Kodak Point of Care CR systems

DICOM Conformance Statement

Kodak QC

Software Version 3.0

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Acronyms, Abbreviations and Symbols

ACC American College of Cardiology
ACR American College of Radiology
ASCII American Standard Code for Information Interchange
AE Application Entity
ANSI American National Standards Institute
CD Compact Disc
CR Computed Radiography
DICOM Digital Imaging and COmmunications in Medicine
DIMSE DICOM Message Service Element
DIMSE-C DICOM Message Service Element-Composite
DIMSE-N DICOM Message Service Element-Normalized
FSC File Set Creator
HD Hard Disc
HIS Hospital Information System
HL7 Health Level 7
IE Information Entity
IOD Information Object Definition
ISO International Standard Organization
MOD Magneto Optical Disk
MWL Modality Worklist
MWM Modality Worklist Management
NEMA National Electrical Manufacturers Association
PDU Protocol Data Unit
RIS Radiology Information System
SC Secondary Capture
STORAGE COMMIT Storage Commitment
SCP Service Class Provider
SCU Service Class User
SOP Service Object Pair
TCP/IP Transmission Control Protocol/Internet Protocol
UID Unique Identifier

1. Introduction

This document is a DICOM Conformance Statement for the Kodak QC system.

This document is intended to provide the reader with the knowledge of how to integrate this product within a DICOM compliant hospital network. It details DICOM Service Classes and Communication Protocols that are supported in Kodak QC.

Kodak QC supports following service classes:

- Storage Service Class (SCU)
- Storage Commitment Service Class (SCU)
- Modality Worklist Management Service Class (SCU)
- Print Service Class (SCU)
- Media Storage Service (FSC)

It is recommended that the reader be familiar with the DICOM Standard (referenced in section 1.2) prior to reading this DICOM Conformance Statement.

1.1. Overview

This document contains 10 sections (including this Section 1 – Introduction).

Section 2 presents the DICOM implementation model of the Kodak QC, supported by detailed application data flow diagrams.

Section 3 provides definition of the Image Transfer Application Entity (AE) that is part of Kodak QC. Details are given in the AE Specification.

Section 4 provides definition of the Modality Worklist AE that is part of Kodak QC. Details are given in the AE Specification.

Communication Profiles are discussed in section 7, and configuration required by Kodak QC is provided in Section 8. Section 9 indicates support for Extended Character Sets.

Annex A provides Information Object Definitions for the modalities supported by Kodak QC.

1.2. References

ACR-NEMA Digital Imaging and Communications in Medicine, DICOM V3.0,.

1.3. Definitions

- **Association Establishment** - An Association Establishment is the first phase of communication between two DICOM Application Entities (AEs). The AEs use the Association Establishment to negotiate how data will be encoded and the type of data to be exchanged.
- **Called Application Entity Title** - The Called AE Title defines the intended receiver of an association request.

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- **Calling Application Entity Title** - The Calling AE Title defines the requestor of an association request.

- **DICOM Message Service Element (DIMSE)** - A DIMSE defines the services and protocols utilized by an Application Entity to exchange messages.

- **Information Object Definition (IOD)** - An IOD is a data model, which is an abstraction of real-world information. This data model defines the nature and attributes relevant to the class of real-world objects represented.

- **Service Class Provider (SCP)** - A Service Class Provider plays the "server" role to perform operations and invoke notifications during an Association. An example of a Storage Service Class Provider would be an image storage device. In this case, the image storage device is storing the image that was sent by a Service Class User.

- **Service Class User (SCU)** - A Service Class User plays the "client" role to invoke operations and perform notifications during an Association. An example of a Storage Service Class User would be an image acquisition device. In this case, the image acquisition device will create and send a DICOM image by requesting that a Service Class Provider store that image.

- **Service/Object Pair (SOP) Class** - A SOP Class is defined by the union of an Information Object Definition and a set of DIMSE Services. A DICOM Application Entity may support one or more SOP Classes. Each SOP Class is uniquely identified by a SOP Class UID.

- **SOP Instance** - A specific occurrence of an Information Object.

- **Transfer Syntax** - The Transfer Syntax is a set of encoding rules that allow DICOM Application Entities to negotiate the encoding techniques (e.g. data element structure, byte ordering, compression) they are able to support. The Transfer Syntax is negotiated during Association Negotiation.

- **Unique Identifier (UID)** - A Unique Identifier is a globally unique, ISO compliant, ASCII-numeric string. It guarantees uniqueness across multiple countries, sites, vendors and equipment.

- **DICOM File** – A DICOM File is a file formatted in accordance with Part 10 of the DICOM Standard.

