Carestream DirectView CR
System Software
Version 5.2

DICOM Conformance Statement

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1   Introduction

1.1   Executive Overview

This document applies to all *Carestream DirectView* CR products utilizing the version 5.2 software. The following DICOM SOP Classes are supported:

Table 1.1   Supported DICOM SOP Classes

SOP Class Name	SOP Class UID	Service Class Role
Verification SOP Class	1.2.840.10008.1.1	SCU, SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCU
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	SCU
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCU
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCU
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCU
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	SCU
Modality Performed Procedure Step Notification SOP Class	1.2.840.10008.3.1.2.3.5	SCU
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	SCU
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCU

1.2   Scope and Field of Application

This document describes the DICOM functionality of *Carestream DirectView* CR Systems. The CR System covered by this document is a family of laser scanners capable of reading the latent image formed on a storage phosphor imaging plate resulting in the production of a digital image. While the various products making up this family of scanners may vary in performance or other

specific user features, the information in this document applies to all unless otherwise stated. Throughout the remainder of this document the term *DirectView* CR System applies to all members of the CR product family.

 The *DirectView* CR System acts as a DICOM Service Class User (SCU) that performs transactions over a TCP/IP network via the DICOM messages exchange protocol.

1.3   Important Considerations for the Reader

This DICOM Conformance Statement by itself is not sufficient to guarantee successful connectivity between the *DirectView* CR System and equipment from other vendors. The following considerations should be made:

- The integration of equipment from different vendors (including Carestream) goes beyond the scope of the DICOM 3.0 standard and the DICOM Conformance Statements from Carestream and other vendors. It is the responsibility of the user (or user's agent) to assess the application requirements and to design a solution that integrates *Carestream* equipment with equipment from other vendors.

- When the comparison of this DICOM Conformance Statement with a DICOM Conformance Statement from another vendor indicates that connectivity should be possible, it is the responsibility of the user (or user's agent) to verify this by carrying out validation tests and to check whether all required functionality is met.

- With regard to the future evolution of the DICOM 3.0 standard Carestream Health, Inc. reserves the right to make changes to the *DirectView* CR System architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to *Carestream* equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity.

1.4   Accessing this Conformance Statement on the World Wide Web

As the *DirectView* CR System product changes, changes to this DICOM Conformance Statement are inevitable. To obtain the most recent revision of this DICOM Conformance Statement, access the following URL:

http://www.carestreamhealth.com/dicom.html

1.5 Definitions, Acronyms, Abbreviations

The following symbols and abbreviations are used in this document.

ASCII	American Standard Code for Information Interchange
AE	Application Entity
CR	Computed Radiography
CR X-ray interface	An accessory product that allows the CR to receive exposure information from specific mammography systems
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DX	Digital X-Ray
GSPS	Grayscale Softcopy Presentation State
HIS/RIS	Hospital Information System / Radiology Information System.
ISO	International Standards Organization
LUT	Look-up Table
MG	Mammography
MPPS	Modality Performed Procedure Step Notification SOP Class
MWL	Modality WorkList
PDU	Protocol Data Unit
PLUT	Presentation Look-up Table
SC	Secondary Capture
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair
SCPM	Storage Commitment Push Model SOP Class
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier

2   Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to deliver studies to remote printers. Basic Worklist Management service is used for the acquisition of patient demographics. The following SOP Classes may be used to deliver images to store devices:

- Computed Radiography Image Storage

- Digital X-Ray Image Storage - For Presentation

- Digital X-Ray Image Storage - For Processing

- Digital Mammography Image Storage - For Presentation

- Digital Mammography Image Storage - For Processing
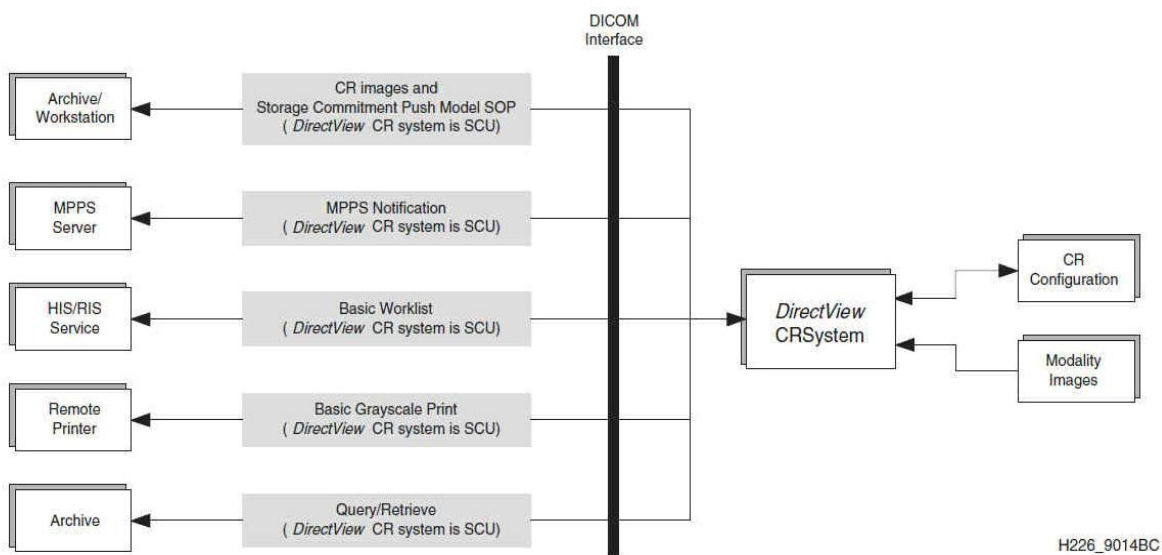
Figure 2.1 Implementation Model

2.1 Functional Definitions

The *DirectView* CR System is a projection radiographic image acquisition product utilizing storage phosphor technology. The system allows the technologist to acquire and identify images, review images for placement and motion, add markers, adjust image processing, manipulate images (flip, rotate, etc.), pan/zoom and route images to their final destinations. The system is capable of obtaining patient demographic information manually from the user interface, the *Carestream DirectView* Remote Operations Panel (ROP), the Remote Patient Data Entry System (RPDES) or via a DICOM Worklist. The ROP is a standalone, network-enabled product that provides a fully functional interface to the device that can be located remotely as needed. The RPDES allows patient demographic data to be entered from remote computers for sites that do not support the DICOM Worklist.

2.2 Sequencing of Real-World Activities

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

All SCU activities are sequentially initiated in the user interface. The task of sending images does not need to complete before initiating another task. The task of manually querying the Worklist SCP is required to complete before the user can perform another task at the user interface.

If a Modality Worklist SCP is present, the CR can be configured to query the Worklist SCP automatically, at a specified interval, in order to update the system's patient database. In this mode of operation, a user action is not required to initiate a query of the Worklist SCP

3 Application Entity Specifications

The *DirectView* CR System provides Standard Conformance to the SOP Classes depicted in Table 1.1 as an SCU.

3.1 Association Establishment Policies

3.1.1 General

3.1.1.1 Delivery

An Association may be attempted whenever a valid destination is selected and at least one image has been acquired.

The maximum PDU size, which the *DirectView* CR System will negotiate, is 128 Kbytes.

3.1.1.2 HIS/RIS

The *DirectView* CR System may be configured to poll the HIS/RIS broker at periodic intervals and/or asynchronously on demand from the user. If periodic polling is enabled, an association for Basic Worklist will be attempted when the *DirectView* CR System application is started and then periodically thereafter.

3.1.2 Number of Associations

3.1.2.1 Delivery

Associations are initiated with the default limitation that no more than three total SCU delivery associations may be open at any given time to a print or a store destination. The default limitation for each class of destination may be increased to 6 by the service provider.

3.1.2.2 HIS/RIS

Two associations may be initiated at a time. The *DirectView* CR System will close each association after receiving a C-FIND response.

3.1.2.3 Storage Commitment

Associations are initiated with the default limitation that no more than three total SCU storage commitment associations may be open at any given time. The default limitation may be increased to 6 by the service provider.

The CR can be configured to support the use of multiple associations for the sending of the storage commitment request and the reception of the success/failure notification.

3.1.3 Asynchronous Nature

The *DirectView* CR System allows up to 1 invoked and 1 performed operation on an Association (it is synchronous).

3.1.4 Implementation Identifying Information

The *DirectView* CR System provides the Implementation Class UID of "1.2.840.113564.3.4.1".

The implementation version name attribute is optional and is not used by the *DirectView* CR System.

