Carestream

Carestream DRX Product Family
ImageView Software Version 2 Build 2.2

DICOM Conformance Statement

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Introduction

1.1 Executive Overview

This document applies to the Carestream DR Family of products with ImageView version 2 software, build 2.2 When the document makes reference to the *DR System* it applies to all products identified in section 1.2 below unless otherwise noted.

1.2 DR Product Family

- Carestream DRX-Revolution
- Carestream DRX-Evolution
- Carestream DRX-Evolution Plus
- Carestream DRX-Rise
- Carestream DRX In-room
- Carestream DRX-Transportable / Lite
- Carestream DRX-Compass

1.3 Supported DICOM SOP Classes

Table 1.2A Supported DICOM SOP Classes for Verification

SOP Class Name	SOP Class UID	Service Class Role
Verification SOP Class	1.2.840.10008.1.1	SCU, SCP

Table 1.2B Supported DICOM SOP Classes for Image Delivery

SOP Class Name	SOP Class UID	Service Class Role
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	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
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	SCU
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCU

Table 1.2C Supported DICOM SOP Classes for Modality Worklist

SOP Class Name	SOP Class UID	Service Class Role
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	SCU

Table 1.2D Supported DICOM SOP Classes for MPPS

SOP Class Name	SOP Class UID	Service Class Role
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	SCU

Table 1.2E Supported DICOM SOP Classes for Storage Commit

SOP Class Name	SOP Class UID	Service Class Role
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	SCU

Table 1.2F Supported DICOM SOP Classes for Prior Image Recall Feature Only

SOP Class Name	SOP Class UID	Service Class Role
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU
Study Root Query Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU
CR Image Storage	1.2.840.10008.5.1.4.1.1.1.1	SCP
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1	SCP
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCP

Table 1.2G Supported DICOM SOP Classes for Dose SR Storage

SOP Class Name	SOP Class UID	Service Class Role
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	SCU

1.4 Scope and Field of Application

This document describes the DICOM functionality of DR products defined in section 1.1.1. These products are capable of performing projection radiographic examinations and producing a digital image. Throughout the remainder of this document the term **DR System** shall refer to these products. The DR System operates with a *Carestream* DRX Plus 3543, a *Carestream* DRX Plus 3543C, a *Carestream* DRX Plus 4343, a *Carestream* DRX Plus 4343C, a *Carestream* DRX Plus 2530C, a *Carestream* DRX-2530C, a *Carestream* DRX Core 3543, a *Carestream* DRX Core 3543C, a *Carestream* DRX Core 4343, a *Carestream* DRX Core 4343C, a *Carestream* Focus 3543C, a *Carestream* Focus 4343C, a *Carestream* DRX-L detector, a *Carestream* DRX-LC detector, a *Carestream* Focus HD 3543C detector, a *Carestream* Focus HD 4343C detector, a *Carestream* Lux 3543C, a *Carestream* Lux HD 2530C, a *Carestream* Lux HD 3543C, or a *Carestream* Lux HD 4343C.

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

1.5 Important Considerations for the Reader

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

- The integration of equipment from different vendors (including Carestream Health) goes beyond the scope of the DICOM 3.0 standard and the DICOM Conformance Statements from Carestream Health 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 Health 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 *DR 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.

1.6 Accessing this Conformance Statement on the World Wide Web

As the *DR 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.carestream.com/dicom.html

1.7 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
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DR	Digital Radiography
DX	Digital X-Ray
GSPS	Grayscale Softcopy Presentation State
HIS/RIS	Hospital Information System / Radiology Information System.
IHE	Integrating the Healthcare Enterprise – initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information
ISO	International Standards Organization
LUT	Look-up Table
MPPS	Modality Performed Procedure Step SOP Class
MWL	Modality Worklist
PDU	Protocol Data Unit
PLUT	Presentation Look-up Table
RDSR	Radiation Dose Structured Report
REM	Radiation Exposure Monitoring
SC	Secondary Capture
SCU	Service Class User
SCP	Service Class Provider
SCPM	Storage Commitment Push Model SOP Class
SOP	Service-Object Pair
SR	Structured Report
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. The DX Image Storage SOP Class is used to deliver studies to archives. Smart Room Assist will use the Secondary Capture Image Storage SOP Class to deliver patient's position photo. Basic Worklist Management service is used for the acquisition of patient demographics. DICOM Query/Retrieve service is used to retrieve prior images. The X-Ray Radiation Dose SR SOP Class is used to deliver dose information to archives and dose information consumers.

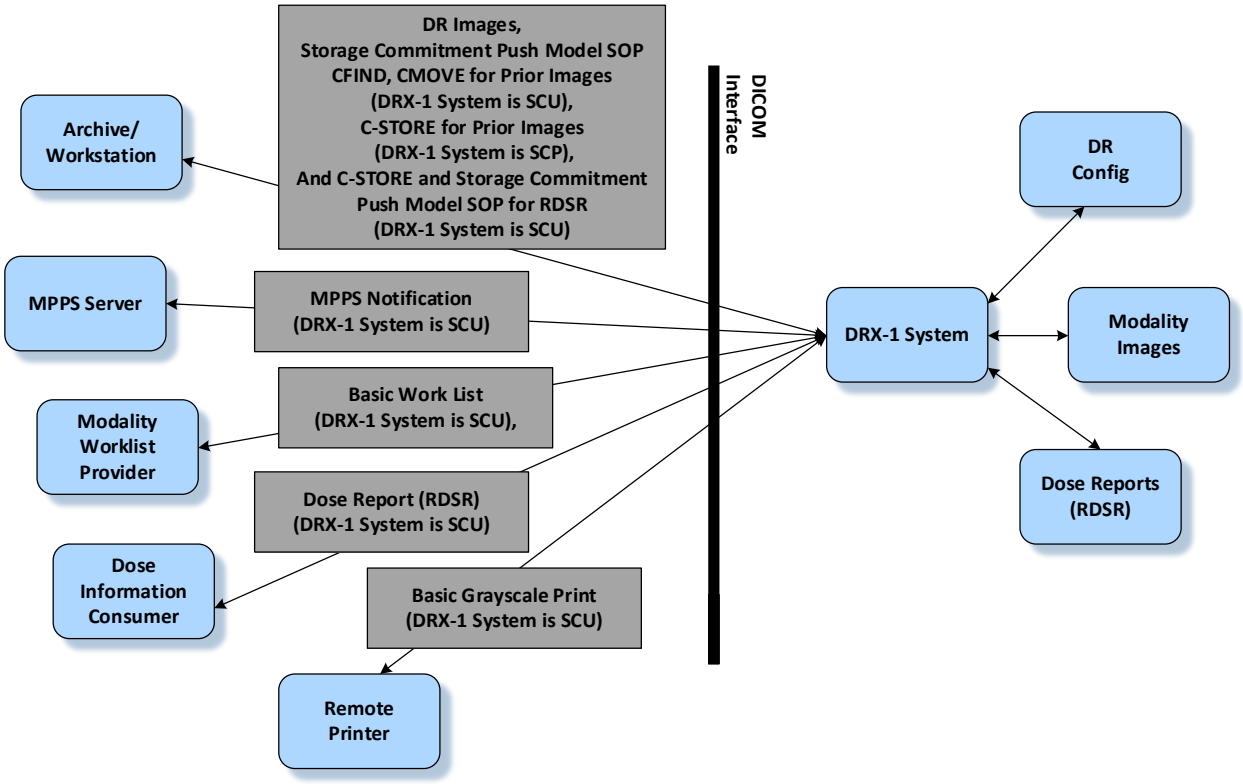


Figure 2.1 Implementation Model

2.1 Functional Definitions

The *DR System* is a digital radiographic image acquisition product utilizing a digital X-Ray detector. 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 or via a DICOM Worklist.

The system is capable of automatic or on demand querying for and retrieving of prior radiographic images for any exams in the DICOM Worklist and displaying those images to the technologist. The *DR System* is also capable of collecting individual procedure dose information related to specific patients and storing this dose information to Image Archive/ Image Manager and/or Dose Information Consumers.

2.2 Sequencing of Real-World Activities

If a HIS/RIS service is present and polling is enabled in the *DR* System, the *DR System* establishes an association when the application is started to obtain a modality Worklist. The Worklist is used as a source of patient demographics. The *DR System* establishes an association with a selected SCP when *it* has collected sufficient information to begin sending images.

3 Application Entity Specifications

The *DR System* provides Standard Conformance to the SOP Classes described in Section 1.2 as an SCU.

3.1 Association Establishment Policies

3.1.1 General

3.1.1.1 Store and Print

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 *DR System* will negotiate, is 128 Kbytes.

3.1.1.2 Modality Worklist

The *DR 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 *DR System* application is started and then periodically thereafter.

3.1.1.3 Priors

The *DR System* may be configured to retrieve Prior images from the PACS as soon as the HIS/RIS record is retrieved, when the exam is started, or only when specifically requested by the Technologist.

3.1.1.4 Structured Reports

The *DR System* may be configured to deliver dose information to a PACS or any other system configured to receive Radiation Dose Structured Reports at the completion or discontinuation of an exam where irradiation events occurred.

The RDSR will be composed and sent on the completion or discontinuation of a procedure step not upon the completion of an irradiation event.

If an irradiation event occurs after the completion of an existing procedure step, the procedure step will be re-opened and a new RDSR will be composed and sent on the completion or discontinuation of the amended procedure step. The irradiation events will duplicate events reported in the subsequent RDSR, but this can be detected by a PACS or any other system configured to receive the RDSR since the same irradiation event UID will appear in both RDSR's that were sent.

3.1.2 Number of Associations

3.1.2.1 Store and Print

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 Modality Worklist

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

3.1.2.3 Priors

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

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

3.1.2.4 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.

3.1.3 Asynchronous Nature

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

3.1.4 Implementation Identifying Information

The *DR 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 *DR System.*

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

The *DR 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 Store and Print

The *DR 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 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 Modality Worklist

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

3.2.1.3 Priors

The *DR System* initiates Associations for the purpose of determining whether there are any prior images to be retrieved. If the *DR System* determines that there are prior images to be retrieved then another association is initiated for each image that is actually to be retrieved.

3.2.1.4 Structured Reports

The *DR System* initiates Associations for the purpose of sending Radiation Dose Structured Reports.

