



# ***Kodak DryView 8900 Laser Imager*** **Release 3E**

## **DICOM Conformance Statement**

**Software Version 3.50**

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**Revision 2.0**

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## Revision History

Date	Rev	MIM S/W	Editor	Comments
2/7/06	1.0	5.6	R.Parasiliti	<ul style="list-style-type: none"><li>• Removed suffix /C support from AE Title</li><li>• Added 11x14in Mammo Blue to Annex C</li><li>• Added left justification mode to Annex D</li><li>• Changed default Smoothing Type to ZERO for Magnification Type NONE in Annex E</li></ul>
12/10/07	2.0	5.6	T. Le	<ul style="list-style-type: none"><li>• Change references from Kodak to Carestream Health</li><li>• Changed maximum Image Max Density, max Border Density, and maximum Image Min Density to 415 from 399 in section 2.3.2.1</li><li>• Added Icon figures to Annex D.</li></ul>

NOTE: See previous revisions of this document (Rev A – Rev E) for changes made in previous releases.

# 0 Introduction

## 0.1 Executive Overview

This document covers *Kodak DryView* 8900 Laser Imager Release 3E. (Note: The “Kodak” brand is used under license by Carestream Health from Eastman Kodak Company.)

The following DICOM SOP Classes are supported:

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	SCP
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	SCP
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15	SCP
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	SCP

## 0.2 Scope and Field of Application

This document describes the DICOM functionality of the *Kodak DryView* 8900 Laser Imager Release 3B. The 8900 Laser Imager:

- acts as a DICOM Service Class Provider (SCP).
- performs transactions over a TCP/IP network via the DICOM messages exchange protocol.
- uses software from the *Kodak* PACS Link Medical Image Manager to capture and print images and data.

## 0.3 Important Considerations for the Reader

This DICOM Conformance Statement by itself is not sufficient to guarantee successful connectivity between the 8900 Laser Imager and equipment from other vendors. The following points should be taken into consideration:

- 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 (such as cut lines) is met.

- Carestream Health reserves the right to make changes to the 8900 Laser Imager architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to Carestream Health equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity.
- For all DICOM attributes of type M (shown in the column of SCP Usage), the SCU must send a valid value within the published range. We guarantee to support all published values. A missing attribute would result in returning an error of Missing Attribute, an invalid value would result in returning an error of Invalid Value and an Out of Range value would result in returning an error of Out of Range. It is up to the SCU to retry with a new value or to abort the association.
- For all DICOM attributes of type U (shown in the column of SCP Usage), the Default Value or the Configured Value is used for all cases of Missing Attribute, Invalid Value or Out of Range. No error would be generated from this type. We will send back the corrected value (i.e. the value being used) to the SCU. It is up to the SCU to accept, to decline (abort) or to resend a new value at this point.
- Attributes received at the Image Box level will override the same attribute received at the Film Box level for a particular image.

#### **0.4 Accessing this Conformance Statement on the World Wide Web**

As the 8900 Laser Imager 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/en/global/en/health/serviceAndSupport/dicom.jhtml-pq-path=10057-10065-6018.htm>

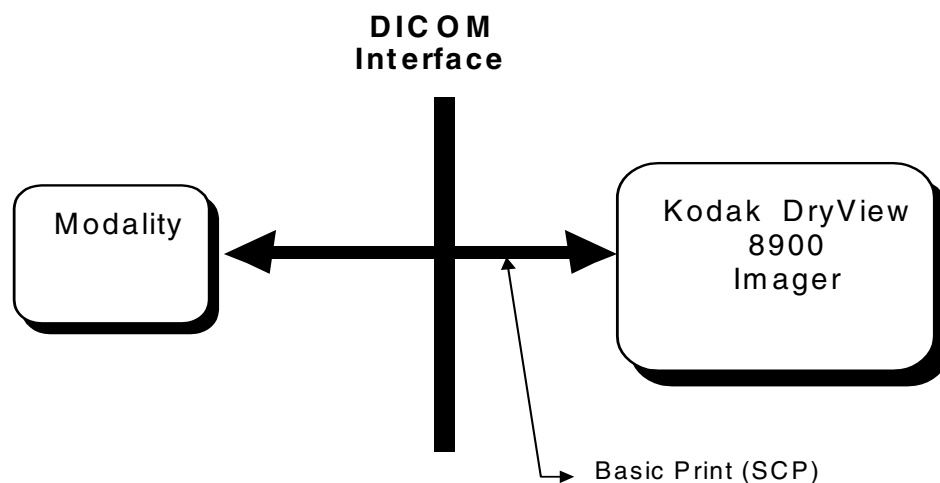
## 0.5 Definitions, Acronyms, Abbreviations

The following symbols and abbreviations are used in this document.

8900	<i>Kodak DryView</i> 8900 Laser Imager
ASCII	American Standard Code for Information Interchange
AE	Application Entity
CS	Curve Shape
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
ISO	International Standards Organization
MIM	<i>Kodak</i> PACS Link Medical Image Manager software
PDU	Protocol Data Unit
PLUT	Presentation Look-Up Table
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
TFT/ULUT	Transfer Function Table
UID	Unique Identifier

# 1 Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to receive studies for the 8900. Multiple associations to SCUs are supported.



## 1.1 Functional Definitions

The 8900 acquires images from the connected device(s). Studies are temporarily stored on disk. The images are then formatted and printed to film.

## 1.2 Sequencing of Real-World Activities

The 8900 prints images to film after receiving all required information from an SCU. It operates as required to meet the definition of the Print Management Service Class.



## 2 Application Entity Specifications

The 8900 provides Standard Conformance to the following SOP Classes as an SCU.

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

The 8900 provides Standard Conformance to the following SOP Classes as an SCP.

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
Basic Annotation Box SOP Class	1.2.840.10008.5.1.1.15
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23

### 2.1 Association Establishment Policies

#### 2.1.1 General

##### 2.1.1.1 Delivery - Basic Grayscale/Color Print Management SCP

The 8900 maximum PDU size is 128 Kbytes.

#### 2.1.2 Number of Associations

The number of simultaneous associations is configurable and the maximum number of associations is 12. If an attempt is made to open more than the number of configured simultaneous associations, the 8900 will reject the additional associations (A-ASSOCIATE-RJ).