2. Implementation Model

Kodak QC is a medical acquisition system that supports Computed Radiography (CR).
Kodak QC encompasses the following DICOM Application Entities:

- KODAK QC IMAGE TRANSFER AE - to exchange images with other Application Entities by the means of DICOM network exchange. It implements the following Service Class:
  - Storage as SCU

- KODAK QC STORAGE COMMITMENT AE - to ask for safe storage confirmation of images that where already sent to other Application Entities in previous associations by the means of DICOM network exchange. It implements the following Service Class:
  - Storage Commitment as SCU

- KODAK QC MWL AE - to fetch modality worklist information from a worklist manager. It implements the following Service Class:
  - DICOM Modality Worklist SCU

- KODAK QC PRINT AE - to exchange print pages with other Application Entities by the means of DICOM network exchange. It implements the following Service Class:
  - Print as SCU

2.1. Image Transfer

KODAK QC IMAGE TRANSFER AE is implemented as a single application entity and performs the following services:
- sends/exports images to remote DICOM storage devices (acts as Storage SCU)

2.1.1. Application Data Flow

Figure 1 illustrates the following scenarios:

- Send a **STORE Request** to a remote DICOM AE in case of automatic or manual sending request.

Figure 1: Image Transfer Data Flow Diagram

2.1.2. Functional Definitions of Application Entities

The KODAK QC IMAGE TRANSFER AE component operates as a service. The startup sequence of the Kodak QC system initiates its execution. The service is NOT shut down when the Kodak QC application is closed

2.1.3. Sequencing of Real-World Activities

- Automatic sending of images - When an Image is accepted in the scan mode and a default DICOM store SCP (i.e. PACS, etc.) is configured, then the image is being sent to it.
- Manual sending of images - the user can enter the Archive tool from the user interface and select images to be sent to a specific storage device.

2.2. Storage Commitment

KODAK QC Storage Commitment AE is implemented as a single application entity and performs the following services:

- sends/exports N_ACTION requests to remote DICOM Image Manager for previously stored images (acts as Storage Commitment SCU).

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- receives N_EVENT_REPORT requests from DICOM Image manager on a separate association initiated by the DICOM Image Manager.

2.2.1. Application Data Flow

Figure 2 illustrates the following scenarios:

- Send an **N_ACTION request** to a remote DICOM AE once the preceding image transfer request is successful and associated to the storage commitment destination.
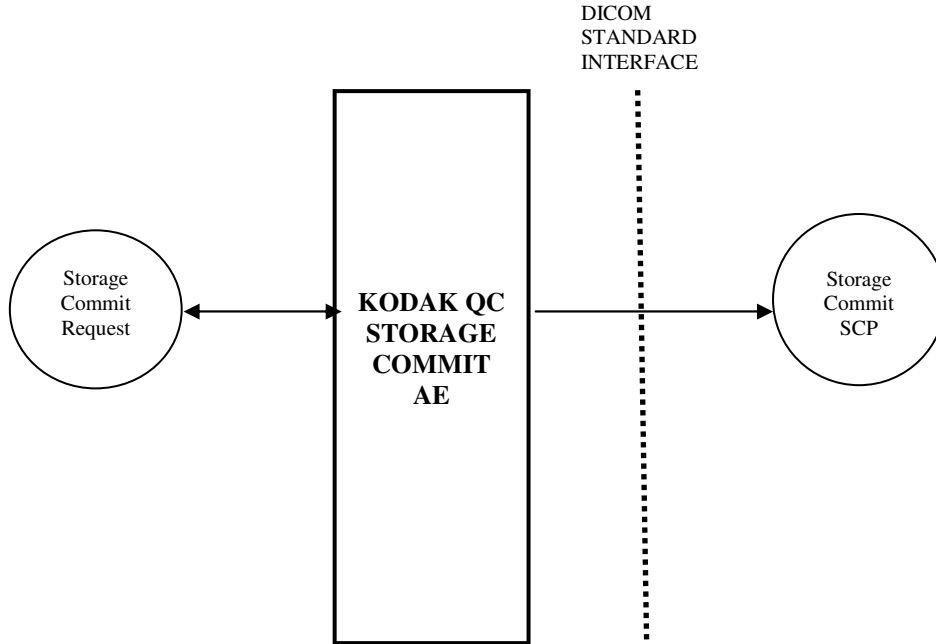
Figure 2: Storage Commitment Data Flow Diagram

2.2.2. Functional Definitions of Application Entities

The KODAK QC STORAGE COMMIT AE component operates as a service. The startup sequence of the Kodak QC system initiates its execution. The service is NOT shut down when the Kodak QC application is closed

2.2.3. Sequencing of Real-World Activities

- After a successful transfer of image (as described at 2.1.3) to a device with Store Commit SCP capability then the AE initiates a new association for sending N_ACTION request using the previous image SOP Class/Instance UID pair.

