.2.6 | M |
| Image | Contrast/bolus Module | Not Used | C |
| Image | Cine Module | Not Used | C |
| Image | Multi-frame Module | Not Used | C |
| Image | Frame Pointers Module | Not Used | U |
| Image | Mask Module | Not Used | C |
| Image | X-ray Image Module | 9.2.7 | M |
| Image | X-ray Acquisition Module | 9.2.8 | M |
| Image | X-ray Collimator Module | Not Used | U |
| Image | Display Shutter Module | Not Used | U |
| Image | Therapy Module | Not Used | U |
| Image | Device Module | Not Used | U |
| Image | X-ray Table Module | Not Used | U |
| Image | XRF Positioner Module | Not Used | U |
| Image | X-Ray Tomo Acquisition Module | Not Used | C |
| Image | Overlay Plane Module | Not Used | U |
| Image | Multi-Frame Overlay Module | Not Used | C |
| Image | Curve Module | Not Used | U |
| Image | Modality LUT Module | Not Used | C/U |
| Image | VOI LUT Module | 9.2.9 | U |
| Image | SOP Common Module | 9.2.10 | M |

[1] M=Mandatory, C=Conditional, U=User option

## 9.2 Information Object Definitions

### 9.2.1 Patient Module

**Table 31**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Patient's Name | (0010, 0010) | 2 | Always set except for urgent patient |
| Patient ID | (0010, 0020) | 2 | Always set |
| Patient's Birth Date | (0010, 0030) | 2 | Always set |
| Patient's Birth Time | (0010, 0032) | 3 | Always set , Length=0 |
| Patient's Sex | (0010, 0040) | 2 | Always set |
| Patient Comments | (0010,4000) | 3 | Length=0 when no entry is made |

### 9.2.2 General Study Module

**Table 32**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Study Instance UID | (0020, 000D) | 1 | Always set |
| Study Date | (0008, 0020) | 2 | Always set |
| Study Time | (0008, 0030) | 2 | Always set |
| Referring Physician's Name | (0008, 0090) | 2 | Length=0 when no entry is made |
| Study ID | (0020, 0010) | 2 | Always set |
| Accession Number | (0008, 0050) | 2 | Length=0 when no entry is made |
| Study Description | (0008, 1030) | 3 | Always set |
| Name of Physician(s) Reading Study | (0008, 1060) | 3 | Length=0 when no entry is made |

### 9.2.3 General Series Module

**Table 33**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Modality | (0008, 0060) | 1 | Always set ("RF") |
| Series Instance UID | (0020, 000E) | 1 | Always set |
| Series Number | (0020, 0011) | 2 | Always set |
| Series Date | (0008, 0021) | 3 | Always set |
| Series Time | (0008, 0031) | 3 | Always set |
| Performing Physician's Name | (0008, 1050) | 3 | Length=0 when no entry is made |
| Protocol Name | (0018, 1030) | 3 | Always set |
| Series Description | (0008,103E) | 3 | Length=0 when no entry is made |
| Body Part Examined | (0018,0015) | 3 | Always set, Length=0 |
| Performed Procedure Step ID | (0040,0253) | 3 | Always set, Length=0 |
| Performed Procedure Step Start Date | (0040,0244) | 3 | Always set |
| Performed Procedure Start Time | (0040,0245) | 3 | Always set |

### 9.2.4 General Equipment Module

**Table 34**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Manufacturer | (0008, 0070) | 2 | Always set |
| Institution Name | (0008, 0080) | 3 | Always set |
| Station Name | (0008, 1010) | 3 | Always set |
| Manufacture's Model Name | (0008, 1090) | 3 | Always set("ADR-1000A") |
| Device Serial Number | (0018, 1000) | 3 | Always set |

### 9.2.5 General Image Module

**Table 35**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Instance Number | (0020, 0013) | 2 | Always set |
| Patient Orientation | (0020, 0020) | 2C | Always set, Length=0 |
| Image Date | (0008, 0023) | 2C | Always set |
| Image Time | (0008, 0033) | 2C | Always set |
| Image Type | (0008, 0008) | 3 | Always set ("ORIGINAL\PRIMARY\SINGLE PLANE"/ "DERIVED\SECONDARY\SINGLE PLANE") |
| Image Comments | (0020, 4000) | 3 | Always set, Length=0 |