#### 2.1.3 Asynchronous Nature

The 8900 only allows 1 invoked and 1 performed operation on an Association at any given time (it is synchronous, e.g. the SCU can send only 1 Request and must wait for the correspondent Response before sending the next Request).

#### 2.1.4 Implementation Identifying Information

The 8900 provides the Implementation Class UID of “1.2.840.113564.3.1.7”.

The implementation version name attribute is of the form of “MIMyyvxxx” where yy is the Released Year and xxx is the Version Number. (e.g. MIM03v5.5 stands for Medical Image Manager software, released in 2003, of version 5.5)

The 8900 establishes an Association using its network node name for the calling DICOM Application Entity title. The network node name is configurable through the 8900 Service Tool.

## **2.2 Association Acceptance Policy**

### **2.2.1 Associated Real-World Activity**

#### **2.2.1.1 Delivery - Basic Grayscale/Color Print Management SCP**

The 8900 accepts Associations for the purpose of acquiring and printing images.

When an association has been established:

The SCU can request the 8900 to create a Film Session, a Film Box, and Image Boxes.

The SCU can request to change the attributes that are allowed for these boxes.

The socket is configurable and the default setting is 5040.

#### **2.2.1.2 Application Entity Titles (AE\_TITLE)**

The Called AE Title may be used to select behavior, which is unique to Carestream Health legacy products for backwards compatibility. The AE\_TITLE should be configured at the SCU to ensure proper functionality with the 8900. The length of the Called AE Title must be no longer than 16 characters (including any prefix or suffix).

- **NER\_ option of the AE Title**

If the Called AE Title begins with “NER\_”, the 8900 will provide status changes as they occur. The SCU must have the capability to receive the unsolicited N-Event-Report.

- **Suffix “/1..6” option of the AE Title**

The 8900 has the ability to select a specific sorter bin. If the Called AE Title contains a suffix “/” followed by a single digit, the number specified will be used to select the output bin (e.g. “/1” will select bin 1, “/6” will select bin 6). All print jobs submitted during this association will be routed to the selected bin. If no bin is selected or any out of range value is selected, the films shall be routed to the configured default bin. Film Destination (2000,0040) in Film Session will override this option. If no sorter bin is configured, all print jobs will be routed to the default output bin (bin1).

### 2.2.1.3 Association Negotiation

If the association is accepted, the list of requested Presentation Context items is returned with each item marked as accepted or rejected with the Result/Reason field containing the values specified in PS 3.8 Table 9-18.

If the association is rejected, the Result, Source, and Reason/Diagnostic fields in the response message contain the values show below:

Condition	Result	Source
Limit on simultaneous associations exceeded	2 – Rejected Transient	3 - DICOM UL Service Provider (Presentation)
The called AE title does not correspond to a recognized printer.	1 – Rejected Permanent	1 - DICOM UL Service User
The IP Connection could not established.	2 – Rejected Transient	3 – DICOM UL Service Provider (Presentation)
The destination printer is recognized, but not installed.	1 - Rejected Permanent	1 - DICOM UL Service User
No Implementation UID	1 - Rejected Permanent	2 – DICOM UL Service Provider (ACSE)
No Application Context Name	1 – Rejected Permanent	2 – DICOM UL Service Provider (ACSE)
DICOM protocol version is not supported	1 – Rejected Permanent	2 – DICOM UL Service Provider (ACSE)
No Presentation Context items given.	1 – Rejected Permanent	2 – DICOM UL Service provider (ACSE)
No presentation context items accepted	1 – Rejected Permanent	1 - DICOM UL Service User

## 2.2.2 Presentation Context Table

The 8900 accepts the Presentation Contexts shown below.

<b>Presentation Context Table</b>					
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>		<b>Role</b>	<b>Ext. Negot</b>
<b>Name</b>	<b>UID</b>	<b>Name List</b>	<b>UID</b>		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Grayscale Print Management	1.2.840.10008.5.1.1. 9	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Color Print Management **	1.2.840.10008.5.1.1. 18	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Basic Annotation Box	1.2.840.10008.5.1.1. 15	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Presentation LUT	1.2.840.10008.5.1.1. 23	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

\*\* Supporting of Basic Color Print Management is configurable using the service tool (default is OFF).

## 2.2.3 SOP Specific Conformance

### 2.2.3.1 Verification

The 8900 provides standard conformance to the DICOM Verification Service Class. Upon receipt from an SCU of a verification of communication request, the 8900 will issue confirmation.

### 2.2.3.2 Delivery- Basic Print Management SCP

The 8900 provides standard SCP conformance to the DICOM Basic Print Management SOP Class. Association attempts will be rejected if more than the maximum number of simultaneous delivery SCP associations are attempted.

## 2.3 Basic Print Management Meta SOP Class

The Meta SOP Class is defined by the following set of supported SOP Classes:

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
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

The Basic Grayscale Image Box SOP Class or the Basic Color Image Box SOP Class may be used within a Film Session, but these two classes must not be mixed within the same session. If Basic Color Image Box SOP Class is negotiated, the color images will be converted to grayscale and printed.

### 2.3.1 Basic Film Session SOP Class

#### 2.3.1.1 DIMSE Service N-CREATE

Attribute	SCP Usage	Tag	Possible Values	Default Values
Number of Copies	U	(2000,0010)	1 – 99	1
Print Priority	U	(2000,0020)	HIGH, MED, LOW	MED Default can be changed through configuration
Medium Type	U	(2000,0030)	BLUE FILM, CLEAR FILM, MAMMO BLUE FILM*  *Only valid when software license for Mammo Enabled 8900 is configured. The print job will be rejected without the license.	BLUE FILM Default can be changed through configuration

Attribute	SCP Usage	Tag	Possible Values	Default Values
Film Destination	U	(2000,0040)	MAGAZINE, PROCESSOR,  BIN_n (where n=1 to 6)  The values of MAGAZINE and PROCESSOR will be mapped to BIN_1.  If no value is provided it will use the default  If no sorter bin is configured, default output bin (BIN_1) is used.	BIN_1  Default can be changed through configuration
Film Session Label	U	(2000,0050)	Up to 64 characters may be provided.  See Annex A	Null String
Memory Allocation	U	(2000,0060)	Not used	Not used

### 2.3.1.2 Film Session N-Create Status Code

Code	Status	Action/Meaning
0000H	Success	Film session created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0210H	Failure	A Film Session already exists. Another is not created. (DICOM ref 3.7.C.5.9)

### 2.3.1.3 DIMSE Service N-Action

The 8900 uses N-ACTION to accept print commands from the SCU. Once a print command is received, the 8900 prints all films in the session. The 8900 conforms to the N-ACTION specification in Part 4 section H.4.1.2.4 of the DICOM standard, and the 8900 collates all Film Boxes when printed.