The *DirectView* CR System establishes an Association using its network node name for the calling DICOM Application Entity title. The network node name is configurable through the *DirectView* CR System Service Application.

The *DirectView* CR System stores a called DICOM Application Entity Title and socket number for each DICOM compatible network destination it knows about.

3.2　Association Initiation Policy

3.2.1　Associated Real-World Activity

3.2.1.1 Delivery

The *DirectView* CR System initiates Associations for the purpose of sending images and associated information for printing to a Basic Grayscale Print Management SCP and archiving to an SC Image Storage SCP.

The default and well-known socket 5040 will be used for making the Association, unless a product service provider configures a different one.

3.2.1.2 HIS/RIS

The *DirectView* CR System initiates Associations for the purpose of obtaining the current Modality Worklist IOD.

3.2.2　Presentation Context Table

The *DirectView* CR System proposes the Presentation Contexts shown in Table 3.1.

Table 3.1　Presentation Context Table

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Ext.**
Name	**UID**	**Name List**	**UID**	**Role**	**Negot**
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Worklist	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Performed	1.2.840.10008.3.1.2.3.5	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Ext.**
Procedure Step Notification SOP Class		DICOM Implicit VR Little Endian	1.2.840.10008.1.2		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		DICOM Implicit VR Little Endian	1.2.840.10008.1.2		
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		DICOM Implicit VR Little Endian	1.2.840.10008.1.2		

3.2.3   SOP Specific Conformance

3.2.3.1 Verification

The *DirectView* CR System provides standard conformance to the DICOM Verification Service Class:

- When prompted by a user, the *DirectView* CR System will request verification of communication to a remote DICOM AE using the C-ECHO primitive.

- Upon receipt from an SCU of a verification of communication request, the CR will issue confirmation.

3.2.3.2 Delivery

Association attempts will be retried if the SCP rejects the request with the RESULT = 2 (rejected transient) and the REASON = 1 (temporary congestion). If all Association attempts fail, then the user will be notified and the Film Session or Study is saved for resending or deletion. No undelivered image files are deleted without manual user direction.

3.3   Association Acceptance Policy

Upon receipt from an SCU of a verification of communication request, the CR will issue confirmation.

3.4   Basic Print Management Meta SOP Class

The Meta SOP Class is defined by the set of supported SOP Classes depicted in Table 3.2.

Table 3.2   Meta SOP Class

SOP Class	UID Value
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

3.4.1   Basic Film Session SOP Class

3.4.1.1 DIMSE Service N-CREATE

Table 3.3   Basic Film Session SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Possible Values
Number of Copies	U	(2000,0010)	1 –> 99
Print Priority	U	(2000,0020)	HIGH, MED, LOW
Medium Type	U	(2000,0030)	PAPER, CLEAR FILM, BLUE FILM, NONE
Film Destination	U	(2000,0040)	MAGAZINE, PROCESSOR, BIN_n (where n=1 to 9)
Film Session Label	U	(2000,0050)	Up to 64 characters may be provided
Memory Allocation	U	(2000,0060)	Not used

3.4.1.2 DIMSE Service N-Action

The *DirectView* CR System uses the N-ACTION to instruct the SCP to print all films in the session. The *DirectView* CR System is configurable (when the destination is installed) to issue the N-ACTION at the Film Session for destinations known to support this optional service. If the destination is not known to support collation, the *DirectView* CR System will only issue the N-ACTION on the Film Box. For Print SCPs that conform to the N-ACTION specification in Part 4 section H.4.1.2.4 of the DICOM standard, the *DirectView* CR System expects that all film boxes will be collated when printed.

3.4.1.3 DIMSE Service N-SET

This service is not used.

3.4.1.4 DIMSE Service N-DELETE

This service is not used.

3.4.2   Basic Film Box SOP Class

3.4.2.1 DIMSE Service N-CREATE

Table 3.4   Basic Film Box SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Possible Values
Image Display Format	M	(2010,0010)	With no annotation being present, these formats may be used: STANDARD\C,R For LANDSCAPE Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2) For PORTRAIT Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2) With annotation, the ROW Symmetric format is being used as following: With Image annotations alone: ROW\n,m,.., (n,m..) may = (1,1), (1,1,1,1), (2,2), (2,2,2,2) With Page annotations alone: ROW\n,m,.., (n,m..) may = (1,1), (1,1,1), (2,2), (2,2,2,2) With Image and Page annotation combined: ROW\n,m,.., (n,m..) may = (1,1,1), (1,1,1,1,1), (2,2,1), (2,2,2,2,1)
Referenced Film Session Sequence	M	(2010,0500)	
>Referenced SOP Class UID	M	(0008,1150)	
>Referenced SOP Instance UID	M	(0008,1155)	
Referenced Basic Image Box Sequence	-	(2010,0510)	Not sent.
Referenced Basic Annotation Box Sequence	-	(2010,0520)	Not used.
Film Orientation	U	(2010,0040)	PORTRAIT, LANDSCAPE
Film Size ID	U	(2010,0050)	8INX10IN 8.5INX11IN 8.5INX12IN 10INX12IN 11INX14IN 14INX14IN 14INX17IN 10INX12IN A4
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE Will be constant for the entire Film Box.
Max Density	U	(2010,0130)	0-450 Configurable for Destination
Configuration Information	U	(2010,0150)	Not used.
Annotation Display Format ID	U	(2010,0030)	Not used

Attribute	SCU Usage	Tag	Possible Values
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED ENHANCED1 Valid only for Magnification Type CUBIC. 0-15
Border Density	U	(2010,0100)	410 Configurable for Destination
Empty Image Density	U	(2010,0110)	Not used
Min Density	U	(2010,0120)	0-410 (Value must be less than Max Density (2010,0130)) Configurable for Destination
Illumination	MC	(2010,015E)	Positive integer in units of cd/m^2 Configurable for Destination
Reflective Ambient Light	MC	(2010,0160)	Positive integer in units of cd/m^2 Configurable for Destination
Trim	U	(2010,0140)	YES and NO

3.4.2.2 DIMSE Service N-ACTION

The *DirectView* CR System uses the N-ACTION to instruct the SCP to print the current film in the session.

3.4.2.3 DIMSE Service N-SET

This service is not used.

3.4.2.4 DIMSE Service N-DELETE

This service is not used.

3.4.3 Basic Image Box SOP Class

3.4.3.1 DIMSE Service N-SET

Table 3.5 Basic Image Box SOP Class – Supported Attributes

Attribute & Usage	SCU Usage	Tag	Supported Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format
Preformatted Grayscale Image Sequence	M	(2020,0110)	
>Samples Per Pixel	M	(0028,0002)	1
>Photometric Interpretation	M	(0028,0004)	MONOCHROME1, MONOCHROME2
>Rows	M	(0028,0010)	Minimum Value 64 Maximum Values: Known for all *Carestream* printers, configurable for others. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value.

Attribute & Usage	SCU Usage	Tag	Supported Values
>Columns	M	(0028,0011)	Minimum Value 64 Maximum Values: Known for all *Carestream* printers, configurable for others. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value.
>Pixel Aspect Ratio	MC	(0028,0034)	R\C R, C = 1 to 9999 (Integer) **Note**: This attribute is always included, even if it is 1\1. It's value will always be 1\1 if Magnification Type is NONE
>Bits Allocated	M		16
>Bits Stored	M	(0028,0101)	12
>High Bit	M	(0028,0102)	Bits Stored -1
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored
Polarity	U	(2020,0020)	NORMAL
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC,NONE **Note**: Is always the same as the Magnification Type specified for the Film Box.
Smoothing Type	U	(2010,0080)	NORMAL, ENHANCED, ENHANCED1 Valid only for Magnification Type CUBIC. 0-15 Must be the same as the Smoothing Type specified for the Film Box.
Configuration Information	U	(2010,0150)	Not used.
Requested Image Size	U	(2020,0030)	Row length in mm up to the size of the printable image, which is a function of Image Display Format and Film Size ID.

3.4.4   Printer SOP Class

3.4.4.1 DIMSE Service N-EVENT-REPORT

The *DirectView* CR System will process the indication of the N-EVENT-REPORT operation. Any string sent by the SCP is accepted and displayed on the *DirectView* CR System user interface. In this translation, all characters that are not space characters or in the ASCII range "A" - "Z" are stripped.

The *DirectView* CR System translates Attributes as described in Table 3.6. Other strings are not translated but may be displayed on a *DirectView* CR System user interface.