- The service always listens (waits for association, on local port 105) for a different association initiated by the Storage Commit SCP to receive the response of the commitment requests (N_EVENT_REPORT) and updates its as Success/Failure in the Kodak QC database.

2.3. Modality Worklist

2.3.1. Application Data Flow
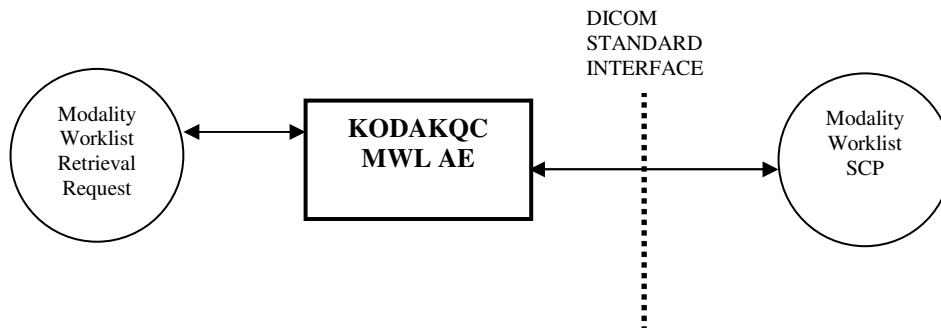
Figure 3: Modality Worklist Data Flow Diagram

2.3.2. Functional Definitions of Application Entities

KODAK QC MWL AE is used to query modality worklist information from a remote DICOM device. It therefore performs the following tasks:

- Establishes a DICOM Association with a remote DICOM device.

- Issues a request for a worklist to a remote DICOM device.

- Receives Modality Worklist from a remote DICOM device.

KODAK QC MWL AE component operates as part of the Kodak QC application. It is shut down when the application terminates.

2.3.3. Sequencing of Real-World Activities

Not applicable.

2.4. Print

KODAK QC PRINT AE is implemented as a single application entity and performs the following services:
- creates print film sessions, film boxes and image boxes with remote DICOM Print device as laser imagers etc. (acts as Print SCU)
- sends presentation LUT (IDENTITY + LIN OD) to Print device.
- receives N_EVENT_REPORT for Print Job from print device with status of print request (written in the **Event Viewer** of the computer).

2.4.1. Application Data Flow

Figure 4 illustrates the following scenarios:

- Send a **PRINT Request** to a remote DICOM AE in case of automatic or manual printing request.
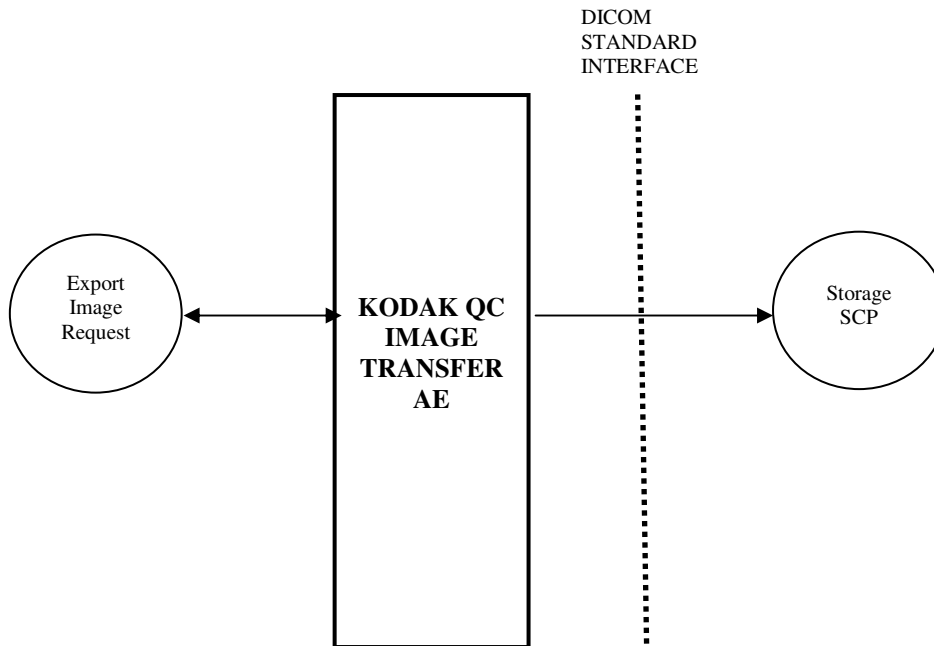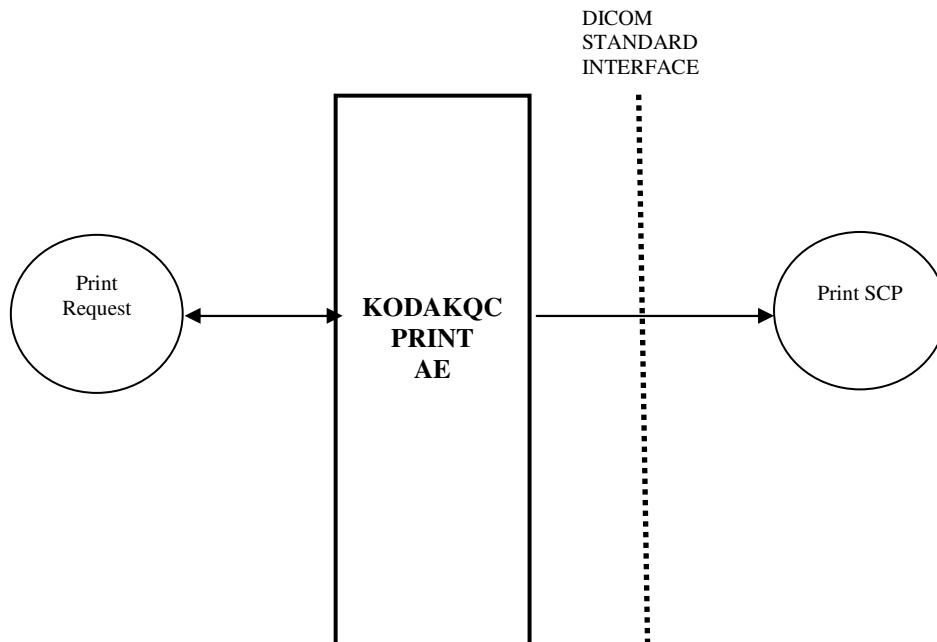

Figure 4: Print Data Flow Diagram

2.4.2. Functional Definitions of Application Entities

KODAK QC PRINT AE acts as a Windows Printer Driver. The AE installation and configuration has a dedicated "Add DICOM Printer Wizard".

2.4.3. Sequencing of Real-World Activities

- Automatic sending of single image print page - When an Image is accepted in the scan mode and a default DICOM Print SCP is configured, and then the print request of the image is sent.

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- Manual printing of images - the user can enter the Viewer tool of the user interface and select images to be printed.

2.5. MEDIA Storage

KODAK QC MEDIA Storage AE is implemented as a single application entity and performs the following services:
- Burns Images and DICOMDIR on media. (acts as FSC)

2.5.1. Application Data Flow

Figure 5 illustrates the following scenarios:

- Request a **BURN operation** .
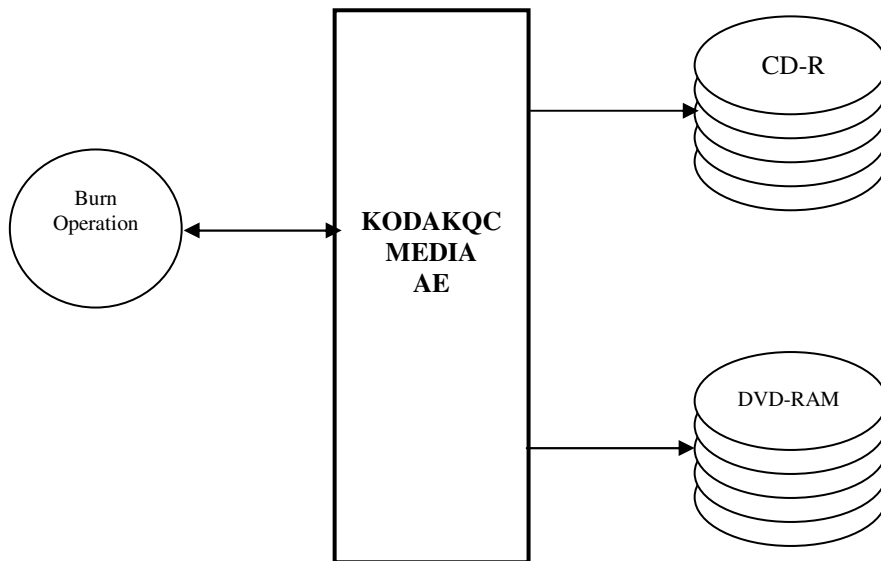
Figure 5: Burn Media Flow Diagram

3. KODAK QC IMAGE TRANSFER AE Specification

KODAK QC IMAGE TRANSFER AE provides Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
CR Image Storage	1.2.840.10008.5.1.4.1.1.1

3.1. Association Establishment Policy

3.1.1. General

The maximum length of PDU that the KODAK QC IMAGE TRANSFER AE will receive is 16384.

