Carestream OnSight 3D Extremity System ImageView Software Version 1.0

DICOM Conformance Statement

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Document # 9K1877

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Introduction

1.1   Executive Overview

This document applies to the *Carestream OnSight 3D Extremity System* that utilizes the version 1.0 software.

The following DICOM SOP Classes are supported:

Table 1.1   Supported DICOM SOP Classes

SOP Class Name	SOP Class UID	Service Class Role
Verification SOP Class	1.2.840.10008.1.1	SCU, SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCU
Modality Work List Information Model – FIND	1.2.840.10008.5.1.4.31	SCU
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCU
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCU
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	SCU
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	SCU
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	SCU
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	SCU

Table 1.2   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

1.2   Scope and Field of Application

This document describes the DICOM functionality of *Carestream OnSight 3D Extremity System*. The *Carestream OnSight 3D Extremity System* is capable of performing projection radiographic examinations and producing a digital image. Throughout the remainder of this document the term **CBCT System** shall refer to the *Carestream OnSight 3D Extremity System* product.

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

1.3   Important Considerations for the Reader

This DICOM Conformance Statement by itself is not sufficient to guarantee successful connectivity between the *CBCT 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 *CBCT System* architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to *Carestream* equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity.

1.4   Accessing this Conformance Statement on the World Wide Web

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

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

1.5   Definitions, Acronyms, Abbreviations

The following symbols and abbreviations are used in this document.

ASCII	American Standard Code for Information Interchange
AE	Application Entity
CBCT	Cone Beam Computed Tomography
CR	Computed Radiography

CT	Computed Tomography	
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.	
ISO	International Standards Organization	
LUT	Look-up Table	
MPPS	Modality Performed Procedure Step SOP Class	
MWL	Modality Work List	
PDU	Protocol Data Unit	
PLUT	Presentation Look-up Table	
REM	Radiation Exposure Monitoring	
RDSR	Radiation Dose Structured Report	
SC	Secondary Capture	
SCP	Service Class Provider	
SCPM	Storage Commitment Push Model SOP Class	
SCU	Service Class User	
SOP	Service-Object Pair	
SR	Structured Report	
TCP/IP	Transmission Control Protocol/Internet Protocol	
UID	Unique Identifier	

1   Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to deliver studies to remote printers. The CT Image Storage SOP Class and the DX Image Storage SOP Class is used to deliver studies to archives. Basic Work List Management service is used for the acquisition of patient demographics. The X-Ray Radiation Dose SR SOP Class is used to deliver dose information to archives and dose information consumers.
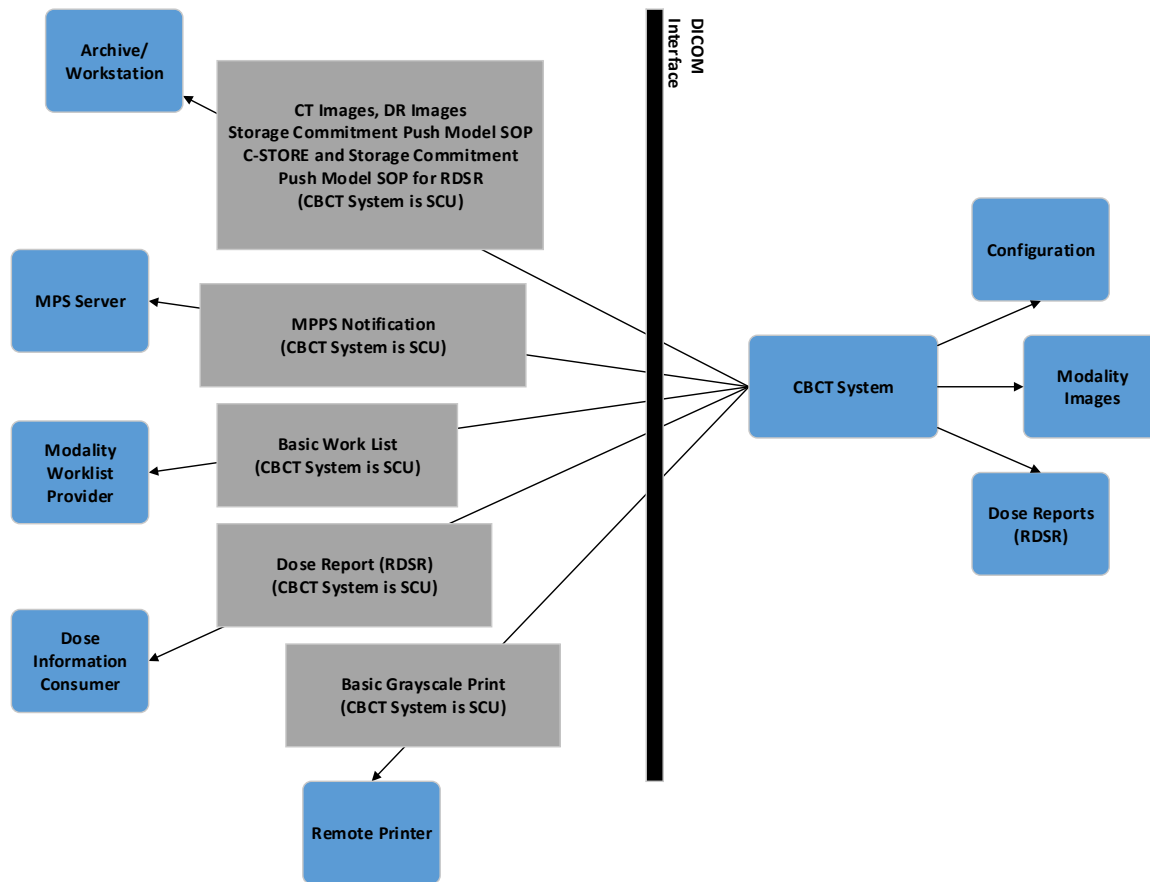
Figure 2.1 Implementation Model

