DICOM Conformance Statement  
for FLEXAVISION HB/FD  
(SDR-100NW)
Overview:
This conformance statement details the compliance to the DICOM standard of Digital Radiography SDR-100NW embedded in the FLEXAVISION HB /FD system.
Table below provides an overview of the network services supported by the SDR-100NW.

<table>
<thead>
<tr>
<th>NETWORK SERVICES</th>
<th>SOP Classes</th>
<th>User of Services (SCU)</th>
<th>Provider of Services (SCP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>X-Ray Radiofluoroscopic Image Storage</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>X-Ray Radiation Dose SR Storage</td>
<td>Option (see Note 1)</td>
<td>No</td>
</tr>
<tr>
<td>Workflow Management</td>
<td>Modality Worklist Information Model – FIND</td>
<td>Option (see Note 1)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Modality Performed Procedure Step</td>
<td>Option (see Note 1)</td>
<td>No</td>
</tr>
<tr>
<td>Print Management</td>
<td>Basic Grayscale Print Management Meta</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Basic Film Session</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Basic Film Box</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Basic Grayscale Image Box</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Printer</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Print Job</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Verification</td>
<td>Verification</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Note 1. Support for these functions are separately licensable option each.

Table below provides an overview of the Media Storage Application Profiles supported by the SDR-100NW.

<table>
<thead>
<tr>
<th>MEDIA SERVICES</th>
<th>Media Storage Application Profile</th>
<th>Write Files (FSC or FSU)</th>
<th>Read Files (FSR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD</td>
<td>General Purpose CD-R</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
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1. INTRODUCTION

1.1. REVISION HISTORY

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Edition</td>
<td>2017/04</td>
<td>New Release</td>
</tr>
</tbody>
</table>

1.2. AUDIENCE

This document is written for the people that need to understand how the SDR-100NW will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product.

This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product’s functionality, and how that functionality integrates with other devices that support compatible DICOM features.

1.3. REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between the SDR-100NW and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.
1.4. TERMS AND DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

**Abstract Syntax** – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class.
Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

**Application Entity (AE)** – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

**Application Entity Title** – the externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

**Application Context** – the specification of the type of communication used between Application Entities. Example: DICOM network protocol.

**Association** – a network communication channel set up between Application Entities.

**Attribute** – a unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements.
Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

**Information Object Definition (IOD)** – the specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).
Examples: MR Image IOD, CT Image IOD, Print Job IOD.

**Module** – a set of Attributes within an Information Object Definition that are logically related to each other.
Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

**Negotiation** – first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

**Presentation Context** – the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

**Protocol Data Unit (PDU)** – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

**Service Class Provider (SCP)** – role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User).
Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
**Service Class User (SCU)** – role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

**Service/Object Pair (SOP) Class** – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

**Service/Object Pair (SOP) Instance** – an information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.

**Tag** – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

**Transfer Syntax** – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

**Unique Identifier (UID)** – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

**Value Representation (VR)** – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.
1.5. BASICS OF DICOM COMMUNICATION

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).

DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a DVD-R). Since there is no Association Negotiation possible, they both use a Media Application Profile that specifies “pre-negotiated” exchange media format, Abstract Syntax, and Transfer Syntax.
1.6. ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Application Entity</td>
</tr>
<tr>
<td>AET</td>
<td>Application Entity Title</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital Imaging and Communications in Medicine</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>HIS</td>
<td>Hospital Information System</td>
</tr>
<tr>
<td>IOD</td>
<td>Information Object Definition</td>
</tr>
<tr>
<td>IPv4</td>
<td>Internet Protocol version 4</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>LDAP</td>
<td>Lightweight Directory Access Protocol</td>
</tr>
<tr>
<td>LUT</td>
<td>Look-up Table</td>
</tr>
<tr>
<td>MPPS</td>
<td>Modality Performed Procedure Step</td>
</tr>
<tr>
<td>MWL</td>
<td>Modality Worklist</td>
</tr>
<tr>
<td>PACS</td>
<td>Picture Archiving and Communication System</td>
</tr>
<tr>
<td>PDU</td>
<td>Protocol Data Unit</td>
</tr>
<tr>
<td>RF</td>
<td>Radiofluoroscopy</td>
</tr>
<tr>
<td>RIS</td>
<td>Radiology Information System</td>
</tr>
<tr>
<td>SCP</td>
<td>Service Class Provider</td>
</tr>
<tr>
<td>SCU</td>
<td>Service Class User</td>
</tr>
<tr>
<td>SOP</td>
<td>Service-Object Pair</td>
</tr>
<tr>
<td>SPS</td>
<td>Scheduled Procedure Step</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol/Internet Protocol</td>
</tr>
<tr>
<td>UL</td>
<td>Upper Layer</td>
</tr>
<tr>
<td>VM</td>
<td>Value Multiplicity</td>
</tr>
<tr>
<td>VR</td>
<td>Value Representation</td>
</tr>
</tbody>
</table>

1.7. REFERENCES

2. NETWORKING

2.1. IMPLEMENTATION MODEL
2.1.1. Application Data Flow

Figure 2.1-1
APPLICATION DATA FLOW DIAGRAM
The Storage 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 radiography/study 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 next radiography is performed or a Patient/Study is closed by the user. The Storage Application Entity sends RDSR Object(s) to a remote AE as well.

The Workflow Application Entity receives Worklist information from and sends MPPS information to a remote AE. It is associated with the local real-world activities “Update Worklist” and “Open/Close Study”. When the “Update Worklist” local real-world activity is performed, the Workflow Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. The “Update Worklist” is performed as a result of an operator request or can be performed automatically at specific operation. When the “Open/Close Study” local real-world activity is performed, the Worklist Application Entity creates and updates Modality Performed Procedure Step instances managed by a remote AE. Opening Study will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator action.

The Hardcopy Application Entity prints images on a remote AE (Printer). It is associated with the real-world activity the “Film Images”. The “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 Verification Application Entity sends echo message to a remote AE. It is associated with the real world activity “ECHO” to verify the connectivity with remote AEs.
2.1.2. Functional Definitions of AE's

2.1.2.1. Functional Definition of Storage Application Entity

The existence of a send-job queue entry with one or more associated network destination AE(s) will activate the Storage AE. An association request is sent to one of the destination AE(s) 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 and can be restarted by the user via job control interface. By default, the Storage AE will not try to initiate another association for this send-job automatically.

2.1.2.2. Functional Definition of Workflow Application Entity

Worklist Update attempts to download a Worklist from a remote AE. If the Workflow AE establishes an Association to the 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 result will be displayed in a separate list, which can be cleared with the next Worklist Update based on the configuration.

The Workflow AE performs the creation of a MPPS Instance automatically whenever studies are started. Further updates on the MPPS data can be performed interactively from the related MPPS user interface. The MPPS “Completed” or “Discontinued” states can only be set from the user interface.

2.1.2.3. Functional Definition of Hardcopy Application Entity

The existence of a print-job in the print queue will activate the Hardcopy AE. An association is established with a 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.

2.1.2.4. Functional Definition of Verification Application Entity

Service personnel can check the connectivity with remote AEs by using this function. An association is established with the server, and C-ECHO message is sent to the server. If the server responds normally, the result is displayed on the service tool. If the server doesn’t respond normally, the result is displayed on the service tool so that service personnel can check the connectivity prior to use any other DICOM related functions.
2.1.3. Sequencing of Real-World Activities

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 2.1-2 apply:

1. Query Worklist
2. Receive Worklist of Modality Scheduled Procedure Steps (MSPS)
3. Select Workitem (MSPS) from Worklist
4. Start Study and create MPPS
5. Acquire Images
6. Complete Study (Finalize MPPS)
7. Print Acquired Images
8. Store Acquired Images
9. Store Created RDSR(s)
Other workflow situations (e.g. unscheduled procedure steps) will have other sequencing constraints. Printing could equally take place after the acquired images have been stored. Printing could be omitted completely if no printer is connected or hardcopies are not required.
2.2. AE SPECIFICATIONS
2.2.1. Storage Application Entity Specification

2.2.1.1. SOP Classes
The SDR-100NW provides Standard Conformance to the following SOP Classes:

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Ray</td>
<td>1.2.840.10008.5.1.4.1.1.12.2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Radiofluoroscopic Image Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-Ray</td>
<td>1.2.840.10008.5.1.4.1.1.88.67</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Radiation Dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2.1.2. Association Policies
2.2.1.2.1. General
The DICOM standard application context name for DICOM 3.0 is always proposed:

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

2.2.1.2.2. Number of Associations
The SDR-100NW 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>
<thead>
<tr>
<th>Maximum number of simultaneous Associations</th>
<th>1</th>
</tr>
</thead>
</table>
2.2.1.2.3. Asynchronous Nature
The SDR-100NW does not support asynchronous communication (multiple outstanding transactions over a single Association).

<table>
<thead>
<tr>
<th>Table 2.2-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASYNCHRONOUS NATURE AS A SCU FOR AE STORAGE</td>
</tr>
<tr>
<td>Maximum number of outstanding asynchronous transactions</td>
</tr>
</tbody>
</table>

2.2.1.2.4. Implementation Identifying Information
The implementation information for this Application Entity is:

<table>
<thead>
<tr>
<th>Table 2.2-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE</td>
</tr>
<tr>
<td>Implementation Class UID</td>
</tr>
<tr>
<td>Implementation Version Name</td>
</tr>
</tbody>
</table>

2.2.1.3. Association Initiation Policy
2.2.1.3.1. Activity – Send Images
2.2.1.3.1.1. Description and Sequencing of Activities
A user can select one or more images and requests them to be sent to multiple destinations. Each request is forwarded to the job queue and processed individually. When the “Auto-send” option SDR-100NW supports is active, each marked instance or marked set of instances stored in database will be forwarded to the network job queue for a pre-configured auto-send target destination. It can be configured which instances will be automatically marked and the destination where the instances are automatically sent to. The “Auto-send” is triggered by the next acquisition.

The Storage AE is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the instances marked for storage and the destination. An internal daemon process triggered by a job for a specific network destination initiates a C-STORE request to store images. If the process successfully establishes an Association to a remote Application Entity, it will transfer each marked instance one after another via the open Association. Status of the transfer is reported through the job control interface. Only one job will be active at a time. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request. If the job contains multiple images then multiple C-STORE requests will be issued over the same Association.
A possible sequence of interactions between the Storage AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Class as an SCP) is illustrated in Figure above:

1. The Storage 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 AE closes the association with the Image Manager.

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

The SDR-100NW is capable of proposing the Presentation Contexts shown in the following table:

**Table 2.2-6**

PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext. Neg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>UID</td>
<td>Name</td>
<td>UID</td>
</tr>
<tr>
<td>X-Ray Radio</td>
<td>1.2.840.10008.5.1</td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>Fluoroscopic Image Storage</td>
<td>.4.1.1.12.2</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td>X-Ray Radiation</td>
<td>1.2.840.10008.5.1</td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>Dose SR Storage</td>
<td>.4.1.1.88.67</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
</tbody>
</table>

Presentation Contexts for each Image Storage will only be proposed if the Send Job contains instances for these SOP Classes.
2.2.1.3.1.3. SOP Specific Conformance Image Storage SOP Classes

All Image Storage SOP Classes supported by the Storage AE exhibit the same behaviour, except where stated, and are described together in this section.