Table 3.6   Basic Image Box SOP Class – Supported Attributes

Attribute	SCU Usage	Tag	Expected Values

Attribute	SCU Usage	Tag	Expected Values
Printer Status	U	(2110,0010)	NORMAL WARNING FAILURE
Printer Status Info	U	(2110,0020)	Any valid string including the following. for NORMAL conditions: "NORMAL" for WARNING conditions: "RECEIVER FULL", "FILM JAM", "PRINTER NOT RDY", "PROCESSOR DOWN", "CHECK PROCESSOR", "PROC NOT READY", "NO RECEIVE MGZ", "NO SUPPLY MGZ", "NO TONER", "NO STATE", "CHECK RIBBON", "PRINTER BUSY", "OFFLINE", "PRINTER STOPPED", "CHECK SUPPLY MAG", "COVER OPEN", "PRINTER OFFLINE", "EXPOSURE FAILURE", "CHECK R MAG", "PROC NOT RDY", "STATE UNKNOWN", "CHECK INK CART", "INK OUT", "QUEUED", "SUPPLY EMPTY", "SUPPLY LOW", "BAD RECEIVE MGZ", "BAD SUPPLY MGZ", "FILM TRANSP ERR", "CHECK CHEMISTRY", "CHECK SORTER", "CHEMICALS LOW", "CHEMICALS EMPTY",

Attribute	SCU Usage	Tag	Expected Values
Printer Status Info (continued from previous page)			"FINISHER EMPTY", "FINISHER ERROR", "FINISHER LOW", "CHECK PROC", "PRINTER BUSY", "PROC DOWN", "PROC INIT", "PROC OVERFLOW FL", "PROC OVERFLOW HI", "PRINTER DOWN", "PRINTER INIT", "CALIBRATING", "CALIBRATION ERR", "ELEC CONFIG ERR", "ELEC DOWN", "ELEC SW ERROR", "EXPOSURE FAILURE", "REQ MED NOT INST", "REQ MED NOT AVAI", "RIBBON ERROR", "NO RIBBON", "UNKNOWN" for FAILURE conditions: "FATAL", "INVALID PAGE DES", "INSUFFIC MEMORY", "FATAL ERROR", "CHECK PRINTER", "PRINTER DOWN", "NO RESPONSE", "RIBBON MISMATCH", "TIME OUT", "UNKNOWN STATUS
Printer Name	U	(2110,0030)	Any valid string
Printer Manufacturer	U	(0008,0070)	Any valid string
Printer Manufacturer Model Name	U	(0008,1090)	Any valid string
Printer Device Serial Number	U	(0018,1000)	Any valid string
Software Version	U	(0018,1020)	Any valid string
Date of Last Calibration	U	(0018,1200)	Ignored
Time of Last Calibration	U	(0018,1201)	Ignored

3.5   Store Service Classes

Table 1.1 lists all the Storage SOP Classes that are supported by the DirectView CR. The following tables list, for each Storage SOP Class, the attributes that the DirectView supports.

3.5.1 Digital X-Ray Image Storage

The DirectView CR provides standard conformance to the Digital X-Ray Image Storage SOP Class as an SCU.

Table 3.7   Digital X-Ray Image SOP Class – For Presentation

SOP Class	SOP Class UID
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1 .1

Table 3.8   Digital X-Ray Image SOP Class – For Processing

SOP Class	SOP Class UID
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1

Table 3.9   Digital X-Ray Image SOP Class – Supported Attributes

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Patient Module			
Patient Name	(0010,0010)	2	Refer to addendum B
Patient ID	(0010,0020)	2	Refer to addendum B
Patient Birth Date	(0010,0030)	2	Refer to addendum B
Patient Sex	(0010,0040)	2	Refer to addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	Only sent if received from modality worklist
Other Patient Names	(0010,1001)	3	Only sent if received from modality worklist
Ethnic Group	(0010,2160)	3	Only sent if received from modality worklist
Patient Comments	(0010,4000)	3	Refer to addendum B
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to addendum B
Study Time	(0008,0030)	2	Refer to addendum B
Referring Physician Name	(0008,0090)	2	Refer to addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to addendum B
Study Description	(0008,1030)	3	Refer to addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	Refer to addendum B
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	DX
Series Instance UID	(0020,000E)	1	A series may contain a single or multiple images depending on configuration specified by Key Operator
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to addendum B
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to addendum B
Performed Procedure Step Start Date	(0040,0244)	3	Refer to addendum B
Performed Procedure Step Start Time	(0040,0245)	3	Refer to addendum B
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to addendum B

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Performed Protocol Code Sequence	(0040,0260)	3	
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to addendum B
DX Series			
Modality	(0008,0060)	1	DX
Referenced Performed Procedure Step Sequence	(0008,1111)	1C	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Presentation Intent Type	(0008,0068)	1	FOR PRESENTATION
General Equipment			
Manufacturer	(0008,0070)	2	Carestream
Institution Name	(0008,0080)	3	Configuration item entered by Key Operator
Institution Address	(0008,0081)	3	Configuration item entered by Key Operator
Station Name	(0008,1010)	3	This is the computer name that is Input by Service
Institutional Department Name	(0008,1040)	3	Refer to addendum B

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Manufacturer Model Name	(0008,1090)	3	
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			
Instance Number	(0020,0013)	2	Within a series, the instance number may be configured by the Key Operator to be 1 or a unique value.
Patient Orientation	(0020,0020)	2C	Value specified per view and cannot be modified by site or Key operator may select "L/F" for all images
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	
Content Time	(0008,0033)	2C	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Derivation Description	(0008,2111)	3	
Acquisition Number	(0020,0012)	3	
Source Image Sequence	(0008,2112)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Images In Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to addendum B
Lossy Image Compression	(0028,2110)	3	Always 00
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 P-values and Luminance always use monochrome 2 Density always uses monochrome 1
Planar Configuration	(0028,0006)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Rows	(0028,0010)	1	1250
			1792
			2048
			2200
			2355
			2392
			2400
			2500
			2600
			3000
			3548
			4330
			4784
			4800
			6000
			Supported values are model dependent
Columns	(0028,0011)	1	1250
			1792
			2048
			2200
			2355
			2392
			2400
			2500
			2600
			3000
			3548
			4330
			4784
			4800
			6000
			Supported values are model dependent
Pixel Aspect Ratio	(0028,0034)	1C	1\1
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	1	0
Largest Image Pixel Value	(0028,0107)	1	4095
Pixel Data	(7FE0,0010)	1	
Contrast/Bolus			
Contrast/Bolus Agent	(0028,0010)	2	Refer to addendum B
DX Anatomy Imaged			
Image Laterality	(0020,0062)	1	L R
Anatomic Region Sequence	(0008,2218)	2	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
DX Image			
Image Type	(0008,0008)	1	
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 P-values and Luminance always use monochrome 2 Density always uses monochrome 1
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Pixel Intensity Relationship	(0028,1040)	1	LOG

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Pixel Intensity Relationship Sign	(0028,1041)	1	1
Rescale Intercept	(0028,1052)	1	0
Rescale Slope	(0028,1053)	1	
Rescale Type	(0028,1054)	1	US
Presentation LUT Shape	(2050,0020)	1	IDENTITY
Lossy Image Compression	(0028,2110)	1	00
Derivation Description	(0008,2111)	3	
Acquisition Device Processing Description	(0018,1400)	3	
Acquisition Device Processing Code	(0018,1401	3	
Patient Orientation	(0020,0020)	1	Value specified per view and cannot be modified by site or Key operator may select "L/F" for all images
Calibration Image	(0050,0004)	3	
Burned In Annotation	(0028,0301)	1	NO
VOI LUT Sequence	(0028,3010)	1C	Based on destination configuration, either the LUT or window/level values, but never both, will be sent
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	3	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
Window Center & Width Explanation	(0028,1055)	3	
DX Detector			
Detector Type	(0018,7004)	2	STORAGE
Detector ID	(0018,700A)	3	CR Plate ID value
Imager Pixel Spacing	(0018,1164)	1	0.168\0.168 0.171\0.171 0.115\0.115 0.097\0.097 0.0485\0.0485
VOI LUT			

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
VOI LUT Sequence	(0028,3010)	3	Based on destination configuration, either the LUT or window/level values, but never both, will be sent
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
Acquisition Context			
Acquisition Context Sequence	(0040,0555)	2	
>Value Type	(0040,A040)	3	
>Concept Name Code Sequence	(0040,AD43)	1	
>Referenced Frame Numbers	(0040,A136)	1C	
>Numeric Value	(0040,A30A)	1C	
>Measurement Units Code Sequence	(0040,08EA)	1C	
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Context Identifier	(0008,010F)	3	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Group Extension Flag	(0008,010B)	3	
>>Context Group Local Version	(0008,0107)	1C	
>>Context Group Extension Creator UID	(0008,010D)	1C	
>Date	(0040,A121)	1C	
>Time	(0040,A122)	1C	
>Person Name	(0040,A123)	1C	
>Text Value	(0040,A160)	1C	
>Concept Code Sequence	(0040,A168)	1C	
>>Code Value	(0008,0100)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Context Identifier	(0008,010F)	3	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Group Extension Flag	(0008,010B)	3	
>>Context Group Local Version	(0008,0107)	1C	
>>Context Group Extension Creator UID	(0008,010D)	1C	
Acquisition Context Description	(0040,0556)	3	
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.2 Digital Mammography X-Ray Image Storage

The DirectView CR provides standard conformance to the Digital Mammography X-Ray Image Storage SOP Class as an SCU.