1.6 Functional Definitions

The *CBCT 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, the Remote Patient Data Entry System (RPDES) or via a DICOM Work List. The RPDES allows patient demographic data to be entered from remote computers for sites that do not support the DICOM Work List. The *CBCT 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.

1.7 Sequencing of Real-World Activities

If a HIS/RIS service is present and polling is enabled in *CBCT System*, the *CBCT System* establishes an association when the *CBCT System* application is started to obtain a modality

Work List. The Work List is used as a source of patient demographics. The *CBCT System* establishes an association with a selected SCP when *it* has collected sufficient information to begin sending images.

2   Application Entity Specifications

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

1.8   Association Establishment Policies

1.8.1   General

1.8.1.1   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 *CBCT System* will negotiate, is 128 Kbytes.

1.8.1.2   Modality Worklist

The *CBCT 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 Work List will be attempted when the *CBCT System* application is started and then periodically thereafter.

1.8.1.3   Structured Reports

The *CBCT 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   Delivery

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

3.1.2.2   HIS/RIS

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

3.1.2.3   Storage Commitment

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

3.1.3 Asynchronous Nature

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

3.1.4 Implementation Identifying Information

The *CBCT 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 *CBCT System.*

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

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

1.9   Association Initiation Policy

3.2.1   Associated Real-World Activity

3.2.1.1   Delivery

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

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

3.2.1.2   HIS/RIS

The *CBCT System* initiates Associations for the purpose of obtaining the current Modality Work List IOD.

3.2.1.3   Structured Reports

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

3.2.2   Presentation Context Table

The *CBCT 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 Work List	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
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Explicit VR Little Endian DICOM Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Digital 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
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
Grayscale Softcopy	1.2.840.10008.5.1.4.1.1.11.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Ext.**
Presentation State Storage SOP Class		DICOM Implicit VR Little Endian	1.2.840.10008.1.2		
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		DICOM Implicit VR Little Endian	1.2.840.10008.1.2		

3.2.3   SOP Specific Conformance

3.2.3.1   Verification

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

- When prompted by a user, the *CBCT 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 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.

1.10 Association Acceptance Policy

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

1.11 Basic Print Management Meta SOP Class

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

Table 3.2   Meta SOP Class

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

3.4.1   Basic Film Session SOP Class

3.4.1.1   DIMSE Service N-CREATE

Table 3.3   Basic Film Session SOP Class – Supported Attributes

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

3.4.1.2   DIMSE Service N-Action

The *CBCT System* uses the N-ACTION to instruct the SCP to print all films in the session. The *CBCT 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 *CBCT 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 *CBCT 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.
Max Density	U	(2010,0130)	0-450 Configurable for Destination
Configuration Information	U	(2010,0150)	Not used.
Annotation Display Format ID	U	(2010,0030)	Not used

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

3.4.2.2 DIMSE Service N-ACTION

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

3.4.2.3 DIMSE Service N-SET

This service is not used.

3.4.2.4 DIMSE Service N-DELETE

This service is not used.

3.4.3   Basic Image Box SOP Class

3.4.3.1 DIMSE Service N-SET

Table 3.5   Basic Image Box SOP Class – Supported Attributes

Attribute & Usage	SCU Usage	Tag	Supported Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format
Preformatted Grayscale Image Sequence	M	(2020,0110)	
>Samples Per Pixel	M	(0028,0002)	1
>Photometric Interpretation	M	(0028,0004)	MONOCHROME1, MONOCHROME2 (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.

Attribute & Usage	SCU Usage	Tag	Supported Values
>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	(0028,0100)	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 *CBCT System* will process the indication of the N-EVENT-REPORT operation. Any string sent by the SCP is accepted and displayed on the *CBCT System* user interface. In this translation, all characters that are not space characters or in the ASCII range "A" - "Z" are stripped.

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

1.12 Store Service Classes

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

3.5.1 Digital X-Ray Image Storage

The *CBCT 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 IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	
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	

Attribute Name	Tag	DICOM Type	Supported Values
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	
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	DX
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R
Series Date	(0008,0021)	3	
Protocol Name	(0018,1030)	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
Performed Procedure Step Start Date	(0040,0244)	3	
Performed Procedure Step Start Time	(0040,0245)	3	

Attribute Name	Tag	DICOM Type	Supported Values
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
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
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM

Attribute Name	Tag	DICOM Type	Supported Values
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *CBCT 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 *CBCT 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	OnSight 3D Extremity System
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	
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.
> 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	
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.
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.
>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
Irradiation Event UID	(0008,3010)	3	If the IHE Dose Reporting Option is enabled on the *CBCT System*, the value for this field will be sent. 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.
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 is 1768 (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 is 2152 (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
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	3	0
Largest Image Pixel Value	(0028,0107)	3	4095
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	L R
Anatomic Region Sequence	(0008,2218)	2	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values