Table 2.2-7
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>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.</td>
</tr>
<tr>
<td>Refused</td>
<td>Out of Resources</td>
<td>A700-A7FF</td>
<td>The Association is released using A-RELEASE 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.</td>
</tr>
<tr>
<td>Error</td>
<td>Data Set does not match SOP Class</td>
<td>A900-A9FF</td>
<td>The Association is released using A-RELEASE 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.</td>
</tr>
<tr>
<td>Error</td>
<td>Cannot Understand</td>
<td>C000-CFFF</td>
<td>The Association is released using A-RELEASE 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.</td>
</tr>
<tr>
<td>Warning</td>
<td>Coercion of Data Elements</td>
<td>B000</td>
<td>Image transmission is considered successful but the status meaning is logged.</td>
</tr>
<tr>
<td>Warning</td>
<td>Elements Discarded</td>
<td>B006</td>
<td>Image transmission is considered successful but the status meaning is logged.</td>
</tr>
<tr>
<td>Warning</td>
<td>Data Set does not match SOP Class</td>
<td>B007</td>
<td>Image transmission is considered successful. The status meaning is logged and the job warning is reported to the user via the job control application.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE 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.</td>
</tr>
</tbody>
</table>
The behaviour of Storage AE during communication failure is summarized in the Table below:

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout</td>
<td>The Association is released using A-RELEASE and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.</td>
</tr>
<tr>
<td>Association aborted by the SCP or network layers</td>
<td>The send job is marked as failed The reason is logged and the job failure is reported to the user via the job control application.</td>
</tr>
</tbody>
</table>

A failed send job can be restarted by user interaction.

The contents of each Image Storage SOP Instances created by the SDR-100NW conform to the DICOM Image IOD definition and are described in Annex A of this document.
2.2.2. Workflow Application Entity Specification

2.2.2.1. SOP Classes

The SDR-100NW provides Standard Conformance to the following SOP Classes:

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality Worklist Information Model - FIND</td>
<td>1.2.840.10008.5.1.4.31</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Modality Performed Procedure Step</td>
<td>1.2.840.10008.3.1.2.3.3</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

2.2.2.2. Association Policies

2.2.2.2.1. General

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

| Application Context Name | 1.2.840.10008.3.1.1.1 |

2.2.2.2.2. Number of Associations

The SDR-100NW initiates one Association at a time for Worklist request.

| Maximum number of simultaneous Associations | 1 |

2.2.2.2.3. Asynchronous Nature

The SDR-100NW does not support asynchronous communication (multiple outstanding transactions over a single Association).

| Maximum number of outstanding asynchronous transactions | 1 |
2.2.2.2.4. Implementation Identifying Information
The implementation information for this Application Entity is:

Table 2.2-13
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE WORKFLOW

<table>
<thead>
<tr>
<th>Implementation Class UID</th>
<th>1.2.392.200036.9110.1.0.6711.2001002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Version Name</td>
<td>SPF XX (XX : version number)</td>
</tr>
</tbody>
</table>

2.2.2.3. Association Initiation Policy

2.2.2.3.1. Activity – Worklist Update

2.2.2.3.1.1. Description and Sequencing of Activities
The request for a Worklist Update is initiated by user interaction, i.e. pressing the buttons “Update” / “Query” or automatically triggered by specific operation. With “Update” the automated query mechanism is performed immediately on request, while with “Query” a dialog to enter search criteria is opened an interactive query can be performed.

The interactive Patient Worklist Query will display a dialog for entering data as search criteria. When the Query is started on user request, only the data from the dialog will be inserted as matching keys into the query.

Upon initiation of the request, the SDR-100NW 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 SDR-100NW will access the local database to add or update patient demographic data. To protect the system from overflow, the SDR-100NW will limit the number of processed worklist responses to a configurable maximum. During receiving the worklist response items are counted and the query processing is canceled by issuing a C-FIND-CANCEL if the configurable limit of items is reached.

The SDR-100NW will initiate an Association in order to issue a C-FIND request according to the Modality Worklist Information Model.
A possible sequence of interactions between the Workflow AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in Figure above:

1. The Worklist AE opens an association with the Department Scheduler.
2. The Worklist 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 Department 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 Worklist AE closes the association with the Department Scheduler.
7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.
2.2.2.3.1.2. Proposed Presentation Contexts
The SDR-100NW will propose Presentation Contexts as shown in the following table:

Table 2.2-14
PROPOSED PRESENTATION CONTEXTS FOR WORKLIST UPDATE

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext. Neg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>UID</td>
<td>Name</td>
<td>UID</td>
<td></td>
</tr>
<tr>
<td>Modality Worklist</td>
<td></td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCU</td>
</tr>
<tr>
<td>Information Model – FIND</td>
<td>1.2.840.10008.5.1</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCU</td>
</tr>
<tr>
<td></td>
<td>.4.31</td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td>SCU</td>
</tr>
</tbody>
</table>

2.2.2.3.1.3. SOP Specific Conformance for Modality Worklist
The behavior of the SDR-100NW when encountering status codes in a Modality Worklist C-FIND response is summarized in the Table below. If any other SCP response status than “Success” or “Pending” is received by the SDR-100NW, an error message will appear on the user interface.

Table 2.2-15
MODALITY WORKLIST C-FIND RESPONSE STATUS HANDLING BEHAVIOR

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Matching is complete</td>
<td>0000</td>
<td>The SCP has completed the matches. Worklist items are available for display or further processing.</td>
</tr>
<tr>
<td>Refused</td>
<td>Out of Resources</td>
<td>A700</td>
<td>The Association is released using A-RELEASE and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.</td>
</tr>
<tr>
<td>Failed</td>
<td>Identifier does not match SOP Class</td>
<td>A900</td>
<td>The Association is released using A-RELEASE and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.</td>
</tr>
<tr>
<td>Failed</td>
<td>Unable to Process</td>
<td>C000-CFFF</td>
<td>The Association is released using A-RELEASE and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.</td>
</tr>
<tr>
<td>Service Status</td>
<td>Further Meaning</td>
<td>Error Code</td>
<td>Behavior</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>Cancel</td>
<td>Matching terminated due to Cancel request</td>
<td>FE00</td>
<td>If the query was cancelled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is released using A-RELEASE and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.</td>
</tr>
<tr>
<td>Pending</td>
<td>Matches are continuing</td>
<td>FF00</td>
<td>The worklist item contained in the Identifier is collected for later display or further processing.</td>
</tr>
<tr>
<td>Pending</td>
<td>Matches are continuing – Warning that one or more Optional Keys were not supported</td>
<td>FF01</td>
<td>The worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the worklist is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.</td>
</tr>
</tbody>
</table>

The behaviour of the SDR-100NW during communication failure is summarized in the Table below.

### Table 2.2-16
MODALITY WORKLIST COMMUNICATION FAILURE BEHAVIOR

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout</td>
<td>The Association is released using A-RELEASE and the worklist query is marked as failed. The reason is logged and reported to the user if an interactive query.</td>
</tr>
<tr>
<td>Association aborted by the SCP or network layers</td>
<td>The worklist query is marked as failed. The reason is logged and reported to the user if an interactive query.</td>
</tr>
</tbody>
</table>

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 SDR-100NW Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored.

**Table 2.2-17**

<table>
<thead>
<tr>
<th>WORKLIST REQUEST IDENTIFIER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module Name</strong></td>
</tr>
<tr>
<td>Scheduled Procedure Step</td>
</tr>
<tr>
<td>&gt; Modality</td>
</tr>
<tr>
<td>&gt; Scheduled Station AE Title</td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step Start Date</td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step Start Time</td>
</tr>
<tr>
<td>&gt; Scheduled Performing Physician's Name</td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step Description</td>
</tr>
<tr>
<td>&gt; Scheduled Protocol Code Sequence</td>
</tr>
<tr>
<td>&gt; Code Value</td>
</tr>
<tr>
<td>&gt; Coding Scheme Designator</td>
</tr>
<tr>
<td>&gt; Coding Scheme Version</td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step ID</td>
</tr>
<tr>
<td>&gt; Scheduled Station Name</td>
</tr>
<tr>
<td>Requested Procedure</td>
</tr>
<tr>
<td>&gt; Referenced SOP Class UID</td>
</tr>
<tr>
<td>&gt; Referenced SOP Instance UID</td>
</tr>
<tr>
<td>Study Instance UID</td>
</tr>
<tr>
<td>Requested Procedure Description</td>
</tr>
<tr>
<td>&gt; Code Value</td>
</tr>
<tr>
<td>&gt; Coding Scheme Designator</td>
</tr>
<tr>
<td>&gt; Coding Scheme Version</td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
</tr>
<tr>
<td>Requested Procedure ID</td>
</tr>
<tr>
<td>Imaging Service Request</td>
</tr>
<tr>
<td>Accession Number</td>
</tr>
<tr>
<td>Module Name</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Requesting Physician</td>
</tr>
<tr>
<td>Patient Identification</td>
</tr>
<tr>
<td>Patient Name</td>
</tr>
<tr>
<td>Patient ID</td>
</tr>
<tr>
<td>Patient Demographic</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
</tr>
<tr>
<td>Patient's Sex</td>
</tr>
<tr>
<td>Patient's Age</td>
</tr>
<tr>
<td>Patient's Size</td>
</tr>
<tr>
<td>Patient’s Weight</td>
</tr>
<tr>
<td>Patient Medical</td>
</tr>
<tr>
<td>Medical Alerts</td>
</tr>
<tr>
<td>Special Needs</td>
</tr>
</tbody>
</table>

Note: Specific Character Set(0008,0005) is included in the identifier with the value based on SDR-100NW configuration. (See Section 4.4)

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 an SDR-100NW Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching keys for Worklist Update. A “S” will indicate that the SDR-100NW will supply an attribute value for Single Value Matching, a “Sq” will indicate Sequence Matching a “R” will indicate Range Matching and a “*” will denote wildcard matching.
R: Return keys. An “x” will indicate that the SDR-100NW will supply this attribute as Return Key with zero length for Universal Matching.
Q: Interactive Query Key. An “x” will indicate that the SDR-100NW will supply this attribute as matching key, if entered in the Query Patient Worklist dialog. For example, the Patient Name can be entered thereby restricting Worklist responses to Procedure Steps scheduled for the patient.
D: Displayed keys. An “x” indicates that this worklist attribute is displayed to the user during a patient registration dialog. 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.
2.2.2.3.2. Activity – Acquire Images

2.2.2.3.2.1. Description and Sequencing of Activities

After Patient registration, the SDR-100NW is awaiting starting study of the patient. The trigger to create a MPPS SOP Instance is derived from this event. An Association to the configured MPPS SCP system is established immediately and the related MPPS SOP Instance will be created.

The SDR-100NW will set its status as “DISCONTINUED” when closing the study without any X-Ray exposure during the study. Otherwise, the status will be set as “COMPLETED”. A MPPS Instance that has been sent with a state of “COMPLETED” or “DISCONTINUED” can no longer be updated.

The SDR-100NW will support creation of “unscheduled cases” by allowing MPPS Instances to be communicated for locally registered Patients.

The SDR-100NW will initiate an Association to issue an:

- N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation.
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.
A possible sequence of interactions between the Workflow 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 Figure above:

1. The Worklist AE opens an association with the Department Scheduler.
2. The Worklist 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 Worklist AE closes the association with the Department Scheduler.
4. All images are acquired and stored in the local database.
5. The Worklist AE opens an association with the Department Scheduler.
6. The Worklist 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 an N-SET response (status success).
7. The Worklist AE closes the association with the Department Scheduler.
2.2.2.3.2.2. Proposed Presentation Contexts
The SDR-100NW will propose Presentation Contexts as shown in the following table:

Table 2.2-18
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY ACQUIRE IMAGES

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Modality Performed Procedure Step</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>SCU</td>
</tr>
</tbody>
</table>

2.2.2.3.2.3. SOP Specific Conformance for MPPS
The behavior of the SDR-100NW when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in the Table below. If any other SCP response status than “Success” or “Warning” is received by the SDR-100NW, an error message will appear on the user interface.

Table 2.2-19
MPPS N-CREATE / N-SET RESPONSE STATUS HANDLING BEHAVIOR

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully.</td>
</tr>
<tr>
<td>Failed</td>
<td>Processing Failure – Performed Procedure Step</td>
<td>0110</td>
<td>The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user. Additional information in the Response will be logged.</td>
</tr>
<tr>
<td>Warning</td>
<td>Attribute Value Out of Range</td>
<td>0116</td>
<td>The MPPS operation is considered successful but the status meaning is logged. Additional information in the Response identifying the attributes out of range will be logged.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>
The behaviour of the SDR-100NW during communication failure is summarized in the Table below.