### 2.3.1.4 Film Session N-Action Status Code

Code	Status	Action/Meaning
0000H	Success	All images in the session are printed as specified. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the requested Film Session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
C600H	Failure	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)
B602H	Warning	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)

### 2.3.1.5 DIMSE Service N-SET

The 8900 uses N-SET to update the Film Session values as supplied by the SCU.

### 2.3.1.6 Film Session N-Set Status Code.

<b>Code</b>	<b>Status</b>	<b>Action/Meaning</b>
0000H	Success	Film session data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1 )
0112H	Failure	The SOP Instance UID of the requested Film Session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

### 2.3.1.7 Film Session N-Delete Status Code.

<b>Code</b>	<b>Status</b>	<b>Action/Meaning</b>
0000H	Success	The Film session is deleted. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the specified Film Session was not found. (DICOM ref 3.7.C.5.19)

## 2.3.2 Basic Film Box SOP Class

### 2.3.2.1 DIMSE Service N-CREATE

Attribute	SCP Usage	Tag	Possible Values	Default Values
Image Display Format	M	(2010,0010)	<p>STANDARD{C,R}</p> <p>For both PORTRAIT and LANDSCAPE Film Orientation, (C,R) may =            (1,1) (1,2) (2,1) (2,2) (2,3) (3,2) (2,4) (4,2) (3,3) (3,4) (4,3) (3,5) (5,3) (4,4) (4,5) (5,4) (4,6) (6,4) (5,6) (6,5) (5,7) (7,5)</p> <p>(i.e. support 1-up, 2-up, 4-up, 6-up, 8-up, 9-up, 12-up, 15-up, 16-up, 20-up, 24-up, 30-up, and 35-up standard formats)</p> <p>ROW{r1,r2,r3...where r1, r2, r3...is the number of images in each row.</p> <p>The rows are limited to 7 and the number of images in each row is limited to 7.</p> <p>CUSTOM{I}</p> <p>I = 101, 102            Only valid for PORTRAIT Film Orientation (2010,0040).</p>	None. SCU must provide this value.
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	M	(2010,0510)		
Referenced Basic Annotation Box Sequence	MC	(2010,0520)		
Film Orientation	U	(2010,0040)	PORTRAIT, LANDSCAPE	PORTRAIT
Film Size ID	U	(2010,0050)	8INX10IN 10INX12IN 11INX14IN 14INX14IN 14INX17IN See Annex C for detailed explanation	14INX17IN Default can be changed through configuration
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE See Annex E for Magnification Type Conversion.	CUBIC



Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) - valid for all Magnification Types ENHANCED - only valid for Magnification Type of CUBIC ENHANCED1 - only valid for Magnification Type of CUBIC 0-15 - only valid for Magnification Type of CUBIC Please see Annex E for all other possible combinations.	5 Default can be changed through configuration
Image Max Density	U	(2010,0130)	BLUE FILM: 170-330** CLEAR FILM: 170-320** MAMMO BLUE FILM: 170-415** Note: ** The highest density shown may not be achieved under certain condition. The actual highest density is the lower value between the DICOM input and the calibrated density obtained from the imager. Note 2: Capabilities to attain 4.15 density on DVM+ film is available to Dryview 8900 software version 3.30 and greater.	300 Default can be changed through configuration. Value less than the minimum will be set to the low end of the range for the appropriate medium type. Value greater than the maximum will be set to the high end of the range for the appropriate medium type.
Configuration Information	U	(2010,0150)	Curve Shape (CS): 000 to 999 Contrast Values (CN): -1 to -5 Lower contrast 0 Normal +1 to +5 Higher contrast Pivot Density (PD): 0 to 2.4 in increments of 0.2 Perception LUT Selection (TFT/ULUT): LUT=m,n (m=string, n = 0 to 15) Text Macros (TM): %PRNTDAT%, %TIM%, %FOF%, %\$TIMES%, %SES% Perception LUT cannot be used with Curve Shape, Contrast or Pivot Density. See Annex A for description	Configurable  Configurable  1.2  LUT=VER693C0.W87,6  None
Referenced Presentation LUT Sequence	MC	(2050,0500)	If the PLUT is received, the tonescaling data from the above Configuration Information will be ignored.	
>SOP Class UID	MC	(0008,1150)		
>SOP Instance UID	MC	(0008,1155)		

Annotation Display Format ID	U	(2010,0030)	0 - No annotation 1 - Text centered at bottom of film  6 – Six annotation positions on two lines, centered at bottom of film.  NONE – No annotation  LABEL – Annotation at bottom of film.  BOTTOM – Text at bottom of images.  COMBINED – 1 line at the bottom of the page and 1 line under each image.  See Basic Annotation Box SOP (section 2.4) for valid values for Annotation Position (2030,0010) for each of these formats.	0 (No annotation)
Border Density	U	(2010,0100)	BLACK, WHITE, i, where i may = 0 -415**  Note 1:  ** The highest density shown may not be achieved under certain condition. The actual highest density is the lower value between the DICOM input and the calibrated density obtained from the imager.  Note 2: Capabilities to attain 4.15 density on DVM+ film is available to DryView 8900 software version 3.30 and greater.	Image Max Density  Default can be changed through configuration
Min Density	U	(2010,0120)	0-415  This value is used only when PLUT or Curve Shape is applied to the images on the page. When PLUT or Curve Shape is applied, actual minimum density will be the greater of the user requested value and the Dmin of the film.  Note: Capabilities to attain 4.15 density on DVM+ film is available to DryView 8900 software version 3.30 and greater.	DMin of the film  Default can be changed through configuration
Illumination	MC	(2010,015E)	Positive integer in units of cd/m <sup>2</sup>	2000
Reflective Ambient Light	MC	(2010,0160)	Positive integer in units of cd/m <sup>2</sup>	10
Trim	U	(2010,0140)	YES, NO	NO

### 2.3.2.2 Film Box N-Create Status Code.

Code	Status	Action/Meaning
0000H	Success	Film box created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0112H	Failure	The Film Session requested to contain this Film Box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref

Code	Status	Action/Meaning
		3.7.C.5.21)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The Film Box is not created. The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

### 2.3.2.3 DIMSE Service N-ACTION

The 8900 uses the N-ACTION to accept print instruction from the SCU. When such an instruction is received, the 8900 prints the current film in the session.