Attribute Name	Tag	DICOM Type	Supported Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
DX Image			
Image Type	(0008,0008)	1	
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME1 MONOCHROME2 (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
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Pixel Intensity Relationship	(0028,1040)	1	LOG
Pixel Intensity Relationship Sign	(0028,1041)	1	-1 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

Attribute Name	Tag	DICOM Type	Supported Values
Patient Orientation	(0020,0020)	1	
Calibration Image	(0050,0004)	3	
Burned In Annotation	(0028,0301)	1	NO
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	
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	
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	
Exposures on Detector Since Manufactured	(0018,7011)	3	NOT AVAILABLE FOR DRX
Detector Manufacturer Name	(0018,702A)	3	VARIAN
Detector Manufacturer's Model Name	(0018,702B)	3	PaxScan2530DX
Detector Time Since Last Exposure	(0018,7012)	3	
Detector Binning	(0018,701A)	3	1\1
Detector Temperature	(0018,7001)	3	
Sensitivity	(0018,6000)	3	
Field of View Shape	(0018,1147)	3	RECTANGLE
Imager Pixel Spacing	(0018,1164)	1	"0.139\0.139"
Detector Element Physical Size	(0018,7020)	3	
Detector Element Spacing	(0018,7022)	3	
X-Ray Collimator			

Attribute Name	Tag	DICOM Type	Supported Values
Collimator Shape	(0018,1700)	1	RECTANGULAR
Vertices of the Polygonal Collimator	(0018,1720)	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	
>>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

Attribute Name	Tag	DICOM Type	Supported 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	
X-Ray Acquisition Dose			
KVP	(0018,0060)	3	
X-Ray Tube Current	(0018,1151)	3	
Exposure Time	(0018,1150)	3	
Exposure	(0018,1152)	3	
Exposure in µAs	(0018,1153)	3	
Distance Source to Detector	(0018,1110)	3	
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	
Relative X-Ray Exposure	(0018,1405)	3	
Exposure Index	(0018,1411)	3	Defined in IEC 62494-1
Target Exposure Index	(0018,1412)	3	Defined in IEC 62494-1
Deviation Index	(0018,1413)	3	Defined in IEC 62494-1
Entrance Dose	(0040,0302)	3	This value will be calculated and 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)	3	This value will be calculated and 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)	3	
Distance Source to Entrance	(0040,0306)	3	
Anode Target Material	(0018,1191)	3	TUNGSTEN

Attribute Name	Tag	DICOM Type	Supported Values
Filter Material	(0018,7050)	3	
Filter Thickness Minimum	(0018,7052)	3	
Filter Thickness Maximum	(0018,7054)	3	
Rectification Type	(0018,1156)	3	
X-Ray Filtration			
Filter Type	(0018,1160)	3	
Filter Material	(0018,7050)	3	
Filter Thickness Minimum	(0018,7052)	3	
Filter Thickness Maximum	(0018,7054)	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	
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	3	
>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 *CBCT 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 IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	
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

Attribute Name	Tag	DICOM Type	Supported Values
> 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	
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	CR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R
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
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	

Attribute Name	Tag	DICOM Type	Supported Values
>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	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *CBCT 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 *CBCT 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	OnSight 3D Extremity System
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	
General Image			
Instance Number	(0020,0013)	2	
Patient Orientation	(0020,0020)	2C	

Attribute Name	Tag	DICOM Type	Supported Values
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	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	
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	If the IHE Dose Reporting Option is enabled on the *CBCT System*, the value for this field will be sent. 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.
Image Plane			
Pixel Spacing	(0028,0030)	3	"0.139\0.139"
Image Pixel			

Attribute Name	Tag	DICOM Type	Supported Values
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 is 1768 (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 is 2152 (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	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	12
High Bit	(0028,0102)	1	11
Pixel Representation	(0028,0103)	1	0
Smallest Image Pixel Value	(0028,0106)	3	0
Largest Image Pixel Value	(0028,0107)	3	4095
Pixel Data	(7FE0,0010)	1	
CR Image			
KVP	(0018,0060)	3	
Plate ID	(0018,1004)	3	
Distance Source to Detector	(0018,1110)	3	
Distance Source to Patient	(0018,1111)	3	Refer to Addendum B
Exposure	(0018,1152)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Exposure in µAs	(0018,1153)	3	
Imager Pixel Spacing	(0018,1164)	3	"0.139\0.139"
Relative X-Ray Exposure	(0018,1405)	3	0 to 4095
Exposure Index	(0018,1411)	3	
Target Exposure Index	(0018,1412)	3	
Deviation Index	(0018,1413)	3	
Sensitivity	(0018,6000)	3	
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
VOI LUT			
VOI LUT Sequence	(0028,3010)	3	
>LUT Descriptor	(0028,3002)	1C	
>LUT Explanation	(0028,3003)	3	
>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 Computed Tomography (CT) Image Storage

The *CBCT System* provides standard conformance to the Computed Tomography Image Storage SOP Class as an SCU. This SOP Class is used for digital CBCT exams.