Table 3.10 Digital Mammography X-Ray Image SOP Class – For Presentation

SOP Class	SOP Class UID
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2

Table 3.11 Digital Mammography X-Ray Image SOP Class – For Processing

SOP Class	SOP Class UID
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1

Table 3.12 Digital Mammography X-Ray Image SOP Class – Supported Attributes

Attribute Name	Tag	DICOM Type	Supported Values/ Comments

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Patient Module			
Patient Name	(0010,0010)	2	Refer to addendum B
Patient ID	(0010,0020)	2	Refer to addendum B
Patient Birth Date	(0010,0030)	2	Refer to addendum B
Patient Sex	(0010,0040)	2	Refer to addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	Only sent if received from modality worklist
Other Patient Names	(0010,1001)	3	Only sent if received from modality worklist
Ethnic Group	(0010,2160)	3	Only sent if received from modality worklist
Patient Comments	(0010,4000)	3	
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to addendum B
Study Time	(0008,0030)	2	Refer to addendum B
Referring Physician Name	(0008,0090)	2	Refer to addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to addendum B
Study Description	(0008,1030)	3	Refer to addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	Refer to addendum B
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	MG
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to addendum B
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to addendum B
Performed Procedure Step Start Date	(0040,0244)	3	Refer to addendum B
Performed Procedure Step Start Time	(0040,0245)	3	Refer to addendum B
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to addendum B
Performed Protocol Code Sequence	(0040,0260)	3	
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to addendum B
DX Series			
Modality	(0008,0060)	1	MG
Referenced Performed Procedure Step Sequence	(0008,1111)	1C	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Presentation Intent Type	(0008,0068)	1	
Mammography Series			
Modality	(0008,0060)	1	MG
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure ID	(0040,1001)	1	
>Scheduled Procedure Step ID	(0040,0009)	1	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
General Equipment			
Manufacturer	(0008,0070)	2	Carestream
Institution Name	(0008,0080)	3	Configuration item entered by Key Operator
Institution Address	(0008,0081)	3	Configuration item entered by Key Operator
Station Name	(0008,1010)	3	This is the computer name that is Input by Service
Institutional Department Name	(0008,1040)	3	Refer to addendum B
Manufacturer Model Name	(0008,1090)	3	
Device Serial Number	(0018,1000)	3	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Software Versions	(0018,1020)	3	
Pixel Padding Value	(0028,0120)	3	
General Image			
Instance Number	(0020,0013)	2	Within a series, the instance number may be configured by the Key Operator to be 1 or a unique value.
Patient Orientation	(0020,0020)	2C	Value specified per view and cannot be modified by site or Key operator may select "L/F" for all images
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	
Content Time	(0008,0033)	2C	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Derivation Description	(0008,2111)	3	
Acquisition Number	(0020,0012)	3	
Source Image Sequence	(0008,2112)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
>Spatial Locations Preserved	(0028,135A)	3	
Images In Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to addendum B
Lossy Image Compression	(0028,2110)	3	00
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 P-values and Luminance always use monochrome 2 Density always uses monochrome 1
Planar Configuration	(0028,0006)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Rows	(0028,0010)	1	3584 4784 4800 6000
Columns	(0028,0011)	1	`3584 4784 4800 6000
Pixel Aspect Ratio	(0028,0034)	1C	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	1	0
Largest Image Pixel Value	(0028,0107)	1	4095
Pixel Data	(7FE0,0010)	1	
Contrast/Bolus			
Contrast/Bolus Agent	(0028,0010)	2	Refer to addendum B
DX Anatomy Imaged			
Image Laterality	(0020,0062)	1	L R
Anatomic Region Sequence	(0008,2218)	2	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
DX Image			
Image Type	(0008,0008)	1	
Samples per Pixel	(0028,0002)	1	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Photometric Interpretation	(0028,0004)	1	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Pixel Intensity Relationship	(0028,1040)	1	LOG
Pixel Intensity Relationship Sign	(0028,1041)	1	1
Rescale Intercept	(0028,1052)	1	0
Rescale Slope	(0028,1053)	1	
Rescale Type	(0028,1054)	1	US
Presentation LUT Shape	(2050,0020)	1	IDENTITY
Lossy Image Compression	(0028,2110)	1	00
Derivation Description	(0008,2111)	3	
Acquisition Device Processing Description	(0018,1400)	3	
Acquisition Device Processing Code	(0018,1401)	3	
Patient Orientation	(0020,0020)	1	Value specified per view and cannot be modified by site or Key operator may select "L/F" for all images
Calibration Image	(0050,0004)	3	
Burned In Annotation	(0028,0301)	1	NO
VOI LUT Sequence	(0028,3010)	1C	Based on destination configuration, either the LUT or window/level values, but never both, will be sent
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	3	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
Window Center & Width Explanation	(0028,1055)	3	
DX Detector			
Detector Type	(0018,7004)	2	STORAGE
Detector ID	(0018,700A)	3	CR Plate ID value

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Imager Pixel Spacing	(0018,1164)	1	0.097\0.097 0.0485\0.0485
DX Positioning			
View Position	(0018,5101)	3	
Patient Orientation Code Sequence	(0054,0410)	3	Refer to Context Identifier 19 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
>Patient Orientation Modifier Code Sequence	(0054,0412)	2	Refer to Context Identifier 20 in Addendum A for supported SNOMED Code Values
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	3	
Estimated Radiographic Magnification Factor	(0018,1114)	3	
Compression Force	(0018,11A2)	3	Refer to addendum B
Positioner Primary Angle	(0018,1510)	3	
Positioner Type	(0018,1508)	2	
X-Ray Acquisition Dose			
KVP	(0018,0060)	3	Refer to addendum B
X-Ray Tube Current	(0018,1151)	3	
Exposure Time	(0018,1150)	3	
Exposure	(0018,1152)	3	Refer to addendum B

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Distance Source to Detector	(0018,1110)	3	Refer to addendum B
Distance Source to Patient	(0018,1111)	3	Refer to addendum B
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	
Body Part Thickness	(0018,11A0)	3	Refer to addendum B
Focal Spot	(0018,1190)	3	
Entrance Dose	(0040,0302)	3	
Organ Dose	(0040,0316)	3	
Anode Target Material	(0018,1191)	3	Refer to addendum B
Filter Material	(0018,7050)	3	Refer to addendum B
Mammography Image			
Positioner Type	(0018,1508)	1	
Image Laterality	(0020,0062)	1	
Organ Exposed	(0040,0318)	1	
View Code Sequence	(0054,0220)	1	Refer to Context Identifier 4014 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
>View Angulation Modifier Code Sequence	(0054,0222)	2	Refer to Context Identifier 4015 in Addendum A for supported SNOMED Code Values
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	3	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
Anatomic Region Sequence	(0008,2218)	1	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	Based on destination configuration, either the LUT or window/level values, but never both, will be sent
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
Acquisition Context			
Acquisition Context Sequence	(0040,0555)	2	
>Value Type	(0040,A040)	3	
>Concept Name Code Sequence	(0040,AD43)	1	
>Referenced Frame Numbers	(0040,A136)	1C	
>Numeric Value	(0040,A30A)	1C	
>Measurement Units Code Sequence	(0040,08EA)	1C	
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Context Identifier	(0008,010F)	3	
>>Mapping Resource	(0008,0105)	1C	

Attribute Name	Tag	DICOM Type	Supported Values/ Comments
>>Context Group Version	(0008,0106)	1C	
>>Context Group Extension Flag	(0008,010B)	3	
>>Context Group Local Version	(0008,0107)	1C	
>>Context Group Extension Creator UID	(0008,010D)	1C	
>Date	(0040,A121)	1C	
>Time	(0040,A122)	1C	
>Person Name	(0040,A123)	1C	
>Text Value	(0040,A160)	1C	
>Concept Code Sequence	(0040,A168)	1C	
>>Code Value	(0008,0100)	1C	
>>Coding Scheme Designator	(0008,0102)	1C	
>>Coding Scheme Version	(0008,0103)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Context Identifier	(0008,010F)	3	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Group Extension Flag	(0008,010B)	3	
>>Context Group Local Version	(0008,0107)	1C	
>>Context Group Extension Creator UID	(0008,010D)	1C	
Acquisition Context Description	(0040,0556)	3	
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.3 Computed Radiography Image Storage

The DirectView CR provides standard conformance to the Computed Radiography Image Storage SOP Class as an SCU.

