Kodak Color Medical Imager 1000 (CMI 1000)
DICOM Conformance Statement

Software Version 1.3

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Revision History

Date	Rev	MIM-CORE S/W	Editor	Comments
1/14/2005	1.0	1.0	Trac Tran	Initial revision
5/24/2005	2.0	2.0	Trac Tran	Final updates for Release 1
6/6/2005	3.0	2.0	Trac Tran	Trademark review for Software Version 1.1
8/26/2006	4.0	2.0	Ross Parasiliti	Updated for Software Version 1.3

0 Introduction

0.1 Executive Overview

This document covers the CMI 1000.

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	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 CMI 1000. The CMI 1000 receives exam images from DICOM sources and prints the images on the Kodak imager. The CMI 1000 acts as a DICOM Service Class Provider (SCP). The CMI 1000 performs transactions over a TCP/IP network via the DICOM messages exchange protocol.

0.3 Important Considerations for the Reader

This DICOM Conformance Statement is written in such a way that assumes the reader has a basic understanding of DICOM. This DICOM Conformance Statement by itself is not sufficient to guarantee successful connectivity between the CMI 1000 and equipment from other vendors. The following considerations should be made:

- The integration of equipment from different vendors (including Kodak) goes beyond the scope of the DICOM 3.0 standard and the DICOM Conformance Statements from Kodak 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 Kodak 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 True Size Measurements) is met.

- Eastman Kodak Company reserves the right to make changes to the CMI 1000 architecture described in this document. The user (or user's agent) should ensure that any equipment connected via DICOM to Kodak equipment also follows the future evolution of the DICOM 3.0 standard. Failure to do so may result in (partial) loss of connectivity or functionality.

- 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 (if it exists) 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 with the exception of the Tonescaling method specified in configuration information. Only one Tonescaling method is supported in one film box (Curve Shape or Perception LUT), the image box Perception LUT cannot override the film Box Curve Shape.

0.4   Accessing this Conformance Statement on the World Wide Web

As the CMI 1000 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 (case sensitive):

http://www.kodak.com/global/en/health/serviceAndSupport/dicom.jhtml

0.5 Definitions, Acronyms, Abbreviations

The following symbols and abbreviations are used in this document.

AE	Application Entity
ASCII	American Standard Code for Information Interchange
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
IOD	Information Object Definition.
ISO	International Standards Organization
LUT	Look-up Table
CMI 1000	Color Medical Imager 1000 software
M	Indicate Mandatory when used in the SCP Usage columns.
MC	Indicate Mandatory with Conditions when used in the SCP Usage columns.
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
U	Indicate User choice (Not Mandatory) when used in the SCP Usage columns.
UID	Unique Identifier

1 Implementation Model

This implementation model uses the DICOM Basic Print Management Meta SOP Class to receive studies for the CMI 1000. Associations from multiple SCUs are supported.

DICOM Interface

Modality

CMI 1000

Basic Print (SCP)
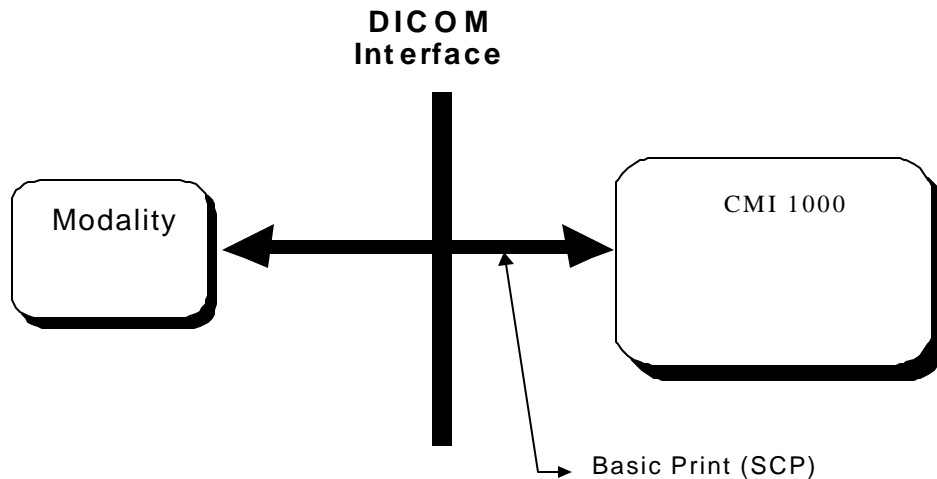
1.1 Functional Definitions

The CMI 1000 receives 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 CMI 1000 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 CMI 1000 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 CMI 1000's maximum PDU size is 128 Kbytes.