### Table 2.2-20
**MODALITY WORKLIST COMMUNICATION FAILURE BEHAVIOR**

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout</td>
<td>The Association is released using A-RELEASE and the MPPS is marked as failed. The reason is logged and reported to the user.</td>
</tr>
<tr>
<td>Association aborted by the SCP or network layers</td>
<td>The MPPS is marked as failed. The reason is logged and reported to the user.</td>
</tr>
</tbody>
</table>

The following Table provides a description of the MPPS N-CREATE and N-SET request identifiers sent by the SDR-100NW. 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 2.2-21
**MPPS N-CREATE / N-SET REQUEST IDENTIFIER**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>N-CREATE</th>
<th>N-SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Character Set</td>
<td>(0008,0005)</td>
<td>CS</td>
<td>In Japanese Mode: “ISO 2022 IR 87\ISO 2022 IR 159” or “ISO 2022 IR 87”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In English Mode: “ISO_IR 100”</td>
<td></td>
</tr>
<tr>
<td>Modality</td>
<td>(0008,0060)</td>
<td>CS</td>
<td>“RF”</td>
<td></td>
</tr>
<tr>
<td>Procedure Code Sequence</td>
<td>(0008,1032)</td>
<td>SQ</td>
<td>From Modality Worklist Zero or more Item included.</td>
<td></td>
</tr>
<tr>
<td>&gt; Code Value</td>
<td>(0008,0100)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Coding Scheme Designator</td>
<td>(0008,0102)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Coding Scheme Version</td>
<td>(0008,0103)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
<td>(0008,0104)</td>
<td>LO</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>Referenced Patient Sequence</td>
<td>(0008,1120)</td>
<td>SQ</td>
<td>Zero item</td>
<td></td>
</tr>
<tr>
<td>Patient’s Name</td>
<td>(0010,0010)</td>
<td>PN</td>
<td>From Modality Worklist or user input (3 component groups with 5 components)</td>
<td></td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>VR</td>
<td>N-CREATE</td>
<td>N-SET</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----------------------</td>
<td>----</td>
<td>-----------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td>LO</td>
<td>From Modality Worklist or user input</td>
<td></td>
</tr>
<tr>
<td>Patient’s Birth Date</td>
<td>(0010,0030)</td>
<td>DA</td>
<td>From Modality Worklist or user input</td>
<td></td>
</tr>
<tr>
<td>Patient’s Sex</td>
<td>(0010,0040)</td>
<td>CS</td>
<td>From Modality Worklist or user input</td>
<td></td>
</tr>
<tr>
<td>Distance Source to Detector (SID)</td>
<td>(0018,1110)</td>
<td>DS</td>
<td>Actual value</td>
<td>Actual value</td>
</tr>
<tr>
<td>Image and Fluoroscopy Area Dose Product</td>
<td>(0018,115E)</td>
<td>DS</td>
<td>Zero length</td>
<td>Total DAP</td>
</tr>
<tr>
<td>Study ID</td>
<td>(0020,0010)</td>
<td>SH</td>
<td>Auto input</td>
<td></td>
</tr>
<tr>
<td>Performed Station AE Title</td>
<td>(0040,0241)</td>
<td>AE</td>
<td>MPPS AE Title from configuration</td>
<td></td>
</tr>
<tr>
<td>Performed Station Name</td>
<td>(0040,0242)</td>
<td>SH</td>
<td>From configuration</td>
<td></td>
</tr>
<tr>
<td>Performed Location</td>
<td>(0040,0243)</td>
<td>SH</td>
<td>From configuration</td>
<td></td>
</tr>
<tr>
<td>Performed Procedure Step Start Date</td>
<td>(0040,0244)</td>
<td>DA</td>
<td>Actual start date</td>
<td></td>
</tr>
<tr>
<td>Performed Procedure Step Start Time</td>
<td>(0040,0245)</td>
<td>TM</td>
<td>Actual start time</td>
<td></td>
</tr>
<tr>
<td>Performed Procedure Step End Date</td>
<td>(0040,0250)</td>
<td>DA</td>
<td>Zero length</td>
<td>Actual end date</td>
</tr>
<tr>
<td>Performed Procedure Step End Time</td>
<td>(0040,0251)</td>
<td>TM</td>
<td>Zero length</td>
<td>Actual end time</td>
</tr>
<tr>
<td>Performed Procedure Step Status</td>
<td>(0040,0252)</td>
<td>CS</td>
<td>“IN PROGRESS”</td>
<td>“COMPLETED” or “DISCONTINUED”</td>
</tr>
<tr>
<td>Performed Procedure Step ID</td>
<td>(0040,0253)</td>
<td>SH</td>
<td>From Modality Worklist or configuration</td>
<td></td>
</tr>
<tr>
<td>Performed Procedure Step Description</td>
<td>(0040,0254)</td>
<td>LO</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>Performed Procedure Type Description</td>
<td>(0040,0255)</td>
<td>LO</td>
<td>Zero length</td>
<td></td>
</tr>
<tr>
<td>Performed Protocol Code Sequence</td>
<td>(0040,0260)</td>
<td>SQ</td>
<td>Zero item</td>
<td>Zero or more items</td>
</tr>
<tr>
<td>&gt; Code Value</td>
<td>(0008,0100)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Coding Scheme Designator</td>
<td>(0008,0102)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>VR</td>
<td>N-CREATE</td>
<td>N-SET</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------</td>
<td>-----</td>
<td>----------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>&gt; Coding Scheme Version</td>
<td>(0008,0103)</td>
<td>SH</td>
<td></td>
<td>From Modality Worklist</td>
</tr>
<tr>
<td>&gt; Code Meaning</td>
<td>(0008,0104)</td>
<td>LO</td>
<td></td>
<td>From Modality Worklist</td>
</tr>
<tr>
<td>Scheduled Step Attributes</td>
<td>(0040,0270)</td>
<td>SQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Accession Number</td>
<td>(0008,0050)</td>
<td>SH</td>
<td>From Modality Worklist or user input</td>
<td></td>
</tr>
<tr>
<td>&gt; Referenced Study Sequence</td>
<td>(0008,1110)</td>
<td>SQ</td>
<td>Zero item</td>
<td></td>
</tr>
<tr>
<td>&gt; Study Instance UID</td>
<td>(0020,000D)</td>
<td>UI</td>
<td>From Modality Worklist or generated by device</td>
<td></td>
</tr>
<tr>
<td>&gt; Requested Procedure</td>
<td>(0032,1060)</td>
<td>LO</td>
<td></td>
<td>From Modality Worklist</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step</td>
<td>(0040,0007)</td>
<td>LO</td>
<td></td>
<td>From Modality Worklist</td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Scheduled Protocol Code</td>
<td>(0040,0008)</td>
<td>SQ</td>
<td></td>
<td>From Modality Worklist</td>
</tr>
<tr>
<td>Sequence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Code Value</td>
<td>(0008,0100)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Coding Scheme Designator</td>
<td>(0008,0102)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Coding Scheme Version</td>
<td>(0008,0103)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Code Meaning</td>
<td>(0008,0104)</td>
<td>LO</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Requested Procedure Step ID</td>
<td>(0040,0009)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>&gt; Scheduled Procedure Step ID</td>
<td>(0040,1001)</td>
<td>SH</td>
<td>From Modality Worklist</td>
<td></td>
</tr>
<tr>
<td>Total Time of Fluoroscopy</td>
<td>(0040,0300)</td>
<td>US</td>
<td>Zero length</td>
<td>Total Time of Fluoroscopy</td>
</tr>
<tr>
<td>Total Number of Exposures</td>
<td>(0040,0301)</td>
<td>US</td>
<td>Zero length</td>
<td>Number of exposures. Number of Fluoroscopy is not included.</td>
</tr>
<tr>
<td>Entrance Dose</td>
<td>(0040,0302)</td>
<td>US</td>
<td>Zero length</td>
<td>Total Entrance Dose (Air Kerma)</td>
</tr>
<tr>
<td>Distance Source to Entrance</td>
<td>(0040,0306)</td>
<td>DS</td>
<td>Zero length</td>
<td>Actual SOD</td>
</tr>
<tr>
<td>Exposure Dose Sequence</td>
<td>(0040,030E)</td>
<td>SQ</td>
<td>Zero item</td>
<td>Contain Total Number of Exposure (0040, 0301) items plus an item for the last fluoroscopy episode in that study.</td>
</tr>
<tr>
<td>&gt; KVP</td>
<td>(0018,0060)</td>
<td>DS</td>
<td>Actual KV</td>
<td></td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>VR</td>
<td>N-CREATE</td>
<td>N-SET</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>----------------------------</td>
<td>----</td>
<td>----------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>&gt; Exposure Time</td>
<td>(0018,1150)</td>
<td>IS</td>
<td>Actual Exposure Time</td>
<td></td>
</tr>
<tr>
<td>&gt; Radiation Mode</td>
<td>(0018,115A)</td>
<td>CS</td>
<td>In case of Radiography mode:</td>
<td>“PULSED”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In case of Fluoroscopy mode:</td>
<td>“CONTINUOUS”</td>
</tr>
<tr>
<td>&gt; X-Ray Tube Current in µA</td>
<td>(0018,8151)</td>
<td>DS</td>
<td>Actual X-Ray Tube Current in µA</td>
<td></td>
</tr>
<tr>
<td>&gt; Filter Type</td>
<td>(0018,1160)</td>
<td>CS</td>
<td>Zero length</td>
<td></td>
</tr>
<tr>
<td>&gt; Filter Material</td>
<td>(0018,7050)</td>
<td>CS</td>
<td>Zero length</td>
<td></td>
</tr>
<tr>
<td>&gt; Exposure Time in µS</td>
<td>(0018,8150)</td>
<td>DS</td>
<td>Actual Exposure Time in µS</td>
<td></td>
</tr>
<tr>
<td>Film Consumption Sequence</td>
<td>(0040,0321)</td>
<td>SQ</td>
<td>Zero item</td>
<td>Only one item</td>
</tr>
<tr>
<td>&gt; Film Size ID</td>
<td>(2010,0050)</td>
<td>CS</td>
<td>Size(s) of film on which images were printed</td>
<td></td>
</tr>
<tr>
<td>&gt; Number of Films</td>
<td>(2100,0170)</td>
<td>IS</td>
<td>Number of films actually printed</td>
<td></td>
</tr>
<tr>
<td>Performed Series Sequence</td>
<td>(0040,0340)</td>
<td>SQ</td>
<td>Zero item</td>
<td>Only one item</td>
</tr>
<tr>
<td>&gt; Retrieve AE Title</td>
<td>(0008,0054)</td>
<td>AE</td>
<td>Zero length</td>
<td>Zero length</td>
</tr>
<tr>
<td>&gt; Series Description</td>
<td>(0008,103E)</td>
<td>LO</td>
<td>Procedure Name and its Description selected when the study is closed</td>
<td>(0008,1050)</td>
</tr>
<tr>
<td>&gt; Performing Physician’s Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Operator’s Name</td>
<td>(0008,1070)</td>
<td>PN</td>
<td>Operator’s Name</td>
<td></td>
</tr>
<tr>
<td>&gt; Referenced Image Sequence</td>
<td>(0008,1140)</td>
<td>SQ</td>
<td>Zero length</td>
<td>Zero or more items</td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Class UID</td>
<td>(0008,1150)</td>
<td>UI</td>
<td>SOP Class UID of referenced image</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
<td>UI</td>
<td>SOP Instance UID of referenced image</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt; Protocol Name</td>
<td>(0018,1030)</td>
<td>LO</td>
<td>Name and Description of the selected Protocol</td>
<td>Name and Description of the selected Protocol</td>
</tr>
<tr>
<td>&gt; Series Instance UID</td>
<td>(0020,000E)</td>
<td>UI</td>
<td>UID generated by the device</td>
<td>Same UID generated at N-CREATE transaction</td>
</tr>
<tr>
<td>&gt; Referenced Non-Image Composite SOP Instance Sequence</td>
<td>(0040,0220)</td>
<td>SQ</td>
<td>Zero item</td>
<td>Zero or one Item. In case of RDSR disable, this sequence item is not generated</td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Class UID</td>
<td>(0008,1150)</td>
<td>UI</td>
<td>“1.2.840.10008.5.1.4.1.1.88.67”</td>
<td></td>
</tr>
<tr>
<td>Attribute Name</td>
<td>Tag</td>
<td>VR</td>
<td>N-CREATE</td>
<td>N-SET</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------</td>
<td>----</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>&gt;&gt; Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
<td>UI</td>
<td>SOP Instance UID of referenced RDSR</td>
<td></td>
</tr>
<tr>
<td>Entrance Dose in mGy</td>
<td>(0040,8302)</td>
<td>DS</td>
<td>Total Entrance Dose (Air Kerma) in mGy</td>
<td></td>
</tr>
</tbody>
</table>

### 2.2.2.4. Association Acceptance Policy

The Workflow Application Entity does not accept Associations.
2.2.3. Hardcopy Application Entity Specification

2.2.3.1. SOP Classes

The SDR-100NW provides Standard Conformance to the following SOP Classes:

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Grayscale Print Management Meta</td>
<td>1.2.840.10008.5.1.1.9</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Basic Film Session</td>
<td>1.2.840.10008.5.1.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Basic Film Box</td>
<td>1.2.840.10008.5.1.1.2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Basic Grayscale Image Box</td>
<td>1.2.840.10008.5.1.1.4</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Printer</td>
<td>1.2.840.10008.5.1.1.16</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Print Job</td>
<td>1.2.840.10008.5.1.1.14</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

2.2.3.2. Association Policies

2.2.3.2.1. General

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

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

2.2.3.2.2. Number of Associations

The SDR-100NW initiates one Association at a time for each configured hardcopy device. Multiple hardcopy devices can be configured.