### 2.3.2.4 FilmBox N-Action Status Code.

Code	Status	Action/Meaning
0000H	Success	All images in the Film Box are printed as specified. (DICOM ref 3.7.C.1.1)
0112H	Failure	The Film Box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
B602H	Warning	Nothing is printed. (DICOM ref 3.4.H.4.1.2.42)

### 2.3.2.5 DIMSE Service N-SET

The 8900 uses N-SET to update the Basic Film Box values as supplied by the SCU. The following attributes may be updated:

Attribute	SCP Usage	Tag
Magnification Type	U	(2010,0060)
Max Density	U	(2010,0130)
Configuration Information	U	(2010,0150)
Smoothing Type	U	(2010,0080)
Border Density	U	(2010,0100)
Empty Image Density	U	(2010,0110)
Min Density	U	(2010,0120)
Illumination	MC	(2010,015E)
Reflective Ambient Light	MC	(2010,0160)
Trim	U	(2010,0140)

### 2.3.2.6 FilmBox N-Set Status Code.

Code	Status	Action/Meaning
0000H	Success	Film box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0112H	Failure	The specified Film Box does not exist. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

### 2.3.2.7 DIMSE Service N-DELETE

Upon receipt of an N-DELETE from the SCU, the 8900 removes the individual Film Box from the session.

### 2.3.2.8 FilmBox N-Delete Status Code.

Code	Status	Action/Meaning
0000H	Success	The Film Box is deleted. (DICOM ref 3.7.C.1.1)
0112H	Failure	The SOP Instance UID of the specified Film Session is returned. (DICOM ref 3.7.C.5.19)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

## 2.3.3 Basic Grayscale Image Box SOP Class

### 2.3.3.1 DIMSE Service N-SET

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format	None. SCU must provide value
Preformatted Grayscale Image Sequence	M	(2020,0110)		
>Samples Per Pixel	U	(0028,0002)	1	1
>Photometric Interpretation	U	(0028,0004)	MONOCHROME1, MONOCHROME2	MONOCHROME2
>Rows	M	(0028,0010)	See Appendix D for the maximum values	None. SCU must provide value.

<b>Attribute &amp; Usage</b>	<b>SCP Usage</b>	<b>Tag</b>	<b>Supported Values</b>	<b>Default Values</b>
>Columns	M	(0028,0011)	See Appendix D for the maximum values	None. SCU must provide value.
>Pixel Aspect Ratio	MC	(0028,0034)	R/C R, C = 1 to 9999 (Integer)	1\1
>Bits Allocated	M	(0028,0100)	8, 16	None. SCU must provide value.
>Bits Stored	M	(0028,0101)	8, 10, 12	None. SCU must provide value.
>High Bit	M	(0028,0102)	Bits Stored - 1	None. SCU must provide value.
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)	0000H
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide value.
Polarity	U	(2020,0020)	NORMAL, REVERSE  Note: Polarity only applies to the Image, not the Border Density.	NORMAL  Default can be changed through configuration
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) - valid for all Magnification Types  ENHANCED - only valid for Magnification Type of CUBIC  ENHANCED1 - only valid for Magnification Type of CUBIC  0-15 - only valid for Magnification Type of CUBIC  Please see Annex E for all other possible combinations.	5  Default can be changed through configuration
Configuration Information	U	(2010,0150)	Curve Shape (CS): 000 to 999  Perception LUT Selection (LUT): LUT=m, n (m=string, n = 0 to 15)  Curve Shape and Perception LUT are mutually exclusive.  See Annex A for description	None.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Requested Image Size	U	(2020,0030)	Width of Image Box in millimeters (fractional millimeters supported)  Please see Annex D for maximum Requested Size for each Film Size.  If this value exceeds the available dimensions of the Image Box, it will be accepted only if the Requested Decimate/Crop Behavior value is NOT set to FAIL. An icon will be added to the page indicating that the Requested Image Size was not achieved.	0.00  0.00 indicates “Maximize film utilization while maintaining Image aspect ratio”.
Requested Decimate/Crop Behavior	U	(2020,0040)	DECIMATE, CROP, FAIL  DECIMATE: If the Image Size exceeds the printable area, the Image Size will be reduced while preserving the full view of the Image. An icon will be added to the page indicating that the Image has been decimated..  CROP: If the Image Size exceeds the printable area, the Image will be center cropped by removing pixels that fall outside the printable area. An icon will be added to the page indicating that the Image has been cropped.  FAIL: If the Image Size exceeds the printable area the Image will be rejected.	DECIMATE  Default can be changed through configuration
Referenced Presentation LUT Sequence	U	(2050,0500)		
>SOP Class UID	U	(0008,1150)		
>SOP Instance UID	U	(0008,1155)	UID of any previously created PLUT instance, as outlined in Section 2.5	

### 2.3.3.2 ImageBox N-Set Status Code.

Code	Status	Action/Meaning
0000H	Success	Image box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The specified Film Box does not exist. (DICOM ref 3.7.C.5.19)

Code	Status	Action/Meaning
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

## 2.3.4 Basic Color Image Box SOP Class

The 8900 will accept color images. The color images will be converted to grayscale using the RGB to YIQ transformation algorithm and printed.