The Basic Color Print Management SCP will be accepted by default but can be turned OFF at the CMI 1000 Local Panel.

CMI 1000 can accept and process a color image within a specified DICOM Basic Grayscale Image Box.

2.1.2 Number of Associations

2.1.2.1 Delivery - Basic Grayscale/ Color Print Management SCP

CMI 1000 will accept by default 12 simultaneous associations. If an attempt is made to open more than the above number of associations, the CMI 1000 will reject the additional associations (A-ASSOCIATE-RJ).

2.1.3 Asynchronous Nature

The CMI 1000 allows up to 1 invoked and 1 performed operation on an Association (it is synchronous, e.g. the SCU/SCP can send only 1 Request and must wait for the corresponding Response before sending the next Request).

2.1.4 Implementation Identifying Information

The CMI 1000 provides the Implementation Class UID of "1.2.840.113564.3.3.1".

The implementation version name attribute is "CMI1k2005v1.0" where CMI1k is the Product Acronym, 2005 is the Released Year and v1.0 is the Version Number.

The Called AE Title used by the CMI 1000 is the host name.

2.2 Association Acceptance Policy

2.2.1 Associated Real-World Activity

2.2.1.1 Delivery - Basic Grayscale/Color Print Management SCP

The CMI 1000 accepts Associations for the purpose of acquiring images and printing them on a local printer.

When an association has been established:

> The SCU can request the CMI 1000 to create or set Film Sessions, Film Boxes, set Image boxes, Annotation boxes, Presentation LUT and request Printer Status.

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

The port number is configurable and the default setting is 5040.

2.2.1.2 Application Entity Titles (AE_TITLE)

The Called AE Title is used to select the destination from the CMI 1000. The AE_TITLE should be configured at the SCU to ensure proper functionality with the CMI 1000. The total length of the Called AE Title must be no longer than 16 characters and may not contain spaces.

The name of the destination or model type should also be contained in the Called AE Title. This name can be the printer's logical name as configured by the CMI 1000 service application.

The Called AE Title may be used to select behavior, which is unique to Kodak legacy products for backwards compatibility:

- NER_ option of the AE Title

   If the Called AE Title begins with "NER_", the CMI 1000 will provide status changes as they occur. The SCU must have the capability to receive the unsolicited N-Event-Report.

- Suffix "/1..9" option of the AE Title

   The CMI 1000 has only one single output tray. The Suffix "/1..9" is for supporting legacy products only. All print jobs will be routed to the default out put of bin 1.

- Suffix "/C" option of the AE Title

   Curve shape tone scaling values are usually interpreted in standard 0-999 range. However, to support Kodak legacy devices, the CMI 1000 Print Server can be configured to accept the curve shape in the 0-690 range. If the Called AE Title contains a suffix "/C", the 0-690 range shall be used.

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 of the DICOM Standard, Release PS 3.1-2004.

2.2.1.4 Association Rejection

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

Condition	Result	Source	Reason/Diagnostic
Limit on simultaneous associations exceeded	2 – Rejected Transient	3 - DICOM UL Service Provider (Presentation)	3 – local limit exceeded
The IP Connection could not established.	2 – Rejected Transient	3 – DICOM UL Service Provider (Presentation)	1 – temporary congestion
No Implementation UID	1 - Rejected Permanent	2 – DICOM UL Service Provider (ACSE)	1 – no reason given
No Application Context Name	1 – Rejected Permanent	2 – DICOM UL Service Provider (ACSE)	1 – no reason given

Condition	Result	Source	Reason/Diagnostic
DICOM protocol version is not supported	1 – Rejected Permanent	2 – DICOM UL Service Provider (ACSE)	2 – protocol version not supported
No Presentation Context items given.	1 – Rejected Permanent	2 – DICOM UL Service provider (ACSE)	1 – no reason given
No presentation context items accepted	1 – Rejected Permanent	1 - DICOM UL Service User	1 – no reason given

2.2.2 Presentation Context Table

The CMI 1000 accepts the Presentation Contexts shown below.