Table 3.13 Computed Tomography Image SOP Class

SOP Class	SOP Class UID
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2

Table 3.14 Computed Tomography 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

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 IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Patient Comments	(0010,4000)	3	
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	
Patient's Size	(0010,1020)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	CT
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	
Operator Name	(0008,1070)	3	Refer to Addendum B
Referenced Performed Procedure Step Sequence	(0008,1111)	3	
Body Part Examined	(0018,0015)	3	Refer to Addendum B
Patient Position	(0018,5100)	2C	This tag will be sent if sequence (0054,0410) is not present. If sent, this tag may be blank.
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	

Attribute Name	Tag	DICOM Type	Supported Values
>> 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 *CBCT 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 *CBCT 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	OnSight 3D Extremity System
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	DERIVED\PRIMARY\AXIAL
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	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.
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.
Image Comments	(0020,4000)	3	Refer to Addendum B
Lossy Image Compression	(0028,2110)	3	00 = No Compression
Burned In Annotation	(0028,0301)	1	NO
Irradiation Event UID	(0008,3010)	3	If the IHE Dose Reporting Option is enabled on the *CBCT System*, the value for this field will be sent. 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.
Image Plane			
Pixel Spacing	(0028,0030)	1	Dependent on reconstructed image size.
Image Orientation (Patient)	(0020,0037)	1	Dependent on exam
Image Position (Patient)	(0020,0032)	1	Dependent on exam
Slice Thickness	(0018,0050)	2	Dependent on exam
Frame of Reference			
Frame of Reference UID	(0020,0052)	1	
Position Reference Indicator	(0020,1040)	2	
Image Pixel			
Samples per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME2
Planar Configuration	(0028,0006)	1C	

Attribute Name	Tag	DICOM Type	Supported Values
Rows	(0028,0010)	1	Dependent on exam
Columns	(0028,0011)	1	Dependent on exam
Pixel Aspect Ratio	(0028,0034)	1C	
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	16
High Bit	(0028,0102)	1	15
Pixel Representation	(0028,0103)	1	0
Pixel Data	(7FE0,0010)	1	
CT Image			
Image Type	(0008,0008)	1	DERIVED\PRIMARY\AXIAL
Samples Per Pixel	(0028,0002)	1	1
Photometric Interpretation	(0028,0004)	1	MONOCHROME2
Bits Allocated	(0028,0100)	1	16
Bits Stored	(0028,0101)	1	16
High Bit	(0028,0102)	1	15
Rescale Intercept	(0028,1052)	1	-1024
Rescale Slope	(0028,1053)	1	1
Rescale Type	(0028,1054)	1C	HU
KVP	(0018,0060)	2	
Acquisition Number	(0020,0012)	2	This tag will be sent with a blank value.
Data Collection Diameter	(0018,0090)	3	
Data Collection Center (Patient)	(0018,9313)	3	
Reconstruction Diameter	(0018,1100)	3	
Reconstruction Target Center (Patient)	(0018,9318)	3	
Distance Source to Detector	(0018,1110)	3	
Gantry/Detector Tilt	(0018,1120)	3	
Rotation Direction	(0018,1140)	3	
Exposure Time	(0018,1150)	3	
X-Ray Tube Current	(0018,1151)	3	
Exposure	(0018,1152)	3	
Exposure in μAs	(0018,1153)	3	
Generator Power	(0018,1170)	3	

Attribute Name	Tag	DICOM Type	Supported Values
Convolution Kernel	(0018,1210)	3	
Revolution Time	(0018,9305)	3	
Single Collimation Width	(0018,9306)	3	
Total Collimation Width	(0018,9307)	3	
Anatomic Region Sequence	(0008,2218)	2	Refer to Context Identifier 4031 in Addendum A for supported SNOMED Code Values
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Coding Scheme Version	(0008,0103)	1C	
>Code Meaning	(0008,0104)	1C	
>Mapping Resource	(0008,0105)	1C	
>Context Group Version	(0008,0106)	1C	
>Context Identifier	(0008,010f)	3	
Contrast/Bolus			
Contrast/Bolus Agent	(0018,0010)	2	Refer to Addendum B
VOI LUT			
Window Center	(0028,1050)	1C	Default value is 300
Window Width	(0028,1051)	1C	Default value is 1500
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 *CBCT System* provides standard conformance to the Grayscale Softcopy Presentation State Storage SOP Class as an SCU.

Table 3.15   Grayscale Softcopy Presentation State SOP Class

SOP Class	SOP Class UID
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1

Table 3.16   Grayscale Softcopy Presentation State SOP Class Attributes

Attribute Name	Tag	DICOM Type	Supported Values

Attribute Name	Tag	DICOM Type	Supported Values
Patient Module			
Patient Name	(0010,0010)	2	Refer to Addendum B
Patient ID	(0010,0020)	2	Refer to Addendum B
Patient Birth Date	(0010,0030)	2	Refer to Addendum B
Patient Sex	(0010,0040)	2	Refer to Addendum B
Patient Birth Time	(0010,0032)	3	
Other Patient IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (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			

Attribute Name	Tag	DICOM Type	Supported Values
Admitting Diagnoses Description	(0008,1080)	3	
Patient's Age	(0010,1010)	3	Refer to Addendum B
Patient's Size	(0010,1020)	3	
Patient's Weight	(0010,1030)	3	
Occupation	(0010,2180)	3	
Additional Patient's History	(0010,21B0)	3	
General Series			
Modality	(0008,0060)	1	PR
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Laterality	(0020,0060)	2C	L R Refer to Addendum B
Series Date	(0008,0021)	3	
Protocol Name	(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
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	