### 9.2.6 Image Pixel Module

**Table 36**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Samples per Pixel | (0028, 0002) | 1 | Always set (0x0001) |
| Photometric Interpretation | (0028, 0004) | 1 | Always set ("MONOCHROME2") |
| Rows | (0028, 0010) | 1 | Always set (0x0400) |
| Columns | (0028, 0011) | 1 | Always set (0x0400/0x0500) |
| Bits Allocated | (0028, 0100) | 1 | Always set (0x0010/0x0008) |
| Bits Stored | (0028, 0101) | 1 | Always set (0x000A/0x0008) |
| High Bit | (0028, 0102) | 1 | Always set (0x0009/0x0007) |
| Pixel Representation | (0028, 0103) | 1 | Always set (0x0000) |
| Pixel Data | (7FE0, 0010) | 1 | Always set |

### 9.2.7 Image Pixel Module

**Table 37**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Image Type | (0008, 0008) | 1 | Always set ("ORIGINAL\PRIMARY\SINGLE PLANE"/ "DERIVED\SECONDARY\SINGLE PLANE") |
| Pixel Intensity Relationship | (0028, 1040) | 1 | Always set ("LIN") |
| Samples per Pixel | (0028, 0002) | 1 | Always set (0x0001) |
| Photometric Interpretation | (0028, 0004) | 1 | Always set ("MONOCHROME2") |
| Bits Allocated | (0028, 0100) | 1 | Always set (0x0010/0x0008) |
| Bits Stored | (0028, 0101) | 1 | Always set (0x000A/0x0008) |
| High Bit | (0028, 0102) | 1 | Always set (0x0009/0x0007) |
| Pixel Representation | (0028, 0103) | 1 | Always set (0x0000) |

### 9.2.8 X-ray Acquisition Module

**Table 38**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| KVP | (0018, 0060) | 2 | Always set [kV] |
| Radiation Setting | (0018, 1155) | 1 | Always set |
| X-ray Tube Current | (0018, 1151) | 2C | Always set [mA] |
| Exposure Time | (0018, 1150) | 2C | Always set [msec] |
| Intensifier Size | (0018, 1162) | 3 | Always set [mm] |

### 9.2.9 VOI LUT Module

**Table 39**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Window Center | (0028, 1050) | 3 | Always set |
| Window Width | (0028, 1051) | 1C | Always set |

### 9.2.10 SOP Common Module

**Table 40**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Specific Character Set | (0008, 0005) | 1C | User selective (“\ISO 2022 IR 87”) |
| SOP Class UID | (0008, 0016) | 1 | Always set ("1.2.840.10008.5.1.4.1.1.12.2"/ “1.2.840.10008.5.1.4.1.1.7”) |
| SOP Instance UID | (0008, 0018) | 1 | Always set |
| Instance Number | (0020, 0013) | 3 | Always set |

# 10. SC Information Object Definition

## 10.1 Entity Module Definitions

The information modules for the Digital Radiography System are defined below.

### 10.1.1 SC IOD Modules

**Table 41**

| Information Entity | Module | Reference | Usage[1] |
|---|---|---|---|
| Patient | Patient Module | 10.2.1 | M |
| Study | General Study Module | 10.2.2 | M |
| Study | Patient Study Module | Not Used | U |
| Series | General Series Module | 10.2.3 | M |
| Equipment | General Equipment Module | 10.2.4 | U |
| Equipment | SC Equipment Module | 10.2.5 | M |
| Image | General Image Module | 10.2.6 | M |
| Image | Image Pixel Module | 10.2.7 | M |
| Image | SC Image Module | 10.2.8 | M |
| Image | Overlay Plane Module | Not Used | U |
| Image | Modality LUT Module | Not Used | U |
| Image | VOI LUT Module | 10.2.9 | U |
| Image | SOP Common Module | 10.2.10 | M |