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Ext.
Name	UID	Name List	UID		Negot
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
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
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
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
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
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

2.2.3 SOP Specific Conformance

2.2.3.1 Verification

The CMI 1000 provides standard conformance to the DICOM Verification Service Class. Upon receipt from an SCU of a verification of communication request, the CMI 1000 will issue confirmation.

2.2.3.2 Delivery- Basic Print Management SCP

The CMI 1000 provides standard SCP conformance to the DICOM Basic Print Management SOP Class. Association will be rejected if the maximum number of associations has been established.

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 Box, but all images will be converted to the same color or grayscale mode defined by the first image to print.

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, Configurable from the CMI 1000 Local Panel.
Medium Type	U	(2000,0030)	All values are converted to PAPER MAMMO BLUE FILM will be rejected.	PAPER
Film Destination	U	(2000,0040)	All values are converted to BIN_1.	BIN_1
Film Session Label	U	(2000,0050)	Up to 64 characters may be provided	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 CMI 1000 uses N-ACTION to accept print commands from the SCU. Once a print command is received, the CMI 1000 prints all films in the session. The CMI 1000 conforms to the N-ACTION specification in Part 4 section H.4.1.2.4 of the DICOM standard, and the CMI 1000 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)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The SOP Instance UID of the requested film session is returned. (DICOM ref 3.7.C.5.19)
B602H	Warning	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)
C600H	Failure	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)

2.3.1.5 DIMSE Service N-SET

The CMI 1000 uses N-SET to update the Film Session values as supplied by the SCU.

2.3.1.6 Film Session N-Set Status Code

Code	Status	Action/Meaning
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)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The SOP Instance UID of the requested film session is returned. (DICOM ref 3.7.C.5.19)

2.3.1.7 Film Session N-Delete Status Code

Code	Status	Action/Meaning
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)	STANDARD\C,R 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) (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) SLIDE (35 mm) Only valid for PORTRAIT Film Orientation (2010,0040). ROW\r1,r2,r3…where r1, r2, r3…is the number of images in each row. The rows are limited to 10 and the number of images in each row is limited to 10. CUSTOM \I I = 101, 102 Only valid for PORTRAIT Film Orientation (2010,0040). Notes: See Annex B for description	None. SCU must provide.
Referenced Film Session Sequence	M	(2010,0500)		None. SCU must provide.
>Referenced SOP Class UID	M	(0008,1150)		None. SCU must provide.

Attribute	SCP Usage	Tag	Possible Values	Default Values
>Referenced SOP Instance UID	M	(0008,1155)		None. SCU must provide.
Referenced Basic Image Box Sequence	M	(2010,0510)		None. SCU must provide.
Referenced Basic Annotation Box Sequence	MC	(2010,0520)		None.
Film Orientation	U	(2010,0040)	PORTRAIT, LANDSCAPE	PORTRAIT Configurable from the CMI 1000 Local Panel.
Film Size ID	U	(2010,0050)	8_5INX11IN 8_5INX12IN A4 See Annex C for detailed explanation	8_5INX11IN or Configurable from the CMI 1000 Local Panel.
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC Variant of CUBIC is configurable from the CMI 1000 Local Panel. (Cubic, Cubic Conv2, Cubic Conv3)
Max Density	U	(2010,0130)	0-399 The value will be mapped within the active calibration range of the printer and less than or equal to the Border Density [2010,0080]	220 Configurable from the CMI 1000 Local Panel.