Attribute Name	Tag	DICOM Type	Supported Values
>> Coding Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1C	
>Scheduled Procedure Step ID	(0040,0009)	1C	
>Requested Procedure ID	(0040,1001)	1C	Refer to Addendum B
Presentation Series			
Modality	(0008,0060)	1	
View Position	(0018,5101)	2	
General Equipment			
Manufacturer	(0008,0070)	2	CARESTREAM
Institution Name	(0008,0080)	3	For this value to be populated and sent, the *CBCT 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 *CBCT 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	OnSight 3D Extremity System
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	
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			Only sent if measurement tools are added to the image and the image is sent to an SCP configured as supports overlays in the DRX-1 System configuration.
Overlay Rows	(60xx,0010)	1	
Overlay Columns	(60xx,0011)	1	
Overlay Type	(60xx,0040)	1	G = GRAPHICS
Overlay Origin	(60xx,0050)	1	1/1
Overlay Bits Allocated	(60xx,0040)	1	1
Overlay Bit Position	(60xx,0102)	1	1
Overlay Data	(60xx,3000)	1	
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	

Attribute Name	Tag	DICOM Type	Supported Values
> Presentation Pixel Aspect Ratio	(0070,0102)	1C	
Spatial Transformation			
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 *CBCT System* provides standard conformance to the X-Ray Radiation Dose SR SOP Class as an SCU.

Table 3.17   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 3.18   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 IDs	(0010,1000)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Other Patient Names	(0010,1001)	3	This value will be sent only if it has been received from the DICOM modality work list (MWL).
Ethnic Group	(0010,2160)	3	This value will be sent only if it has been received from the DICOM modality work list (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	

Attribute Name	Tag	DICOM Type	Supported Values
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	
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 *CBCT 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 *CBCT 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	OnSight 3D Extremity System
Device Serial Number	(0018,1000)	3	

Attribute Name	Tag	DICOM Type	Supported Values
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	
>Requested Procedure Description	(0032,1060)	2	
>Requested Procedure Code Sequence	(0032,1064)	2	
>Reason for the Requested Procedure	(0040,1002)	3	
>Requested Procedure ID	(0040,1001)	2	
>Placer Order Number / Imaging Service Request	(0040,2016)	2	
>Filler Order Number / Imaging Service Request	(0040,2017)	2	

Attribute Name	Tag	DICOM Type	Supported Values
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 (for Projection X-Ray Radiation Dose SR) 10011 (for CT Radiation Dose SR)
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	

1.13 Basic Work List Service

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

Table 3.17   Matching Key Attributes

Attribute name	Tag
Accession Number	(0008,0050)
Modality	(0008,0060)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Scheduled Station AE Title	(0040,0001)

Attribute name	Tag
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 Work List 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.

1.13.1   Modality Work List IOD

The *CBCT System* provides standard conformance to the Modality Work List Information Model – FIND SOP Class as an SCU.

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

Table 3.18   Modality Work List SOP Class

SOP Class	SOP Class UID
Modality Work List Information Model – FIND	1.2.840.10008.5.1.4.31

Table 3.19   Modality Work List 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		

Attribute Name	Tag	Matching Key
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)	
Referenced Study Sequence	(0008,1110)	
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
Requested Procedure Priority	(0040,1003)	

Attribute Name	Tag	Matching Key
Requested Procedure Location	(0040,1005)	
Imaging Service Request		
Referring Physicians Name	(0008,0090)	
Accession Number	(0008,0050)	
Requesting Service	(0032,1033)	
Visit Status		
Visit Status ID	(0038,0008)	
Patient's Institution Residence	(0038,0400)	
Patient Identification		
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Other Patient Ids*	(0010,1000)	
Other Patient Names	(0010,1001)	
Patient Demographic		
Patient's Birth Date	(0010,0030)	
Patient's Birth Time	(0010,0032)	
Patient's Sex	(0010,0040)	
Patient's Age	(0010,1010)	
Patient's Size	(0010,1020)	
Patient's Weight	(0010,1030)	
Ethnic Group	(0010,2160)	
Occupation	(0010,2180)	
Patient Medical		
Additional Patient's History	(0010,21B0)	

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

1.13.2 Procedure Mapping

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

For the procedure mapping to function properly the DR must receive the correct code in the code in any of the following:

- Code value (0008,0100) element of the requested procedure code sequence (0032,1064) – this is the factory default

- Requested procedure ID (0040, 1001)

- Code value (0008,0100) element of the scheduled protocol code sequence (0040,0008) of the scheduled procedure step sequence (0040, 0100)

1.14 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 *CBCT System* operator to signal the start and end of a study, respectively.

3.7.1 Modality Performed Procedure Step IOD

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

Table 3.20   Modality Performed Procedure Step SOP Class

SOP Class	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

Table 3.21   Modality Performed Procedure Step Attributes

Attribute Name	Tag	DICOM Type	Supported Values
SOP Common			
SOP Class UID	(0008,0016)	1	
SOP Instance UID	(0008,0018)	1	
Specific Character Set	(0008,0005)	1C	
Performed Procedure Step Relationship			
Patient Name	(0010,0010)	2	
Patient ID	(0010,0020)	2	
Patient Birth Date	(0010,0030)	2	
Patient Sex	(0010,0040)	2	
Scheduled Step Attribute Sequence	(0040,0270)	1	
> Study Instance UID	(0020,000D)	1	

Attribute Name	Tag	DICOM Type	Supported Values
> 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
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	

Attribute Name	Tag	DICOM Type	Supported Values
> 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	
> Performing Physician's Name	(0008,1050)	2C	
> Protocol Name	(0018,1050)	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.