<table>
<thead>
<tr>
<th>Maximum number of simultaneous Associations</th>
<th>1</th>
</tr>
</thead>
</table>
2.2.3.2.3. Asynchronous Nature
The SDR-100NW does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-25
ASYNCHRONOUS NATURE AS A SCU FOR AE HARDCOPY

| Maximum number of outstanding asynchronous transactions | 1 |

2.2.3.2.4. Implementation Identifying Information
The implementation information for this Application Entity is:

Table 2.2-26
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE HARDCOPY

| Implementation Class UID | 1.2.392.200036.9110.1.0.6711.2001002 |
| Implementation Version Name | SPF XX (XX : version number) |

2.2.3.3. Association Initiation Policy
2.2.3.3.1. Activity – Film Images
2.2.3.3.1.1. Description and Sequencing of Activities
A user can compose 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.

The Hardcopy AE is invoked by the job control interface that is responsible for processing network tasks. The job consists of data describing the images and graphics to be printed as well as the requested layout and other parameters. Each image on the sheet is sent to the specified device and will be set in the same sheet there. If no association to the printer can be established, the print-job is switched to a failed state and the user informed.
A typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer is illustrated in Figure above:

1. Hardcopy AE opens an association with the Printer
2. N-CREATE on the Film Session SOP Class creates a Film Session.
3. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session.
4. N-SET on the Image Box SOP Class transfers image of the film sheet to the printer.
5. N-SET on the Image Box SOP Class transfers another image 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). The printer can send this message at any time. Hardcopy AE does not require the N-EVENT-REPORT to be sent. Hardcopy AE is capable of receiving an N-EVENT-REPORT
notification at any time during an association. If the Printer reports a status of FAILURE, the print-job is switched to a failed status and the user informed.

9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.

10. Hardcopy AE closes the association with the Printer.

Status of the print-job is reported through the job control interface. Only one job will be active at a time for each separate hardcopy device. If any Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related job is switched to a failed state. It can be restarted any time by user interaction.

2.2.3.3.1.2. Proposed Presentation Contexts

The SDR-100NW is capable of proposing the Presentation Contexts shown in the following table:

Table 2.2-27

<table>
<thead>
<tr>
<th>PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY FILM IMAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presentation Context Table</strong></td>
</tr>
<tr>
<td>Abstract Syntax</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Basic Grayscale Print Management (META)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Print Job</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
2.2.3.3.1.3. Common SOP Specific Conformance for all Print SOP Classes

The general behavior of Hardcopy AE during communication failure is summarized in the Table below. This behavior is common for all SOP Classes supported by Hardcopy AE.

Table 2.2-28
HARDCOPY COMMUNICATION FAILURE BEHAVIOR

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.</td>
</tr>
<tr>
<td>Association aborted by the SCP or network layers</td>
<td>The print-job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.</td>
</tr>
</tbody>
</table>

2.2.3.3.1.4. SOP Specific Conformance for the Printer SOP Class

Hardcopy AE supports the following DIMSE notifications for the Printer SOP Class:

- N-EVENT-REPORT

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

2.2.3.3.1.4.1. Printer SOP Class Operation (N-EVENT-REPORT)

Hardcopy AE is capable of receiving an N-EVENT-REPORT request at any time during an association.

The behavior of Hardcopy AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below:

Table 2.2-29
PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOUR

<table>
<thead>
<tr>
<th>Event Type Name</th>
<th>Event Type ID</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>1</td>
<td>The print-job continues to be printed.</td>
</tr>
<tr>
<td>Warning</td>
<td>2</td>
<td>The print-job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.</td>
</tr>
<tr>
<td>Failure</td>
<td>3</td>
<td>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.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>An invalid Event Type ID will cause a status code of 0113H to be returned in a N-EVENT-REPORT response.</td>
</tr>
</tbody>
</table>
The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below:

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The notification event has been successfully received.</td>
</tr>
<tr>
<td>Failure</td>
<td>No Such Event Type</td>
<td>0113</td>
<td>An invalid Event Type ID was supplied in the N-EVENT-REPORT request.</td>
</tr>
<tr>
<td>Failure</td>
<td>Processing Failure</td>
<td>0110</td>
<td>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).</td>
</tr>
</tbody>
</table>

### 2.2.3.3.1.5. SOP Specific Conformance for the Film Session SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Session SOP Class:

- N-CREATE
- N-DELETE

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

#### 2.2.3.3.1.5.1. Film Session SOP Class Operation (N-CREATE)

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

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Copies</td>
<td>(2000,0010)</td>
<td>IS</td>
<td>1 ..</td>
<td>ALWAYS</td>
<td>USER</td>
</tr>
<tr>
<td>Print Priority</td>
<td>(2000,0020)</td>
<td>CS</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Medium Type</td>
<td>(2000,0030)</td>
<td>CS</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Film Destination</td>
<td>(2000,0040)</td>
<td>CS</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
The behavior of Hardcopy AE when encountering status codes in a N-CREATE response is summarized in the Table below:

### Table 2.2-32
**FILM SESSION SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>

#### 2.2.3.3.1.5.2. Film Session SOP Class Operation (N-DELETE)

The behavior of Hardcopy AE when encountering status codes in a N-DELETE response is summarized in the Table below:

### Table 2.2-33
**FILM SESSION SOP CLASS N-DELETE RESPONSE STATUS HANDLING BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>
2.2.3.3.1.6. SOP Specific Conformance for the Film Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Box SOP Class:

- N-CREATE
- N-ACTION

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

2.2.3.3.1.6.1. Film Box SOP Class Operation (N-CREATE)

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

Table 2.2-34
FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Display Format</td>
<td>(2010,0010)</td>
<td>ST</td>
<td>From user input</td>
<td>ALWAYS</td>
<td>USER</td>
</tr>
<tr>
<td>Film Orientation</td>
<td>(2010,0040)</td>
<td>CS</td>
<td>From user input</td>
<td>ALWAYS</td>
<td>USER</td>
</tr>
<tr>
<td>Film Size ID</td>
<td>(2010,0050)</td>
<td>CS</td>
<td>From user input</td>
<td>ALWAYS</td>
<td>USER</td>
</tr>
<tr>
<td>Magnification Type</td>
<td>(2010,0060)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Smoothing Type</td>
<td>(2010,0080)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Border Density</td>
<td>(2010,0100)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Empty Image Density</td>
<td>(2010,0110)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Trim</td>
<td>(2010,0140)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Configuration Information</td>
<td>(2010,0150)</td>
<td>CS</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Referenced Film Session Sequence</td>
<td>(2010,0500)</td>
<td>SQ</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Referenced SOP Class UID</td>
<td>(0008,1150)</td>
<td>UI</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Referenced SOP Instance UID</td>
<td>(0008,1155)</td>
<td>UI</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
The behavior of Hardcopy AE when encountering status codes in a N-CREATE response is summarized in the Table below:

### Table 2.2-35
**FILM BOX SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>

2.2.3.3.1.6.2. Film Box SOP Class Operation (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 Hardcopy AE when encountering status codes in a N-ACTION response is summarized in the Table below:

### Table 2.2-36
**FILM BOX SOP CLASS N-ACTION RESPONSE STATUS HANDLING BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully. The film has been accepted for printing.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>
2.2.3.3.1.7. SOP Specific Conformance for the Image Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Image Box SOP Class:

- N-SET

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

2.2.3.3.1.7.1. Image Box SOP Class Operation (N-SET)

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

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Box Position</td>
<td>(2020,0010)</td>
<td>US</td>
<td>Depends on image position</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Basic Grayscale Image Sequence</td>
<td>(2020,0110)</td>
<td>SQ</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Samples Per Pixel</td>
<td>(0028,0002)</td>
<td>US</td>
<td>“1”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Photometric Interpretation</td>
<td>(0028,0004)</td>
<td>CS</td>
<td>“MONOCHROME2”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Rows</td>
<td>(0028,0010)</td>
<td>US</td>
<td>Depends on image size</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Columns</td>
<td>(0028,0011)</td>
<td>US</td>
<td>Depends on image size</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Bits Allocated</td>
<td>(0028,0100)</td>
<td>US</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Bits Stored</td>
<td>(0028,0101)</td>
<td>US</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;High Bit</td>
<td>(0028,0102)</td>
<td>US</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Pixel Representation</td>
<td>(0028,0103)</td>
<td>US</td>
<td>“0”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Pixel Data</td>
<td>(7FE0,0010)</td>
<td>OW</td>
<td>Pixels of rendered image</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
The behavior of Hardcopy AE when encountering status codes in a N-SET response is summarized in the Table below:

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has completed the operation successfully. Image successfully stored in Image Box.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code.</td>
<td>The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.</td>
</tr>
</tbody>
</table>
2.2.4. Verification Application Entity Specification

2.2.4.1. SOP Classes
The SDR-100NW provides Standard Conformance to the following SOP Classes:

Table 2.2-39
SOP CLASSES FOR AE VERIFICATION

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification</td>
<td>1.2.840.10008.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

2.2.4.2. Association Policies

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

Table 2.2-40
DICOM APPLICATION CONTEXT FOR AE STORAGE

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

2.2.4.2.2. Number of Associations
The SDR-100NW 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 2.2-41
NUMBER OF ASSOCIATIONS INITIATED FOR AE STORAGE

<table>
<thead>
<tr>
<th>Maximum number of simultaneous Associations</th>
<th>1</th>
</tr>
</thead>
</table>
2.2.4.2.3. Asynchronous Nature
The SDR-100NW does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-42
ASYNCHRONOUS NATURE AS A SCU FOR AE STORAGE

| Maximum number of outstanding asynchronous transactions | 1 |

2.2.4.2.4. Implementation Identifying Information
The implementation information for this Application Entity is:

Table 2.2-43
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE

| Implementation Class UID | 1.2.392.200036.9110.1.0.6711.2001002 |
| Implementation Version Name | SPF XX (XX : version number) |

2.2.4.3. Association Initiation Policy
2.2.4.3.1. Activity – Verification
2.2.4.3.1.1. Description and Sequencing of Activities
Service personnel can select servers in the maintenance tool to check the connectivity.

The verification AE is invoked by activating [ECHO] by the service personnel. It will send verification message to the selected server and display its verification result notified by the server.