[1] M=Mandatory, C=Conditional, U=User option

## 10.2 Information Object Definitions

### 10.2.1 Patient Module

**Table 42**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Patient's Name | (0010, 0010) | 2 | Always set except for urgent patient |
| Patient ID | (0010, 0020) | 2 | Always set |
| Patient's Birth Date | (0010, 0030) | 2 | Always set |
| Patient's Birth Time | (0010, 0032) | 3 | Always set , Length=0 |
| Patient's Sex | (0010, 0040) | 2 | Always set |
| Patient Comments | (0010,4000) | 3 | Length=0 when no entry is made |

### 10.2.2 General Study Module

**Table 43**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Study Instance UID | (0020, 000D) | 1 | Always set |
| Study Date | (0008, 0020) | 2 | Always set |
| Study Time | (0008, 0030) | 2 | Always set |
| Referring Physician's Name | (0008, 0090) | 2 | Length=0 when no entry is made |
| Study ID | (0020, 0010) | 2 | Always set |
| Accession Number | (0008, 0050) | 2 | Length=0 when no entry is made |
| Study Description | (0008, 1030) | 3 | Always set |
| Name of Physician(s) Reading Study | (0008, 1060) | 3 | Length=0 when no entry is made |

### 10.2.3 General Series Module

**Table 44**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Modality | (0008, 0060) | 1 | Always set ("XA"/"RF"/"OT") |
| Series Instance UID | (0020, 000E) | 1 | Always set |
| Series Number | (0020, 0011) | 2 | Always set |
| Series Date | (0008, 0021) | 3 | Always set |
| Series Time | (0008, 0031) | 3 | Always set |
| Performing Physician's Name | (0008, 1050) | 3 | Always set when no entry is made |
| Series Description | (0008,103E) | 3 | Length=0 when no entry is made |
| Body Part Examined | (0018,0015) | 3 | Always set, Length=0 |
| Performed Procedure Step ID | (0040,0253) | 3 | Always set, Length=0 |
| Performed Procedure Step Start Date | (0040,0244) | 3 | Always set |
| Performed Procedure Start Time | (0040,0245) | 3 | Always set |

### 10.2.4 General Equipment Module

**Table 45**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Manufacturer | (0008, 0070) | 2 | Always set |
| Institution Name | (0008, 0080) | 3 | Always set |
| Station Name | (0008, 1010) | 3 | Always set |
| Manufacture's Model Name | (0008, 1090) | 3 | Always set("ADR-1000A") |
| Device Serial Number | (0018, 1000) | 3 | Always set |

### 10.2.5 SC Equipment Module

**Table 46**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Conversion Type | (0008, 0064) | 1 | Always set ("DI") |
| Modality | (0008, 0060) | 3 | Always set("XA"/"RF"/"OT") |

### 10.2.6 General Image Module

**Table 47**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Instance Number | (0020, 0013) | 2 | Always set |
| Patient Orientation | (0020, 0020) | 2C | Always set, Length=0 |
| Image Date | (0008, 0023) | 2C | Always set |
| Image Time | (0008, 0033) | 2C | Always set |
| Image Type | (0008, 0008) | 3 | Always set<br>(“DERIVED\SECONDARY\SINGLE PLANE”) |
| Image Comments | (0020, 4000) | 3 | Always set, Length=0 |

### 10.2.7 Image Pixel Module

**Table 48**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Samples per Pixel | (0028, 0002) | 1 | Always set (0x0001) |
| Photometric Interpretation | (0028, 0004) | 1 | Always set ("MONOCHROME2") |
| Rows | (0028, 0010) | 1 | Always set (0x0400) |
| Columns | (0028, 0011) | 1 | Always set (0x0400/0x0500) |
| Bits Allocated | (0028, 0100) | 1 | Always set (0x0010/0x0008) |
| Bits Stored | (0028, 0101) | 1 | Always set (0x000A/0x0008) |
| High Bit | (0028, 0102) | 1 | Always set (0x0009/0x0007) |
| Pixel Representation | (0028, 0103) | 1 | Always set (0x0000) |
| Pixel Data | (7FE0, 0010) | 1 | Always set |