Attribute Name	Tag	DICOM Type	Supported Values
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)		
Entrance Dose	(0040,0302)		This value will be and 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 and 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 and Fluoroscopy Area 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)		
>Filter Type	(0018,1160)	3	
>Filter Material	(0018,7050)	3	

Note: There is no standardization of CT radiation dose information in MPPS, therefore dose information delivered in MPPS will not include CT dose.

1.15 Storage Commitment Push Model SOP Class

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

Table 3.22   Storage Commitment SOP Class

SOP Class	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

The SCPM N-Action command is sent by the *CBCT 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 *CBCT System* and the Storage SCP.

1.15.1   DIMSE Service N-ACTION

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

1.15.1.1   Storage Commitment N-ACTION IOD

Table 3.23   Storage Commitment N-ACTION Attributes

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

1.15.2   DIMSE Service N-EVENT-REPORT

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

3.8.1.1   Storage Commitment N-EVENT-REPORT IOD

Table 3.24   Storage Commitment N-EVENT-REPORT Attributes

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

| > Failure Reason	(0008, 1197)
Referenced SOP Sequence	(0008,1199)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)

* For Event Type ID 2 only.

1.16 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
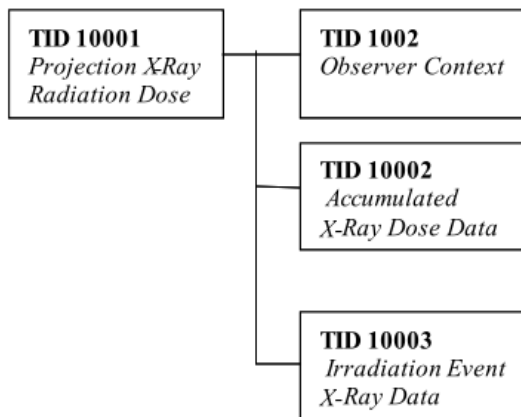
CT Radiation Dose SR IOD Template Structure
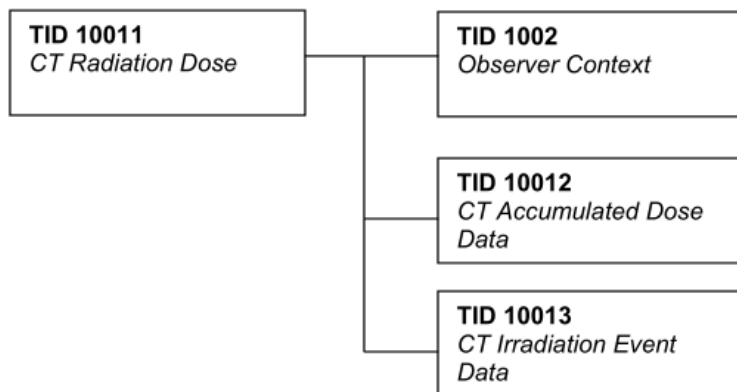
Note: A CBCT exam will be recorded as a single Irradiation Event and will use TID 10011.

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")
>>	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")
>		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")
>	CONTAINS	DTID (10002) Accumulated X-Ray Dose	1	ALWAYS	(113622, DCM, "Single Plane"

NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
>	CONTAINS	DTID (10003) Irradiation Event X-Ray Data	1-n	ALWAYS	
>	CONTAINS	(113854, DCM, "Source of Dose Information")	1-n	ALWAYS	(113856, DCM, " Automated Data Collection")

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 (10005) Accumulated Mammography X-Ray Dose	1	CONDITIONAL	TID not present for this product.
>	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	Refer to Addendum B
>	CONTAINS	(111636, DCM, "Entrance Exposure at RP")	1	CONDITIONAL	Value is not present for this product. 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)	1	CONDITIONAL	

		Irradiation Event X-Ray Mechanical Data			

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 for this product.
		(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. Refer to Addendum B
		(113780, DCM, "Reference Point Definition")	1	ALWAYS	(113941, DCM, "In Detector Plane")
		(111631, DCM, "Average Glandular	1	CONDITIONAL	This value will not be present for this

NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		Dose")			product.
		(113733, DCM, "KVP")	1-n	ALWAYS	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 (uAs, UCUM, "uAs")

		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 ")
		(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)**

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	1	ALWAYS	(121094, DCM,

		Observer's Role in this Procedure")			"Performing")

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	(P5-08000, SRT, "Computed Tomography X-Ray")
>>	HAS CONCEPT MOD	(G-C0E8, SRT, "Has Intent")	1	ALWAYS	(R-408C3, SRT, "Diagnostic Intent")
>		DTID (1002) Observer Context	1-n	ALWAYS	Will have one Device Observer and one Person Observer
>	HAS OBS CONTEXT	(113809, DCM, "Start of X-Ray Irradiation")	1	ALWAYS	
>	HAS OBS CONTEXT	(113810, DCM, "End of X-Ray Irradiation")	1	ALWAYS	
>	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	DTID (10012) CT Accumulated Dose Data	1	ALWAYS	
>	CONTAINS	DTID (10013) Irradiation Event Data	1-n	ALWAYS	
>	CONTAINS	(113854, DCM, "Source of Dose Information")	1-n	ALWAYS	(113856, DCM, "Automated Data Collection")