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

1. The Verification AE opens an association with the Remote AE.
3. The Verification AE closes the association with the Remote AE.

Figure 2.2-5 SEQUENCE OF ACTIVITY – VERIFICATION
### 2.2.4.3.1.2. Proposed Presentation Contexts

The SDR-100NW is capable of proposing the Presentation Contexts shown in the following table:

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext. Neg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>UID</td>
<td>Name</td>
<td>UID</td>
</tr>
<tr>
<td>Verification</td>
<td>1.2.840.10008.1.1</td>
<td>Implicit VR LittleEndian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR LittleEndian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
</tbody>
</table>

### 2.2.4.3.1.3. SOP Specific Conformance Verification SOP Classes

The SDR-100NW provides standard conformance to the DICOM Verification Service Class as as SCU. The status code for the C-ECHO is as follows;

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has successfully responded the C-ECHO.</td>
</tr>
</tbody>
</table>

The behaviour of Verification AE during communication failure is summarized in the Table below:

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout</td>
<td>The Association is released using A-RELEASE. The reason is logged and the job failure is reported to the service personnel via the maintenance tool.</td>
</tr>
<tr>
<td>Association aborted by the SCP or network layers</td>
<td>The reason is logged and the job failure is reported to the service personnel via the maintenance tool.</td>
</tr>
</tbody>
</table>
2.3. NETWORK INTERFACES

2.3.1. Physical Network Interface
The SDR-100NW supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

<table>
<thead>
<tr>
<th>Supported Physical Network Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet 1000baseT</td>
</tr>
<tr>
<td>Ethernet 100base-TX</td>
</tr>
<tr>
<td>Ethernet 10baseT</td>
</tr>
</tbody>
</table>

2.3.2. IPv4 and IPv6 Support
This product only supports IPv4 connections.
2.4. CONFIGURATION
2.4.1. AE Title/Presentation Address Mapping

2.4.1.1. Local AE Titles

All local applications use the AE Titles and TCP/IP Ports configured via the Service Tool. The default AE Titles is listed below.

<table>
<thead>
<tr>
<th>Application Entity</th>
<th>Default AE Title</th>
<th>Default TCP/IP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>IMAGE</td>
<td>SDRNW_StoreSCU</td>
</tr>
<tr>
<td></td>
<td>RDSR</td>
<td>SDRNW_RdsrSCU</td>
</tr>
<tr>
<td>Workflow</td>
<td>MWM</td>
<td>SDRNW_MwmSCU</td>
</tr>
<tr>
<td></td>
<td>MPPS</td>
<td>SDRNW_MppsSCU</td>
</tr>
<tr>
<td>Hardcopy</td>
<td></td>
<td>SDRNW_PrintSCU</td>
</tr>
</tbody>
</table>

2.4.1.2. Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the SDR-100NW Service Tool.

2.4.1.2.1. Storage

The SDR-100NW Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Storage SCPs. Associations will only be accepted from known AE Titles 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.

2.4.1.2.2. Workflow

The SDR-100NW Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities of the remote Modality Worklist SCPs. Even though multiple remote Workflow SCPs can be defined, only one SCP can be selected at a time. The SDR-100NW will open an association to the SCP selected in the user interface.

The SDR-100NW Service Tool must be used to set the AE Title, port-number, host-name and capabilities of the remote MPPS SCP. Only a single remote MPPS SCP can be defined.

2.4.1.2.3. Hardcopy

The SDR-100NW 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.
2.4.2. 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. See the SDR-100NW Service Manual for details on general configuration capabilities.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Configurable (Yes/No)</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDU Size</td>
<td>Yes</td>
<td>16kB</td>
</tr>
<tr>
<td>Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>General DIMSE level time-out values</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out waiting for response to TCP/IP connect() request. (Low-level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Time-out for waiting for data between TCP/IP packets. (Low-level timeout)</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Any changes to default TCP/IP settings, such as configurable stack parameters.</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>
3. MEDIA INTERCHANGE

3.1. IMPLEMENTATION MODEL

3.1.1. Application Data Flow

![Diagaram of Application Data Flow for Media Storage]

The Offline-Media Application Entity exports images to a DVD-R Storage medium. It is associated with the local real-world activity “Export to DVD-R”. “Export to DVD-R” is performed upon user request for selected patients, studies, series, or images.

3.1.2. Functional Definition of AE’s

3.1.2.1. Functional Definition of Offline-Media Application Entity

Activation of the “Export to DVD-R” menu entry will pass the currently selected patients, studies, series or images to the Offline-Media Application Entity. The SCP Instances associated with the selection will be collected into one or more export jobs. The contents of each export job will be written to a single DVD-R media.

3.1.3. Sequencing of Real-World Activities

At least one image must exist and be selected before the Offline-Media Application Entity can be invoked. The operator can insert a new DVD-R media at any time before or after invocation of the Offline-Media Application Entity. The Offline-Media Application Entity will wait indefinitely for a media to be inserted before starting to write to the DVD-R device. If no DVD-R media is available the export job can be canceled from the job queue.

3.1.4. File Meta Information Options

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

| Table 3.1-1 |
| DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE |
| Implementation Class UID | 1.2.392.200036.9110.1.0.6711.2001002 |
| Implementation Version Name | SPF XX (XX : version number) |
3.2. AE SPECIFICATIONS

3.2.1. 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>
<thead>
<tr>
<th>Application Profiles Supported</th>
<th>Real World Activity</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>STD-GEN-CD</td>
<td>Export to CD-R</td>
<td>FSC</td>
</tr>
</tbody>
</table>

3.2.1.1. File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is fixed (see section 3.4).

3.2.1.2. Real-World Activities

3.2.1.2.1. Activity – Export to DVD-R

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

A dialogue will be presented informing the user about the required / available media capacity. If the contents of the current selection do not fit on a single media selection will be canceled and ask the user to select SOP Instances again.

The user will be prompted to insert a DVD-R media which is empty or written in this system for each export job. The contents of the export job will be written together with a corresponding DICOMDIR. The user can cancel an export job in the job queue.

3.2.1.2.1.1. Media Storage Application Profiles

The Offline-Media Application Entity supports the STD-GEN-CD Application Profile.
3.2.1.2.1.1. Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table below:

Table 3.2-2

<table>
<thead>
<tr>
<th>Information Object Definition</th>
<th>SOP Class UID</th>
<th>Transfer Syntax</th>
<th>Transfer Syntax UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Storage Directory Storage</td>
<td>1.2.840.10008.1.3.10</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td>X-Ray Radiofluoroscopic Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.12.2</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td>X-Ray Radiation Dose SR Storage</td>
<td>1.2.840.10008.5.1.4.1.1.88.67</td>
<td>Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
</tbody>
</table>

3.3. AUGMENTED AND PRIVATE APPLICATION PROFILES

The SDR-100NW does not support any augmented for private application profiles.

3.4. MEDIA CONFIGURATION

All local applications use the fixed AE Title listed in the Table below:

Table 3.4-1

<table>
<thead>
<tr>
<th>Application Entity</th>
<th>Default AE Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offline-Media</td>
<td>SDRNW-0000000000</td>
</tr>
</tbody>
</table>
4. SUPPORT OF CHARACTER SETS
All the SDR-100NW applications support the following character sets:

- ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No.1 supplementary set)
- ISO 2022 IR 87 (JIS X 0208: Kanji)
- ISO 2022 IR 159 (JIS X 0212: Supplementary Kanji set)

The SDR-100NW will set the corresponding character set based on its configuration as listed below:

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Character Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>English mode</td>
<td>ISO_IR 100</td>
</tr>
<tr>
<td>Japanese mode</td>
<td>ISO 2022 IR 87\ISO 2022 IR 159 or \ISO 2022 IR 87</td>
</tr>
</tbody>
</table>

5. SECURITY
The SDR-100NW does not support any specific security measures.

It is assumed that the SDR-100NW 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 the SDR-100NW
- b. Firewall or router protections to ensure that the SDR-100NW 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.
6. ANNEXES

6.1. IOD CONTENTS

6.1.1. Created SOP Instances

The attributes of each IODs transmitted by the SDR-100NW storage application are specified in the Table listed below:

<table>
<thead>
<tr>
<th>IOD</th>
<th>Specified Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Ray Radio Fluoroscopic Image IOD</td>
<td>Table 6.1-2</td>
</tr>
<tr>
<td>X-Ray Radiation Dose SR IOD</td>
<td>Table 6.1-3</td>
</tr>
</tbody>
</table>

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Module” 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

The abbreviations used in the “Source” column are:

- **MWL**: the attribute value source Modality Worklist
- **USER**: the attribute value source is from User input
- **AUTO**: the attribute value is generated automatically
- **MPPS**: the attribute value is the same as that use for Modality Performed Procedure Step
- **CONFIG**: the attribute value source is a configurable parameter

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Windows Date and Time configuration.
### 6.1.1.1. X-Ray Radio Fluoroscopic Image IOD

#### Table 6.1-2
**IOD OF CREATED RF SOP INSTANCES**

<table>
<thead>
<tr>
<th>IE</th>
<th>Module</th>
<th>Reference</th>
<th>Presence of Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>Patient</td>
<td>Table 6.1-4</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Study</td>
<td>General Study</td>
<td>Table 6.1-5</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>Patient Study</td>
<td>Table 6.1-6</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>General Series</td>
<td>Table 6.1-7</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Equipment</td>
<td>General Equipment</td>
<td>Table 6.1-9</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Image</td>
<td>General Image</td>
<td>Table 6.1-11</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>Image Pixel</td>
<td>Table 6.1-14</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>Cine</td>
<td>Table 6.1-15</td>
<td>Only if Multi-frame</td>
</tr>
<tr>
<td></td>
<td>Multi-frame</td>
<td>Table 6.1-16</td>
<td>Only if Multi-frame</td>
</tr>
<tr>
<td></td>
<td>Frame Pointers</td>
<td>Table 6.1-17</td>
<td>Only if Multi-frame</td>
</tr>
<tr>
<td></td>
<td>Display Shutter</td>
<td>Table 6.1-19</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>X-Ray Image</td>
<td>Table 6.1-20</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>X-Ray Acquisition</td>
<td>Table 6.1-21</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>SOP Common</td>
<td>Table 6.1-23</td>
<td>ALWAYS</td>
</tr>
</tbody>
</table>
### 6.1.1.2. X-Ray Radiation Dose SR IOD

#### Table 6.1-3

IOD OF CREATED RDSR SOP INSTANCES

<table>
<thead>
<tr>
<th>IE</th>
<th>Module</th>
<th>Reference</th>
<th>Presence of Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>Patient</td>
<td>Table 6.1-4</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Study</td>
<td>General Study</td>
<td>Table 6.1-5</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>Patient Study</td>
<td>Table 6.1-6</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Series</td>
<td>SR Document Series</td>
<td>Table 6.1-8</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Equipment</td>
<td>General Equipment</td>
<td>Table 6.1-9</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>Enhanced General Equipment</td>
<td>Table 6.1-10</td>
<td>ALWAYS</td>
</tr>
<tr>
<td>Document</td>
<td>SR Document General</td>
<td>Table 6.1-12</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>SR Document Content</td>
<td>Table 6.1-13</td>
<td>ALWAYS</td>
</tr>
<tr>
<td></td>
<td>SOP Common</td>
<td>Table 6.1-23</td>
<td>ALWAYS</td>
</tr>
</tbody>
</table>
### 6.1.1.3. Modules

#### 6.1.1.3.1. Patient Module

**Table 6.1-4**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s Name</td>
<td>(0010,0010)</td>
<td>PN</td>
<td>From Modality Worklist or user input or generated by device</td>
<td>ALWAYS</td>
<td>MWL/USER/AUTO</td>
</tr>
<tr>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td>LO</td>
<td>From Modality Worklist or user input or generated by device</td>
<td>ALWAYS</td>
<td>MWL/USER/AUTO</td>
</tr>
<tr>
<td>Patient’s Birth Date</td>
<td>(0010,0030)</td>
<td>DA</td>
<td>From Modality Worklist or user input</td>
<td>VNAP</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Patient’s Sex</td>
<td>(0010,0040)</td>
<td>CS</td>
<td>From Modality Worklist or user input</td>
<td>VNAP</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Patient Comments</td>
<td>(0010,4000)</td>
<td>LT</td>
<td>From user input</td>
<td>VNAP</td>
<td>USER</td>
</tr>
</tbody>
</table>
### 6.1.1.3.2. General Study Module