### 10.2.8 SC Image Module

**Table 49**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Date of Secondary Capture | (0018, 1012) | 1 | Always set |
| Time of Secondary Capture | (0028, 1014) | 1 | Always set |

### 10.2.9 VOI LUT Module

**Table 50**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Window Center | (0028, 1050) | 3 | Always set |
| Window Width | (0028, 1051) | 1C | Always set |

### 10.2.10 SOP Common Module

**Table 51**

| Attribute Name | Tag | Type | Attribute Description |
|---|---|---|---|
| Specific Character Set | (0008, 0005) | 1C | User selective (“\ISO 2022 IR 87”) |
| SOP Class UID | (0008, 0016) | 1 | Always set<br>( “1.2.840.10008.5.1.4.1.1.7”) |
| SOP Instance UID | (0008, 0018) | 1 | Always set |
| Instance Number | (0020, 0013) | 3 | Always set |

# 11. DIMSE-Service and Attributes

## 11.1 DIMSE-Services

**Table 52**

| SOP Class | DIMSE Service Element | Reference | Usage SCU *1 |
|---|---|---|---|
| Basic Film Session SOP Class | N-CREATE | 11.2.1 | M |
| | N-SET | not used | U |
| | N-DELETE | not used | U |
| | N-ACTION | not used | U |
| Basic Film Box SOP Class | N-CREATE | 11.3.1 | M |
| | N-SET | not used | U |
| | N-DELETE | not used | U |
| | N-ACTION | used | M |
| Basic Grayscale Image Box SOP Class | N-SET | 11.4.1 | M |
| Printer SOP Class | N-EVENT-REPORT | 11.5.1 | M |
| | N-GET | 11.5.2 | U |

*1 : M = Mandatory, U = User option

## 11.2 Basic Film Session SOP Class

### 11.2.1 N-CREATE Attributes

**Table 53**

| Attribute Name | Tag | Usage | Attribute Description |
|---|---|---|---|
| Number of Copies | (2000,0010) | U | Always set ("1" - "99") |
| Print Priority | (2000,0020) | U | Always set (“MED”) |
| Media Type | (2000,0030) | U | Always set ("PAPER"/"CLEAR FILM"/ "BLUE FILM") |
| Film Destination | (2000,0040) | U | Always set ("PROCESSOR") |
| Film Session Label | (2000,0050) | U | Not set |

## 11.3 Basic Film Box SOP Class

### 11.3.1 N-CREATE Attributes

**Table 54**

| Attribute Name | Tag | Usage | Attribute Description |
|---|---|---|---|
| Image Display Format | (2010,0010) | M | Always set |
| Film Orientation | (2010,0040) | U | Always set (“PORTRAIT/LANDSCAPE”) |
| Film Size ID | (2010,0050) | U | Always set |
| Magnification Type | (2010,0060) | U | Always set |
| Border Density | (2010,0100) | U | Always set |
| Empty Image Density | (2010,0110) | U | Always set |
| Min Density | (2010,0120) | U | Always set |
| Max Density | (2010,0130) | U | Always set |
| Trim | (2010,0140) | U | Always set |
| Referenced Film Session Sequence | (2010,0500) | M | Always set |
| >Referenced SOP Class UID | (0008,1150) | M | Always set(“1.2.840.10008.5.1.1.1”) |
| >Referenced SOP Instance UID | (0008,1155) | M | Always set |

## 11.4 Basic Grayscale Image Box SOP Class

### 11.4.1 N-SET Attributes

**Table 55**

| Attribute Name | Tag | Usage | Attribute Description |
|---|---|---|---|
| Image Position | (2020,0010) | M | Always set |
| Polarity | (2020,0020) | U | Always set |
| Magnification Type | (2010,0060) | U | Always set |
| Basic Grayscale Image Sequence | (2020,0110) | M | Always set |
| >Samples Per Pixel | (0028,0002) | M | Always set (0x0001) |
| >Photometric Interpretation | (0028,0004) | M | Always set ("MONOCHROME2") |
| >Rows | (0028,0010) | M | Always set (0x0400) |
| >Columns | (0028,0011) | M | Always set (0x0500) |
| >Pixel Aspect Ratio | (0028,0034) | MC | Always set |
| >Bits Allocated | (0028,0100) | M | Always set (0x0008) |
| >Bits Stored | (0028,0101) | M | Always set (0x0008) |
| >High Bit | (0028,0102) | M | Always set (0x0007) |
| >Pixel Representation | (0028,0103) | M | Always set (0x0000) |
| >Pixel Data | (7FE0,0010) | M | Always set |