TID 10011 CT Radiation Dose

		TID 10012 Accumulated CT Dose Data			
NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		(113811, DCM, "CT Accumulated Dose Data")	1	ALWAYS	
>	CONTAINS	(113812, DCM, "Total Number of Irradiation Events")	1	ALWAYS	
>	CONTAINS	(113813, DCM, "CT Dose Length Product Total")	1	ALWAYS	
		TID 10013 Irradiation Event X-Ray Data			
NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		(113819, DCM, "CT Acquisition")	1	ALWAYS	
>	CONTAINS	(123014 , DCM, "Target Region")	1	ALWAYS	DCID (4030) CT and MR Anatomy Images Refer to Addendum A
>	CONTAINS	(113820 , DCM, "Acquisition Type")	1	ALWAYS	(113806, DCM, "Stationary Acquisition")
>	CONTAINS	(113769, DCM, "Irradiation Event UID")	1	ALWAYS	
>	CONTAINS	(113822, DCM, "CT Acquisition Parameters")	1	ALWAYS	Units = EV (s, UCUM, "s")
>>	CONTAINS	(113824, DCM, "Exposure Time")	1	ALWAYS	
>>	CONTAINS	DTID (10014) Scanning Length	1	ALWAYS	
>>	CONTAINS	(113826, DCM, "Nominal Single Collimation Width")	1	ALWAYS	Units = EV (mm, UCUM, "mm")

>>	CONTAINS	(113827, DCM, "Nominal Total Collimation Width")	1	ALWAYS	Units = EV (mm, UCUM, "mm")
>>	CONTAINS	(113823, DCM, "Number of X-Ray Sources")	1	ALWAYS	3 Units = EV ({X-Ray sources}, UCUM, "X-Ray sources")
>>	CONTAINS	(113831, DCM, "CT X-Ray Source Parameters")	1-n	ALWAYS	
>>>	CONTAINS	(113832, DCM, "Identification of the X-Ray Source")	1	ALWAYS	
>>>	CONTAINS	(113733, DCM, "KVP")	1	ALWAYS	Units = EV (kV, UCUM, "kV")
>>>	CONTAINS	(113833, DCM, "Maximum X-Ray Tube Current")	1	ALWAYS	Units = EV (mA, UCUM, "mA")
>>>	CONTAINS	(113734, DCM, "X-Ray Tube Current"	1	ALWAYS	Units = EV (mA, UCUM, "mA")
>>>	CONTAINS	(113834, DCM, "Exposure Time per Rotation")	1	CONDITIONAL	Units = EV (s, UCUM, "s")
>	CONTAINS	(113829, DCM, "CT Dose")	1	CONDITIONAL	
>>	CONTAINS	(113830, DCM, "Mean CTDIvol")	1	ALWAYS	Units = EV (mGy, UCUM, "mGy")
>>	CONTAINS	(113835, DCM, "CTDIw Phantom Type")	1	ALWAYS	(113690, DCM, "IEC Head Dosimetry Phantom")
>>	CONTAINS	EV (113838, DCM, "DLP")	1	ALWAYS	Units = EV (mGy.cm, UCUM, "mGy.cm")
>>	CONTAINS	DTID (10015) CT Dose	1	ALWAYS	

		Check Details			

TID 10014 Scanning Length

NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		(113825, DCM, "Scanning Length")	1	ALWAYS	

TID 10015 CT Dose Check Details

NL	Relation with Parent	Concept Name	VM	Presence of Value	Value(s)
		(113900, DCM, "Dose Check Alert Details")	1	CONDITIONAL	
>	CONTAINS	(113901, DCM, "DLP Alert Value Configured")	1	ALWAYS	(R-00339, SRT "No")
>	CONTAINS	(113902, DCM, "CTDIvol Alert Value Configured")	1	ALWAYS	(R-00339, SRT "No")
>	CONTAINS	(113903, DCM, "DLP Alert Value")	1	CONDITIONAL	(R-00339, SRT "No")
>	CONTAINS	(113904, DCM, "CTDIvol Alert Value")	1	CONDITIONAL	(R-00339, SRT "No")
	CONTAINER	(113908, DCM, "Dose Check Notification Details")	1	CONDITIONAL	
>	CONTAINS	(113909, DCM, "DLP Notification Value Configured")	1	ALWAYS	(R-00339, SRT "No")
>	CONTAINS	(113910, DCM, "CTDIvol Notification Value Configured")	1	ALWAYS	(R-00339, SRT "No")

TID 1002 Observer Context

NL	Relation with	Concept Name	VM	Presence of	Value(s)

	Parent			Value	
	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")

4 Communication Profiles

4.1 Supported Communications Stacks

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

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

4.2 Physical Media

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

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

5 Extensions/Specializations/Privatizations

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

5.1 Computed Radiography IOD

5.1.1 Specialization of Pixel Spacing

The *CBCT 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.

For Computed Tomography Image Storage, the Pixel Spacing (0028,0030) attribute is required and will always be sent regardless of the configuration on the *CBCT System*.