Table 3.13   Computed Radiography Image SOP Class

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1

Table 3.14   Computed Radiography Image SOP Class – Supported Attributes

Attribute Name	Tag	DICOM Type	Supported Values/Comments
Patient Module			
Patient Name	(0010,0010)	2	Refer to addendum B
Patient ID	(0010,0020)	2	Refer to addendum B
Patient Birth Date	(0010,0030)	2	Refer to addendum B
Patient Sex	(0010,0040)	2	Refer to addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	Only sent if received from modality worklist
Other Patient Names	(0010,1001)	3	Only sent if received from modality worklist
Ethnic Group	(0010,2160)	3	Only sent if received from modality worklist
Patient Comments	(0010,4000)	3	
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to addendum B
Study Time	(0008,0030)	2	Refer to addendum B
Referring Physician Name	(0008,0090)	2	Refer to addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to addendum B
Study Description	(0008,1030)	3	Refer to addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	Refer to addendum B
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			

Attribute Name	Tag	DICOM Type	Supported Values/Comments
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	CR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to addendum B
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to addendum B
Performed Procedure Step Start Date	(0040,0244)	3	Refer to addendum B
Performed Procedure Step Start Time	(0040,0245)	3	Refer to addendum B
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to addendum B
Performed Protocol Code Sequence	(0040,0260)	3	
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	

Attribute Name	Tag	DICOM Type	Supported Values/Comments
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to addendum B
CR Series			
Body Part Examined	(0018,0015)	2	Refer to addendum B
View Position	(0018,5101)	2	Refer to addendum B
General Equipment			
Manufacturer	(0008,0070)	2	Carestream
Institution Name	(0008,0080)	3	Configuration item entered by Key Operator
Institution Address	(0008,0081)	3	Configuration item entered by Key Operator
Station Name	(0008,1010)	3	This is the computer name that is Input by Service
Institutional Department Name	(0008,1040)	3	Refer to addendum B
Manufacturer Model Name	(0008,1090)	3	
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			
Instance Number	(0020,0013)	2	Within a series, the instance number may be configured by the Key Operator to be 1 or a unique value.
Patient Orientation	(0020,0020)	2C	Value specified per view and cannot be modified by site or Key operator may select "L/F" for all images
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	
Content Time	(0008,0033)	2C	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Derivation Description	(0008,2111)	3	

Attribute Name	Tag	DICOM Type	Supported Values/Comments
Acquisition Number	(0020,0012)	3	
Images In Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to addendum B
Lossy Image Compression	(0028,2110)	3	00
Image Plane			
Pixel Spacing	(0028,0030)	3	0.168\0.168 0.171\0.171. 0.115\0.115 0.097\0.097
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 P-values and Luminance always use monochrome 2 Density always uses monochrome 1
Planar Configuration	(0028,0006)	1C	
Rows	(0028,0010)	1	1250 1792 2048 2200 2355 2392 2400 2500 2600 3548 4330 Supported values are model dependent

Attribute Name	Tag	DICOM Type	Supported Values/Comments
Columns	(0028,0011)	1	1250
			1792
			2048
			2200
			2355
			2392
			2400
			2500
			2600
			3548
			4330
			Supported values are model dependent
Pixel Aspect Ratio	(0028,0034)	1C	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	1	0
Largest Image Pixel Value	(0028,0107)	1	4095
Pixel Data	(7FE0,0010)	1	
CR Image			
KVP	(0018,0060)	3	Refer to addendum B
Plate ID	(0018,1004)	3	Refer to addendum B
Distance Source to Detector	(0018,1110)	3	Refer to addendum B
Distance Source to Patient	(0018,1111)	3	Refer to addendum B
Exposure	(0018,1152)	3	Refer to addendum B
Imager Pixel Spacing	(0018,1164)	3	"0.168\0.168"
			"0.171\0.171"
			"0.115\0.115"
			"0.097\0.097"
Cassette Orientation	(0018,1402)	3	LANDSCAPE
			PORTRAIT

Attribute Name	Tag	DICOM Type	Supported Values/Comments
Cassette Size	(0018,1403)	3	15CMX30CM 18CMX24CM 24CMX30CM 35CMX35CM 35CMX43CM The term "COMPOSITE" will be used for the cassette size of a combined image.
Relative X-Ray Exposure	(0018,1405)	3	0 to 4095
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to addendum B
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	Based on destination configuration, either the LUT or window/level values, but never both, will be sent
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	
Window Width	(0028,1051)	1C	
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.4 Grayscale Softcopy Presentation State IOD

The DirectView CR provides standard conformance to the Grayscale Softcopy Presentation State Storage SOP Class as an SCU.

Table 3.15   Grayscale Softcopy Presentation State SOP Class

SOP Class	SOP Class UID
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1

Table 3.16   Grayscale Softcopy Presentation State SOP Class Attributes

Attribute Name	Tag	DICOM Type	Supported Values

Attribute Name	Tag	DICOM Type	Supported Values
Patient Module			
Patient Name	(0010,0010)	2	Refer to addendum B
Patient ID	(0010,0020)	2	Refer to addendum B
Patient Birth Date	(0010,0030)	2	Refer to addendum B
Patient Sex	(0010,0040)	2	Refer to addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	Only sent if received from modality worklist
Other Patient Names	(0010,1001)	3	Only sent if received from modality worklist
Ethnic Group	(0010,2160)	3	Only sent if received from modality worklist
Patient Comments	(0010,4000)	3	Refer to addendum B
General Study			
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	Refer to addendum B
Study Time	(0008,0030)	2	Refer to addendum B
Referring Physician Name	(0008,0090)	2	Refer to addendum B
Study ID	(0020,0010)	2	
Accession Number	(0008,0050)	2	Refer to addendum B
Study Description	(0008,1030)	3	Refer to addendum B
Referenced Study Sequence	(0008,1110)	3	
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	Refer to addendum B
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	1C	
> Code Meaning	(0008,0104)	1C	
Patient Study			
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to addendum B
Series Date	(0008,0021)	3	
Protocol Name	(0008,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to addendum B
Performed Procedure Step Start Date	(0040,0244)	3	Refer to addendum B
Performed Procedure Step Start Time	(0040,0245)	3	Refer to addendum B
Performed Procedure Step ID	(0040,0253)	3	
Performed Procedure Step Description	(0040,0254)	3	Refer to addendum B
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to addendum B
Presentation Series			
Modality	(0008,0060)	1	
View Position	(0018,5101)	2	

Attribute Name	Tag	DICOM Type	Supported Values
General Equipment			
Manufacturer	(0008,0070)	2	Carestream
Institution Name	(0008,0080)	3	Configuration item entered by Key Operator
Institution Address	(0008,0081)	3	Configuration item entered by Key Operator
Station Name	(0008,1010)	3	This is the computer name that is Input by Service
Institutional Department Name	(0008,1040)	3	Refer to addendum B
Manufacturer Model Name	(0008,1090)	3	
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
Presentation State			
Instance Number	(0020,0013)	1	Within a series, the instance number may be configured by the Key Operator to be 1 or a unique value.
Content Label	(0070,0080)	1	
Content Description	(0070,0081)	2	
Presentation Creation Date	(0070,0082)	1	
Presentation Creation Time	(0070,0083)	1	
Content Creator's Name	(0070,0084)	2	
Reference Series Sequence	(0008,1115)	1	
> Series Instance UID	(0020,000E)	1	
> Referenced Image Sequence	(0008,1140)	1	
>> Referenced SOP Class UID	(0008,1150)	1	
>> Referenced SOP Instance UID	(0008,1155)	1	
>> Referenced Frame Number	(0008,1160)	1	
Shutter Presentation Value	(0018,1622)	1C	0
Mask Subtraction Sequence	(0028,6100)	1C	
> Mask Operation	(0028,6101)	1	
> Contrast Frame Averaging	(0028,6112)	1C	
> Recommended Viewing Mode	(0028,1090)	1C	
Display Shutter			