## 11.5 Printer SOP Class

### 11.5.1 N-EVENT-REPORT

**Table 56**

| Event Type Name | Event Type ID | Attribute | Tag | Usage SCU/SCP |
|---|---|---|---|---|
| NORMAL | 1 | | | |
| WARNING | 2 | Printer Name | (2110,0030) | U/U |
| | | Printer Status Information | (2110,0020) | U/M |
| FAILURE | 3 | Printer Name | (2110,0030) | U/U |
| | | Printer Status Information | (2110,0020) | U/M |

### 11.5.2 N-GET Attributes

**Table 57**

| Attribute Name | Tag | Usage SCU/SCP |
|---|---|---|
| Printer Status | (2110,0010) | U/M |
| Printer Status Information | (2110,0020) | U/M |
| Printer Name | (2110,0030) | U/U |
| Manufacturer | (0008,0070) | U/U |
| Manufacturer's Model Name | (0008,1090) | U/U |
| Device Serial Number | (0018,1000) | U/U |
| Software Version | (0018,1020) | U/U |
| Date of Last Calibration | (0018,1200) | U/U |
| Time of Last Calibration | (0018,1201) | U/U |

# 12. Modality Worklist Information Object Definition

## 12.1 Matching Key Attributes

The supported Matching Key Attributes is listed as follows.

### 12.1.1 Scheduled Procedure Step Module

**Table 58**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Scheduled Procedure Step Sequence | (0040, 0100) | R | |
| >Scheduled station AE title | (0040, 0001) | R | Single Value Matching |
| >Scheduled Procedure Step Start Date | (0040, 0002) | R | Single Value Matching or Range Matching |
| >Scheduled Procedure Step Start Time | (0040, 0003) | R | Single Value Matching or Range Matching |
| >Modality | (0008, 0060) | R | Single Value Matching Always set (“XA”/”RF”) or Universal Matching (as a Return Key) |

### 12.1.2 Imaging Service Request Module

**Table 59**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Accession Number | (0008, 0050) | O | Single Value Matching or Universal Matching (as a Return Key) |

### 12.1.3 Patient Identification Module

**Table 60**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Patient ID | (0010,0020) | 1 | Single Value Matching |

## 12.2 Return Key Attributes

The supported Return Key Attributes are listed as follows.

### 12.2.1 SOP Common Module

**Table 61**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Specific Character Set | (0008,0005) | 1C | Required if an extended or replacement character set is used. |

### 12.2.2 Scheduled Procedure Step Module

**Table 62**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Scheduled Procedure Step Sequence | (0040, 0100) | 1 | |
| >Scheduled station AE title | (0040, 0001) | 1 | |
| >Scheduled Procedure Step Start Date | (0040, 0002) | 1 | |
| >Scheduled Procedure Step Start Time | (0040, 0003) | 1 | |
| >Modality | (0008, 0060) | 1 | |
| >Scheduled Performing Physician's Name | (0040,0006) | 2 | |
| >Scheduled Procedure Step Description | (0040, 0007) | 1C | |
| >Scheduled Procedure Step Location | (0040, 0011) | 2 | |
| >Scheduled Action Item Code Sequence | (0040, 0008) | 1C | |
| >>Code Value | (0008, 0100) | 1C | |
| >>Coding Scheme Designator | (0008, 0102) | 1C | |
| >>Code Meaning | (0008, 0104) | 3 | |
| >Scheduled Procedure Step ID | (0040, 0009) | 1 | |