#### Table 6.1-5

**GENERAL STUDY MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Date</td>
<td>(0008,0020)</td>
<td>DA</td>
<td>&lt;yyyymddd&gt; format date on which the study is started</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Study Time</td>
<td>(0008,0030)</td>
<td>TM</td>
<td>&lt;hmmssmmm&gt; format time on which the study is started</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Accession Number</td>
<td>(0008,0050)</td>
<td>SH</td>
<td>From Modality Worklist or user input or generated by device</td>
<td>VNAP</td>
<td>MWL/AUTO</td>
</tr>
<tr>
<td>Referring Physician’s Name</td>
<td>(0008,0090)</td>
<td>PN</td>
<td>From Modality Worklist or user input</td>
<td>VNAP</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td>UI</td>
<td>From Modality Worklist or generated by device</td>
<td>ALWAYS</td>
<td>MWL/AUTO</td>
</tr>
<tr>
<td>Study ID</td>
<td>(0020,0010)</td>
<td>SH</td>
<td>From Modality Worklist or generated by device</td>
<td>ALWAYS</td>
<td>MWL/AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.3.3. Patient Study Module

#### Table 6.1-6

**PATIENT STUDY MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s Age</td>
<td>(0010,1010)</td>
<td>AS</td>
<td>From user input or generated by device</td>
<td>VNAP</td>
<td>USER/AUTO</td>
</tr>
<tr>
<td>Patient’s Size</td>
<td>(0010,1020)</td>
<td>DS</td>
<td>From Modality Worklist</td>
<td>VNAP</td>
<td>MWL</td>
</tr>
<tr>
<td>Patient’s Weight</td>
<td>(0010,1030)</td>
<td>DS</td>
<td>From Modality Worklist</td>
<td>VNAP</td>
<td>MWL</td>
</tr>
</tbody>
</table>
### 6.1.1.3.4. General Series Module

#### Table 6.1-7

**GENERAL SERIES MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Date</td>
<td>(0008,0021)</td>
<td>DA</td>
<td>&lt;yyyymmdd&gt; format date on which the series is created</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Time</td>
<td>(0008,0031)</td>
<td>TM</td>
<td>&lt;hhmmss.fff&gt; format time on which the series is created</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Modality</td>
<td>(0008,0060)</td>
<td>CS</td>
<td>“RF”</td>
<td>ALWAYS</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Series Description</td>
<td>(0008,103E)</td>
<td>LO</td>
<td>“”</td>
<td>EMPTY</td>
<td>AUTO</td>
</tr>
<tr>
<td>Performing Physician’s Name</td>
<td>(0008,1050)</td>
<td>PN</td>
<td>From Modality Worklist or user input</td>
<td>VNAP</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Operator’s Name</td>
<td>(0008,1070)</td>
<td>PN</td>
<td>From Modality Worklist or user input</td>
<td>VNAP</td>
<td>MWL/USER</td>
</tr>
<tr>
<td>Protocol Name</td>
<td>(0018,1030)</td>
<td>LO</td>
<td>Name and Description of the selected Protocol</td>
<td>ALWAYS</td>
<td>USER</td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td>UI</td>
<td>Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Number</td>
<td>(0020,0011)</td>
<td>IS</td>
<td>Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Laterality</td>
<td>(0020,0060)</td>
<td>CS</td>
<td>“”</td>
<td>EMPTY</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### 6.1.1.3.5. SR Document Series Module

#### Table 6.1-8

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Date</td>
<td>(0008,0021)</td>
<td>DA</td>
<td>&lt;yyymmd&gt; format date on which the series is created</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Time</td>
<td>(0008,0031)</td>
<td>TM</td>
<td>&lt;hhmmssfff&gt; format time on which the series is created</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Modality</td>
<td>(0008,0060)</td>
<td>LO</td>
<td>“SR”</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Description</td>
<td>(0008,103E)</td>
<td>LO</td>
<td>“”</td>
<td>EMPTY AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td>UI</td>
<td>UID generated by device</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Series Number</td>
<td>(0020,0011)</td>
<td>IS</td>
<td>Number generated by device</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Referenced Performed Procedure Step Sequence</td>
<td>(0008,1111)</td>
<td>SQ</td>
<td>Zero item</td>
<td>EMPTY AUTO</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.3.6. General Equipment Module

#### Table 6.1-9

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>(0008,0070)</td>
<td>LO</td>
<td>“Shimadzu Corp.”</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Institution Name</td>
<td>(0008,0080)</td>
<td>LO</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td>CONFIG</td>
</tr>
<tr>
<td>Institution Address</td>
<td>(0008,0081)</td>
<td>ST</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td>CONFIG</td>
</tr>
<tr>
<td>Station Name</td>
<td>(0008,1010)</td>
<td>SH</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td>CONFIG</td>
</tr>
<tr>
<td>Institution Department Name</td>
<td>(0008,1040)</td>
<td>LO</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td>CONFIG</td>
</tr>
<tr>
<td>Manufacturer’s Model Name</td>
<td>(0008,1090)</td>
<td>LO</td>
<td>“SDR-100NW”</td>
<td>ALWAYS AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Device Serial Number</td>
<td>(0018,1000)</td>
<td>LO</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td>CONFIG</td>
</tr>
</tbody>
</table>
### ENHANCED GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>(0008,0070)</td>
<td>LO</td>
<td>“Shimadzu Corp.”</td>
<td>ALWAYS CONFIG</td>
<td></td>
</tr>
<tr>
<td>Manufacturer’s Model Name</td>
<td>(0008,1090)</td>
<td>LO</td>
<td>“SDR-100NW”</td>
<td>ALWAYS CONFIG</td>
<td></td>
</tr>
<tr>
<td>Device Serial Number</td>
<td>(0018,1000)</td>
<td>LO</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td></td>
</tr>
<tr>
<td>Software Version</td>
<td>(0018,1020)</td>
<td>LO</td>
<td>From Configuration</td>
<td>ALWAYS CONFIG</td>
<td></td>
</tr>
</tbody>
</table>
### 6.1.1.3.8. General Image Module

#### Table 6.1-11

GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition Date</td>
<td>(0008,0022)</td>
<td>DA</td>
<td>&lt;yyyymmdd&gt; format date on which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Content Date</td>
<td>(0008,0023)</td>
<td>DA</td>
<td>&lt;yyyymmdd&gt; format date on which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Acquisition Time</td>
<td>(0008,0032)</td>
<td>TM</td>
<td>&lt;hhmmss&gt; format time at which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Content Time</td>
<td>(0008,0033)</td>
<td>TM</td>
<td>&lt;hhmmss&gt; format time at which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Instance Number</td>
<td>(0020,0013)</td>
<td>IS</td>
<td>Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Patient Orientation</td>
<td>(0020,0020)</td>
<td>CS</td>
<td>EMPTY</td>
<td></td>
<td>AUTO</td>
</tr>
</tbody>
</table>
6.1.1.3.9. SR Document General Module

Table 6.1-12

SR DOCUMENT GENERAL MODULE OF CREATED SOP INSTANCES

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Date</td>
<td>(0008,0023)</td>
<td>DA</td>
<td>&lt;yyyymmdd&gt; format date on which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Content Time</td>
<td>(0008,0033)</td>
<td>TM</td>
<td>&lt;hhmmss&gt; format time on which the image is acquired</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Performed Procedure Code</td>
<td>(0040,A372)</td>
<td>SQ</td>
<td>Zero item</td>
<td>EMPTY</td>
<td>AUTO</td>
</tr>
<tr>
<td>Sequence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instance Number</td>
<td>(0020,0013)</td>
<td>IS</td>
<td>Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Completion Flag</td>
<td>(0040,A491)</td>
<td>CS</td>
<td>“PARTIAL” or “COMPLETE”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Verification Flag</td>
<td>(0040,A493)</td>
<td>CS</td>
<td>“UNVERIFIED”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

6.1.1.3.10. SR Document Content Module

Table 6.1-13

SR DOCUMENT CONTENT MODULE OF CREATED SOP INSTANCES

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Type</td>
<td>(0040,A040)</td>
<td>CS</td>
<td>“CONTAINER”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Concept Name Code Sequence</td>
<td>(0040,A043)</td>
<td>SQ</td>
<td>Only single item is included</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Code Value</td>
<td>(0008,0100)</td>
<td>SH</td>
<td>“113701”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Coding Scheme Designator</td>
<td>(0008,0102)</td>
<td>SH</td>
<td>“DCM”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Code Meaning</td>
<td>(0008&lt;0104)</td>
<td>LO</td>
<td>“X-Ray Radiation Dose Report”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Continuity of Content</td>
<td>(0040,A050)</td>
<td>CS</td>
<td>“SEPARATE”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

* Refer to 6.1.1.4 for detailed information.
### 6.1.1.3.11. Image Pixel Module

#### Table 6.1-14

**IMAGE PIXEL MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample per Pixel</td>
<td>(0028,0002)</td>
<td>US</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Photometric Interpretation</td>
<td>(0028,0004)</td>
<td>US</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Rows</td>
<td>(0028,0010)</td>
<td>US</td>
<td>“1024”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Columns</td>
<td>(0028,0011)</td>
<td>US</td>
<td>“1024”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Aspect Ratio</td>
<td>(0028,0034)</td>
<td>IS</td>
<td>“1/1”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Bits Allowed</td>
<td>(0028,0100)</td>
<td>US</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>High Bits</td>
<td>(0028,0102)</td>
<td>US</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Representation</td>
<td>(0028,0103)</td>
<td>US</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Data</td>
<td>(7FE0,0010)</td>
<td>OW</td>
<td>The Pixel Data itself</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.3.12. Cine Module

#### Table 6.1-15

**CINE MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Display Frame Rate</td>
<td>(0008,2144)</td>
<td>IS</td>
<td>Only if multi-frame</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>Cine Rate</td>
<td>(0018,0040)</td>
<td>IS</td>
<td>Only if multi-frame</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>Frame Time</td>
<td>(0018,1063)</td>
<td>DS</td>
<td>Only if multi-frame</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### 6.1.1.3.13. Multi-Frame Module

**Table 6.1-16**

MULTI-FRAME MODULE OF CREATED SOP Instances

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Frames</td>
<td>(0028,0008)</td>
<td>IS</td>
<td>Only if multi-frame</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>Frame Increment Pointer</td>
<td>(0028,0009)</td>
<td>AT</td>
<td>This Attribute is overwritten by X-Ray Image Module. See Table 6.1-20</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.3.14. Frame Pointers Module

**Table 6.1-17**

FRAME POINTERS MODULE OF CREATED SOP Instances

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representative Frame Number</td>
<td>(0028,6010)</td>
<td>US</td>
<td>Only if multi-frame</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.3.15. Mask Module

**Table 6.1-18**

MASK MODULE OF CREATED SOP Instances

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Viewing Mode</td>
<td>(0028,1090)</td>
<td>CS</td>
<td>“SUB”</td>
<td>VNAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>Mask Subtraction Sequence</td>
<td>(0028,6100)</td>
<td>SQ</td>
<td>Only if subtracted image</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Mask Operation</td>
<td>(0028,6101)</td>
<td>CS</td>
<td>“AVG_SUB”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Mask Frame Numbers</td>
<td>(0028,6110)</td>
<td>US</td>
<td>Indicate frame number of mask</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;Mask Sub-pixel Shift</td>
<td>(0028,6114)</td>
<td>FL</td>
<td>Indicate pixel shift value</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
6.1.1.3.16. Display Shutter Module