### 2.3.4.1 DIMSE Service N-SET

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Image Position	M	(2020,0010)	All values within the range of Image Display Format	None. SCU must provide value
Basic Color Image Sequence	M	(2020,0111)		
>Samples Per Pixel	U	(0028,0002)	3	3
>Photometric Interpretation	U	(0028,0004)	RGB	RGB
>Planar Configuration	M	(0028,0006)	000H or 001H 000H – pixels arrive in R <sub>1</sub> G <sub>1</sub> B <sub>1</sub> R <sub>2</sub> G <sub>2</sub> B <sub>2</sub> R <sub>3</sub> G <sub>3</sub> B <sub>3</sub> ... order 001H – pixels arrive in R <sub>1</sub> R <sub>2</sub> R <sub>3</sub> ..., G <sub>1</sub> G <sub>2</sub> G <sub>3</sub> ..., B <sub>1</sub> B <sub>2</sub> B <sub>3</sub> ... order	None. SCU must provide value.
>Rows	M	(0028,0010)	See Appendix D for the maximum values applied to the case of Requested Decimate/Crop Behavior of FAIL	None. SCU must provide value.
>Columns	M	(0028,0011)	See Appendix D for the maximum values applied to the case of Requested Decimate/Crop Behavior of FAIL	None. SCU must provide value.
>Pixel Aspect Ratio	MC	(0028,0034)	R/C R, C = 1 to 9999 (Integer)	1\1
>Bits Allocated	U	(0028,0100)	8	8
>Bits Stored	U	(0028,0101)	8	8
>High Bit	U	(0028,0102)	7	7
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)	0000H

<b>Attribute &amp; Usage</b>	<b>SCP Usage</b>	<b>Tag</b>	<b>Supported Values</b>	<b>Default Values</b>
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide value.
Polarity	U	(2020,0020)	NORMAL, REVERSE Note: Polarity only applies to the Image, not the Border Density.	NORMAL Default can be changed through configuration
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) - valid for all Magnification Types ENHANCED - only valid for Magnification Type of CUBIC ENHANCED1 - only valid for Magnification Type of CUBIC 0-15 - only valid for Magnification Type of CUBIC Please see Annex E for all other possible combinations.	5 Default can be changed through configuration
Configuration Information	U	(2010,0150)	Curve Shape (CS): 000 to 999 Perception LUT Selection (LUT): LUT=m, n (m=string, n = 0 to 15) Curve Shape and Perception LUT are mutually exclusive. See Annex A for description	None.
Requested Image Size	U	(2020,0030)	Width of Image Box in millimeters (fractional millimeters supported) Please see Annex D for maximum Requested Size for each Film Size. If this value exceeds the available dimensions of the Image Box, it will be accepted only if the Requested Decimate/Crop Behavior value is NOT set to FAIL. An icon will be added to the page indicating that the Requested Image Size was not achieved.	0.00 0.00 indicates "Maximize film utilization while maintaining Image aspect ratio".



Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Requested Decimate/Crop Behavior	U	(2020,0040)	DECIMATE, CROP, FAIL DECIMATE: If the Image Size exceeds the printable area, the Image Size will be reduced while preserving the full view of the Image. An icon will be added to the page indicating that the Image has been decimated. CROP: If the Image Size exceeds the printable area, the Image will be center cropped by removing pixels that fall outside the printable area. An icon will be added to the page indicating that the Image has been cropped. FAIL: If the Image Size exceeds the printable area, the Image will be rejected.	DECIMATE Default can be changed through configuration
Color Profile	U	(2011,0160)	DEFAULT1, DEFAULT2, DEFAULT3, DEFAULT4, DEFAULT5, DEFAULT6 This value is ignored.	None.

### 2.3.4.2 Basic Color Image Box N-Set Status Code.

Code	Status	Action/Meaning
0000H	Success	Image box data is set. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The specified Film Box does not exist. (DICOM ref 3.7.C.5.19)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)
0120H	Failure	The attribute tag of the missing required attribute is returned. (DICOM ref 3.7.C.5.13)
0121H	Failure	The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)

## 2.3.5 Printer SOP Class

### 2.3.5.1 DIMSE Service N-GET

Changes in printer status will be sent when they occur using N-EVENT-REPORT only if the 8900 is configured to do so. Otherwise, the SCU can use the N-GET to retrieve an instance of the Printer SOP class.

Printer Status (2110,0010) and Printer Status Info (2110,0020) will be returned with all N-GET requests of the Printer SOP class.

<b>Attribute</b>	<b>SCP Usage</b>	<b>Tag</b>	<b>Supported Values</b>
Printer Status	M	(2110,0010)	NORMAL WARNING FAILURE
Printer Status Info	M	(2110,0020)	for NORMAL conditions: NORMAL  for WARNING conditions: BAD SUPPLY MGZ CALIBRATION ERR COVER OPEN  EMPTY 8X10 BLUE EMPTY 8X10 CLR EMPTY 10X12 BLUE EMPTY 10X12 CLR EMPTY 11X14 BLUE EMPTY 11X14 CLR EMPTY 14X14 BLUE EMPTY 14X14 CLR EMPTY 14X17 BLUE EMPTY 14X17 CLR EMPTY 8X10 MAMO EMPTY 10X12 MAMO EMPTY 11X14 MAMO FILM JAM FILM TRANSP ERR PRINTER INIT PRINTER OFFLINE  PROC INIT  for FAILURE conditions: ELEC DOWN PRINTER DOWN PROC DOWN
Printer Name	U	(2110,0030)	Any value up to 16 characters in length. Chosen by user at time of installation
Printer Manufacturer	U	(0008,0070)	EASTMAN KODAK
Printer Manufacturer Model Name	U	(0008,1090)	Any value up to 16 characters in length. Chosen by user at time of installation.
Printer Device Serial Number	U	(0018,1000)	AAAAAAAA (number up to 8 ASCII characters)
Software Version	U	(0018,1020)	“X.Y” (ID up to 6 ASCII characters)
Date of Last Calibration	U	(0018,1200)	Not supported
Time of Last Calibration	U	(0018,1201)	Not supported

### 2.3.5.2 Printer SOP N-Get Status Code.

Code	Status	Action/Meaning
0000H	Success	Printer Status and Printer Status Info are always returned along with the requested attribute values. (DICOM ref3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref3.7.C.5.21)

## 2.4 Basic Annotation Box SOP Class

### 2.4.1 DIMSE Service N-SET

The Basic Annotation Box SOP Instance is created by the SCP at the time of the Basic Film Box SOP Instance is created, based on the value of the Annotation Display Format ID attribute (2010,0030) of the Basic Film Box.