### 12.2.3 Requested Procedure Module

**Table 63**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Requested Procedure ID | (0040, 1001) | 1 | |
| Requested Procedure Description | (0032, 1060) | 1C | |
| Requested Procedure Code Sequence | (0032, 1064) | 1C | |
| >Code Value | (0008, 0100) | 1C | |
| >Coding Scheme Designator | (0008, 0102) | 1C | |
| >Code Meaning | (0008, 0104) | 3 | |
| Study Instance UID | (0020, 000D) | 1 | |
| Requested Procedure Comments | (0040, 1400) | 3 | |
| Name of Intended Recipients of results | (0040, 1010) | 3 | |

### 12.2.4 Imaging Service Request Module

**Table 64**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Accession Number | (0008, 0050) | 2 | |
| Requesting Physician | (0032, 1032) | 2 | |
| Referring Physician's Name | (0008, 0090) | 2 | |
| Imaging Service Request Comments | (0040, 2400) | 3 | |
| Requesting Service | (0032, 1033) | 3 | |

### 12.2.5 Visit Status Module

**Table 65**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Current Patient Location | (0038, 0300) | 2 | |

### 12.2.6 Visit Admission Module

**Table 66**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Referring Physician's Name | (0008, 0090) | 3 | |

### 12.2.7 Patient Identification Module

**Table 67**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Patient's Name | (0010,0010) | 1 | Wild Card Matching |
| Patient ID | (0010,0020) | 1 | Single Value Matching |

### 12.2.8 Patient Demographic Module

**Table 68**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Patient's Birth Date | (0010,0030) | 2 | |
| Patient's Sex | (0010,0040) | 2 | |
| Patient Comments | (0010,4000) | 3 | |

### 12.2.9 Patient Medical Module

**Table 69**

| Description/Module | Tag | Matching Key Type | Remark/ Matching Type |
|---|---|---|---|
| Pregnancy Status | (0010, 21C0) | 2 | |
| Medical Alerts | (0010, 2000) | 2 | |
| Additional Patient History | (0032, 1033) | 2 | |

# 13. Modality Performed Procedure Step Information Object Definition

## 13.1 N-CREATE Attributes

### 13.1.1 SOP Common Module

**Table 70**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Specific Character Set | (0008,0005) | 1C | Required if an extended or replacement character set is used. |

### 13.1.2 Performed Procedure Step Relationship Module

**Table 71**

| Attribute Name | Tag | Req. Type N-CREATE | Attributes Description |
|---|---|---|---|
| Scheduled Step Attributes Sequence | (0040,0270) | 1 | Always set |
| >Study Instance UID | (0020,000D) | 1 | Always set |
| >Referenced Study Sequence | (0008,1110) | 2 | Always set, Length=0 |
| >Accession Number | (0008,0050) | 2 | Always set |
| >Requested Procedure ID | (0040,1001) | 2 | Always set, Length=0 |
| >Requested Procedure Description | (0032,1060) | 2 | Always set |
| >Scheduled Procedure Step ID | (0040,0009) | 2 | Always set, Length=0 |
| >Scheduled Procedure Step Description | (0040,0007) | 2 | Always set, Length=0 |
| >Scheduled Action Item Code Sequence | (0040,0008) | 2 | Always set, Length=0 |
| Patient's Name | (0010,0010) | 2 | Always set |
| Patient ID | (0010,0020) | 2 | Always set |
| Patient's Birth Date | (0010,0032) | 2 | Always set |
| Patient's Sex | (0010,0040) | 2 | Always set |
| Referenced Patient Sequence | (0008,1120) | 2 | Always set, Length=0 |

### 13.1.3 Performed Procedure Step Information Module

**Table 72**

| Attribute Name | Tag | Req. Type N-CREATE | Attributes Description |
|---|---|---|---|
| Performed Procedure Step ID | (0040,0253) | 1 | Always set |
| Performed Station AE Title | (0040,0241) | 1 | Always set |
| Performed Station Name | (0040,0242) | 2 | Always set, Length=0 |
| Performed Location | (0040,0243) | 2 | Always set, Length=0 |
| Performed Procedure Step Start Date | (0040,0244) | 1 | Always set |
| Performed Procedure Step Time | (0040,0245) | 1 | Always set |
| Performed Procedure Step Status | (0040,0252) | 1 | Always set<br>(“IN PROGRESS”) |
| Performed Procedure Step Description | (0040,0254) | 2 | Always set, Length=0 |
| Performed Procedure Type Description | (0040,0255) | 2 | Always set |
| Procedure Code Sequence | (0008,1032) | 2 | Always set, Length=0 |
| Performed Procedure Step End Date | (0040,0250) | 2 | Always set |
| Performed Procedure Step End Time | (0040,0251) | 2 | Always set |