Table 6.1-19

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutter Shape</td>
<td>(0018,1600)</td>
<td>CS</td>
<td>“CIRCULAR”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Center of Circular Shutter</td>
<td>(0018,1610)</td>
<td>IS</td>
<td>Location of the center of</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Radius of Circular Shutter</td>
<td>(0018,1612)</td>
<td>IS</td>
<td>Radius of the circular</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

6.1.1.3.17. X-Ray Image Module

Table 6.1-20

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image Type</td>
<td>(0008,0008)</td>
<td>CS</td>
<td>Specified by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Samples per Pixel</td>
<td>(0028,0002)</td>
<td>US</td>
<td>“0001H”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Photometric Interpretation</td>
<td>(0028,0004)</td>
<td>CS</td>
<td>“MONOCHROME2”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Frame Increment Pointer</td>
<td>(0028,0009)</td>
<td>AT</td>
<td>“(0018,1063)’=”00181063H’”</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>Bits Allocated</td>
<td>(0028,0100)</td>
<td>US</td>
<td>“0010H”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Bits Stored</td>
<td>(0028,0101)</td>
<td>US</td>
<td>“000CH”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>High Bits</td>
<td>(0028,0102)</td>
<td>US</td>
<td>“000BH”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Representation</td>
<td>(0028,0103)</td>
<td>US</td>
<td>“0000H”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Intensity Relationship</td>
<td>(0028,1040)</td>
<td>CS</td>
<td>“LIN”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### 6.1.1.3.18. X-Ray Acquisition Module

#### Table 6.1-21

**X-RAY ACQUISITION MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>KVP (0018,0060)</td>
<td>DS</td>
<td>KVP</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Field of View Shape (0018,1147)</td>
<td>CS</td>
<td>CS</td>
<td>“ROUND”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Field of View Dimension(s)</td>
<td>IS</td>
<td>IS</td>
<td>Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Exposure Time</td>
<td>IS</td>
<td>IS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>X-Ray Tube Current (0018,1151)</td>
<td>IS</td>
<td>IS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Radiation Setting (0018,1155)</td>
<td>CS</td>
<td>CS</td>
<td>In case of Radiography image: “GR”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In case of Fluoro Record image: “SC”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image and Fluoroscopy Area</td>
<td>DS</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Dose Product (0018,115E)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure Time in uS (0018,8150)</td>
<td>DS</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>X-Ray Tube Current in uA</td>
<td>DS</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Pixel Spacing (0028,0030)</td>
<td>DS</td>
<td>DS</td>
<td>Calculated by calibration measurement</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
6.1.1.3.19. X-Ray Acquisition Dose Module

Table 6.1-22

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>KVP</td>
<td>(0018,0060)</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Exposure Time</td>
<td>(0018,1150)</td>
<td>IS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>X-Ray Tube Current</td>
<td>(0018,1151)</td>
<td>IS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Image and Fluoroscopy Area Dose Product</td>
<td>(0018,115E)</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>Exposure Time in uS</td>
<td>(0018,8150)</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>X-Ray Tube Current in uA</td>
<td>(0018,8151)</td>
<td>DS</td>
<td>From Acquisition data</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### 6.1.1.3.20. SOP Common Module

**Table 6.1-23**

**SOP COMMON MODULE OF CREATED SOP INSTANCES**

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag</th>
<th>VR</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Character Set</td>
<td>(0008,0005)</td>
<td>CS</td>
<td>In Japanese Mode: “ISO 2022 IR 87\ISO 2022 IR 159” In English Mode: “ISO_IR 100”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>SOP Class UID</td>
<td>(0008,0016)</td>
<td>UI</td>
<td>In case of X-Ray Image Storage SOP : “1.2.840.10008.5.1.4.1.12.2” In case of RDSR Storage SOP : “1.2.840.10008.5.1.4.1.1.88.67”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>SOP Instance UID</td>
<td>(0008,0018)</td>
<td>UI</td>
<td>UID generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
6.1.1.4. X-Ray Radiation Dose Report

6.1.1.4.1. Template Structure

- **TID 10001**
  - Projection X-Ray Radiation Dose

- **TID 1002**
  - Observer Context

- **TID 10002**
  - Accumulated X-Ray Dose Data

- **TID 1020**
  - Person Participant

- **TID 10003**
  - Irradiation Event X-Ray Data

- **TID 10004**
  - Accumulated Fluoroscopy and Acquisition Projection X-Ray Dose

- **TID 10007**
  - Accumulated Integrated Projection Radiography Dose

- **TID 10003a**
  - Irradiation Event X-Ray Source Data

- **TID 10003b**
  - Irradiation Event X-Ray Source Data

- **TID 1021**
  - Device Participant
6.1.4.2. Projection X-Ray Radiation Dose (TID10001)
Table 6.1-24

PROJECTION X-RAY RADIATION DOSE INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONTAINER</td>
<td>EV(113701, DCM, “X-Ray Radiation Dose Report”)</td>
<td></td>
<td>ALWAYS AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS CONCEPT MOD</td>
<td>CODE</td>
<td>EV(121058, DCM, “Procedure reported”)</td>
<td>EV(113704, DCM, “Projection X-Ray”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>HAS CONCEPT MOD</td>
<td>CODE</td>
<td>EV(G-C0E8, SRT, “Has Intent”)</td>
<td>EV(R-408C3, SRT, “Diagnostic Intent”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td>DTID(1002) Observer Context</td>
<td>Table 6.1-31</td>
<td>ALWAYS AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS OBS CONTEXT</td>
<td>CODE</td>
<td>EV(113705, DCM, “Scope of Accumulation”)</td>
<td>EV(113015, DCM, “Series”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>HAS PROPERTIES</td>
<td>UIDREF</td>
<td>EV(112002, DCM, “Series Instance UID”)</td>
<td>Series Instance UID generated by device</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV (113945, DCM, “X-Ray Detector Data Available”)</td>
<td>EV(R-00339, SRT, “No”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV (113943, DCM, “X-Ray Source Data Available”)</td>
<td>EV(R-0038D, SRT, “Yes”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV (113944, DCM, “X-Ray Mechanical Data Available”)</td>
<td>EV(R-00339, SRT, “No”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td>DTID(10002) Accumulated X-Ray Dose</td>
<td>Table 6.1-25</td>
<td>ALWAYS AUTO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NL</td>
<td>Rel with Parent</td>
<td>VT</td>
<td>Concept Name</td>
<td>Value</td>
<td>Presence of Value</td>
<td>Source</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>----</td>
<td>--------------</td>
<td>-------</td>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV(113854, DCM, “Source of Dose Information”)</td>
<td>EV(A-2C090, SRT, ”Dosimeter”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INCLUDE</td>
<td>DTID(10003) Irradiation Event X-Ray Data</td>
<td>Table 6.1-26</td>
<td>ALWAYS</td>
<td></td>
</tr>
</tbody>
</table>
### ACCUMULATED X-RAY DOSE INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CONTAINER</td>
<td>EV(113702, DCM, “Accumulated X-Ray Dose Data”)</td>
<td></td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS CONCEPT MOD</td>
<td>CODE</td>
<td>EV(113764, DCM, “Acquisition Plane”)</td>
<td>EV(113622, DCM, “Single Plane”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS CONTAINER</td>
<td>CODE</td>
<td>EV(122505, DCM, “Calibration”)</td>
<td></td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>CONTAINS DATETIME</td>
<td>CODE</td>
<td>EV(113723, DCM, “Calibration Date”)</td>
<td>&lt;yyyymmddhhmms&gt; format date and time that the calibration of the equipment’s dose indicators was performed</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>CONTAINS NUM</td>
<td>CODE</td>
<td>EV(122322, DCM, “Calibration Factor”)</td>
<td>Calibration Factor. Unit=EV(1, UCUM, “no units”)</td>
<td>ALWAYS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>CONTAINS NUM</td>
<td>CODE</td>
<td>EV(113763, DCM, “Calibration Uncertainty”)</td>
<td>Calibration Uncertainty. Unit=EV(1, UCUM, ”Percent”)</td>
<td>ALWAYS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>CONTAINS TEXT</td>
<td>CODE</td>
<td>EV(113724, DCM, “Calibration Responsible Party”)</td>
<td>“Shimadzu Corp.”</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>NL</td>
<td>Rel with Parent</td>
<td>VT</td>
<td>Concept Name</td>
<td>Value</td>
<td>Presence of Value</td>
<td>Source</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>----</td>
<td>--------------</td>
<td>-------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td>DTID(10004) Accumulated Fluoroscopy and Acquisition Projection X-Ray Dose</td>
<td>Table 6.1-29a</td>
<td></td>
<td>(*1)</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td>DTIS(10007) Accumulated Total Projection Radiography Dose</td>
<td>Table 6.1-30b</td>
<td></td>
<td>(*2)</td>
<td></td>
</tr>
</tbody>
</table>

(*1) IFF TID (10001) Row 4 = (113957, DCM, "Fluoroscopy-Guided Projection Radiography System") or TID (10001) Row 2 = (113704, DCM, "Projection X-Ray") and TID (10001) Row 4 is absent

(*2) IFF TID (10001) Row 4 = (113958, DCM, "Integrated Projection Radiography System") or TID (10001) Row 4 = (113957, DCM, "Fluoroscopy-Guided Projection Radiography System") or TID(10001) Row 2 = (113704, DCM, “Projection X-Ray”) and TID (10001) Row 4 is absent
### 6.1.1.4.4. Irradiation Event X-Ray Data (TID10003)

#### Table 6.1-26

**IRRADIATION EVENT X-RAY DATA INFORMATIONS**

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CONTAINER</td>
<td>EV(113706, DCM, “Irradiation Event X-Ray Data”)</td>
<td></td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>CODE</td>
<td>EV(113764, DCM, “Acquisition Plane”)</td>
<td>EV(113622, DCM, &quot;Single Plane&quot;)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>UIDREF</td>
<td>EV(113769, DCM, “Irradiation Event UID”)</td>
<td>Irradiation Event UID generated by device</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>DATETIME</td>
<td>DT(111526, DCM, “DateTime Started”)</td>
<td>&lt;yyyymmddhhmms&gt; format date when irradiation is started</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>CODE</td>
<td>EV(113721, DCM, “Irradiation Event Type”)</td>
<td>In case of Radiography: EV(113611, DCM, &quot;Stationary Acquisition&quot;) In case of Fluoro; EV(P5-06000, SRT, &quot;Fluoroscopy&quot;)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>TEXT</td>
<td>EV(125203, DCM, “Acquisition Protocol”)</td>
<td>EV(125203, DCM, &quot;*&quot;) In case of: --- SPOT --- SPOT SERIAL SERIAL DSA DSA FILM FILM Fluoro FLUORO</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>&gt;</td>
<td></td>
<td>CODE</td>
<td>EV(123014, DCM, “Target Region”)</td>
<td>DCID(4031) Common Anatomic Regions</td>
<td>ALWAYS USER</td>
<td></td>
</tr>
</tbody>
</table>

---

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S517-E121
<table>
<thead>
<tr>
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<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(122130, DCM, “Dose Area Product”)</td>
<td>Dose Area Product of this irradiation. Unit=EV(Gy.m2, UCUM, “Gy.m2”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td></td>
<td>DTID (10003a) Irradiation Event X-Ray Detector Data</td>
<td>Table 6.1-27</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td></td>
<td>DTID (10003b) Irradiation Event X-Ray Source Data</td>
<td>Table 6.1-28</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### 6.1.1.4.5. Irradiation Event X-Ray Detector Data (TID10003a)

**Table 6.1-27**

**IRRADIATION EVENT X-RAY DETECTOR DATA INFORMATIONS**

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>IMAGE</td>
<td>EV(113795, DCM, &quot;Acquired Image&quot;)</td>
<td>SOP Instance UID generated by device</td>
<td>In case of Radiography (VNA)</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