3.1.2. Number of Associations

The KODAK QC IMAGE TRANSFER AE can initiate one association concurrently.

3.1.3. Asynchronous nature

The KODAK QC IMAGE TRANSFER AE allows a single outstanding operation on any association. Therefore, Kodak QC AE does not support asynchronous operations and will not perform asynchronous window negotiation, other than the default as specified by the DICOM specification.

3.1.4. Implementation Identifying Information

The KODAKQC IMAGE TRANSFER AE is identified by the following ids:
Implementation Class UID: 1.2.3
Implementation Version Name: ver 1

3.2. Association Initiation by Real World Activity

This section details the action of the KODAKQC IMAGE TRANSFER AE SCU component as a result of user initiated activity on the Kodak QC Application User Interface.

3.2.1. Export Image Request

3.2.1.1. Associated Real World Activity

Automatic export:

The user configures the Kodak QC application to automatically export a study after it has been completed. The user sets up the default destination and no further intervention on the user part is required. The KODAK QC IMAGE TRANSFER AE transfers the images in the background.

3.2.1.2. Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended**
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.2.1.3. SOP-Specific Conformance

This implementation supports transfers as an SCU as described in the DICOM Standard, PS3.4,Annex B.

The Information Object attributes that are encapsulated in a dataset and sent with the C-STORE request are specified in Annex A of this document.

3.3. Association Acceptance Policy

NA.

4. KODAK QC STORAGE COMMITMENT AE Specification

KODAK QC STORAGE COMMIT AE provides Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
Storage Commitment Push Model Class	1.2.840.10008.1.20.1

4.1. Association Establishment Policy

4.1.1. General

The maximum length of PDU that the KODAK QC STORAGE COMMIT AE will receive is 16384.

4.1.2. Number of Associations

The KODAK QC STORAGE COMMIT AE can initiate one association concurrently..

4.1.3. Asynchronous nature

The KODAK QC STORAGE COMMIT AE allows a single outstanding operation on any association. Therefore, Kodak QC AE does not support asynchronous operations and will not perform asynchronous window negotiation, other than the default as specified by the DICOM specification.

4.1.4. Implementation Identifying Information

The KODAK QC STORAGE COMMIT AE is identified by the following ids:
Implementation Class UID: 1.2.3
Implementation Version Name: ver 1

4.2. Association Initiation by Real World Activity

This section details the action of the KODAK QC STORAGE COMMIT AE SCU component as a result of user initiated activity on the Kodak QC Application User Interface.

4.2.1. Storage commitment Request

4.2.1.1. Associated Real World Activity

Automatic N_ACTION requests after sending images to storage device

4.2.1.2. Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax			Extended
Name	UID	Name List	UID List	Role	Negotiation
Storage Commitment Push Model Class	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.1.3. SOP-Specific Conformance

This implementation supports storage commitment requests as an SCU as described in the DICOM Standard, PS3.4, Annex B.

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4.3. Association Acceptance Policy

The KODAK QC STORAGE COMMIT AE accepts Associations on port 105 for N_EVENT _REPORT requests as an SCU, and C_ECHO requests as an SCP.

5. KODAK QC MWL AE Specification

5.1. Association Establishment Policy

5.1.1. General

When KodakQC Application issues a request to retrieve a Modality Worklist, it initiates an association to the Modality Worklist SCP through the KODAK QC MWL AE Component.

5.1.2. Number of Associations

KODAK QC MWL AE initiates one association with the default remote Modality Worklist SCP. The association is released once the worklist has been retrieved.

5.1.3. Asynchronous nature

The system does not support asynchronous operations and will not perform asynchronous window negotiation.

5.1.4. Implementation Identifying Information

The KODAK QC MWL AE is identified by the following ids:
Implementation Class UID: 1.2.840.113564.3.2
Implementation Version Name: not specified

5.2. Association Initiation by Real World Activity

5.2.1. Modality Worklist Retrieval Request

5.2.1.1. Associated Real World Activity

The user of the KodakQC Application selects the Retrieve Worklist operation button on the user interface.