A maximum of 6 annotation boxes may be received with a Film Box.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Annotation Position	M	(2030,0010)	<p>Annotations are placed in order from upper-left to lower-right.</p> <p>If the Annotation Display Format ID is 1, then value must be 1. The text will be printed on one line at the bottom of the film.</p> <p>If the Annotation Display Format ID is 6, then valid range is 1-6. The text will be printed within 2 lines at the bottom of the film, within 6 different positions.</p> <p>If the Annotation Display Format ID is LABEL, the valid range is 0-1. The text will be printed at the bottom of the film on two lines.</p> <p>If the Annotation Display Format ID is BOTTOM, then the valid range is 1 to the number of images in the Film Box. The text will be placed below the images.</p> <p>If the Annotation Display Format ID is COMBINED, then the valid range is 0 to the number of images in the Film Box. Position 0 will be printed at the bottom of the film. The other annotations will be printed below the images.</p> <p>Any annotation box with a position outside the valid range</p>	None.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
			will be ignored and a warning code of 0116H will be returned to the SCU	
Text String	M	(2030,0020)	Up to 64 characters (see Note)	None.

Note: the number of characters displayed may be less than 64 characters depending on the size of the film, the page format, the annotation format and the characters used. This exception does not apply to Annotation Format IDs of LABEL or 1.

## 2.4.2 Annotation N-Set Status Code.

Code	Status	Action/Meaning
0000H	Success	The annotation data is set.
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.1.1)
0112H	Failure	The annotation box does not exist. (DICOM ref 3.7.C.5.21)
0116H	Warning	Invalid Position was specified. (DICOM ref 3.7.C.5.19)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)

## 2.5 Presentation LUT SOP Class

### 2.5.1 DIMSE Service N-CREATE

The Presentation LUT SOP Instance is created by the SCP upon receipt of the N-CREATE action. The Print SCU may create the Presentation LUT instance prior to referencing it in the Basic Film Box. Multiple Presentation LUT instances are supported in an association, but only one instance will be supported for each image.

The SCU shall send either Presentation LUT Sequence or the Presentation LUT Shape. These values are mutually exclusive and the action will result in an error if neither or both are present. The presence of the Presentation LUT instance overrides any data set in the Configuration Information attribute (2010,0150) of the Film Box or Image Box.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Presentation LUT Sequence	M	(2050,0010)		None.
>LUT Descriptor	M	(0028,3002)	The first value is the number of entries in the lookup table. The number of entries shall be equal to the number of possible values in	None.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
			<p>the input. (For 8 bit input will be 256 entries, for 12 bit input it will be 4096 entries)</p> <p>The second value is the first input value mapped, and shall always be 0.</p> <p>The third value specifies the number of bits for each entry in the LUT Data. It shall be between 10 and 16 inclusive.</p>	
>LUT Explanation	U	(0028,3003)	Free form text explanation of the meaning of the LUT.	None.
>LUT Data	M	(0028,3006)	The LUT Data shall be stored in a format equivalent to 16 bits allocated where the high bit is equal to bits stored - 1, where bits stored is the third value of the LUT Descriptor.	None.
Presentation LUT Shape	M	(2050,0020)	Enumerated values IDENTITY and LIN OD.	None.

## 2.5.2 Presentation LUT N-Create Status Code.

Code	Status	Action/Meaning
0000H	Success	The Presentation LUT is created. Some attributes may have different values than those that were requested. The changed attributes will be returned with the values that were used. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

## 2.5.3 DIMSE Service N-DELETE

Upon receipt of an N-DELETE from the SCU, the 8900 removes the Presentation LUT instance.

## 2.5.4 Presentation LUT N-Delete Status Code.

Code	Status	Action/Meaning
0000H	Success	The Presentation LUT is deleted. (DICOM ref 3.7.C.1.1)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)

## 3 Communication Profiles

### 3.1 Supported Communications Stacks

The 8900 provides TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

### 3.2 Physical Media

The 8900 supports *Ethernet* with the following physical connectors:

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

## 4 Extensions/Specializations/Privatizations

There are not any Extensions/Specializations/Privatizations.

## 5 Configuration

The following attributes are configurable by a qualified service provider:

- IP address
- DICOM Port
- Subnet Mask
- Local Network Host Name (8900 AE Title)
- Router Address (Gateway)
- DICOM Service(s) available
- Film Sizes available
- Sorter Bin installed or not
- Other destination properties

## 6 Support of Extended Character Sets

The 8900 supports the ISO-IR 100 Latin 1 character set as well as the ISO-IR 6 default character set.

The 8900 also supports the ISO-IR 87 character set. This is part of the JIS X 0208 code table for 2-byte Japanese character sets, which supports Kanji (ideograph), Hiragana (phonetic), and Katakana (phonetic).

The 8900 also supports the ISO-IR 13 character set. This is part of the JIS X 0201 code table for single-byte Japanese Katakana (phonetic) characters.

The value set in the tag Specific Character Set (0008,0005) must be one of the following:

- a) “ISO\_IR 6” (default repertoire)
- b) “ISO\_IR 100” (Latin 1),
- c) “ISO\_IR 13” (Katakana),
- d) “ISO 2022 IR 13\ISO 2022 IR 87” (Katakana, Hiragana, Kanji),
- e) “ISO 2022 IR 159” (supplementary Kanji set)
- f) or blank (ISO-IR 6 is the default character set).

## 7 Error Handling

Warnings indicate that the operation/notification has been completed, but an error was detected. Failures convey that the operation/notification failed and was not performed. Refer to the DICOM Specification PS 3.7, Annex C for the Status Types supported by the DIMSE services.

## Annex A - Configuration Information

The Configuration Information attribute contains the list of Carestream Health-specific values. These attributes are not DICOM standard attributes.

The Configuration Information value is an ordered list. The attribute is specified using the ASCII two-character key prefix in the following sequence:

- 1) Curve Shape, Contrast, Pivot Density  
or Perception LUT
- 2) Text Macros.

The Film Box Curve Shape value applies to all images in the Film Box except when Curve Shape or Perception LUT is specified for the image in the Image Box. Note that the tonescaling method (Curve Shape or Perception LUT) specified at the image box level must be the same for all images on the same page.