3.2.2 Presentation Context Table

The *DR 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	SCU	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
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	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 Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	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
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	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

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Ext.**
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	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
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	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

NOTE: If the system is configured to "Allow Non-Conforming DICOM" in Delivery Preferences and a multi-byte language is selected, then Transfer Syntax "DICOM Explicit VR Little Endian" will be used for storing images. If the smart room assist feature is enabled and a patient's position photo is persisted along with the patient's radiographic image, then the Secondary Capture Image Storage SOP Class will be used for the photo delivery.

3.2.3 SOP Specific Conformance

3.2.3.1 Verification

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

- When prompted by a user, the *DR 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 *DR System* 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 *DR System* 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. This class supports sending/DICOM Send of image data for printing.

NOTE: Printing of Digital Tomosynthesis slices is not currently supported.

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 *DR System* uses the N-ACTION to instruct the SCP to print all films in the session. The *DR 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 *DR 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 *DR 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), (1,3), (3,1), (2,3), (3,2), (3,3) For PORTRAIT Film Orientation, (C,R) may = (1,1), (1,2), (2,1), (2,2) , (3,1), (2,3), (3,2), (3,3) 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), (1,1,1,1,1,1), (2,2), (2,2,2,2), (2,2,2,2,2,2), (3,3), (3,3,3,3), (3,3,3,3,3,3) With Page annotations alone: ROW\n,m,.., (n,m..) may = (1,1), (1,1,1), (2,1), (2,2,1), (3,1), (3,3,1), (3,3,3,1) With Image and Page annotation combined: ROW\n,m,.., (n,m..) may = (1,1,1), (1,1,1,1,1), (1,1,1,1,1,1,1), (2,2,1), (2,2,2,2,1), (2,2,2,2,2,2,1), (3,3,1), (3,3,3,3,1), (3,3,3,3,3,3,1)
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.

Attribute	SCU Usage	Tag	Possible Values
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
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 *DR 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

Attribute & Usage	SCU Usage	Tag	Supported Values
>Photometric Interpretation	M	(0028,0004)	MONOCHROME1, MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
>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.
>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 *DR System* will process the indication of the N-EVENT-REPORT operation. Any string sent by the SCP is accepted and displayed on the *DR System* user interface. In this translation, all characters that are not space characters or in the ASCII range “A” - “Z” are stripped.

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

Table 3.6 Basic Image Box SOP Class – Supported Attributes

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
Manufacturer	U	(0008,0070)	Any valid string
Manufacturer Model Name	U	(0008,1090)	Any valid string
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 1.2B lists all the Storage SOP Classes that are supported by the *DR System*. These classes support sending/DICOM Send of image data for image storage. The following tables list, for each Storage SOP Class, the attributes that the *DR System* supports.

3.5.1 Digital X-Ray Image Storage

The DR System 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
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 Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
Allergies	(0010,2110)	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	

Attribute Name	Tag	DICOM Type	Supported Values
>Referenced SOP Class UID	(0008,1150)	1C	
>Referenced SOP Instance UID	(0008,1155)	1C	
Procedure Code Sequence	(0008,1032)	3	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> Coding Scheme Designator	(0008,0102)	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	
Admission Id	(0038,0010)	3	
General Series			
Modality	(0008,0060)	1	DX
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Series Description	(0008,103E)	3	Same value as tag (0018,5101)
Operator Name	(0008,1070)	3	Refer to Addendum B
Body Part Examined	(0018,0015)	3	Refer to Addendum B and 5.2
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	
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	

Attribute Name	Tag	DICOM Type	Supported Values
>Code Meaning	(0008,0104)	1C	
Protocol Name	(0018,1030)	3	
Request Attributes Sequence	(0040,0275)	3	
>Requested Procedure Description	(0032,1060)	3	Refer to Addendum B
>Reason for the Requested Procedure	(0040,1002)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	Refer to Addendum B
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	Refer to Addendum B
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	Refer to Addendum B
>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	Enumerated Values: FOR PRESENTATION, FOR PROCESSING
Frame of Reference			This module is only included for Digital Tomosynthesis slices.
Frame of Reference UID	(0020,0052)	1	Populated with the Series Instance UID
Position Reference Indicator	(0020,1040)	2	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.

Attribute Name	Tag	DICOM Type	Supported Values
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-Evolution DRX-Revolution DRX-Rise DRX-Compass DRX-1 NOTE: This tag will be populated with DRX-Evolution for both the DRX-Evolution and DRX-Evolution Plus hardware.
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
UDI Sequence	(0018,100A)	3	
> Unique Device Identifier	(0018,1009)	1	This field represents the detector serial number.
General Image			
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	Populated with same value as (0008,0022)
Content Time	(0008,0033)	2C	Populated with same value as (0008,0032)
Acquisition Number	(0020,0012)	3	This field will not be populated for Digital Tomosynthesis slices.
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Referenced Image Sequence	(0008,1140)	3	
> Referenced SOP Class UID	(0008,1150)	1C	Only populated for companion images and will contain Referenced SOP Class UID of the standard image associated with the companion image.

Attribute Name	Tag	DICOM Type	Supported Values
> Referenced SOP Instance UID	(0008,1155)	1C	Only populated for companion images and will contain Referenced SOP Instance UID of standard image associated with the companion image.
Derivation Description	(0008,2111)	3	Only populated for companion images, the composite Dual Energy image and images processed using Smart Noise Cancellation.
Source Image Sequence	(0008,2112)	3	Note: This is sent for the FOR_PRESENTATION image, with the UID to the FOR_PROCESSING image, even if the FOR_PROCESSING image was not sent to store destination. This sequence will not be populated for Digital Tomosynthesis slices.
>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	00 = No Compression

Attribute Name	Tag	DICOM Type	Supported Values
Irradiation Event UID	(0008,3010)	3	This field represents the unique identification of the irradiation event(s) associated with the acquisition of this image. It will be used by receiving systems to determine duplicate events reported in a Dose Report for a particular procedure step/study. NOTE: For a companion image, this field will be populated with the Irradiation Event UID of the standard image associated with this companion. For stitched images, this field will be populated with the Irradiation Event UIDs of all of its component images. For the Dual Energy composite image, this field will be populated with the Irradiation Event UIDs of the high and low energy images.
Image Plane Module			
Pixel Spacing	(0028,0030)	2	This will always be delivered with Digital Tomosynthesis slices. If configured in Delivery Preferences then this tag can also be delivered for all other DX images.
Slice Thickness	(0018,0050)	2	Digital Tomosynthesis Slices only
Image Pixel			
Samples per Pixel	(0028,0002)	1	1

Attribute Name	Tag	DICOM Type	Supported Values
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.

Rows	(0028,0010)	1	Max Value for a DRX Plus 3543 (GOS) is 3056 Max Value for a DRX Plus 3543C (CsI) is 3032 Max Value for a DRX Plus 4343 (GOS) is 3056 Max Value for a DRX Plus 4343 (CsI) is 3032 Max Value for a DRX 2530C is 2136 Max Value for a DRX Plus 2530C is 2504 Max Value for a DRX Core 3543 (GOS) is 3056 Max Value for a DRX Core 3543 (CsI) is 3032 Max Value for a DRX Core 4343 (GOS) is 3056 Max Value for a DRX Core 4343 (CsI) is 3032 Max Value for a Focus 3543C is 2800 Max Value for a Focus 4343C is 3072 Max Value for a Focus HD 3543C is 4300 Max Value for a Focus HD 4343C is 4267 Max Value for a Lux 3543C is 3032 Max Value for a Lux HD 2530C is 3000 Max Value for a Lux HD 3543C is 4300 Max Value for a Lux HD 4343C is 4267 Max Value for a DRX-L is 9200 Max Value for a DRX-LC is 8696 (if the user crops the image, the supported rows value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)

Columns	(0028,0011)	1	Max Value for a DRX Plus 3543 (GOS) is 2544 Max Value for a DRX Plus 3543C (CsI) is 2520 Max Value for a DRX Plus 4343 (GOS) is 3056 Max Value for a DRX Plus 4343 (CsI) is 3032 Max Value for a DRX 2530C is 1752 Max Value for a DRX Plus 2530C is 3016 Max Value for a DRX Core 3543 (GOS) is 2544 Max Value for a DRX Core 3543 (CsI) is 2520 Max Value for a DRX Core 4343 (GOS) is 3056 Max Value for a DRX Core 4343 (CsI) is 3032 Max Value for a Focus 3543C is 2304 Max Value for a Focus 4343C is 3072 Max Value for a Focus HD 3543C is 3500 Max Value for a Focus HD 4343C is 4267 Max Value for a Lux 3543C is 2520 Max Value for a Lux HD 2530C is 2500 Max Value for a Lux HD 3543C is 3500 Max Value for a Lux HD 4343C is 4267 Max Value for a DRX-L is 3056 Max Value for a DRX-LC is 3064 (if the user crops the image, the supported columns value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Pixel Aspect Ratio	(0028,0034)	1C	1\1

Attribute Name	Tag	DICOM Type	Supported Values
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12 This tag will be populated with 16 for Digital Tomosynthesis slices
High Bit	(0028,0102)	1	11 This tag will be populated with 15 for Digital Tomosynthesis slices.
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	3	0 This field will not be populated for Digital Tomosynthesis slices
Largest Image Pixel Value	(0028,0107)	3	4095 This field will not be populated for Digital Tomosynthesis slices.
Pixel Data	(7FE0,0010)	1	
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
DX Anatomy Imaged			
Image Laterality	(0020,0062)	1	R L U B
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	
>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