### 13.1.4 Image Acquisition Results Module

**Table 73**

| Attribute Name | Tag | Req. Type N-CREATE | Attributes Description |
|---|---|---|---|
| Modality | (0008,0060) | 1 | Always set ("XA"/"RF") |
| Study ID | (0020,0010) | 2 | Always set |
| Performed Action Item Code Sequence | (0040,0260) | 2 | Always set, Length=0 |
| Performed Series Sequence | (0008, 0340) | 2 | Always set |
| >Performing Physician's Name | (0008, 1050) | 2C | Length=0, when no entry is made |
| >Protocol Name | (0018, 1030) | 1C | Always set |
| >Operator's Name | (0008, 1070) | 2C | Length=0, when no entry is made |
| >Series Instance UID | (0020, 000E) | 1C | Always set |
| >Series Description | (0008, 103E) | 2C | Length=0, when no entry is made |
| >Retrieve AE Title | (0008, 0054) | 2C | Always set, Length=0 |
| >Referenced Image Sequence | (0008, 1140) | 2C | Always set |
| >>Referenced SOP Class UID | (0008, 1150) | 1C | Always set |
| >>Referenced SOP Instance UID | (0008, 1155) | 1C | Always set |
| >Referenced Standalone SOP instance Sequence | (0040, 0220) | 2C | Always set, length=0 |

## 13.2 N-SET Attributes

### 13.2.1 Performed Procedure Step Information Module

**Table 74**

| Attribute Name | Tag | Req. Type N-SET(*1) | Attributes Description |
|---|---|---|---|
| Performed Procedure Step Status | (0040,0252) | 3 | Always set ("COMPLETED" /"DISCONTINUED") |
| Performed Procedure Step Description | (0040,0254) | 3 | Always set, Length=0 |
| Performed Procedure Type Description | (0040,0255) | 3 | Always set |
| Performed Procedure Step End Date | (0040,0250) | 3 (1) | Always set |
| Performed Procedure Step End Time | (0040,0251) | 3 (1) | Always set |
| Procedure Code Sequence | (0008,1032) | 3 | Always set, Length=0 |

*1) Requirement Type Final State

### 13.2.2 Image Acquisition Results Module

**Table 75**

| Attribute Name | Tag | Req. Type N-SET(*1) | Attributes Description |
|---|---|---|---|
| Performed Action Item Code Sequence | (0040,0260) | 3 | Always set, Length=0 |
| Performed Series Sequence | (0008, 0340) | 3 (1) | Always set |
| >Performing Physician's Name | (0008, 1050) | 2C (2) | Length=0, when no entry is made |
| >Protocol Name | (0018, 1030) | 1C (1) | Always set |
| >Operator's Name | (0008, 1070) | 2C (2) | Length=0, when no entry is made |
| >Series Instance UID | (0020, 000E) | 1C (1) | Always set |
| >Series Description | (0008, 103E) | 2C (2) | Length=0, when no entry is made |
| >Retrieve AE Title | (0008, 0054) | 2C (2) | Always set, Length=0 |
| >Referenced Image Sequence | (0008, 1140) | 2C | Length=0, when no data is available |
| >>Referenced SOP Class UID | (0008, 1150) | 1C | Always set, when data is available |
| >>Referenced SOP Instance UID | (0008, 1155) | 1C | Always set, when data is available |
| >Referenced Standalone SOP instance Sequence | (0040, 0220) | 2C | Always set, length=0 |

*1) Requirement Type Final State

### 13.2.3 Radiation Dose Module

**Table 76**

| Description/Module | Tag | Return Key Type | Remark |
|---|---|---|---|
| Total Number of Exposures | (0040,0301) | 3 | Length=0, when no data is available |