5.1.2 Alternate Image Display Spaces

In addition to supporting P-Values (DICOM Grayscale Display Function perceptually linear output), the CBCT 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 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	*CBCT 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   Computed Tomography (CT) IOD

A number of additional tags have been added to enable service and diagnostics of any potential imaging issues.

DX Detector			
Detector Type	(0018,7004)	2	DIRECT
Detector Configuration	(0018,7005)	3	AREA
Detector ID	(0018,700A)	3	

Date of Last Detector Calibration	(0018,700C)	3	
Time of Last Detector Calibration	(0018,700E)	3	
Detector Manufacturer Name	(0018,702A)	3	VARIAN
Detector Manufacturer's Model Name	(0018,702B)	3	PaxScan2530DX
Detector Time Since Last Exposure	(0018,7012)	3	
Detector Binning	(0018,701A)	3	2\2
Detector Temperature	(0018,7001)	3	

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 (*CBCT 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
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 *CBCT 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 1 character 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 Work List.

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 *CBCT 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

Code Value (0008,0100)	Code Meaning (0008,0104)
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-40782	medial oblique
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	parietoacanthial
R-102C6	acanthioparietal
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	
4030	
Coding Scheme Designator (0008,0102)	**Coding Scheme Version (0008,0103)**
SRT	20120822
Code Value (0008,0100)	**Code Meaning (0008,0104)**
T-42500	Abdominal aorta
T-41070	Abdominal aorta and its branches
T-B3000	Adrenal gland
T-42300	Aortic arch

T-A0100	Brain
T-45010	Carotid Artery
T-A6000	Cerebellum
T-45526	Circle of Willis
T-43000	Coronary artery
T-A0193	Cranial venous system
T-41040	Iliac arterial system
T-71000	Kidney
T-62002	Liver
T-65000	Pancreas
T-B7000	Parathyroid
T-44000	Pulmonary artery
T-46600	Renal artery
T-C3000	Spleen
T-94000	Testis
T-42070	Thoracic aorta
T-C8000	Thymus
T-B6000	Thyroid
T-83000	Uterus

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 Work List 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	Requesting Service (0032,1033)	Institutional Department Name (0008,1040)
Entrance Dose Read only calculated value	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 Read only calculated value	NA	Image and Fluoroscopy Area Dose Product (0018,115E) (122130, DCM, "Dose Area Product")
Comments	NA	Image Comments (0020,4000)
Laterality	NA	Laterality (0020,0060)
kVp Received from X-ray interface	NA	kVp (0018,0060) (113733, DCM, "KVP")
Modality	Modality (0008,0060)	Modality (0008,0060)
Orientation	NA	Cassette Orientation (0018,1402)
Patient Age Read only value	Patient's age (0010,1010)	Patient's age (0010,1010)
Patient Comments	NA	Patient Comments (0010,4000)
Patient First Name **Patient Last Name** **Patient Middle Name**	Patient's Name (0010,0010)	Patient's Name (0010,0010)
Patient Location	Patient's Institution Residence (0038,0400)	Patient's Institution Residence (0038,0400)
Patient Position	NA	NA
Priority	Requested Procedure Priority (0040,1003)	N/A
Study Date & Time Read only value	Initial Value: Scheduled Procedure Step Start Date (0040,0002) Scheduled Procedure Step Start Time (0040,0003) These values will be updated to the time/date that the technologist began the first procedure step for a study.	Study Date (0008,0020) Study Time (0008,0030) Performed Procedure Step Start Date (0040,0244) Performed Procedure Step Start Time (0040,0245)

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
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 ID (0040,1001) or Requested Procedure Code Sequence (0032,1064) > Code Value (0008,0100) 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)
Procedure ID	Requested Procedure ID (0040,1001)	Requested Procedure ID (0040,1001)
CTDIvol Read only calculated value	NA	(113830, DCM, "Mean CTDIvol")
Dose Length Product Read only calculated value	NA	(113838, DCM, "DLP")

User Interface Input field Label	Associated DICOM MWL IOD Element	Associated DICOM IOD Element/ TID Concept Name
Study Name	Requested Procedure Description (0032,1060) wil be used if Requested Procedure ID or Requested Procedure Code Sequence (0032,1064) > Code Value (0008,0100) 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 (0008,0100) is used to populate Procedure Code field) If the above fields are blank, the first non-blank field in the following list will be used. Requested Procedure Description (0032,1060) or Scheduled Procedure Step Sequence (0040,100) > Scheduled Procedure Step Description (0040,0007) or Procedure Code Sequence (0008,1032) > Code Value (0008,0100)	Procedure Code Sequence (0008,1032) > Code Meaning (0008,0104)
Step Description	Scheduled Procedure Step Sequence (0040,0100) >Scheduled Procedure Step Description (0040,0007)	Request Attributes Sequence (0040,0275 >Scheduled Procedure Step Description (0040,0007) If the Procedure Step Description field is modified by the user the changes will be stored in: Performed Procedure Step Description (0040,0254)
Referring Physician	Referring Physician's Name (0008,0090)	Referring Physician's Name (0008,0090)
Procedure Description	Requested Procedure Description (0032,1060)	Study Description (0008,1030)
Source to Image (mm)	NA	Distance Source to Detector (0018,1110) Note: This value is traditionally referred to as Source Image Receptor Distance (SID).

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)