Attribute Name	Tag	DICOM Type	Supported Values
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12 This tag will be populated with 16 for Digital Tomosynthesis slices.
High Bit	(0028,0102)	1	11 This tag will be populated with 15 for Digital Tomosynthesis slices.
Pixel Representation	(0028,0103)	1	0
Pixel Intensity Relationship	(0028,1040)	1	LOG This tag will be populated with “LIN” for Digital Tomosynthesis slices.
Pixel Intensity Relationship Sign	(0028,1041)	1	-1 if output is p-values or luminance +1 if output is density
Rescale Intercept	(0028,1052)	1	0
Rescale Slope	(0028,1053)	1	1
Rescale Type	(0028,1054)	1	US
Presentation LUT Shape	(2050,0020)	1	If FOR_PRESENTATION image, IDENTITY If FOR_PROCESSING image, INVERSE
Lossy Image Compression	(0028,2110)	1	00 = No Compression
Patient Orientation	(0020,0020)	1	
Calibration Image	(0050,0004)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Burned in Annotation	(0028,0301)	1	NO
>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	DIRECT
Detector Configuration	(0018,7005)	3	AREA
Detector Description	(0018,7006)	3	
Detector Mode	(0018,7008)	3	
Detector ID	(0018,700A)	3	For DRX Plus, DRX-2530C, DRX Core, DRX-L, Lux detectors, the Detector ID will be the serial number of the detector. For Focus, DRX-LC, Focus HD, Lux HD detectors, the serial numbers are larger than 16 digits, the Detector ID will be the last 16 digits of the serial number of the detector.
Date of Last Detector Calibration	(0018,700C)	3	
Time of Last Detector Calibration	(0018,700E)	3	
Exposures on Detector Since Last Calibration	(0018,7010)	3	NOTE: Not supported for the DRX-L detector
Detector Binning	(0018,701A)	3	For Digital Tomosynthesis slices: If the image was acquired at High Speed, the Detector Binning mode will be "2\1". If the image was acquired at High Resolution, the Detector Binning mode will be "1\1". For all other images the Detector Binning mode will be "1\1".
Detector Manufacturer Name	(0018,702A)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Detector Manufacturer's Model Name	(0018,702B)	3	DRX Plus 3543 if the scintillator is GOS DRX Plus 3543C if the scintillator is CsI DRX Plus 4343 if the scintillator is GOS DRX Plus 4343C if the scintillator is CsI DRX 25x30C if the detector is DRX 25x30C DRX Plus 2530C if the detector is DRX Plus 2530C DRX Core 3543 if the scintillator is GOS DRX Core 3543C if the scintillator is CsI DRX Core 4343 if the scintillator is GOS DRX Core 4343C if the scintillator is CsI Focus3543C Focus4343C Focus3543HRC Focus4343HRC Lux3543C Lux25HRC Lux35HRC Lux43HRC DrxLC FXRD_1751SB if the detector is DRX-L
Detector Temperature	(0018,7001)	3	
Field of View Shape	(0018,1147)	3	RECTANGLE
Field of View Dimension(s)	(0018,1149)	3	
Sensitivity	(0018,6000)	3	
Detector Active Time	(0018,7014)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Imager Pixel Spacing	(0018,1164)	1	"0.098\0.098" for the DRX Plus 2530C detector "0.150\0.150" for Focus 3543C detector "0.140\0.140" for DRX-L detector "0.100\0.100" for Focus HD 3543C detector, Focus HD 4343C detector, , Lux HD 2530C, Lux HD 3543C and Lux HD 4343C "0.139\0.139" for all other detectors
Detector Element Physical Size	(0018,7020)	3	
Detector Element Spacing	(0018,7022)	3	
X-Ray Collimator			
Collimator Shape	(0018,1700)	1	RECTANGULAR
Collimator Left Vertical Edge	(0018,1720)	1C	
Collimator Right Vertical Edge	(0018,1704)	1C	
Collimator Upper Horizontal Edge	(0018,1706)	1C	
Collimator Lower Horizontal Edge	(0018,1780)	1C	
DX Positioning			
View Position	(0018,5101)	3	
View Code Sequence	(0054,0220)	3	Refer to Context Identifier 4010 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 Modifier Code Sequence	(0054,0222)	2	Refer to Context Identifier 4010 in Addendum A for supported SNOMED Code Values
>>Code Value	(0008,0100)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
>>Coding Scheme Designator	(0008,0102)	1C	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	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	
>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	
>>Code Meaning	(0008,0104)	1C	
>>Mapping Resource	(0008,0105)	1C	
>>Context Group Version	(0008,0106)	1C	
>>Context Identifier	(0008,010f)	3	
Positioner Type	(0018,1508)	2	
Positioner Primary Angle	(0018,1510)	3	DRX-Revolution only: Accuracy of ±X degrees
Positioner Secondary Angle	(0018,1511)	3	DRX-Revolution only: Accuracy of ±X degrees
Detector Primary Angle	(0018,1530)	3	DRX-Revolution only: Accuracy of ±X degrees
Detector Secondary Angle	(0018,1531)	3	DRX-Revolution only: Accuracy of ±X degrees
Column Angulation	(0018,1450)	3	DRX-Revolution only: Accuracy of ±X degrees
Table Type	(0018,113A)	3	DRX Evolution only: FIXED or NONE
X-Ray Tomography Acquisition			

Attribute Name	Tag	DICOM Type	Supported Values
Tomo Layer Height	(0018,1460)	1	For Digital Tomosynthesis slices
(0Tomo Angle	(0018,1470)	3	For Digital Tomosynthesis slices
Tomo Time	(0018,1480)	3	For Digital Tomosynthesis slices – will not be included if not known
Tomo Type	(0018,1490)	3	For Digital Tomosynthesis slices - LINEAR
Tomo Class	(0018,1491)	3	For Digital Tomosynthesis slices - TOMOSYNTHESIS
Number of Tomosynthesis Source Images	(0018,1495)	3	For Digital Tomosynthesis slices
X-Ray Acquisition Dose			
KVP	(0018,0060)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
X-Ray Tube Current	(0018,1151)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
Exposure Time	(0018,1150)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.

Attribute Name	Tag	DICOM Type	Supported Values
Exposure	(0018,1152)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
Exposure in µAs	(0018,1153)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
Distance Source to Detector	(0018,1110)	3	This field will not be populated for Digital Tomosynthesis slices. Refer to Addendum B
Distance Source to Patient	(0018,1111)	3	If LLI Feature is enabled Refer to Addendum B
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	For Dual Energy, only one of the high energy, low energy or composite images will be delivered. As a result, the total Image and Fluoroscopy Area Dose Product for the Dual Energy exam will be included in this value. This will not be included for Digital Tomosynthesis slices.
Relative X-Ray Exposure	(0018,1405)	3	0 to 4095 NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.

Attribute Name	Tag	DICOM Type	Supported Values
Exposure Index	(0018,1411)	3	Defined in IEC 62494-1 NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and Digital Tomosynthesis slices.
Target Exposure Index	(0018,1412)	3	Defined in IEC 62494-1 NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and Digital Tomosynthesis slices.
Deviation Index	(0018,1413)	3	Defined in IEC 62494-1 NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and Digital Tomosynthesis slices.
Exposure Time in µS	(0018,8150)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
X-Ray Tube Current in µA	(0018,8151)	3	NOTE: For a companion image, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.

Attribute Name	Tag	DICOM Type	Supported Values
Exposure in mAs	(0018,9332)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images, the Dual Energy composite image and Digital Tomosynthesis slices.
Entrance Dose	(0040,0302)	3	This value will be calculated if Image Area Dose is available, otherwise a value of zero will be sent. It will be measured at reference point “In Detector Plane” when Distance Source to Detector and Distance Source to Patient are NOT available. For Dual Energy, only one of the high energy, low energy or composite images will be delivered. As a result, the entrance dose will be calculated using the total Image and Fluoroscopy Area Dose Product for the Dual Energy exam. This field will not be populated for Digital Tomosynthesis slices. Refer to Addendum B

Attribute Name	Tag	DICOM Type	Supported Values
Entrance Dose in mGy	(0040,8302)	3	This value will be calculated if Image Area Dose is available, otherwise value will be zero. It will be measured at reference point “In Detector Plane” when Distance Source to Detector and Distance Source to Patient are NOT available. For Dual Energy, only one of the high energy, low energy or composite images will be delivered. As a result, the entrance dose will be calculated using the total Image and Fluoroscopy Area Dose Product for the Dual Energy exam. This field will not be populated for Digital Tomosynthesis slices. Refer to Addendum B
Exposed Area	(0040,0303)	3	
Distance Source to Entrance	(0040,0306)	3	
Anode Target Material	(0018,1191)	3	“TUNGSTEN”
Filter Material	(0018,7050)	3	“ALUMINUM”, or “ALUMINUM+COPPER” , or “ALUMINUM+SILVER”
Filter Thickness Minimum	(0018,7052)	3	“0.94”, “0.94\0.098”, or “0.94\0.198”, or “1.94”
Filter Thickness Maximum	(0018,7054)	3	“1.06”, “1.06\0.102”, or “1.06\0.202”, or “2.06”
Rectification Type	(0018,1156)	3	DRX-Revolution: “CONST POTENTIAL” DRX-Evolution: “THREE PHASE” Compass: “THREE PHASE” or “SINGLE PHASE”
Exposure Index Macro			

Attribute Name	Tag	DICOM Type	Supported Values
Exposure Index	(0018,1411)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.
Target Exposure Index	(0018,1412)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.
Deviation Index	(0018,1413)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.
X-Ray Filtration			
Filter Type	(0018,1160)	3	"NONE", "WEDGE", or "MULTIPLE"
Filter Material	(0018,7050)	3	"ALUMINUM", or "ALUMINUM+COPPER" , or "ALUMINUM+SILVER"
Filter Thickness Minimum	(0018,7052)	3	"0.94", "0.94\0.098", or "0.94\0.198", or "1.94"
Filter Thickness Maximum	(0018,7054)	3	"1.06", "1.06\0.102", or "1.06\0.202", or "2.06"
X-Ray Generation			
Exposure Control Mode	(0018,7060)	3	This will be populated with MANUAL or AUTOMATIC . For Digital Tomosynthesis slices this field will be populated with MANUAL

Attribute Name	Tag	DICOM Type	Supported Values
Exposure Control Mode Description	(0018,7062)	3	The value will identify the AEC/DEC chamber location(s) used for the exposure and the selected DEC subset (cell group) of available exposure control cells. The value will represent the exposure control configuration applied during image acquisition and is populated on a per-image basis.
Focal Spot	(0018,1190)	3	
X-Ray Grid			
Grid	(0018,1166)	3	
Grid Absorbing Material	(0018,7040)	3	
Grid Spacing Material	(0018,7041)	3	
Grid Thickness	(0018,7042)	3	
Grid Pitch	(0018,7044)	3	
Grid Aspect Ratio	(0018,7046)	3	
Grid Period	(0018,7048)	3	
Grid Focal Distance	(0018,704C)	3	
Overlay Plane			Only sent if measurement tools or markers are added to the image and the image is sent to an SCP configured as supports overlays in System configuration, and the system is not configured to write annotations to image data.
Overlay Rows	(6000,0010)	1	
Overlay Columns	(6000,0011)	1	
Overlay Type	(6000,0040)	1	G = GRAPHICS
Overlay Origin	(6000,0050)	1	1/1
Overlay Bits Allocated	(6000,0100)	1	1
Overlay Bit Position	(6000,0102)	1	1
Overlay Data	(6000,3000)	1	
VOI LUT			

Attribute Name	Tag	DICOM Type	Supported Values
VOI LUT Sequence	(0028,3010)	3	This sequence will not be populated for Digital Tomosynthesis slices.
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	2048
Window Width	(0028,1051)	1C	4096
Acquisition Context			
Acquisition Context Sequence	(0040,0555)	2	Empty Sequence
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.2 Computed Radiography Image Storage

The DR System 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
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 Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).