5.2.1.2. Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name	UID		Negotiation
Modality Worklist Model FIND	1.2.840.10008.5.1.4.31	Implicit VR, Little Endian	1.2.840.10008.1.2	SCU	None

5.2.1.3. SOP-Specific Conformance for Modality Worklist Model- Find SOP Class

Attribute	Tag	Possible Values
Specific Character Set	(0008,0005)	User Defined or Empty
Accession Number	(0008,0050)	User Defined or default (*/Empty)
Referring Physician's Name	(0008,0090)	Empty
Patient's Name	(0010,0010)	User Defined or default (*/Empty)
Patient ID	(0010,0020)	User Defined or default (*/Empty)
Patient's Birth Date	(0010,0030)	Empty
Patient's Sex	(0010,0040)	Empty
Study Instance UID	(0020,000D)	Empty
Requested Procedure Description	(0032,1060)	Empty
Scheduled Procedure Step Sequence	(0040,0100)	
>Modality	(0008,0060)	CR or Empty
>Scheduled Station AE Title	(0040,0001)	configurable in DICOM settings
>Scheduled Procedure Step Start Date	(0040,0002)	Days range is configurable in DICOM settings
> Scheduled Procedure Step Start Time	(0040,0003)	Empty
>Scheduled Procedure Step Description	(0040,0007)	Empty
> Scheduled Station Name	(0040,0010)	configurable in DICOM settings
>Scheduled Procedure Step Location	(0040,0011)	User Defined or Empty

5.3.Association Acceptance Policy

The KODAK QC MWL AE does not accept association requests.

6. KODAK QC PRINT AE Specification

KODAK QC PRINT AE provides Standard Conformance to the following DICOM SOP Class as an SCU:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Film Session SOP Class	1.2.840.100008.5.1.1.1
Basic Film Box SOP Class	1.2.840.100008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.100008.5.1.1.4
Printer SOP Class	1.2.840.100008.5.1.1.16
Print Job SOP Class	1.2.840.10008.5.1.1.14
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23

6.1. Association Establishment Policy

6.1.1. General

The maximum length of PDU that the KODAK QC PRINT AE will receive is 16384.

6.1.2. Number of Associations

The KODAK QC PRINT AE can initiate one association concurrently.

6.1.3. Asynchronous nature

The KODAK QC PRINT AE allows a single outstanding operation on any association. Therefore, KodakQC AE does not support asynchronous operations and will not perform asynchronous window negotiation, other than the default as specified by the DICOM specification.

6.1.4. Implementation Identifying Information

The KODAK QC PRINT AE is identified by the following ids:
Implementation Class UID: 1.2.840.113564.12.1
Implementation Version Name: not specified

6.2. Association Initiation by Real World Activity

This section details the action of the KODAK QC PRINT AE SCU component as a result of user initiated activity on the KodakQC Application User Interface.

6.2.1. Print Request

6.2.1.1. Associated Real World Activity

Automatic or manual Print requests after images are scanned

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6.2.1.2. Proposed Presentation Contexts

<table>
<tr><td colspan="6" align="center">Presentation Context Table</td></tr>
<tr><td colspan="2">Abstract Syntax</td><td colspan="2">Transfer Syntax</td><td rowspan="2">Role</td><td>Extended</td></tr>
<tr><td>Name</td><td>UID</td><td>Name List</td><td>UID List</td><td>Negotiation</td></tr>
<tr><td>Basic Grayscale Print Management Meta SOP Class</td><td>1.2.840.10008.5.1.1.9</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
<tr><td>Print Job SOP Class</td><td>1.2.840.10008.5.1.1.14</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
<tr><td>Presentation LUT SOP Class</td><td>1.2.840.10008.5.1.1.23</td><td>Implicit VR Little Endian</td><td>1.2.840.10008.1.2</td><td>SCU</td><td>None</td></tr>
</table>

6.2.1.3. SOP-Specific Conformance for Basic Film Session SOP Class

Attribute	SCU Usage	Tag	Possible Values	Notes
Number of Copies	U	(2000,0010)		
Print Priority	U	(2000,0020)	HIGH, MED, LOW	print_priority ExtEscape command exists
Medium Type	U	(2000,0030)	PAPER, CLEAR FILM, BLUE FILM, MAMMO BLUE FILM	
Film Destination	U	(2000,0040)	BIN_n	n is printer specific