Attribute	SCP Usage	Tag	Possible Values	Default Values
Configuration Information	U	(2010,0150)	Curve Shape (CS): 000 to 999	*LUT*=Ver693c0.w87,6 Configurable from the CMI 1000 Local Panel.
			Contrast Values (CN): -1 to -5 Lower contrast 0 Normal +1 to +5 Higher contrast	Configurable from the CMI 1000 Local Panel.
			Pivot Density (PD): 0 to 2.4 in increments of 0.2	1.2
			Perception LUT Selection (LUT): LUT=m, n (m=string, n = 1 to 15) For TFT n = 1 to 15 For ULUT n = 1 to 12	
			Text Macros (TM): %PRNTDAT%, %TIM%, %FOF%, %$TIME$%, %SES%	None
			Perception LUT cannot be used with Curve Shape, Contrast or Pivot Density.	
			See Annex A for description	
Referenced Presentation LUT Sequence	MC	(2050,0500)	If the PLUT is received, the tonescaling data from the above Configuration Information will be ignored.	None
>SOP Class UID	MC	(0008,1150)		None
>SOP Instance UID	MC	(0008,1155)		None
Annotation Display Format ID	U	(2010,0030)	0 - No annotation 1 - Text centered at bottom of film	0 (No annotation)
			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.	

Attribute	SCP Usage	Tag	Possible Values	Default Values
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.)	5 Configurable from the CMI 1000 Local Panel.
Border Density	U	(2010,0100)	BLACK, WHITE, i where i may = 0 -399	Image Max Density
Min Density	U	(2010,0120)	0-399 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.	DMin of the film
Illumination	MC	(2010,015E)	Positive integer in units of cd/m^2	150
Reflective Ambient Light	MC	(2010,0160)	Positive integer in units of cd/m^2	0
Trim	U	(2010,0140)	YES, NO	NO Configurable from the CMI 1000 Local Panel.

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)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The film session requested to contain this 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 film box is not created. The required attribute was present, but contained no value. (DICOM ref 3.7.C.5.13)

2.3.2.3 DIMSE Service N-ACTION

The CMI 1000 uses the N-ACTION to accept print instruction from the SCU. When such an instruction is received, the CMI 1000 prints the indicated film box 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)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The film box does not exist. (DICOM ref 3.7.C.5.19)
B603H	Warning	Nothing is printed (DICOM ref 3.4.H.4.1.2.42)
C600H	Failure	Nothing is printed. (DICOM ref 3.4.H.4.1.2.4.2)

2.3.2.5 DIMSE Service N-SET

The CMI 1000 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)
Min Density	U	(2010,0120)
Illumination	MC	(2010,015E)
Reflective Ambient Light	MC	(2010,0160)
Trim	U	(2010,0140)
Referenced Presentation LUT Sequence	MC	(2050,0500)

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)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)
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)
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)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)

2.3.2.7 DIMSE Service N-DELETE

Upon receipt of an N-DELETE from the SCU, the CMI 1000 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)
0110H	Failure	The Error Comment field will contain the detailed description of the error. (DICOM ref 3.7.C.5.21)
0112H	Failure	The SOP Instance UID of the specified film session is returned. (DICOM ref 3.7.C.5.19)

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.
Preformatted Grayscale Image Sequence	M	(2020,0110)		None. SCU must provide.
>Samples Per Pixel	U	(0028,0002)	1	1
>Photometric Interpretation	U	(0028,0004)	MONOCHROME1, MONOCHROME2	MONOCHROME2
>Rows	M	(0028,0010)	Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Appendix D.	None. SCU must provide.
>Columns	M	(0028,0011)	Maximum Values: Depends on film size and printer model. The aspect ratio is used with the printer's page extents, display format, etc. to calculate this value. See Appendix D.	None. SCU must provide.
>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.
>Bits Stored	M	(0028,0101)	8, 10, 12, 14	None. SCU must provide.
>High Bit	M	(0028,0102)	Bits Stored -1	None. SCU must provide.
>Pixel Representation	M	(0028,0103)	0000H (unsigned integer)	0000H
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide.
Polarity	U	(2020,0020)	NORMAL, REVERSE	NORMAL Configurable from the CMI 1000 Local Panel.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE	CUBIC Variant of CUBIC is configurable from the CMI 1000 Local Panel. (Cubic, Cubic Conv2, Cubic Conv3)
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.)	5 Configurable from the CMI 1000 Local Panel.
Configuration Information	U	(2010,0150)	Setting these values will override film box settings for this image position. 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	Configurable from the CMI 1000 Local Panel. Configurable from the CMI 1000 Local Panel. *LUT*=Ver693c0.w87,6
Requested Image Size	U	(2020,0030)	Width of Image Box in millimeters (fractional millimeters supported) 0.00 indicates "Maximize film utilization while maintaining Image aspect ratio". 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 Note: in order to maintain diagnostic quality, the Magnification and Minification factors must not be more than 50% from the original pixel size. Please refer to Annex D for paper dimensions