Attribute Name	Tag	DICOM Type	Supported Values
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
Allergies	(0010,2110)	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	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> 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	
Admission Id	(0038,0010)	3	
General Series			
Modality	(0008,0060)	1	CR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	

Attribute Name	Tag	DICOM Type	Supported Values
Series Date	(0008,0021)	3	
Protocol Name	(0018,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to Addendum B
Body Part Examined	(0018,0015)	3	Refer to Addendum B and 5.2
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	
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	Refer to Addendum B
>Reason for the Requested Procedure	(0040,1002)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	Refer to Addendum B
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	Refer to Addendum B
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	Refer to Addendum B
>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	
View Position	(0018,5101)	2	

Attribute Name	Tag	DICOM Type	Supported Values
Focal Spot	(0018,1190)	3	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-Evolution DRX-Revolution DRX-Rise DRX-Compass DRX-1 NOTE: This tag will be populated with DRX-Evolution for both the DRX-Evolution and DRX-Evolution Plus hardware.
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	Populated with same value as (0008,0022)
Content Time	(0008,0033)	2C	Populated with same value as (0008,0032)
Acquisition Number	(0020,0012)	3	This field will not be populated for Digital Tomosynthesis slices.
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Referenced Image Sequence	(0008,1140)	3	

Attribute Name	Tag	DICOM Type	Supported Values
> Referenced SOP Class UID	(0008,1150)	1C	Only populated for companion images and will contain Referenced SOP Class UID of the standard image associated with the companion image.
> Referenced SOP Instance UID	(0008,1155)	1C	Only populated for companion images and will contain Referenced SOP Instance UID of standard image associated with the companion image.
Derivation Description	(0008,2111)	3	Only populated for companion images, the composite Dual Energy image and images processed using Smart Noise Cancellation.
Images in Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to Addendum B
Lossy Image Compression	(0028,2110)	3	00 = No Compression
Irradiation Event UID	(0008,3010)	3	This field represents the unique identification of the irradiation event(s) associated with the acquisition of this image. It will be used by receiving systems to determine duplicate events reported in a Dose Report for a particular procedure step/study. NOTE: For a companion image, this field will be populated with the Irradiation Event UID of the standard image associated with this companion. For stitched images, this field will be populated with the Irradiation Event UIDs of all of its component images. For the Dual Energy composite image, this field will be populated with the Irradiation Event UIDs of the high and low energy images.
Image Plane			

Attribute Name	Tag	DICOM Type	Supported Values
Pixel Spacing	(0028,0030)	3	"0.098\0.098" for the DRX Plus 2530C detector "0.150\0.150" for the Focus 3543C detector. "0.140\0.140" for the DRX-L detector "0.100\0.100" for Focus HD 3543C detector, Focus HD 4343C detector, Lux HD 2530C, Lux HD 3543C and Lux HD 4343C "0.139\0.139" for all other detectors
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (If the image space configured on the destination is set to density, MONOCHROME1 is set. If the image space configured on the destination is p-values or luminance, MONOCHROME2 is set. See section 5.1.3 for more information.
Planar Configuration	(0028,0006)	1C	

Rows	(0028,0010)	1	Max Value for a DRX Plus 3543 (GOS) is 3056 Max Value for a DRX Plus 3543C (CsI) is 3032 Max Value for a DRX Plus 4343 (GOS) is 3056 Max Value for a DRX Plus 4343 (CsI) is 3032 Max Value for a DRX 2530C is 2136 Max Value for a DRX Plus 2530C is 2504 Max Value for a DRX Core 3543 (GOS) is 3056 Max Value for a DRX Core 3543 (CsI) is 3032 Max Value for a DRX Core 4343 (GOS) is 3056 Max Value for a DRX Core 4343 (CsI) is 3032 Max Value for a Focus 3543C is 2800 Max Value for a Focus 4343C is 3072 Max Value for a Focus HD 3543C is 4300 Max Value for a Focus HD 4343C is 4267 Max Value for a Lux 3543C is 3032 Max Value for a Lux HD 2530C is 3000 Max Value for a Lux HD 3543C is 4300 Max Value for a Lux HD 4343C is 4267 Max Value for a DRX-L is 9200 Max Value for a DRX-LC is 8696 (if the user crops the image, the supported rows value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Columns	(0028,0011)	1	Max Value for a DRX Plus 3543 (GOS) is 2544

Attribute Name	Tag	DICOM Type	Supported Values
			Max Value for a DRX Plus 3543C (CsI) is 2520 Max Value for a DRX Plus 4343 (GOS) is 3056 Max Value for a DRX Plus 4343 (CsI) is 3032 Max Value for a DRX 2530C is 1752 Max Value for a DRX Plus 2530C is 3016 Max Value for a DRX Core 3543 (GOS) is 2544 Max Value for a DRX Core 3543 (CsI) is 2520 Max Value for a DRX Core 4343 (GOS) is 3056 Max Value for a DRX Core 4343 (CsI) is 3032 Max Value for a Focus 3543C is 2304 Max Value for a Focus 4343C is 3072 Max Value for a Focus HD 3543C is 3500 Max Value for a Focus HD 4343C is 4267 Max Value for a Lux 3543C is 2520 Max Value for a Lux HD 2530C is 2500 Max Value for a Lux HD 3543C is 3500 Max Value for a Lux HD 4343C is 4267 Max Value for a DRX-L is 3056 Max Value for a DRX-LC is 3064 (if the user crops the image, the supported columns value may be less than max value. Some auto-cropping will take place if Black Surround is enabled and the DR image is going to a store device.)
Pixel Aspect Ratio	(0028,0034)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12 This tag will be populated with 16 for Digital Tomosynthesis slices.
High Bit	(0028,0102)	1	11 This tag will be populated with 15 for Digital Tomosynthesis slices.
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	3	0 This field will not be populated for Digital Tomosynthesis slices.
Largest Image Pixel Value	(0028,0107)	3	4095 This field will not be populated for Digital Tomosynthesis slices.
Pixel Data	(7FE0,0010)	1	
CR Image			
KVP	(0018,0060)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and the Dual Energy composite image.
Plate ID	(0018,1004)	3	
Distance Source to Detector	(0018,1110)	3	This field will not be populated for Digital Tomosynthesis slices. Refer to Addendum B
Distance Source to Patient	(0018,1111)	3	If LLI Feature is enabled Refer to Addendum B
Exposure	(0018,1152)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and the Dual Energy composite image.

Attribute Name	Tag	DICOM Type	Supported Values
Exposure in μAs	(0018,1153)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and the Dual Energy composite image.
Imager Pixel Spacing	(0018,1164)	3	"0.098\0.098" for the DRX Plus 2530C detector "0.150\0.150" for the Focus 3543C detector "0.140\0.140" for the DRX-L detector "0.100\0.100" for Focus HD 3543C detector, Focus HD 4343C detector, Lux HD 2530C, Lux HD 3543C and Lux HD 4343C "0.139\0.139" for all other detectors
Relative X-Ray Exposure	(0018,1405)	3	0 to 4095 NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and the Dual Energy composite image.
Exposure Index	(0018,1411)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.
Target Exposure Index	(0018,1412)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.

Attribute Name	Tag	DICOM Type	Supported Values
Deviation Index	(0018,1413)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images.
Sensitivity	(0018,6000)	3	
Exposure in mAs	(0018,9332)	3	NOTE: For companion images, this field will be populated with the same value as the standard image associated with this companion. This field will not be populated for stitched images and the Dual Energy composite image.
Image Laterality	(0020,0062)	1	This is not part of the CR IOD, so it will not be delivered unless the destination is configured to send DICOM Extension Tags. The valid values are R, L, U and B
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
Overlay Plane			Only sent if measurement tools or markers are added to the image and the image is sent to an SCP configured as supports overlays in System configuration, and the system is not configured to write annotations to image data.
Overlay Rows	(6000,0010)	1	
Overlay Columns	(6000,0011)	1	
Overlay Type	(6000,0040)	1	G = GRAPHICS
Overlay Origin	(6000,0050)	1	1/1
Overlay Bits Allocated	(6000,0100)	1	1
Overlay Bit Position	(6000,0102)	1	1
Overlay Data	(6000,3000)	1	
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	This sequence will not be populated for Digital Tomosynthesis slices.

Attribute Name	Tag	DICOM Type	Supported Values
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	1C	
>LUT Data	(0028,3006)	1C	
Window Center	(0028,1050)	1C	2048
Window Width	(0028,1051)	1C	4096
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.3 Secondary Captured Image Storage

The *DR System* provides standard conformance to the Secondary Capture Image Storage SOP Class as an SCU.

NOTE: Secondary Capture Image Storage SOP Class will be used for delivering Patient Picture. It is only applicable if patient picture persists in image storage directory. Patient Picture is available when Smart Room Assist is enabled.

Table 3.15 Secondary Capture Image SOP Class

SOP Class	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

Table 3.16 Secondary Capture Image SOP Class – Supported Attributes

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 Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).

Patient Comments	(0010,4000)	3	Refer to Addendum B
Allergies	(0010,2110)	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	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> 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	
Admission Id	(0038,0010)	3	
General Series			
Modality	(0008,0060)	1	OT
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Series Date	(0008,0021)	3	
Protocol Name	(0018,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to Addendum B

Body Part Examined	(0018,0015)	3	Refer to Addendum B and 5.2
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	
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	Refer to Addendum B
>Reason for the Requested Procedure	(0040,1002)	3	
>Scheduled Procedure Step Description	(0040,0007)	3	Refer to Addendum B
>Scheduled Protocol Code Sequence	(0040,0008)	3	
>> Code Value	(0008,0100)	1C	Refer to Addendum B
>> Coding Scheme Designator	(0008,0102)	1C	
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	Refer to Addendum B
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to Addendum B
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.

Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-Evolution DRX-Compass NOTE: This tag will be populated with DRX-Evolution for both the DRX-Evolution and DRX-Evolution Plus hardware.
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
SC Equipment			
Modality	(0008,0060)	3	OT
Conversion Type	(0008,0064)	1	DF
General Image			
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	
Image Type	(0008,0008)	3	
Content Date	(0008,0023)	2C	Populated with same value as (0008,0022)
Content Time	(0008,0033)	2C	Populated with same value as (0008,0032)
Acquisition Number	(0020,0012)	3	
Acquisition Date	(0008,0022)	3	
Acquisition Time	(0008,0032)	3	
Referenced Image Sequence	(0008,1140)	3	
> Referenced SOP Class UID	(0008,1150)	1C	
> Referenced SOP Instance UID	(0008,1155)	1C	
Derivation Description	(0008,2111)	3	N/A
Images in Acquisition	(0020,1002)	3	
Image Comments	(0020,4000)	3	Refer to Addendum B
Lossy Image Compression	(0028,2110)	3	00 = No Compression
Irradiation Event UID	(0008,3010)	3	This field will not be populated for a Patient Picture since no x-ray exposure to the patient.
SC Image			

Pixel Spacing	(0028,0030)	1C	This field will not be populated for a Patient Picture.
Image Pixel			
Samples per Pixel	(0028,0002)	1	3
Photometric Interpretation	(0028,0004)	1	RGB
Planar Configuration	(0028,0006)	1C	
Rows	(0028,0010)	1	
Columns	(0028,0011)	1	
Pixel Aspect Ratio	(0028,0034)	1C	
Bits Allocated	(0028,0100)	1	8
Bits Stored	(0028,0101)	1	8
High Bit	(0028,0102)	1	7
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	3	0
Largest Image Pixel Value	(0028,0107)	3	255
Pixel Data	(7FE0,0010)	1	
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 *DR System* provides standard conformance to the Grayscale Softcopy Presentation State Storage SOP Class as an SCU.

NOTE: Grayscale Softcopy Presentation State will not be delivered with Digital Tomosynthesis slices and Patient Picture image.

Table 3.17 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 3.18 Grayscale Softcopy Presentation State SOP Class Attributes

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

Attribute Name	Tag	DICOM Type	Supported Values
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 Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
Allergies	(0010,2110)	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	
Occupation	(0010,2180)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Additional Patient's History	(0010,21B0)	3	
Admission Id	(0038,0010)	3	
General Series			
Modality	(0008,0060)	1	PR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Series Date	(0008,0021)	3	
Protocol Name	(0018,1030)	3	
Series Time	(0008,0031)	3	
Operator Name	(0008,1070)	3	Refer to Addendum B
Body Part Examined	(0018,0015)	3	Refer to Addendum B and 5.2
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	
>Reason for the Requested Procedure	(0040,1002)	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	

Attribute Name	Tag	DICOM Type	Supported Values
View Position	(0018,5101)	2	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B
Manufacturer Model Name	(0008,1090)	3	DRX-Evolution DRX-Revolution DRX-Rise DRX-Compass DRX-1 NOTE: This tag will be populated with DRX-Evolution for both the DRX-Evolution and DRX-Evolution Plus hardware.
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
Presentation State			
Instance Number	(0020,0013)	1	
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	

Attribute Name	Tag	DICOM Type	Supported Values
>> Referenced SOP Instance UID	(0008,1155)	1	
>> Referenced Frame Number	(0008,1160)	1	
Shutter Presentation Value	(0018,1622)	1C	
Display Shutter			
Shutter Shape	(0018,1600)	1	POLYGONAL
Vertices of the Polygonal Shutter	(0018,1620)	1C	
Shutter Presentation Value	(0018,1622)	3	
Overlay Plane			
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			
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	1\1
> Displayed Area Bottom Hand Corner	(0070,0053)	1	
> Presentation Size Mode	(0070,0100)	1	
> Presentation Pixel Spacing	(0070,0101)	1C	
> Presentation Pixel Aspect Ratio	(0070,0102)	1C	
Spatial Transformation			

Attribute Name	Tag	DICOM Type	Supported Values
Image Rotation	(0070,0042)	1	Always 0 (no rotation)
Image Horizontal Flip	(0070,0041)	1	Always N (no flip)
Softcopy VOI LUT			
Softcopy VOI LUT Sequence	(0028,3110)	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	
> VOI LUT Sequence	(0028,3010)	1C	
>> 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	
Softcopy Presentation LUT			
Presentation LUT Sequence	(2050,0010)	1C	
Presentation LUT Shape	(2050,0020)	1C	
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	

3.5.5 X-Ray Radiation Dose SR

The *DR System* provides standard conformance to the X-Ray Radiation Dose SR SOP Class as an SCU.

Table 3.19 X-Ray Radiation Dose SR SOP Class

SOP Class	SOP Class UID
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

Table 3.20 X-Ray Radiation Dose SR SOP Class – Supported Attributes

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 Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality worklist (MWL).
Patient Comments	(0010,4000)	3	Refer to Addendum B
Allergies	(0010,2110)	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	
> Code Value	(0008,0100)	1C	Refer to Addendum B
> Coding Scheme Designator	(0008,0102)	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	
Admission Id	(0038,0010)	3	
SR Document Series			
Modality	(0008,0060)	1	SR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	1
Series Date	(0008,0021)	3	Populated with current date of creation. The date the procedure step/study was ended.
Series Time	(0008,0031)	3	Populated with current time of creation. The time the procedure step/study was ended.
Series Description	(0008,103E)	3	Radiation Dose Information This will be translated.
Referenced Performed Procedure Step Sequence	(0008,1111)	2	
>Referenced SOP Class UID	(0008,1150)	1C	1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	(0008,1155)	1C	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Institution Address	(0008,0081)	3	For this value to be populated and sent, the *DR System* user needs to enter the value on the *Delivery Preferences* screen.
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	Refer to Addendum B

Attribute Name	Tag	DICOM Type	Supported Values
Manufacturer Model Name	(0008,1090)	3	DRX-Evolution DRX-Revolution DRX-Rise DRX-Compass DRX-1 NOTE: This tag will be populated with DRX-Evolution for both the DRX-Evolution and DRX-Evolution Plus hardware.
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
Gantry ID	(0018,1008)	3	
SR Document General			
Instance Number	(0020,0013)	1	1
Completion Flag	(0040,A491)	1	This field defines the estimated degree of completeness of the SR document content of the Dose Report. We populate this field with a value of "COMPLETE" when a procedure step/study is ended.
Verification Flag	(0040,A493)	1	We do not provide a means to verify the content of the Dose Report. Therefore, we populate this field with a value of "UNVERIFIED".
Content Date	(0008,0023)	1	Populated with current date of creation. The date the procedure step/study was ended.
Content Time	(0008,0033)	1	Populated with current time of creation. The time the procedure step/study was ended.
Predecessor Documents Sequence	(0040,A360)	1C	This field may be present if the Dose Report includes content from a previously delivered Dose Report.
Referenced Request Sequence	(0040,A370)	1C	
>Accession Number	(0008,0050)	2	Refer to Addendum B
>Referenced Study Sequence	(0008,1110)	2	
>Study Instance UID	(0020,000D)	1	

Attribute Name	Tag	DICOM Type	Supported Values
>Requested Procedure Description	(0032,1060)	2	
>Requested Procedure Code Sequence	(0032,1064)	2	
>Requested Procedure ID	(0040,1001)	2	
>Placer Order Number / Imaging Service Request	(0040,2016)	2	
>Filler Order Number / Imaging Service Request	(0040,2017)	2	
Performed Procedure Code Sequence	(0040,A372)	2	
>Code Value	(0008,0100)	1C	Refer to Addendum B
>Coding Scheme Designator	(0008,0102)	1C	
>Code Meaning	(0008,0104)	1C	
SR Document Content			
Value Type	(0040,A040)	1	CONTAINER
Concept Name Code Sequence	(0040,A043)	1C	
>Code Value	(0008,0100)	1C	113701
>Coding Scheme Designator	(0008,0102)	1C	DCM
>Code Meaning	(0008,0104)	1C	X-Ray Radiation Dose Report
Continuity of Content	(0040,A050)	1	SEPARATE
Content Template Sequence	(0040,A504)	1C	
>Mapping Resource	(0008,0105)	1	DCMR
>Template Identifier	(0040,DB00)	1	10001
Content Sequence	(0040,A730)	1C	
SOP Common Module			
SOP Class UID	(0008,0016)	1	1.2.840.10008.5.1.4.1.1.88.67
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 3.19 shows the Matching Key attributes that may optionally contain a non-NULL value in the request.

Table 3.21 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 *DR System* 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 *DR System* will accept any valid character set for the Specific Character Set attribute (0008,0005).

Table 3.22 Modality Worklist SOP Class

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

Table 3.23 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)	
>>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)	

Attribute Name	Tag	Matching Key
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 Identification		
Admission ID	(0038,0010)	
Visit Status		
Visit Status ID	(0038,0008)	
Current Patient Location	(0038,0300)	
Patient Identification		
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Other Patient Names	(0010,1001)	
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		

Attribute Name	Tag	Matching Key
Patient Comments	(0010,4000)	Any values greater than 255 characters will be truncated to 255 characters.
Additional Patient's History	(0010,21B0)	Any values greater than 255 characters will be truncated to 255 characters.

3.6.2 Procedure Mapping

The procedure mapping feature of the *DR System* 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 *DR System* must receive the correct code in any of the following:

- Requested Procedure Description (0032,1060)
- Requested Procedure ID (0040,1001)
- Requested Procedure Code Sequence . Code Value (0032,1064)(0008,0100) – this is the factory default
- Scheduled Procedure Step Sequence . Scheduled Procedure Step ID (0040,0100)(0040,0009)
- Scheduled Procedure Step Sequence . Scheduled Procedure Step Description (0040,0100)(0040,0007)
- Scheduled Procedure Step Sequence . Scheduled Protocol Code Sequence . Code Value (0040,0100)(0040,0008)(0008,0100)

3.7 Modality Performed Procedure Step 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 *DR System* operator to signal the start and end of a study, respectively.