6.2.1.4. SOP-Specific Conformance for Basic Film Box SOP Class

Attribute	SCU Usage	Tag	Possible Values	Notes
Image Display Format	M	(2010,0010)	STANDARD/1,1	1-up only
Film Orientation	M	(2010,0040)	PORTRAIT, LANDSCAPE	
Film Size ID	M	(2010,0050)		Printer specific
Magnification Type	U	(2010,0060)	CUBIC, BILINEAR, REPLICATE	
Max Density	U	(2010,0130)	1 - 399	dmax ExtEscape command exists
Border Density	U	(2010,0100)	BLACK, WHITE	
Empty Image Density	U	(2010,0110)	Same as Border Density	
Min Density	U	(2010,0120)	1 - 399	
Illumination	MC	(2010,015E)	0 - 3000	Default to 2000
Reflected Ambient Light	MC	(2010,0160)	0 - 200	Default to 10

6.2.1.5. SOP-Specific Conformance for Basic Image Box SOP Class

Attribute	SCU Usage	Tag	Possible Values	Notes
Image Position	M	(2020,0010)		
Basic Grayscale Image Sequence	M	(2020,0110)		
>Samples per Pixel	M	(0028,0002)	1	
>Photometric Interpretation	M	(0028,0004)	MONOCHROME1, MONOCHROME2	
>Rows	M	(0028,0010)		
>Columns	M	(0028,0011)		
>Pixel Aspect Ratio	MC	(0028,0034)		
>Bits Allocated	M	(0028,0100)	8, 16	
>Bits Stored	M	(0028,0101)	Up to 12	bpp ExtEscape command exists
>High Bit	M	(0028,0102)	Bits Stored - 1	
>Pixel Representation	M	(0028,0103)	0000H	
>Pixel Data	M	(7FE0,0010)		
>Polarity	U	(2020,0020)	NORMAL, REVERSE	
>Magnification Type	U	(2010,0060)	CUBIC, BILINEAR, REPLICATE	

6.3. Association Acceptance Policy

NA.

7. Media Storage AE

This Application Entity provides conformance to the standard General Purpose CD-R (STD-GEN-CD) and DVD (STD-GEN-DVD-RAM) interchange Profiles as an FSC.

7.1.1. Media Storage Application Profiles

In addition to the mandatory support of DICOMDIR for the Basic Directory SOP class (1.2.840.10008.1.3.10), refer to the following table for the list of composite image and stand-alone storage SOP class and the list of transfer syntaxes that are supported by this media storage interchange service respectively

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended**
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1	FSC	None
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	FSC	None

7.1.1.1. SOP-Specific Conformance

The Information Object attributes that are encapsulated in a dataset via burn request are specified in Annex A of this document.

8. Communications Profiles

8.1. Supported Communication Stacks

TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard is supported.

8.2. OSI Stack

Not applicable to this product.

8.3. TCP/IP Stack

8.3.1. API

The KODAK QC IMAGE TRANSFER AE KODAK QC MWL AE implementations use Berkeley style sockets.

8.3.2. Physical Media Support

KodakQC is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it executes.

8.4. Point to Point Stack

Not applicable to this product.

9. Configuration

9.1. KODAK QC IMAGE TRANSFER AE Configuration

KodakQC Service Manual, supplied with the product, defines the available configuration parameters.

Application entity host names can be specified as either IP address or host name.

9.2. KODAK QC STORAGE COMMIMENT AE Configuration

KodakQC Service Manual, supplied with the product, defines the available configuration parameters.

Application entity host names can be specified as either remote IP address or host name. It will receive association requests only on local port 105.

9.3. KODAK QC MWL AE Configuration

KodakQC Service Manual, supplied with the product, defines the available configuration parameters.

Local AE title can be set.

Parameters of the remote MWL SCP can be set (i.e., AE title, host name or IP address)

9.4. KODAK QC PRINT AE Configuration

KodakQC Service Manual, supplied with the product, defines the available configuration parameters.

Application entity host names can be specified as either IP address or host name.

10. Support of Extended Character Sets

- ISO_IR 100 (European Languages)
- GB18030 (Chinese)
- \ISO 2022 IR 87 (Japanese for Kanji, full **only** Katakana, Hiragana).
- ISO 2022 IR 13\ISO 2022 IR 87 (Japanese for Kanji, **full and half** Katakana, Hiragana).
- ISO_IR 144 (Cyrillic – Russian).
- ISO_IR 148(Turkish).

11. Annex A - Information Object Definitions

The Information Object Definitions for Digital Computed Radiography (CR) image is described in this section.

11.1. Computed Radiography (CR) Information Object Definition

KodakQC supports sending of CR images.