Attribute Name	Tag	DICOM Type	Supported Values
Shutter Shape	(0018,1600)	1	POLYGONAL
Vertices of the Polygonal Shutter	(0018,1620)	1C	
Shutter Presentation Value	(0018,1622)	3	0
Overlay Plane			This information is only sent for measurement tool overlays
Overlay Rows	(60xx,0010)	1	
Overlay Columns	(60xx,0011)	1	
Overlay Type	(60xx,0040)	1	
Overlay Origin	(60xx,0050)	1	
Overlay Bits Allocated	(60xx,0040)	1	
Overlay Bit Position	(60xx,0102)	1	
Overlay Data	(60xx,3000)	1C	
Displayed Area			Dimensions of entire image always sent
Displayed Area Selection Sequence	(0070,005A)	1	
> Referenced Image Sequence	(0008,1140)	1C	
> > Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
>> Referenced Frame Number	(0008,1160)	1C	
> Displayed Area Top Left Hand Corner	(0070,0052)	1	
> Displayed Area Bottom Hand Corner	(0070,0053)	1	
> Presentation Size Mode	(0070,0100)	1	SCALE TO FIT
> Presentation Pixel Spacing	(0070,0101)	1C	Imager Pixel spacing value
> Presentation Pixel Aspect Ratio	(0070,0102)	1C	Never sent
Graphic Annotation			
Spatial Transformation			
Image Rotation	(0070,0042)	1	Always 0 (no rotation)
Image Horizontal Flip	(0070,0041)	1	Always N (no flip)
Softcopy VOI LUT			

Attribute Name	Tag	DICOM Type	Supported Values
Softcopy VOI LUT Sequence	(0028,3110)	1	
> Window Center	(0028,1050)	1C	
> Window Width	(0028,1051)	1C	
Softcopy Presentation LUT			
Presentation LUT Sequence	(2050,0010)	1C	
Presentation LUT Shape	(2050,0020)	1C	IDENTITY
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.6　Basic Worklist Service

The C-FIND request for a Modality Worklist sends an Identifier object that contains all the attributes of the Modality Worklist Information Model. Table 3.17 shows the Matching Key attributes that may optionally contain a non-NULL value in the request.

Table 3.17　Matching Key Attributes

Attribute name	Tag
Accession Number	(0008,0050)
Modality	(0008,0060)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Scheduled Station AE Title	(0040,0001)
Scheduled Procedure Step Start Date	(0040,0002)
Scheduled Procedure Step Start Time	(0040,0003)
Requested Procedure ID	(0040,0101)
Scheduled Station Name	(0040,0010)

This is intended to produce a series of responses from the Worklist SCP for all matching Scheduled Procedures on the said Station.

The system can be configured to send this request periodically at an interval of 1 to 720 minutes. The user may also issue a non-periodic C-FIND request to obtain information for a patient recently added by the site's information system.

3.6.1 Modality Worklist IOD

The DirectView CR provides standard conformance to the Modality Worklist Information Model – FIND SOP Class as an SCU.

For additional information on the Modality Worklist Information Model, refer to the DICOM specification, Part 4, Table K.6-1. The CR will accept any valid character set for the Specific Character Set attribute (0008,0005).

Table 3.18   Modality Worklist SOP Class

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

Table 3.19   Modality Worklist SOP Class – Required Attributes

Attribute Name	Tag	Matching Key
SOP Common		
SOP Class UID	(0008,0016)	
SOP Instance UID	(0008,0018)	
Specific Character Set	(0008,0005)	
Scheduled Procedure Step		
Scheduled Procedure Step Sequence	(0040,0100)	Required
> Scheduled Station AE Title	(0040,0001)	Required
> Scheduled Procedure Step Start Date	(0040,0002)	Required
> Scheduled Procedure Step Start Time	(0040,0003)	Required
> Modality	(0008,0060)	Required
>Requested Contrast Agent	(0032,1070)	
> Scheduled Performing Physician's Name	(0040,0006)	Required
>Scheduled Procedure Step Description	(0040,0007)	
>Scheduled Station Name	(0040,0010)	
>Scheduled Protocol Code Sequence	(0040,0008)	
>>Code Value	(0008,0100)	

Attribute Name	Tag	Matching Key
>>Coding Scheme Designator	(0008,0102)	
>>Code Meaning	(0008,0104)	
>Scheduled Procedure Step ID	(0040,0009)	
Requested Procedure		
Requested Procedure ID	(0040,1001)	
Requested Procedure Description	(0032,1060)	
Requested Procedure Code Sequence	(0032,0164)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Code Meaning	(0008,0104)	
Study Instance UID	(0020,000D)	
Referenced Study Sequence	(0008,1110)	
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Requested Procedure Priority	(0040,1003)	
Requested Procedure Location	(0040,1005)	
Imaging Service Request		
Referring Physicians Name	(0008,0090)	
Accession Number	(0008,0050)	
Requesting Service	(0032,1033)	
Visit Status		
Visit Status ID	(0038,0008)	
Patient's Institution Residence	(0038,0400)	
Patient Identification		
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Other Patient Ids*	(0010,1000)	
Other Patient Names	(0010,1001)	

Attribute Name	Tag	Matching Key
Patient Demographic		
Patient's Birth Date	(0010,0030)	
Patient's Birth Time	(0010,0032)	
Patient's Sex	(0010,0040)	
Patient's Age	(0010,1010)	
Patient's Size	(0010,1020)	
Patient's Weight	(0010,1030)	
Ethnic Group	(0010,2160)	
Occupation	(0010,2180)	
Patient Medical		
Additional Patient's History	(0010,21B0)	

* Accept only one value (the first value) from the Modality Worklist with a maximum length of 64 characters

3.6.2 Procedure Mapping

The procedure mapping feature of the CR products automatically builds the image icons and pre-populates fields such as body/part and projections from information supplied by the key operator. This eliminates the need for the technologists to supply this information for every image created.

For the procedure mapping to function properly, the CR must receive the correct code in one of the following fields:

- Requested Procedure Code Sequence (0032,1064) > Code value (0008,0100)
- Requested Procedure ID (0040,1001)
- Scheduled Protocol Code Sequence (0040,0008) > Code Value (0008,0100)

3.7   Modality Performed Procedure Step Notification SOP Class

The Modality Performed Procedure Step (MPPS) commands N-CREATE and N-SET will be sent to the HIS/RIS or PACS by the *DirectView* CR operator to signal the start and end of a study, respectively.

3.7.1 Modality Performed Procedure Step Notification IOD

The DirectView CR provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

Table 3.20   Modality Performed Procedure Step SOP Class

SOP Class	SOP Class UID
Modality Performed Procedure Step Notification	1.2.840.10008.3.1.2.3.5

Table 3.21   Modality Performed Procedure Step Attributes

Attribute Name	Tag	DICOM Type	Supported Values
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	
Performed Procedure Step Relationship			
Patient Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Patient Birth Date	(0010,0030)	2	
Patient Sex	(0010,0040)	2	
Scheduled Step Attribute Sequence	(0040,0270)	1	
> Study Instance UID	(0010,1000)	1	
> Referenced Study Sequence	(0008,1110)	2	
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
> Accession Number	(0008,0050)	2	
> Requested Procedure ID	(0040,1001)	2	
> Requested Procedure Description	(0032,1060)	2	
> Scheduled Procedure Step ID	(0040,0009)	2	
> Scheduled Procedure Step Description	(0040,0007)	2	
> Scheduled Protocol Code Sequence	(0040,0008)	2	
>> Code Value	(0008,0100)	1C	
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	3	
>> Code Meaning	(0008,0104)	3	
Referenced Patient Sequence	(0008,1120)	2	

Attribute Name	Tag	DICOM Type	Supported Values
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	
Performed Procedure Step Information			
Performed Procedure Step ID	(0040,0253)	1	
Performed Station AE Title	(0040,0241)	1	
Performed Station Name	(0040,0242)	2	
Performed Location	(0040,0243)	2	
Performed Procedure Step Start Date	(0040,0244)	1	
Performed Procedure Step Start Time	(0040,0245)	1	
Performed Procedure Step Status	(0040,0252)	1	
Performed Procedure Step Description	(0040,0254)	2	
Performed Procedure Type Description	(0040,0255)	2	
Procedure Code Sequence	(0008,1032)	2	
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	3	
> Code Meaning	(0008,0104)	3	
Performed Procedure Step End Date	(0040,0250)	2	
Performed Procedure Step End Time	(0040,0251)	2	
Image Acquisition Results			
Modality	(0008,0060)	1	
Study ID	(0020,0010)	3	
Performed Protocol Code Sequence	(0040,0260)	2	
> Code Value	(0008,0100)	1C	
> Coding Scheme Designator	(0008,0102)	1C	
> Coding Scheme Version	(0008,0103)	3	

Attribute Name	Tag	DICOM Type	Supported Values
> Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	2	
> Performing Physician's Name	(0040,0340)	2C	
> Protocol Name	(0008,1050)	1C	
> Operator's Name	(0008,1070)	2C	
> Series Instance UID	(0020,000E)	1C	
> Series Description	(0008,103E)	2C	
> Retrieve AE Title	(0008,0054)	2C	
> Referenced Image Sequence	(0008,1140)	2C	
>> Referenced SOP Class UID	(0008,1150)	1C	
>> Referenced SOP Instance UID	(0008,1155)	1C	

3.8   Storage Commitment Push Model SOP Class

The DirectView CR provides standard conformance to the Storage Commitment Push Model SOP Class as an SCU.