3.7.1 Modality Performed Procedure Step IOD

The *DR System* provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

Table 3.24 Modality Performed Procedure Step SOP Class

SOP Class	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

Table 3.25 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	(0020,000D)	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	Empty Sequence

Attribute Name	Tag	DICOM Type	Supported Values
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	
> 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	
> Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	2	

Attribute Name	Tag	DICOM Type	Supported Values
> Performing Physician's Name	(0008,1050)	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	
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2	If the IHE Dose Reporting Option is enabled on the system, the value for this field will be sent. This field represents the unique identification of Dose Report(s) associated with this procedure step.
Radiation Dose			
Anatomic Structure Sequence	(0008,2229)		Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)		
>Coding Scheme Designator	(0008,0102)		
>Coding Scheme Version	(0008,0103)		
>Code Meaning	(0008,0104)		
>Mapping Resource	(0008,0105)		
>Context Group Version	(0008,0106)		
>Context Identifier	(0008,010f)		
Total Number of Exposures	(0040,0301)		
Distance Source to Detector	(0018,1110)		
Distance Source to Entrance	(0040,0306)		

Attribute Name	Tag	DICOM Type	Supported Values
Entrance Dose	(0040,0302)		This value will be calculated if Image Area Dose is available, otherwise value will be zero. It will be measured at reference point “In Detector Plane” when Distance Source to Detector and Distance Source to Patient are NOT available. Refer to Addendum B
Entrance Dose in mGy	(0040,8302)		This value will be calculated if Image Area Dose is available, otherwise value will be zero. It will be measured at reference point “In Detector Plane” when Distance Source to Detector and Distance Source to Patient are NOT available. Refer to Addendum B
Exposed Area	(0040,0303)		
Image Dose Product	(0018,115E)		
Exposure Dose Sequence	(0040,030E)		
>Radiation Mode	(0018,115A)		
>KVP	(0018,0060)		
>X-ray Tube Current in uA	(0018,8151)		
>Exposure Time	(0018,1150)		

3.8 Storage Commitment Push Model SOP Class

The *DR System* provides standard conformance to the Storage Commitment Push Model SOP Class as an SCU.

Table 3.26 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 *DR 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 *DR System* and the Storage SCP.

3.8.1 DIMSE Service N-ACTION

The *DR System* uses the N-ACTION to instruct the Storage SCP to commit the images of the study and/or to commit the RDSR.

3.8.1.1 Storage Commitment N-ACTION IOD

Table 3.27 Storage Commitment N-ACTION Attributes

Attribute	Tag
Transaction UID	(0008,1195)
Referenced SOP Sequence	(0008,1199)
>Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

3.8.2 DIMSE Service N-EVENT-REPORT

The *DR System* will process the indication of the N-EVENT-REPORT from the Storage Commitment operation. Table 3.26 lists the attributes that are processed by the DR.

3.8.1.1 Storage Commitment N-EVENT-REPORT IOD

Table 3.28 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.

3.9 Priors

The Priors feature will send separate C-FIND and C-MOVE commands to the PACS to request a list of studies/images for a given patient, and to them request the transfer of those images respectively.

3.9.1 DICOM Query C-FIND

SOP Class	SOP Class UID
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1

Study Level Key Attributes (C-Find):

First, we look for studies that we might be interested in.

Attribute Name	Tag	Value
Specific Character Set e.g., ISO_IR 100, GB18030	*(0008,0005)*	*Used by the device to properly decode DICOM fields subject to this value, e.g., Patient Name.*
Study Date	(0008,0020)	We populate this field with the date range of interest in the format: yyyyMMdd-yyyyMMdd. This is a required field by the DICOM standard. We expect matching to occur on this field. i.e. We expect any C-Find response to have study dates within this range.
Study Time	(0008,0030)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. If not filled in, we can still handle this.
Accession Number	(0008,0050)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. We do not currently use this field.
Query/Retrieve Level	(0008,0052)	We populate this field with: "STUDY"
Patient Name	(0010,0010)	We fill this field with the Patient's Last Name + '*' (wild card). e.g. If the Patient's Last Name is Smith, we fill this value with "Smith*". This is a required field by the DICOM standard, and it is expected that the PACS will match on this value.
Patient Id	(0010,0020)	We fill this field with the Patient Id. This is a required field by the DICOM standard, and it is expected that the PACS will match on this value.
Patient's Birth Date	(0010,0030)	This is an optional tag by the DICOM standard. We will only pass this tag if the "Date of Birth" must match checkbox is checked on the Key Op Configuration for priors. If we pass this tag, we fill this in the patient's birth date. We will then look at the value in the response returned to see if it matches the patient's birth date. A device could treat this as a matching field.
Study Instance UID	(0020,000D)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of a study. We populate this field with an empty string. The PACS will fill in this value in the response.
Study Id	(0020,0010)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response.
Modalities in Study	(0008,0061)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.
Study Description	(0008,1030)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.

Series Level Key Attributes (C-Find):

From the list of matching studies found, we look for matching series.

Attribute Name	Tag	Value
Specific Character Set e.g., ISO_IR 100, GB18030	(0008,0005)	Used by the device to properly decode DICOM fields subject to this value, e.g., Patient Name.
Modality	(0008,0060)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. The returned value is then used to determine whether this series is associated with one of the modalities that we are configured to retrieve priors for. If so, we will continue to query on this series. If not, we won't.
Query/Retrieve Level	(0008,0052)	We populate this field with "SERIES".
Body Part Examined	(0018,0015)	We populate this field with an empty string. This is an optional tag by the DICOM standard, but the prior image retrieval feature will not work optimally if this tag is not supported. If returned by the PACS, this tag is used to determine if this series is for the body part that we are interested in. If this field is empty or not returned, we will treat this as a body part match even though we really don't know if it is.
Patient Position	(0018,5100)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the Patient Position.
View Position	(0018,5101)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the View Position. If this series is retrieved, the view position value will be used for determining how well the prior matches the image for which it was retrieved. It will also be displayed with the Body Part on the Prior Information Panel.
Study Instance UID	(0020,000D)	This is the Study Instance UID returned in the Study Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Study Instance UID.
Series Instance UID	(0020,000E)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of a series. We populate this field with an empty string. The PACS will fill in this value in the response.
Series Number	(0020,0011)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. This is used to help us determine which series record is most recent.
Series Description	(0008,103E)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the list of modalities used in the study.

Image Level Key Attributes (C-Find):

From the list of matching series, we look for matching images.

Attribute Name	Tag	Value
Specific Character Set e.g., ISO_IR 100, GB18030	(0008,0005)	Used by the device to properly decode DICOM fields subject to this value, e.g., Patient Name.
Query/Retrieve Level	(0008,0052)	We populate this field with "IMAGE".
Study Instance UID	(0020,000D)	This is the Study Instance UID returned in the Study Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Study Instance UID.
Series Instance UID	(0020,000E)	This is the Series Instance UID returned in the Series Level C-Find command. This value is treated as a matching value. The PACS will only return responses to this query that match this Series Instance UID.
SOP Instance UID	(0008,0018)	This is defined as a "Unique Key" by the DICOM standard. In this case, this uniquely identifies an instance of an image. We populate this field with an empty string. The PACS will fill in this value in the response.
Acquisition Date	(0008,0022)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the acquisition date of the image.
Acquisition Time	(0008,0032)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the acquisition time of the image.
Instance Number	(0020,0013)	We populate this field with an empty string. This is a required field by the DICOM standard, so this should be filled in by the PACS in the response. This is used to help us determine which image record is most recent.
SOP Class UID	(0008,0016)	We populate this field with an empty string. This is an optional tag by the DICOM standard. If supported by the PACS, the PACS will return the SOP Class UID of the image. This helps us to determine whether or not we are interested in this image. Perhaps this is a type of image that we do not support, e.g., Ultrasound Image Storage.

3.9.2 DICOM Retrieve C-MOVE

SOP Class	SOP Class UID
Study Root Query Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2

From the list of matching images, will send a C-MOVE command for each image:

Description	Tag	Usage
Query/Retrieve Level	(0008,0052)	"IMAGE"

Description	Tag	Usage
Study Instance UID	(0020,000D)	Study Instance UID associated with this image.
Series Instance UID	(0020,000E)	Series Instance UID associated with this image.
SOP Instance UID	(0008,0018)	SOP Instance UID that uniquely identifies this image.

Act as a Store SCP for the following Store Services:

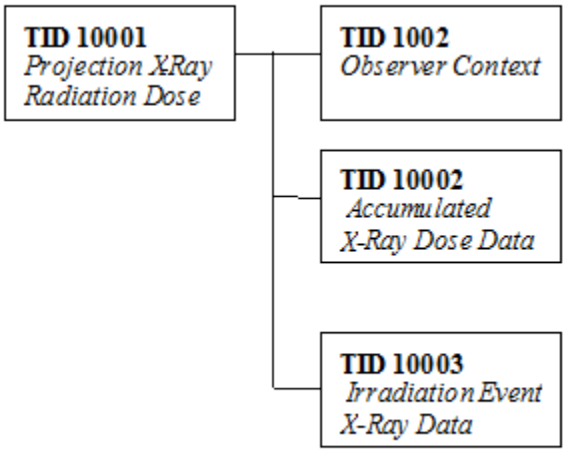
SOP Class	UID	Transfer Syntax Name	Transfer Syntax UID	Role
Computed Radiography Image Storage SOP Class UID	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian (Default Transfer Syntax for DICOM)	1.2.840.10008.1.2	SCP
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP

3.10 Structured Reports

The IHE Dose Reporting feature will enable the creation and delivery (e.g., Store Dose Information, Storage Commitment) of a Radiation Dose Structured Report on completion or discontinuation of a procedure step where irradiation events occurred.

Radiation Dose Structured Report

X-Ray Radiation Dose SR IOD Template Structure



Note: A Dual Energy exam will be recorded as two separate Irradiation Events and will use TID 10001.

Note: Terminology used in the following TID table(s) for the column “Presence of Value”:

ALWAYS If the attribute is a “Mandatory” attribute then it will always be present with a value or included with no value.

If the attribute is a “Mandatory Conditional” attribute and the condition was satisfied, then it will always be present with a value or included with no value.

If the attribute is a “User Option” attribute and the attribute has a value then it will be included.

If the attribute is a “User Option Conditional” attribute and the condition was satisfied and the attribute has a value then it will be included.

CONDITIONAL The attribute is present under specified condition.