### 6.1.1.4.6. Irradiation Event X-Ray Source Data (TID10003b)

**Table 6.1-28**

**IRRADIATION EVENT X-RAY SOURCE DATA INFORMATIONS**

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113738, DCM, &quot;Dose (RP)&quot;)</td>
<td>Air Kerma of this irradiation. Unit=EV(Gy, UCUM, &quot;Gy&quot;)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV(113780, DCM, &quot;Reference Point Definition&quot;)</td>
<td>EV(113863, DCM, &quot;30cm above Tabletop&quot;)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV(113732, DCM, &quot;Fluoro Mode&quot;)</td>
<td>In case of Continuous Fluoro: EV(113630, DCM, &quot;Continuous&quot;) In case of Pulse Fluoro; EV(113631, DCM, &quot;Pulsed&quot;)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113791, DCM, &quot;Pulse Rate&quot;)</td>
<td>In case of Pulse Fluoro; Unit=EV({pulse}/s, UCUM, &quot;pulse/s&quot;)</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>NL</td>
<td>Rel with Parent</td>
<td>VT</td>
<td>Concept Name</td>
<td>Value</td>
<td>Presence of Value</td>
<td>Source</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>-----</td>
<td>--------------</td>
<td>-------</td>
<td>-------------------</td>
<td>--------</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113768, DCM, “Number of Pulses”)</td>
<td>Total number of pulses of this irradiation. Unit=EV(1, UCUM, “no units”)</td>
<td>ANAP</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;&gt;</td>
<td>HAS CONCEPT MOD</td>
<td>CODE</td>
<td>EV(121401, DCM, &quot;Derivation&quot;)</td>
<td>EV(R-10260, SRT, “Estimated”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113733, DCM, “KVP”)</td>
<td>Applied X-Ray Tube voltage at peak of X-Ray generation of this irradiation. Unit=EV(kV, UCUM, “kV”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113734, DCM, “X-Ray Tube Current”)</td>
<td>Tube current of this irradiation. Unit=EV(mA, UCUM, ”mA”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113735, DCM, “Exposure Time”)</td>
<td>Exposure time of this irradiation. Unit=EV(ms, UCUM, ”ms”)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>INCLUDE</td>
<td>DTID(1021)</td>
<td>Device Participant</td>
<td>Table 6.1-33</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
### ACCUMULATED FLUOROSCOPY AND ACQUISITION PROJECTION X-RAY DOSE INFORMATIONS

<table>
<thead>
<tr>
<th>ROW</th>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113726, DCM, “Fluoro Dose Area Product Total”)</td>
<td>Total Fluoro Dose Area Product in the study. Unit=EV(Gy.m², UCUM, “Gy.m²”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113728, DCM, “Fluoro Dose (RP) Total”)</td>
<td>Total Fluoro Air Kerma in the study. Unit=EV(Gy, UCUM, “Gy”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113730, DCM, “Total Fluoro Time”)</td>
<td>Total Fluoro Time in the study. Unit=EV(s, UCUM, “s”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113727, DCM, “Acquisition Dose Area Product Total”)</td>
<td>Total Rad Dose Area Product in the study. Unit=EV(Gy.m², UCUM, “Gy.m²”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113729, DCM, “Acquisition Dose (RP) Total”)</td>
<td>Total Rad Air Kerma in the study. Unit=EV(Gy, UCUM, “Gy”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113855, DCM, “Total Acquisition Time”)</td>
<td>Total Rad time in the study. Unit=EV(s, UCUM, “s”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
</tbody>
</table>
### ACCUMULATED TOTAL PROJECTION RADIOGRAPHY DOSE INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113722, DCM, “Dose Area Product Total”)</td>
<td>Total Dose Area Product in the study. Unit=EV(Gy.m2, UCUM, “Gy.m2”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113725, DCM, “Dose (RP) Total”)</td>
<td>Total Air Kerma in the study. Unit=EV(Gy, UCUM, “Gy”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONTAINS</td>
<td>NUM</td>
<td>EV(113731, DCM, “Total Number of Radiographic Frames”)</td>
<td>Total number of frames acquired in the study. Unit=EV(1, UCUM, ”no unit”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONTAINS</td>
<td>CODE</td>
<td>EV(113780, DCM, “Reference Point Definition”)</td>
<td>EV(113863, DCM, “30cm above Tabletop”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
</tbody>
</table>

### OBSERVER CONTEXT INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HAS OBS CONTEXT</td>
<td>CODE</td>
<td>EV(121005, DCM, “Observer Type”)</td>
<td>EV(121007, DCM, “Device”)</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INCLUDE</td>
<td>CODE</td>
<td>DTID(1004) Device Observer Identifying Attributes</td>
<td>Table 6.1-32</td>
<td>ALWAYS AUTO</td>
<td></td>
</tr>
</tbody>
</table>
6.1.1.4.10. Device Observer Identifying Attributes (TID1004)

Table 6.1-32

DEVICE OBSERVER IDENTIFYING ATTRIBUTES INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HAS OBS CONTEXT</td>
<td>UIDREF</td>
<td>EV(121012, DCM, “Device Observer UID”)</td>
<td>UID Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>

6.1.1.4.11. Device Participant (TID1021)

Table 6.1-33

DEVICE PARTICIPANT INFORMATIONS

<table>
<thead>
<tr>
<th>NL</th>
<th>Rel with Parent</th>
<th>VT</th>
<th>Concept Name</th>
<th>Value</th>
<th>Presence of Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CODE</td>
<td>EV(113876, DCM, &quot;Device Role in Procedure&quot;)</td>
<td>EV(113859, DCM, &quot;Irradiation Device&quot;)</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS PROPERTIES</td>
<td>TEXT</td>
<td>EV(113878, DCM, &quot;Device Manufacturer&quot;)</td>
<td>&quot;Shimadzu Corporation&quot;</td>
<td>ALWAYS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS PROPERTIES</td>
<td>TEXT</td>
<td>EV(113879, DCM, &quot;Device Model Name &quot;)</td>
<td>&quot;SDR-100NW&quot;</td>
<td>ALWAYS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS PROPERTIES</td>
<td>TEXT</td>
<td>EV(113880, DCM, &quot;Device Serial Number &quot;)</td>
<td>From Configuration</td>
<td>ALWAYS</td>
<td>CONFIG</td>
</tr>
<tr>
<td>&gt;</td>
<td>HAS PROPERTIES</td>
<td>UIDREF</td>
<td>EV(121012, DCM, “Device Observer UID”)</td>
<td>UID Generated by device</td>
<td>ALWAYS</td>
<td>AUTO</td>
</tr>
</tbody>
</table>
6.1.2. Used Fields in received IOD by application
The SDR-100NW storage application does not receive SOP Instances. The usage of attributes received via Modality Worklist is described in section 2.2.2.3.2.3.

6.1.3. Attribute mapping
The relationship between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in the Table below.

<table>
<thead>
<tr>
<th>Modality Worklist</th>
<th>Image IOD</th>
<th>MPPS IOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Character Set</td>
<td>Specific Character Set</td>
<td>Specific Character Set</td>
</tr>
<tr>
<td>&gt;Modality [Note 2]</td>
<td>Modality</td>
<td>Modality</td>
</tr>
<tr>
<td>&gt;Scheduled Station AE Title [Note 2]</td>
<td></td>
<td>Performed Station AE Title</td>
</tr>
<tr>
<td>&gt;Scheduled Performing Physician’s Name [Note 2]</td>
<td>Performing Physician’s Name</td>
<td>&gt;Performing Physician’s Name [Note 3]</td>
</tr>
<tr>
<td>&gt;Scheduled Procedure Step Description [Note 2]</td>
<td></td>
<td>&gt;Scheduled Procedure Step Description [Note 4]</td>
</tr>
<tr>
<td>&gt;Scheduled Protocol Code Sequence [Note 1] [Note 2]</td>
<td></td>
<td>&gt;Scheduled Protocol Code Sequence [Note 1] [Note 4]</td>
</tr>
<tr>
<td>&gt;Scheduled Procedure Step ID [Note 2]</td>
<td></td>
<td>&gt;Scheduled Procedure Step ID [Note 4]</td>
</tr>
<tr>
<td>&gt;Scheduled Station Name [Note 2]</td>
<td>Station Name</td>
<td>Performed Station Name</td>
</tr>
<tr>
<td>&gt;Scheduled Procedure Step Location [Note 2]</td>
<td>Institution Department Name</td>
<td>Performed Location</td>
</tr>
<tr>
<td>Modality Worklist</td>
<td>Image IOD</td>
<td>MPPS IOD</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Referenced Study Sequence</td>
<td></td>
<td>&gt;Referenced Study Sequence [Note 4]</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>Study Instance UID</td>
<td>&gt;Study Instance UID [Note 4]</td>
</tr>
<tr>
<td>Requested Procedure Description</td>
<td>Study Description</td>
<td>&gt;Requested Procedure Description [Note 4]</td>
</tr>
<tr>
<td>Requested Procedure Code Sequence [Note 1]</td>
<td>Procedure Code Sequence</td>
<td>[Note 1]</td>
</tr>
<tr>
<td>Requested Procedure ID</td>
<td></td>
<td>&gt;Requested Procedure ID [Note 4]</td>
</tr>
<tr>
<td>Accession Number</td>
<td>Accession Number</td>
<td>Accession Number</td>
</tr>
<tr>
<td>Referring Physician’s Name</td>
<td>Referring Physician’s Name</td>
<td></td>
</tr>
<tr>
<td>Patient’s Name</td>
<td>Patient’s Name</td>
<td>Patient’s Name</td>
</tr>
<tr>
<td>Patient ID</td>
<td>Patient ID</td>
<td>Patient ID</td>
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<tr>
<td>Patient’s Birth Date</td>
<td>Patient’s Birth Date</td>
<td>Patient’s Birth Date</td>
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<td>Patient’s Weight</td>
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<tr>
<td>Series Description</td>
<td></td>
<td>&gt;Series Description [Note 3]</td>
</tr>
<tr>
<td>Operator’s Name</td>
<td></td>
<td>&gt;Operator’s Name [Note 3]</td>
</tr>
<tr>
<td>Protocol Name</td>
<td>Protocol Name</td>
<td></td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>Series Instance UID</td>
<td></td>
</tr>
<tr>
<td>Study ID</td>
<td>Study ID</td>
<td></td>
</tr>
</tbody>
</table>

[Note 1] During these attributes mapping, only the first item will be copied to MPPS IOD, even multiple items might be defined in the Worklist IOD.

[Note 2] These attributes are belonging to ‘Scheduled Procedure Step Sequence (0040, 0100)’.

[Note 3] These attributes are belonging to ‘Performed Series Sequence (0040, 0340)’.

[Note 4] These attributes are belonging to ‘Scheduled Step Attribute Sequence (0040, 0270)’.

6.1.4. Coerced/Modified Fields

The SDR-100NW does not coerce/modify any attribute values received in the response to a Modality Worklist Query.
6.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES
The Private Attributes added to created SOP Instances are listed in the Table below. The SDR-100NW reserves block of private attributes in groups 6B07.

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<thead>
<tr>
<th>Tag</th>
<th>Attribute Name</th>
<th>VR</th>
<th>VM</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6B07,0030)</td>
<td>Private Creator</td>
<td>LO</td>
<td>1</td>
</tr>
<tr>
<td>(6B07,3000)</td>
<td>Last Modifier</td>
<td>UI</td>
<td>1</td>
</tr>
<tr>
<td>(6B07,3001)</td>
<td>Last Modify Date</td>
<td>DA</td>
<td>1</td>
</tr>
<tr>
<td>(6B07,3002)</td>
<td>Last Modify Time</td>
<td>TM</td>
<td>1</td>
</tr>
</tbody>
</table>

6.3. Coded Terminology and Templates
The Workflow AE is capable of supporting arbitrary coding scheme for Procedure and Protocol Codes. The contents of Scheduled Protocol Code Sequence (0040,0008) supplied in Worklist items will be mapped to MPPS attributes as described in Table 6-5.

6.4. Grayscale Image Consistency
The high resolution display monitor attached to the SDR-100NW should be adjusted by the Service Personnel during the installation.

6.5. Standard Extended/Specialized/Private SOP Classes
No Specialized or Private SOP Classes are supported.

6.6. Private Transfer Syntaxes
No Private Transfer Syntaxes are supported.