Table 3.22   Storage Commitment SOP Class

SOP Class	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

The SCPM N-Action command is sent by the *DirectView* CR System at the end of a storage session or at a separate session if configured to do so. The Storage Commitment N-Event-Report is received and processed anytime providing the Port Number is configured correctly between the *DirectView* CR System and the Storage SCP.

3.8.1 DIMSE Service N-ACTION

The *DirectView* CR System uses the N-ACTION to instruct the Storage SCP to commit the images of the study.

3.8.1.1 Storage Commitment N-ACTION IOD

Table 3.23   Storage Commitment N-ACTION Attributes

Attribute	Tag
Transaction UID	(0008,1195)
Referenced SOP Sequence	(0008,1199)

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>Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

3.8.2 DIMSE Service N-EVENT-REPORT

The *DirectView* CR System will process the indication of the N-EVENT-REPORT from the Storage Commitment operation. Table 3.24 lists the attributes that are processed by the CR.

3.8.1.1 Storage Commitment N-EVENT-REPORT IOD

Table 3.24   Storage Commitment N-EVENT-REPORT Attributes

Attribute	Tag
Transaction UID	(0008,1195)
Failed SOP Sequence*	(0008,1198)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)
> Failure Reason	(0008, 1197)
Referenced SOP Sequence	(0008,1199)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

* For Event Type ID 2 only.

4   Communication Profiles

4.1   Supported Communications Stacks

The *DirectView* CR System provides TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

The *DirectView* CR System normally issues a network echo prior to delivering a job to a qualified DICOM Print or DICOM Store destination to ensure that the device is active.

4.2   Physical Media

The *DirectView* CR System supports Ethernet with the following physical connectors:

 • Unshielded Twisted pair (10BaseT, 100BaseT and 1000BaseT).

5   Extensions/Specializations/Privatizations

Tables 5.1 and 5.2 list a number of extensions to the DICOM Store Service Class, which the *DirectView* CR System supports. The extensions are all optional attributes.

5.1   Computed Radiography IOD

5.1.1   Specialization of Pixel Spacing

The *DirectView* CR System optionally allows the Pixel Spacing (0028,0030) attribute to be used from the Image Plane Module. This is done to support workstations that incorrectly use this field rather than Imager Pixel Spacing (0018,1164), as defined in the DICOM standard. If this field is used, the actual size of any objects displayed on the workstation (scales, etc.) may be in error.

5.1.2   Private Tags

These Private Tags are used to enhance the General Image Module. The *DirectView* CR System only sends these tags if the Storage SCP has been configured to support Private Tag.

Table 5.1   Private Attributes for enhancing the General Image Module

Attribute	Tag	VR	VM
privateDirectviewGroup	(0029, 0010)	LO	1
View Name (view used to identify the image)	(0029, 1015)	LO	1
View guid (view used to identify the image)	(0029, 1016)	LO	1
View guid (view used to process the image)	(0029, 1017)	LO	1
Private Eclipse image processing data	(0029, 1018)	UT	1
Flip setting on Image	(0029, 1019)	IS	1

Rotate setting on image	(0029, 101A)	IS	1

5.1.3 Alternate Image Display Spaces

In addition to supporting P-Values (DICOM Grayscale Display Function perceptually linear output), the CR systems also support the following display spaces:

Density
Pixel data is linearly related to optical film density. With a photometric interpretation of MONOCHROME1, a value of 0 represents minimum density and a value of 4095 represents maximum density.

Luminance
Pixel data is perceptually linear in brightness according to a proprietary model of the human visual system response developed by Kodak. Despite the name used, the pixel data is not linearly related to luminance or log luminance.

This option should only be used in support of legacy Kodak display products.

The CR supports the use of the Density, Luminance or P-Value display spaces with the CR IOD, DX IOD and MG IOD.

5.1.4 Extension for P-Value Encoding

If the destination supports VOI LUTs, a VOI LUT converting image pixel values to P-Values will be sent. Otherwise, the VOI LUT will be rendered into the image.

The Photometric Interpretation will be always MONOCHROME2 and an additional tag of Presentation LUT Shape as IDENTITY will be sent.

Table 5.2 Extension Attributes for P-Value Encoding

Attribute Name	Tag	DICOM Type	*DirectView* CR System Type	Supported Values
Photometric Interpretation	(0028,0004)	1	1	MONOCHROME2 Only MONOCHROME2 is sent when P-Value Encoding flag is turned on
Presentation LUT Shape	(2050,0020)	N/A	1C	IDENTITY Sent only when P-Value Encoding flag is turned on

5.1.5 Extensions to Body Part Examined and View Position

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The user may define additional labels that may be used to populate the Body Part Examined (0018,0015) and View Position (0018,5101) attributes. The software enforces the use of valid characters for the additional labels created by the user.

6 Configuration

Table 6.1 lists the network attributes that are configurable by a qualified service provider.

Table 6.1   Configurable Network Attributes

Configurable Network Attributes
IP address
Subnet Mask
Local Network Host Name (*DirectView* CR System AE Title)
SCP DICOM Called Application Entity Title
Socket number
Router Address (Gateway)
DICOM Service(s) available
Film Sizes available
Private Tag Support
P-Value Encoding Support
Other destination properties
SCPM separate association support
GSPS support
Alternate IOD (Secondary Capture) for the SCP that does not support CR

7 Support of Extended Character Sets

The *DirectView* CR will support the following characters sets:

   a)   ISO-IR 6 (Default)

   b)   ISO_IR 100 (Latin 1),

c) ISO_1R 13 (This is part of the JIS X 0201 code table for single-byte Japanese Katakana (phonetic) characters.)

d) ISO-IR 87 (This is part of the JIS X 0208 code table for 2-byte Japanese character sets that supports Kanji (ideograph), Hiragana (phonetic), and Katakana (phonetic).)

e) ISO-IR 144 (Russian)

f) ISO-IR 149 (Korean)

g) GB18030 (Traditional and simplified Chinese)

8 Error Handling

If communication errors are encountered, retries will be attempted based on configurable retry intervals and maximum number of retries. If the communication cannot be achieved, the job will be considered failed and set for retrial after a configurable time period (default of 5 minutes).

All errors and warnings received from the SCPs will be logged and job status will be reported to the user.

Addendum A Supported SNOMED Code Values

Table A.1 describes the SNOMED Code Values that are supported by the DirectView CR.

Table A.1   Supported SNOMED Code Values

Context Identifier	
19	
Coding Scheme Designator (0008,0102)	**Context Group Version (0008,0106)**
SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**
F-10440	erect
F-10450	recumbent
F-10460	semi-erect

Context Identifier	
20	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**
F-10310	prone
F-10316	semi-prone
F-10317	right lateral decubitus
F-10318	lateral decubitus
F-10319	left lateral decubitus
F-10320	standing
F-10326	anatomical
F-10330	kneeling
F-10336	knee-chest

Code Value	Code Meaning
F-10340	supine
F-10346	lithotomy
F-10348	Trendelenburg
F-10349	inverse Trendelenburg
F-10380	frog
F-10390	stooped-over
F-103A0	sitting
F-10410	curled-up

Context Identifier	
4010	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20040322
Code Value (0008,0100)	Code Meaning (0008,0104)
R-10202	frontal
R-10206	antero-posterior
R-10204	frontal oblique
R-10208	antero-posterior oblique
R-10210	right posterior oblique
R-10212	left posterior oblique
R-10214	postero-anterior
R-10216	postero-anterior oblique
R-10218	right anterior oblique
R-10220	left anterior oblique
R-10222	sagittal
R-10224	medial-lateral
R-10228	lateral-medial
R-10232	right lateral
R-10234	right oblique