TID 10001 Projection X-Ray Radiation Dose					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113701, DCM, “X-Ray Radiation Dose Report”)	1	ALWAYS	
>	HAS CONCEPT MOD	(121058, DCM, ”Procedure reported”)	1	ALWAYS	(113704, DCM, “Projection X-Ray”) for Digital and Computed Radiography
>>	HAS CONCEPT MOD	(G-C0E8, SRT, “Has Intent”)	1	ALWAYS	(R-408C3, SRT, “Diagnostic Intent”)
>	CONTAINS	(122142, DCM, “Acquisition Device Type”)	1	ALWAYS	(113958, DCM, “Integrated Projection Radiography System”) for Digital Radiography (113959, DCM, “Cassette-based

					Projection Radiography System") for Computed Radiography
>		DTID (1002) Observer Context	1-n	ALWAYS	Will have one Device Observer and one Person Observer
>	HAS OBS CONTEXT	(113705, DCM, "Scope of Accumulation")	1	ALWAYS	(113016, DCM, "Performed Procedure Step")
>>	HAS PROPERTIES	DCID (10001) UID Types	1	ALWAYS	(121126, DCM, "Performed Procedure Step SOP Instance UID")
>	CONTAINS	(113945, DCM, "X-Ray Detector Data Available")	1	ALWAYS	(R-0038D, SRT, "Yes")
>	CONTAINS	(113943, DCM, "X-Ray Source Data Available")	1	ALWAYS	(R-0038D, SRT, "Yes") if X-Ray Source Data is available; otherwise (R-00339, SRT, "No")
>	CONTAINS	(113944, DCM, "X-Ray Mechanical Data Available")	1	ALWAYS	(R-0038D, SRT, "Yes") for Digital Radiography Systems (R-00339, SRT, "No") for Computed Radiography Systems who do not have a Livingston box
>	CONTAINS	DTID (10002) Accumulated X-Ray Dose	1	ALWAYS	(113622, DCM, "Single Plane"
>	CONTAINS	DTID (10003) Irradiation Event X-Ray Data	1-n	ALWAYS	
>	CONTAINS	(113854, DCM, "Source of Dose Information")	1-n	ALWAYS	(113857, DCM, "Manual Entry") for Non-integrated Systems

					(113856, DCM, ” Automated Data Collection”) for Integrated Systems
TID 10002 Accumulated X-Ray Dose Data					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113702, DCM, ”Accumulated X-Ray Dose Data”)	1	ALWAYS	
>	HAS CONCEPT MOD	(113764, DCM, “Acquisition Plane”	1	ALWAYS	(113622, DCM, “Single Plane”
>	CONTAINS	DTID (10007) Accumulated Integrated Projection Radiography Dose	1	CONDITIONAL	
>	CONTAINS	DTID (10006) Accumulated Cassette-based Projection Radiography Dose	1	CONDITIONAL	
TID 10003 Irradiation Event X-Ray Data					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113706, DCM, ”Irradiation Event X-Ray Data”)	1	ALWAYS	
>	HAS CONCEPT MOD	(113764, DCM, “Acquisition Plane”	1	ALWAYS	(113622, DCM, “Single Plane”
>	CONTAINS	(113769, DCM, “Irradiation Event UID”)	1	ALWAYS	
>	CONTAINS	(111526, DCM, “DateTime Started”)	1	ALWAYS	

>	CONTAINS	(113721, DCM, “Irradiation Event Type”)	1	ALWAYS	(113611, DCM, “Stationary Acquisition”)
>	CONTAINS	(125203, DCM, “Acquisition Protocol”)	1	ALWAYS	
>	CONTAINS	(T-D0005, SRT, “Anatomical structure”)	1	ALWAYS	DCID (4009) DX Anatomy Imaged Refer to Addendum A
>	CONTAINS	(111031, DCM, “Image View”)	1	ALWAYS	DCID (4010) DX View Refer to Addendum A
>>	HAS CONCEPT MOD	(111032, DCM, “Image View Modifier”)	1	ALWAYS	DCID (4011) DX View Modifier Refer to Addendum A
>	CONTAINS	(123014 , DCM, ”Target Region”)	1	ALWAYS	DCID (4031) Common Anatomic Regions Refer to Addendum A
>	CONTAINS	(122130, DCM, “Dose Area Product”	1	CONDITIONAL	For non-integrated systems in order for this value to be populated and sent, the system user needs to enter the value manually. Value is present for Projection X-Ray. Refer to Addendum B
>	CONTAINS	(111636, DCM, “Entrance Exposure at RP”)	1	CONDITIONAL	Value may be present. Refer to Addendum B
>	CONTAINS	(113780, DCM, “Reference Point Definition”)	1	ALWAYS	(113941, DCM, “In Detector Plane”)
>	CONTAINS	DTID (10003a) Irradiation Event X-Ray Detector Data	1	CONDITIONAL	

>	CONTAINS	DTID (10003b) Irradiation Event X-Ray Source Data	1	CONDITIONAL	
>	CONTAINS	DTID (10003c) Irradiation Event X-Ray Mechanical Data	1	CONDITIONAL	
TID 10003a Irradiation Event X-Ray Detector Data					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113845, DCM, “Exposure Index”)	1	ALWAYS	Units = (1,UCUM, “no units”) This will always be the IEC Exposure Index.
		(113846, DCM, “Target Exposure Index”)	1	ALWAYS	Units = (1,UCUM, “no units”)
		(113847, DCM, “Deviation Index”)	1	ALWAYS	Units = (1,UCUM, “no units”)
		(113795, DCM, “Acquired Image”)	1-n	ALWAYS	Referenced SOP Class UID and Instance UID of Image Object created for this irradiation event.
TID 10003b Irradiation Event X-Ray Source Data					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113738, DCM, “Dose (RP)”)	1	CONDITIONAL	Dose at the Reference Point. This value will be calculated if Image Area Dose is available, otherwise value will be zero. Note: If the system user manually enters the value for Entrance Dose it is assumed that the

					dose information entered is "at the surface of the patient" based on the DICOM Specification for tags Entrance Dose ((0040,0302) and (0040,8302)). Even if this is the case, the Reference Point Definition tag value (113780, DCM, “Reference Point Definition”) will still be reported as (113941, DCM, “In Detector Plane”). Value is present for Projection X-Ray. Refer to Addendum B
		(113780, DCM, “Reference Point Definition”)	1	ALWAYS	(113941, DCM, “In Detector Plane”)
		(113733, DCM, “KVP”)	1-n	ALWAYS	For non-integrated systems in order for this value to be populated and sent, the system user needs to enter the value manually. Refer to Addendum B
		(113734, DCM, “X-Ray Tube Current”)	1-n	ALWAYS	Units = EV (mA, UCUM, “mA”)
		(113824, DCM, “Exposure Time”)	1	ALWAYS	Time in milliseconds
		(113736, DCM, “Exposure”)	1-n	ALWAYS	Units = EV (uA.s, UCUM, “uA.s”)
TID 10003c Irradiation Event X-Ray Mechanical Data					

NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		DCID (10008) Dose Related Distance Measurements	1-n	CONDITIONAL	(113750, DCM, “Distance Source to Detector”) Value is present if SID value is used in dose calculations.
TID 10006 Accumulated Cassette-based Projection Radiography Dose					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113947, DCM, “Detector Type”)	1	CONDITIONAL	(113949, DCM, “Indirect Detector “) for Digital Radiography
		(113731, DCM, “Total Number of Radiographic Frames”)	1	CONDITIONAL	Value represents the number of images in the procedure step/study that have been exposed.
TID 10007 Accumulated Integrated Projection Radiography Dose					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(113722, DCM, “Dose Area Product Total”)	1	ALWAYS	The value will be the sum of the Dose Area Product values for the procedure step. Units = EV (Gy.m2, UCUM, “Gy.m2”)
		(113725, DCM, “Dose (RP) Total”)	1	ALWAYS	The value will be the sum of the Dose (RP) values for the procedure step. Units = EV (Gy, UCUM, “Gy”)

		(113731, DCM, “Total Number of Radiographic Frames”)	1	ALWAYS	Value represents the number of images in the procedure step/study that have been exposed.
		(113780, DCM, “Reference Point Definition”)	1	ALWAYS	(113941, DCM, “In Detector Plane”)
TID 1002 Observer Context					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
	HAS OBS CONTEXT	(121005,DCM, “Observer Type”)	1	ALWAYS	(121006, DCM, “Person”) (121007, DCM, “Device”)
	HAS OBS CONTEXT	DTID (1003) Person observer identifying attributes	1	ALWAYS	
	HAS OBS CONTEXT	DTID (1004) Device observer identifying attributes	1	ALWAYS	
TID 1004 Device Observer Identifying Attributes					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(121012,DCM, “Device Observer UID”)	1	ALWAYS	This field will be populated.
		(121013,DCM, “Device Observer Name”)	1	ALWAYS	Defaults to value of Station Name (0008,1010) in General Equipment Module
		(121014,DCM, “Device Observer Manufacturer”)	1	ALWAYS	Defaults to value of Manufacturer (0008,0070) in General Equipment Module
		(121015,DCM, “Device Observer Model Name”)	1	ALWAYS	Defaults to value of

					Manufacturer's Model Name (0008,1090) in General Equipment Module
		(121016,DCM, "Device Observer Serial Number")	1	ALWAYS	Defaults to value of Device Serial Number (0018,1000) in General Equipment Module
		(113876, DCM, "Device Role in Procedure")	1-n	ALWAYS	(113859, DCM, "Irradiating Device")
TID 1003 Person Participant					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		(121008,DCM, "Person Observer Name")	1	ALWAYS	The system user needs to enter the value manually, otherwise a blank value will be sent. Refer to Addendum B
		(121009,DCM, "Person Observer's Organization Name")	1	ALWAYS	Defaults to Institution Name (0008,0080) of the General Equipment Module
		(121010,DCM, "Person Observer's Role in the Organization")	1	ALWAYS	(121083, DCM, "Technologist")
		(121011,DCM, "Person Observer's Role in this Procedure")	1	ALWAYS	(121094, DCM, "Performing")
TID 1021 Device Participant					
NL	**Relation with Parent**	**Concept Name**	**VM**	**Presence of Value**	**Value(s)**
		EV (113876, DCM, "Device Role in Procedure")	1	ALWAYS	(113859, DCM, "Irradiating Device")

		EV (113877, DCM, "Device Name")	1	ALWAYS	Defaults to value of Station Name (0008,1010) in General Equipment Module
		EV (113878, DCM, "Device Manufacturer")	1	ALWAYS	Defaults to value of Manufacturer (0008,0070) in General Equipment Module
		EV (113879, DCM, "Device Model Name")	1	ALWAYS	Defaults to value of Manufacturer's Model Name (0008,1090) in General Equipment Module
		EV (113880, DCM, "Device Serial Number")	1	ALWAYS	Defaults to value of Device Serial Number (0018,1000) in General Equipment Module
		EV (121012,DCM, "Device Observer UID")	1	ALWAYS	This field will be populated.