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 Configurable from the CMI 1000 Local Panel.
Referenced Presentation LUT Sequence	U	(2050,0500)	If the PLUT is received, the tonescaling data from the above Configuration Information will be ignored	
>SOP Class UID	U	(0008,1150)		
>SOP Instance UID	U	(0008,1155)		
Body Part Examined	U	(0018,0015)	ABDOMEN, ANKLE, ARM, BREAST, CHEST, CLAVICLE, COCCYX, CSPINE, ELBOW, EXTREMITY, FOOT, HAND, HEAD, HEART, HIP, JAW, KNEE, LEG, LSPINE, NECK, PELVIS, SHOULDER, SKULL, SSPINE, TSPINE, DEFAULT.	None.
Modality	U	(0008,0060)	CR, CT, Film Digitizer, Kodak CR, MR, Nuclear Med, Ultrasound, OT = Other	None
Image Tone Adjustment	U	(2011,0170)	-9 to 9	None.

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)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref 3.7.C.5.11)
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)
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)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)

2.3.4   Basic Color Image Box SOP Class

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.
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 $R_1G_1B_1R_2G_2B_2R_3G_3B_3\ldots$ order 001H – pixels arrive in $R_1R_2R_3\ldots, G_1G_2G_3\ldots B_1B_2B_3\ldots$ order	None. SCU must provide.
>Rows	M	(0028,0010)	See Appendix D for behavior depending on the printed image size.	None. SCU must provide.
>Columns	M	(0028,0011)	See Appendix D for behavior depending on the printed image size.	None. SCU must provide.
>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
>Pixel Data	M	(7FE0,0010)	All values consistent with Bits Stored	None. SCU must provide.
Polarity	U	(2020,0020)	NORMAL, REVERSE All values are supported only when the image must be converted to grayscale. When the image is printed as color, this attribute is ignored.	NORMAL Configurable from the CMI 1000 Local Panel.

Attribute & Usage	SCP Usage	Tag	Supported Values	Default Values
Magnification Type	U	(2010,0060)	REPLICATE, BILINEAR, CUBIC, NONE All values are supported only when the image must be converted to grayscale. When the image is printed as color, REPLICATE is always used.	CUBIC Configurable from the CMI 1000 Local Panel.
Smoothing Type	U	(2010,0080)	NORMAL (minimum cubic convolution error) ENHANCED, ENHANCED1 (Valid only for Magnification Type CUBIC.) 0-15 (Valid only for Magnification Type CUBIC.) Smoothing Type is used only when the image must be converted to grayscale.	5 Configurable from the CMI 1000 Local Panel.
Configuration Information	U	(2010,0150)	Setting these values will override film box settings for this image position. The following settings will only be used when the image must be converted to grayscale. 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	*LUT*=Ver693c0.w87,6 Configurable from the CMI 1000 Local Panel. Configurable from the CMI 1000 Local Panel.
Requested Image Size	U	(2020,0030)	Width of Image Box in millimeters (fractional millimeters supported) 0.00 indicates "Maximize film utilization while maintaining Image aspect ratio". 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 Note: in order to maintain diagnostic quality, the Magnification and Minification factors must not be more than 50% from the original pixel size. Please refer to Annex D for paper dimensions.

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 Configurable from the CMI 1000 Local Panel.