R-10236	left lateral
R-10238	left oblique
R-10241	axial
R-10242	cranio-caudal
R-10244	caudo-cranial
R-10246	oblique axial
R-10248	oblique cranio-caudal
R-10250	oblique caudo-cranial
R-10252	frontal-oblique axial
R-10254	sagittal-oblique axial
R-10256	submentovertical
R-10257	verticosubmental
R-102C1	oblique
R-102C2	tangential
R-102C3	plantodorsal
R-102C4	dorsoplantar
R-102C5	parietoacanthal
R-102C6	acanthoparietal
R-102C7	orbitoparietal
R-102C8	parieto-orbital
R-102CD	lateral
R-40782	medial oblique
R-40783	lateral oblique

Context Identifier	
4011	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20040322
Code Value (0008,0100)	**Code Meaning (0008,0104)**

Code Value	Code Meaning
G-D00B	transoral
R-10242	caudad
R-10244	cephalad
R-40554	transorbital
R-40799	Lordotic
R-4087B	transforamenal
R-40885	transthoracic

Context Identifier	
4014	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20040322
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-10226	medio-lateral oblique
R-10230	latero-medial oblique
R-1024A	cranio-caudal exaggerated laterally
R-1024B	cranio-caudal exaggerated medially
R-102CF	exaggerated cranio-caudal

Context Identifier	
4015	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20050321
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-102D6	Magnification

Context Identifier	
4031	
Coding Scheme Designator (0008,0102)	Context Group Version (0008,0106)
SNM3	20020904
Code Value (0008,0100)	**Code Meaning (0008,0104)**

T-04000	Breast
T-11100	Skull
T-11102	Optic canal
T-11133	Mastoid bone
T-11149	Nasal bone
T-11167	Zygomatic arch
T-11170	Maxilla
T-11180	Mandible
T-11196	Facial bones
T-11210	Sternum
T-11300	Rib
T-11500	Spine
T-11501	Cervical spine
T-11502	Thoracic spine
T-11503	Lumbar spine
T-11AD0	Sacrum
T-11BF0	Coccyx
T-12280	Scapula
T-12310	Clavicle
T-12402	Forearm bone
T-12410	Humerus
T-12710	Femur
T-12730	Patella
T-12770	Calcaneus
T-12980	Sesamoid bones of foot
T-15290	Temporomandibular joint
T-15420	Acromioclavicular joint
T-15610	Sternoclavicular joint

T-15680	Sacroiliac joint
T-15710	Hip joint
T-15750	Ankle joint
T-15770	Tarsal joint
T-22000	Paranasal sinus
T-24100	Larynx
T-25000	Trachea
T-26000	Bronchus
T-280A0	Apex of Lung
T-32000	Heart
T-56000	Esophagus
T-57000	Stomach
T-58000	Small intestine
T-58200	Duodenum
T-59000	Large intestine
T-59600	Rectum
T-60610	Bile duct
T-61100	Parotid gland
T-61300	Submandibular gland
T-63000	Gall bladder
T-70010	Upper urinary tract
T-74000	Bladder
T-75000	Urethra
T-88920	Uterus and fallopian tubes
T-D0300	Extremity
T-D0801	Orbital region
T-D1100	Head
T-D1213	Jaw region

T-D1460	Sella turcica
T-D1600	Neck
T-D2220	Shoulder
T-D3000	Chest
T-D3300	Mediastinum
T-D4000	Abdomen
T-D8200	Arm
T-D8300	Elbow
T-D8600	Wrist
T-D8700	Hand
T-D8800	Finger
T-D8810	Thumb
T-D9200	Knee
T-D9400	Leg
T-D9700	Foot
T-D9800	Toe

Addendum B Input Field/DICOM Tag Cross Reference

Table B.1 describes the DICOM Image attributes and Patient/Exam information flow through the product. The first column describes the Patient/Exam information fields supported by the product's. The second column indicates the MWL IOD Attribute that the system will use to populate the field if a DICOM WorkList SCP is present. The third column identifies the CR Image IOD Attribute containing the data in the system's output.

Table B.1   Patient/Exam Input and MWL/CR Image Attributes Cross Reference

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Accession Number	Accession Number (0008,0050)	Accession Number (0008,0050)
Anode Target Material Received from CR X-ray interface or input via GUI	NA	Anode Target Material (0018,1191)
Body Part	NA	Body Part Examined (0018,0015)
Cassette ID input via bar code scanner	NA	Plate ID (0018,1004)
Compression Force Received from CR X-ray interface or input via GUI	NA	Compression Force (0018,11A2)
Compression Thickness Received from CR X-ray interface or input via GUI	NA	Body Part Thickness (0018,11A0)
Contrast Agent	Requested Contrast Agent (0032,1070)	Contrast/Bolus Agent (0018,0010)
Date Of Birth	Patient's Birth Date (0010,0030)	Patient's Birth Date (0010,0030)
Department Name	Requesting Service (0032,1033)	Institutional Department Name (0008,1040)
Filter Material	NA	Filter Material (0018,7050)
Gender	Patient Sex (0010,0040)	Patient Sex (0010,0040)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Image Comments	NA	Image Comments (0020,4000)
KVP Received from CR X-ray interface or input via GUI	NA	KVP (0018,0060)
Laterality	NA	Laterality (0020,0060)
Magnification Ratio	NA	Estimated Radiographic Magnification Factor (0018,1114)
mAs Received from CR X-ray interface or input via GUI	NA	Exposure (0018,1152)
Modality	Modality (0008,0060)	Modality (0008,0060)
Orientation	NA	Cassette Orientation (0018,1402)
Patient Age Read only value	Patient's age (0010,1010)	Patient's age (0010,1010)
Patient Comments	NA	Patient Comments (0010,4000)
Patient First Name **Patient Last Name** **Patient Middle Name**	Patient's Name (0010,0010)	Patient's Name (0010,0010)
Patient Location	Patient's Institution Residence (0038,0400)	Patient's Institution Residence (0038,0400)
Priority	Requested Procedure Priority (0040,1003)	N/A
Study Date & Time Read only value	Initial Value: Scheduled Procedure Step Start Date (0040,0002) Scheduled Procedure Step Start Time (0040,0003) These values will be updated to the time/date that the technologist began the first procedure step for a study.	Study Date (0008,0020) Study Time (0008,0030) Performed Procedure Step Start Date (0040,0244) Performed Procedure Step Start Time (0040,0245)
Tech ID	NA	Operator's Name (0008,1070)
Patient ID	Patient ID (0010,0020)	Patient ID (0010,0020)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Procedure Code	Requested Procedure ID (0040,1001) or Requested Procedure Code Sequence (0032,1064) > code value (0008,0100) or Scheduled Protocol Code Sequence (0040,0008) > code Value (0008,0100)	Procedure Code Sequence (0008,1032) > code value (0008,0100)
Procedure ID	Requested Procedure ID (0040,1001)	Requested Procedure ID (0040,1001)
Procedure Name	Requested Procedure Description (0032,1060) wil be used if Requested Procedure ID or Requested Procedure Code Sequence (0032,1064) > code value is used to populate the Procedure code field or Scheduled Procedure Step Sequence (0040,0100) > Scheduled Protocol Code Sequence (0040,0008) > Code Meaning (0008,0104) will be used if Scheduled Protocol Code Sequence > code Value is used to populate Procedure Code field) if the above fields are blank, the first non-blank field in the following list will be used. Requested Procedure Description (0032,1060) or Scheduled Procedure Step Sequence (0040,100) > Scheduled Procedure Step Description (0040,0007) or Procedure Code Sequence (0008,1032) > code value (0008,0100)	Procedure Code Sequence (0008,1032) > code meaning (0008,0104)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element
Procedure Step Description	Scheduled Procedure Step Sequence (0040,0100) >Scheduled Procedure Step Description (0040,0007)	Request Attributes Sequence (0040,0275 >Scheduled Procedure Step Description (0040,0007) If the Procedure Step Description field is modified by the user the changes will be stored in: Performed Procedure Step Description (0040,0254)
Referring Physician	Referring Physician's Name (0008,0090)	Referring Physician's Name (0008,0090)
Requested Procedure Description	Requested Procedure Description (0032,1060)	Study Description (0008,1030)
Source to Patient (cm)	NA	Source to Patient Distance (0018,1111)
Source to Image (cm)	NA	Source to Image Distance (SID) (0018,1110)
Study Date	Initial Value: Scheduled Procedure Step Start Date (0040,0002) Scheduled Procedure Step Start Time (0040,0003) These values will be updated to the time/date that the technologist began the first procedure step for a study.	Study Date (0008,0020) Study Time (0008,0030)
View Name	NA	NA
View Position	NA	View Position (0018,5101)