ATTRIBUTE	USAGE	DESCRIPTION	DEFAULT
Curve Shape designated by the ASCII two- character prefix: CS	U/M	000 to 999  <b>Note:</b> 000 = linear, 999 = highest curvature  Curve Shape is a tone scale adjustment used to optimize the image on film compared to the image on the operator console monitor. Curve shape is not valid when a Perception LUT is specified.	Film Box: Value set in the Printer by the user  Image Box: Basic Film Box Curve Shape
Contrast designated by the ASCII two- character prefix: CN	U/M	-5 to 5  <b>Note:</b> Integer values only. Negative Contrast settings are lower contrast where the amount of data that is represented by medium film densities is increased. Positive settings are higher contrast where the amount of data that is represented by high and low densities is increased.	Value set in the Printer by the user
Pivot Density designated by the ASCII two- character prefix: PD	U/M	0.0 to 2.4  <b>Note:</b> Value must be specified in increments of 0.2. Densities above and below the pivot density will be adjusted up and down by an amount, which is a function of the difference between the code value and the pivot density code value.	Value set in the Printer by the user





“LUT=0,3\ TM%PRNTDAT%%TIM%%FOF%”

The Perception LUT TFT/ULUT set is 0 (default) and the Contrast Setting is 3.

The following text macros will be printed on the bottom of the page:

Date of Printing, Time of Printing, and Film of Film count.

“TM%PRNTDAT%%TIM%%FOF%”

The following text macros will be printed at the bottom of the page:

Date of Printing, Time of Printing, and Film of Film count.

"PD2.0\CN4\CS333"

This is **invalid** because the attributes are out of order, curve shape must precede pivot density and contrast, and contrast must precede pivot density. It should be "CS333\CN4\PD2.0".

"CS333\PD1.2\LUT=0,3"

This is **invalid** because Curve Shape and Pivot Density cannot be mixed with Perception LUT. In this case, the Perception LUT setting will be used.

## Annex B - Custom Formats

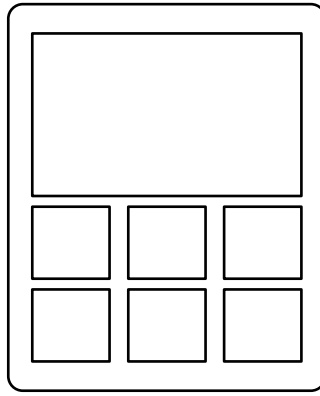
The following formats are supported:

### Format ID 101

This format consists of 7 image positions, 1 large image in the upper section of the page and 6 smaller images in the lower section of the page. The approximate size and positioning of the images are defined in terms of the standard formats 2 and 12.

Upper Section: 1 frame of a 2-up format.

Lower Section: 6 frames of a 12-up format.

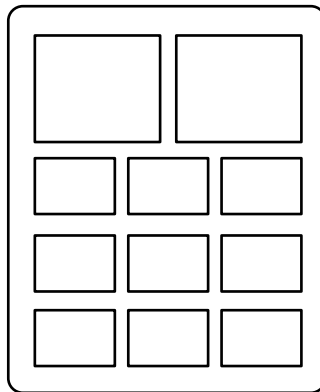


### Format ID 102

This format consists of 11 image positions, 2 large images in the upper section of the page and 9 smaller images in the lower section of the page. The approximate size and positioning of the images are defined in terms of the standard formats 6 and 15.

Upper Section: 2 frames occupying top 1/3 of media.

Lower Section: 9 frames occupying bottom 2/3 of media.



## **Annex C - Unsupported Film Types**

If the requested film size and film base is currently installed, the imager prints the page on the specified film size and film base.

If the requested film size and film base is supported, but not currently installed, the imager stores the job in a queue and the user must change film cartridge to match the requested film size and film base before the job will be printed.

If the requested film size and film base is not supported, the job will be rejected.

Mammo Blue Film is valid for 8x10in, 10x12in, and 11x14in film sizes. Mammo Blue Film is only supported when the software license for Mammo Enabled 8900 is configured.

# Annex D – Printer Specifications

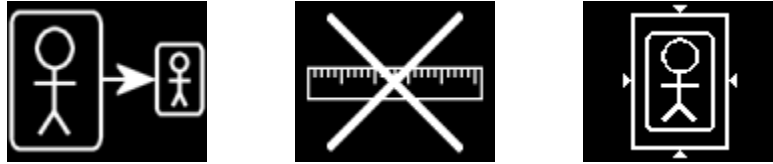
The 8900 is capable of printing edge to edge for Requested Image Size jobs. The following tables list the details unique to the 8900.

## D.1 Film Size

This table shows the accepted film sizes for the 8900. The Maximum Width/Height represents the largest pixel number accepted with and without annotation printed on the bottom of the film.

If annotations are printed, some pixel space will be used for the text and the maximum image size will be reduced.

If the minification or crop option is enabled, larger images may be printed but some image data will be discarded in order to fit onto the page. In this case, an icon will be added to the bottom of the page to indicate minification or crop has occurred.



If the requested image size is smaller than the image size, then minification option is needed to get the image printed.

Portrait Size Info:

Mode	Available Film Sizes	Max Width (Portrait) (pixel pitch = 25.591)		Max Height w/o Annotation (Portrait)	Max Height w/ Annotation (Portrait)
		Pixels	Mm		
With Requested image size	8INX10IN	5167	201.91	6490	6234
	10INX12IN	6490	253.60	7767	7511
	11INX14IN	7137	278.89	9100	8844
	14INX14IN	9100	355.60	9087	8831
	14INX17IN	9100	355.60	11037	10781
Without Requested Image Size and 2mm optional border is not configured	8INX10IN	4742	n/a	6286	6030
	10INX12IN	6286	n/a	7342	7086
	11INX14IN	6712	n/a	8896	8640
	14INX14IN	8896	n/a	8662	8406
	14INX17IN	8896	n/a	10612	10356
Without Requested Image Size and 2mm optional border configured	8INX10IN	5056	n/a	6368	6112
	10INX12IN	6368	n/a	7656	7400
	11INX14IN	7028	n/a	8976	8720
	14INX14IN	8976	n/a	8976	8720