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)
0106H	Failure	The invalid attribute value is returned in the response data set. (DICOM ref3.7.C.5.11)
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)
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 ref3.7.C.5.13)
0213H	Failure	Page limit is exceeded. (DICOM ref 3.7.C.5.22)

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 SCU established the association using a called AE title beginning with "NER_". 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.

Attribute	SCP Usage	Tag	Supported Values
Printer Status	M	(2110,0010)	NORMAL, WARNING
Printer Status Info	M	(2110,0020)	for Printer Status of NORMAL: NORMAL
			for Printer Status of WARNING: CHECK PAPER CHECK PRINTER COVER OPEN EMPTY PAPER FILM JAM MEDIA OUT PAPER ILLEGAL PRINTER OFFLINE SW ERROR
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)	The actual CMI 1000 software version (ID up to 6 ASCII characters) as X.y where X is the CMI 1000 Release number and y the version number.
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)	Annotations are placed in order from upper-left to lower-right. 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. 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. 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. 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. 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. Any annotation box with a position outside the valid range will be ignored.	None.
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 Presentation LUT instance prior to being referenced by 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 the input. (For 8 bit input will be 256 entries, for 12 bit input it will be 4096 entries) The second value is the first input value mapped, and shall always be 0. The third value specifies the number of bits for each entry in the LUT Data. It shall be between 10 and 16 inclusive.	None.
>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 CMI 1000 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 CMI 1000 provides TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

3.2 Physical Media

The CMI 1000 supports Ethernet with the following physical connectors:

- Standard Twisted pair (10BaseT and 100BaseT)

4 Extensions/Specializations/Privatizations

There are no Extensions/Specializations/Privatizations.

5 Configuration

The following attributes are configurable by the CMI 1000 Local Panel:

> IP address
> DICOM Port number
> Subnet Mask
> Local Network Host Name - CMI 1000 AE Title (Default is CMI1000)
> Router Address (Gateway)
> Basic Color Print Management Association (Default is ON)
> N-Event-Report support (Default is Off)
> Other configuration indicated in the SOP Class tables.

> ICC Profile: The ICC Profile is a set of Color Management Attributes loaded into the CMI 1000 and can be configurable through the Local Panel. Depending on the chosen ICC Profile, the resulting color prints may be different. Please see the User Manual for instructions to adjust color images.

6 Support of Extended Character Sets

The CMI 1000 supports the ISO-IR 100 Latin 1 character set as well as the ISO-IR 6 default character set.

The CMI 1000 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 CMI 1000 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 either:

a) "ISO_IR 6" (default repertoire)

b) "ISO_IR 100" (Latin 1),

c) "ISO_1R 13" (Katakana),

d) "ISO 2022 IR 13\ISO 2022 IR 87" (Katakana, Hiragana, Kanji),

e) "ISO 2022 IR 159" (supplementary Kanji set)

f) "ISO 2022 IR 149" (Korean Hangu set)

g) "GB18030" (Chinese set)

h) 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 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.

ATTRIBUTE	USAGE	DESCRIPTION	DEFAULT
Curve Shape designated by the ASCII two-character prefix: CS	U/M	000 to 999 **Note:** 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 **Note:** 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 **Note:** 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

Perception LUT Selection designated by the ASCII three-character prefix: LUT	U/M	LUT = m, n Allows selection of the LUT that best suits the user's images. M is the name of the TFT set and N specifies a contrast setting within the group. Curve shape will be ignored if the LUT parameter is used. m=string (0=default group) n=0 to 15 (0=use default value set at Local Panel)	m=0, n=0
Text Macros designated by the ASCII two-character key prefix: TM	M/M	%PRNTDAT% Capture Date* DD-MMM-YY %TIM% Capture Time* HH:MM (HH=0-23) %FOF% Film of Film Count NN/MM %$TIME$% Time of Printing HH:MM:SS %SES% Film Session Label AAAAAA (1-64 chars from the Film Session SOP Class) **Note:** The text macros will be printed on the bottom of the film and will be truncated if necessary	None

* This is the receiving Date/Time of the first valid image of the first Film Box.