4 Communication Profiles

4.1 Supported Communications Stacks

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

The *DR 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 Support

The *DR System* supports Ethernet with the following physical connectors:

- Unshielded Twisted pair (10BaseT, 100BaseT and 1000BaseT).
- DRX-Revolution, DRX-Revolution Plus, DRX-Rise, and DRX-Transportable provide an additional 802.11a/b/g wireless network interface.

5 Extensions/Specializations/Privatizations

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

5.1 Computed Radiography IOD

5.1.1 Specialization of Pixel Spacing

The *DR 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 Alternate Image Display Spaces

In addition to supporting P-Values (DICOM Grayscale Display Function perceptually linear output), the DR 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 *DR System* supports the use of the Density, Luminance or P-Value display spaces with the CR IOD, DX IOD.

5.1.3 Extension for P-Value Encoding

If the destination supports VOI LUT, 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	*DR 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

5.1.4 Extension to Body part Examined, View Position and Patient Position

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

5.2 Configuration of Body Part Examined (0018,0015)

The DR System provides the ability to configure the software to populate the Body Part Examined tag with either Body Part, Anatomical Region or View Name. If configured to populate using View Name, the system must also be configured to "Allow non-conforming DICOM" otherwise, a PACS or Storage SCP may reject or remove any special characters (e.g., hyphen) not supported by the DICOM standard for this tag.

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 (*DR System* AE Title)
SCP DICOM Called Application Entity Title
Socket number
Router Address (Gateway)
DICOM Service(s) available
Private Tag Support
P-Value Encoding Support
Other destination properties

Configurable Network Attributes
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 *DR System* will support any valid character set for the Specific Character Set attribute (0008,0005).

Possible Values of (0008,0005)	Description
blank ISO 2022 IR 6	ISO-IR 6 the Default character set
ISO_IR 100 ISO 2022 IR 100	Latin 1character set
GB18030	Simplified and Traditional Chinese
ISO 2022 IR 13	Japanese (JIS X 0201: Katakana and Romaji)
ISO 2022 IR 87	Japanese (JIS X 0208: Kanji)
ISO_IR 101	Polish, Hungarian, Romanian, and Czech
ISO_IR 126	Greek (Supplementary set of ISO 8859)
ISO_IR 144	Ukrainian and Russian
ISO_IR 148	Turkish
ISO 2022 IR 149	Korean (KS X 1001: Hangul and Hanja)
ISO 2022 IR 159	Japanese (JIS X 0212: Supplemental Kanji set)

Note: The Extended Character Sets mentioned above do not apply to the Worklist.

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 *DR System*.

Table A.1 Supported SNOMED Code Values

Context Identifier	
19	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	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)	**Coding Scheme Version (0008,0103)**
SRT	20070524
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
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
R-40799	lordotic
Context Identifier	
4010	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	20090119
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-10202	frontal
R-10204	frontal oblique
R-10206	antero-posterior
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-40783	lateral oblique
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-102C1	oblique
R-102CD	lateral
R-102C2	tangential
R-10256	submentovertical
R-10257	verticosubmental
R-102C3	plantodorsal
R-102C4	dorsoplantar
R-102C5	parietoacanthal
R-102C6	acanthoparietal
R-102C7	orbitoparietal
R-102C8	parieto-orbital
R-10230	latero-medial oblique
R-10226	medio-lateral oblique
G-8300	tissue specimen
Context Identifier	
4011	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	20070524

Code Value (0008,0100)	Code Meaning (0008,0104)
R-10244	cephalad
R-10242	caudad
R-40885	transthoracic
R-4087B	transforamenal
G-D00B	transoral
R-40554	transorbital
111069	Crosstable
R-421A4	Mouth closed
Context Identifier	
4014	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	20090717
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-10224	medio-lateral
R-10226	medio-lateral oblique
R-10228	latero-medial
R-10230	latero-medial oblique
R-10242	cranio-caudal
R-10244	caudo-cranial (from below)
R-102D0	superolateral to inferomedial oblique
R-40AAA	inferomedial to superolateral oblique
R-1024A	cranio-caudal exaggerated laterally
R-1024B	cranio-caudal exaggerated medially
G-8310	tissue specimen from breast
Context Identifier	
4015	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**

SRT	20090717
Code Value (0008,0100)	**Code Meaning (0008,0104)**
R-102D2	Cleavage
R-102D1	Axillary Tail
R-102D3	Rolled Lateral
R-102D4	Rolled Medial
R-102CA	Rolled Inferior
R-102C9	Rolled Superior
R-102D5	Implant Displaced
R-102D6	Magnification
R-102D7	Spot Compression
R-102C2	Tangential
R-40AB3	Nipple in profile
P2-00161	Anterior compression
R-40ABE	Infra-mammary fold
R-40AB2	Axillary tissue
Context Identifier	
4031	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	20091021
Code Value (0008,0100)	**Code Meaning (0008,0104)**
T-D4000	Abdomen
T-15420	Acromioclavicular joint
T-15750	Ankle joint
T-280A0	Apex of Lung
T-D8200	Arm
T-60610	Bile duct
T-74000	Bladder

T-04000	Breast
T-26000	Bronchus
T-12770	Calcaneus
T-11501	Cervical spine
T-D3000	Chest
T-12310	Clavicle
T-11BF0	Coccyx
T-58200	Duodenum
T-D8300	Elbow
T-56000	Esophagus
T-D0300	Extremity
T-D0801	Eye region
T-11196	Facial bones
T-12710	Femur
T-D8800	Finger
T-D9700	Foot
T-12402	Forearm bone
T-63000	Gall bladder
T-D8700	Hand
T-D1100	Head
T-32000	Heart
T-15710	Hip joint
T-12410	Humerus
T-D1213	Jaw region
T-D9200	Knee
T-59000	Large intestine
T-24100	Larynx
T-D9400	Leg

T-11503	Lumbar spine
T-11180	Mandible
T-11133	Mastoid bone
T-11170	Maxilla
T-D3300	Mediastinum
T-11149	Nasal bone
T-D1600	Neck
T-11102	Optic canal
T-22000	Paranasal sinus
T-61100	Parotid gland
T-12730	Patella
T-D6000	Pelvis
T-59600	Rectum
T-11300	Rib
T-15680	Sacroiliac joint
T-11AD0	Sacrum
T-12280	Scapula
T-D1460	Sella turcica
T-12980	Sesamoid bones of foot
T-D2220	Shoulder
T-11100	Skull
T-58000	Small intestine
T-D0146	Spine
T-15610	Sternoclavicular joint
T-11210	Sternum
T-57000	Stomach
T-61300	Submandibular gland
T-15770	Tarsal joint

T-15290	Temporomandibular joint
T-11502	Thoracic spine
T-D8810	Thumb
T-D9800	Toe
T-25000	Trachea
T-70010	Upper urinary tract
T-75000	Urethra
T-88920	Uterus and fallopian tubes
T-15460	Wrist joint
T-11167	Zygomatic arch

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 DR products. 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 and, if applicable, the TID Concept Name contained in the Dose Report.

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/ TID Concept Name
Accession Number	Accession Number (0008,0050)	Accession Number (0008,0050)
Body Part	NA	Body Part Examined (0018,0015)
Cassette ID input via bar code scanner	NA	Plate ID (0018,1004)
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)
Entrance Dose May be received from X-ray interface depending on equipment or input via GUI.	NA	Entrance Dose (0040,0302) Entrance Dose in mGy (0040,8302) (113738, DCM, "Dose (RP)")
Gender	Patient Sex (0010,0040)	Patient Sex (0010,0040)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
Image Area Dose May be received from X-ray interface depending on equipment or input via GUI.	NA	Image and Fluoroscopy Area Dose Product (0018,115E) (122130, DCM, "Dose Area Product"
Image Comments	NA	Image Comments (0020,4000)
kVp May be received from X-ray interface depending on equipment or input via GUI.	NA	kVp (0018,0060) (113733, DCM, "KVP")
Laterality	NA	Laterality (0020,0062)
Modality	Modality (0008,0060)	Modality (0008,0060)
Organ Dose May be received from X-ray interface depending on equipment or input via GUI.	NA	Organ Dose (0040,0316) (111636, DCM, "Entrance Exposure at RP")
Patient Age Read only value	Patient's age (0010,1010)	Patient's age (0010,1010)
Patient Comments A maximum of 255 characters are allowed.	Patient Comments (0010,4000)	Patient Comments (0010,4000)
Symptoms/Notes A maximum of 255 characters are allowed.	Additional Patient History (0010,21B0)	Additional Patient History (0010,21B0)
Patient First Name **Patient Last Name** **Patient Middle Name**	Patient's Name (0010,0010)	Patient's Name (0010,0010)
Patient Location	Current Patient Location (0038,0300)	NA
Patient Position	NA	NA
Priority	Requested Procedure Priority (0040,1003)	N/A

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
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) (121008,DCM, "Person Observer Name")
Patient ID	Patient ID (0010,0020)	Patient ID (0010,0020)
Procedure Code	Requested Procedure Description (0032,1060) or Requested Procedure ID (0040,1001) or Requested Procedure Code Sequence (0032,1064) > Code Value (0008,0100) or Scheduled Procedure Step Sequence (0040,0100) > Scheduled Procedure Step ID (0040,0009) or Scheduled Procedure Step Sequence (0040,0100) > Scheduled Procedure Step Description (0040,0007) or Scheduled Procedure Step Sequence (0040,0100) > Scheduled Protocol Code Sequence (0040,0008) > Code Value (0008,0100)	Procedure Code Sequence (0008,1032) > code value (0008,0100)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
Procedure ID	Requested Procedure ID (0040,1001)	Requested Procedure ID (0040,1001)
Study Name	Requested Procedure Description (0032,1060) will 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 (0040,0100) > 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)
Step Description	Performed Procedure Step Description (0040,0254)	Performed Procedure Step Description (0040,0254)
Referring Physician	Referring Physician's Name (0008,0090)	Referring Physician's Name (0008,0090)
Procedure Description	Requested Procedure Description (0032,1060)	Study Description (0008,1030)
Source to Image (cm)	NA	Distance Source to Detector (SID) (0018,1110) * value converted to mm
Source to Patient (cm)	NA	Distance Source to Patient (SOD) (0018,1111) * value converted to mm

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
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)