Mode	Available Film Sizes	Max Width (Landscape) (pixel pitch = 25.591)		Max Height w/o Annotation (Landscape)	Max Height w/ Annotation (Landscape)
		Pixels	Mm		
With Requested image size	8INX10IN	6490	253.60	5167	4911
	10INX12IN	7767	303.51	6490	6234
	11INX14IN	9100	355.59	7137	6881
	14INX14IN	9087	355.09	9100	8844
	14INX17IN	11037	431.28	9100	8844
Without Requested Image Size and 2mm optional border is not configured	8INX10IN	6286	n/a	4742	4486
	10INX12IN	7342	n/a	6286	6030
	11INX14IN	8896	n/a	6712	6456
	14INX14IN	8662	n/a	8896	8640
	14INX17IN	10612	n/a	8896	8640
Without Requested Image Size and 2mm optional border configured	8INX10IN	6368	n/a	5056	4800
	10INX12IN	7656	n/a	6368	6112
	11INX14IN	8976	n/a	7028	6772
	14INX14IN	8976	n/a	8976	8720
	14INX17IN	10928	n/a	8976	8720
		Max Width (Portrait) (pixel pitch = 25.591)			
	14INX17IN	8976	n/a	10928	10672
With left justification configured	8INX10IN	5096	199.13	6470	6214
	10INX12IN	6419	250.83	7747	7491

Landscape Size Info:

The above tables implicitly list the maximum image values of a 1Up given the DICOM Requested Decimate/Crop Behavior attribute set to FAIL. For all other formats the maximum image values follows these general rules:

- In any Row, the sum of all Image Widths plus all Horizontal Separations can not exceed the above Max Width values
- In any Column, the sum of all Image Lengths plus all the Vertical Separations cannot exceed the above Max Height values.

**The left justification mode only applies to 1Up portrait formats (requested and non requested image size) with Blue Mammo 8x10in. & 10x12in.film, and takes precedence over the 2mm optional border option.**

## D.2 Printer Capabilities

This table shows the unique capabilities for the 8900.

<b>Color / Grayscale</b>	<b>Film Trays</b>	<b>Sorter Bin</b>
Grayscale	1 to 3 (configurable)	Installed or not installed (configurable)

Printable Max Area for Multiple Page Format when horizontal and vertical separations are set to zero.

Maximum Imageable Area (default border behavior) without Requested Image Size:

	<b>8X10</b>		<b>10X12</b>		<b>11X14</b>		<b>14X14</b>		<b>14X17</b>	
	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>
1	4742	6286	6286	7342	6712	8896	8896	8662	8896	10612
2	4742	3143	6286	3671	6712	4448	8896	4331	8896	5306
4	2371	3143	3143	3671	3356	4448	4448	4331	4448	5306
6	2371	2095	3143	2447	3356	2965	4448	2887	4448	3537
8	2371	1571	3143	1835	3356	2224	4448	2165	4448	2653
9	1580	2095	2095	2447	2237	2965	2965	2887	2965	3537
12	1580	1571	2095	1835	2237	2224	2965	2165	2965	2653
15	1580	1257	2095	1468	2237	1779	2965	1732	2965	2122
16	1185	1571	1571	1835	1678	2224	2224	2165	2224	2653
20	1185	1257	1571	1468	1678	1779	2224	1732	2224	2122
24	1185	1047	1571	1223	1678	1482	2224	1443	2224	1768
30	948	1047	1257	1223	1342	1482	1779	1443	1779	1768
35	948	898	1257	1048	1342	1270	1779	1237	1779	1516

Maximum Imageable Area (2mm optional border behavior) without Requested Image Size:

	<b>8X10</b>		<b>10X12</b>		<b>11X14</b>		<b>14X14</b>		<b>14X17</b>	
	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>	<b>Width</b>	<b>Height</b>
1	5056	6368	6368	7656	7028	8976	8976	8976	8976	10928
2	5056	3184	6368	3828	7028	4488	8976	4488	8976	5464
4	2528	3184	3184	3828	3514	4488	4488	4488	4488	5464
6	2528	2122	3184	2552	3514	2992	4488	2992	4488	3642
8	2528	1592	3184	1914	3514	2244	4488	2244	4488	2732
9	1685	2122	2122	2552	2342	2992	2992	2992	2992	3642
12	1685	1592	2122	1914	2342	2244	2992	2244	2992	2732
15	1685	1273	2122	1531	2342	1795	2992	1795	2992	2185

	<b>8X10</b>		<b>10X12</b>		<b>11X14</b>		<b>14X14</b>		<b>14X17</b>	
16	1264	1592	1592	1914	1757	2244	2244	2244	2244	2732
20	1264	1273	1592	1531	1757	1795	2244	1795	2244	2185
24	1264	1061	1592	1276	1757	1496	2244	1496	2244	1821
30	1011	1061	1273	1276	1405	1496	1795	1496	1795	1821
35	1011	909	1273	1093	1405	1282	1795	1282	1795	1561



## Annex E – Smoothing Type Conversion Table.

Input (DICOM)		Output	
Magnification	Smoothing Type	Magnification	Smoothing Type
NONE	-	NONE	0
REPLICATE	-	REPLICATE	0
BILINEAR	-	CUBIC	9
CUBIC	0	CUBIC	0
CUBIC	1	CUBIC	1
CUBIC	2	CUBIC	2
CUBIC	3	CUBIC	3
CUBIC	4	CUBIC	4
CUBIC	5	CUBIC	5
CUBIC	6	CUBIC	6
CUBIC	7	CUBIC	7
CUBIC	8	CUBIC	8
CUBIC	9	CUBIC	9
CUBIC	10	CUBIC	10
CUBIC	11	CUBIC	11
CUBIC	12	CUBIC	12
CUBIC	13	CUBIC	13
CUBIC	14	CUBIC	14
CUBIC	15	CUBIC	15
CUBIC	NORMAL	CUBIC	5
CUBIC	ENHANCED	CUBIC	6 *
CUBIC	ENHANCED1	CUBIC	6 *

\*These are the closest mapping in the 0-15 smoothing range. There is no equivalence of Enhanced and Enhanced1 on the range of 0..15, Enhanced and Enhanced1 are achieved thru software's imaging rendering prior to the printing process.

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