Examples

"CS333"
The curve shape is set to 1/3 of the printer's tone scale range and defaults are applied to contrast and pivot density.

"CS500\CN3\PD2.2"
The curve shape is set to 1/2 the printer's tone scale range, Contrast is set to 3, and pivot density is set to 2.2.

"PD2.0"
The pivot density is set to 2.0, and defaults are applied to curve shape and contrast.

"CS333\CN3\PD2.2\TM%PRNTDAT%%TIM%%FOF%"
The curve shape is set to 1/3 of the range, Contrast is set to 3, and pivot density is set to 2.2.
The following text macros will be printed on the bottom of the page:
        Date of Printing, Time of Printing, and Film of Film count.

"LUT=Ver693c0.w87,3"
The Perception LUT TFT set is "Ver693c0.w87" and the Contrast Setting is 3.

"LUT=0,3\ TM%PRNTDAT%%TIM%%FOF%"
The Perception LUT TFT 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 expected to be supported by printers manufactured by Kodak and will only be specified to these printers.

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 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.
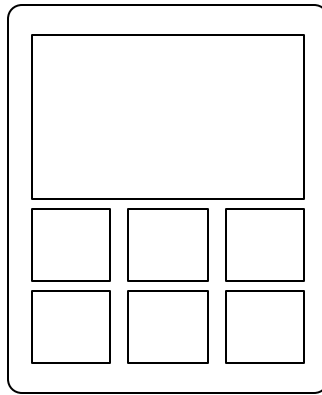
Format ID 102

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 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.
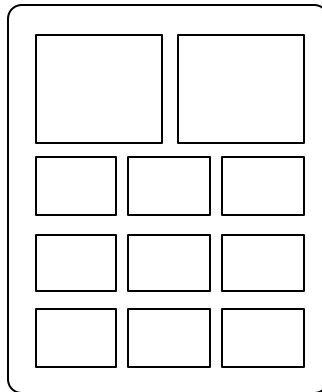
Annex C - Unsupported Film Types

The CMI 1000 prints all the requested Medium Type ID (2000,0030) except MAMMO BLUE FILM on paper. MAMMO BLUE FILM will be rejected.

The CMI 1000 prints all the requested Film Size ID (2010,0050) on the size of the paper currently loaded to the printer providing that the paper size is configured properly from the Local Panel.

If the user configured at the Local Panel a longer paper size than the size actually loaded, the printer would not print until the correct paper is loaded.

Annex D – Printer Specifications

D.1 Film Size

This table shows the accepted film sizes. The maximum image size represents the largest image 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 selected, larger images may be printed but some data will be lost in order to fit the images onto the page. In these cases, an icon will be added to the bottom of the page to indicate minification or cropping has been performed.

Portrait Size Info:

Available Film Sizes	Max Width (Portrait) (Product pixel pitch 12.3425)		Max Height w/o Annotation (Portrait)	Max Height w/ Annotation (Portrait)
	Pixels	Mm		
8_5X11	2508	203.2mm	2954	2904
8_5X12	2508	203.2mm	3134	3084
A4	2508	203.2mm	3134	3084

Landscape Size Info:

Available Film Sizes	Max Width (Portrait) (Product pixel pitch 12.3425)		Max Height w/o Annotation (Portrait)	Max Height w/ Annotation (Portrait)
	Pixels	Mm		
8_5X11	2954	239.3mm	2508	2458
8_5X12	3134	253.9mm	2508	2458
A4	3134	253.9mm	2508	2458

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

Film size:	8.5x11		A4		8.5x12	
Format	Width	Height	Width	Height	Width	Height
1	2508	2954	2508	3134	2508	3134
2	2508	1477	2508	1567	2508	1567
4	1254	1477	1254	1567	1254	1567
6	1254	984	1254	1044	1254	1044
8	1254	738	1254	783	1254	783
9	836	984	836	1044	836	1044
12	836	738	836	783	836	783
15	836	590	836	626	836	626
16	627	738	627	783	627	783
20	627	590	627	626	627	626
24	627	492	627	522	627	522
30	501	492	501	522	501	522
35	501	422	501	447	501	447