11.1.1. Information Object Definitions For CR Image IOD

11.1.1.1. Patient Module

Attribute Name	Tag	Type	Attribute Assignment
Patient's Name	(0010, 0010)	2	From User or MWL
Patient ID	(0010, 0020)	2	From User or MWL
Patient's Birth Date	(0010, 0030)	2	From User or MWL
Patient's Sex	(0010, 0040)	2	From User or MWL
Referenced Patient Sequence	(0008,1120)	3	Not set
>Referenced SOP Class UID	(0008,1150)	1C	Required if Referenced Patient Sequence is set
>Referenced SOP Class Instance UID	(0008,1155)	1C	Required if Referenced Patient Sequence is set

11.1.1.2. General Study Module

Attribute Name	Tag	Type	Attribute Assignment
Study Instance UID	(0020, 000D)	1	Auto generated or from MWL
Study Date	(0008, 0020)	2	Always set
Study Time	(0008, 0030)	2	Always set
Referring Physician's Name	(0008, 0090)	2	From User or MWL
Study ID	(0020, 0010)	2	Length=0
Accession Number	(0008, 0050)	2	From User or MWL
Study Description	(0008,1030)	3	From User or MWL
Physician(s) of Record	(0008,1048)	3	Not set
Name of Physician(s) Reading Study	(0008,1060)	3	Not set
Referenced Study Sequence	(0008,1110)	3	Not set
>Referenced SOP Class UID	(0008,1150)	1C	Required Referenced Study Sequence is set
>Referenced SOP Class Instance UID	(0008,1155)	1C	Required Referenced Study Sequence is set

Procedure Code Sequence	(0008,1032)	3	Not set
>Code Value	(0008,0100)	1C	Required if Procedure Code Sequence present
>Coding Scheme Designator	(0008,0102)	1C	Required if Procedure Code Sequence present
>Coding Scheme Version	(0008,0103)	1C	Required if Procedure Code Sequence present and its value is available
>Code Meaning	(0008,0104)	1C	Required if Procedure Code Sequence present

11.1.1.3. Patient Study Module

Attribute Name	Tag	Type	Attribute Assignment
Admitting Diagnoses Description	(0008,1080)	3	Not set
Patient's Age	(0010, 1010)	3	Not set
Patient's Size	(0010,1020)	3	Not set
Patient's Weight	(0010,1030)	3	Not set
Occupation	(0010,2180)	3	Not set
Additional Patient's History	(0010,21B0)	3	Not set

11.1.1.4. General Series Module

Attribute Name	Tag	Type	Attribute Assignment
Modality	(0008, 0060)	1	CR
Series Instance UID	(0020, 000E)	1	Always set
Series Number	(0020, 0011)	2	Always set
Laterality	(0020,0060)	2C	Length=0
Series Date	(0008,0021)	3	Not set
Series Time	(0008,0031)	3	Not set
Performing Physician's Name	(0008,1050)	3	Set From User
Protocol Name	(0018,1030)	3	Not set
Series Description	(0018,103E)	3	Not set
Operator's Name	(0008,1070)	3	Always set
Referenced Study Component Sequence	(0008,1111)	3	Not set
>Referenced SOP Class UID	(0008,1150)	1C	Set if Referenced Study Component Sequence is present

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>Referenced SOP Instance UID	(0008,1155)	1C	Set if Referenced Study Component Sequence is present
Body Part Examined	(0018,0015)	2	Always set
Patient Position	(0018,5100)	2	Length=0
Smallest Pixel Value in Series	(0028,0108)	3	Not set
Largest Pixel Value in Series	(0028,0109)	3	Not set
Request Attributes Sequence	(0040,0275)	3	Not set
>Requested Procedure ID	(0040,1001)	1C	Set if Request Attributes Sequence is present
>Scheduled Procedure Step ID	(0040,0009)	1C	Set if Request Attributes Sequence is present
>Scheduled Procedure Step Description	(0040,0007)	1C	Set if Request Attributes Sequence is present and the value is available
>Scheduled Action Item Code Sequence	(0040,0008)	3	Not set
>>Code Value	(0008,0100)	1C	Required if Scheduled Action Item Code Sequence is present
>>Coding Scheme Designator	(0008,0102)	1C	Required if Scheduled Action Item Code Sequence is present
>>Coding Scheme Version	(0008,0103)	1C	Required if Scheduled Action Item Code Sequence is present and its value is available
>>Code Meaning	(0008,0104)	1C	Required if Scheduled Action Item Code Sequence is present
Performed Procedure Step ID	(0040,0253)	3	Not set
Performed Procedure Step Start Date	(0040,0244)	3	Not set
Performed Procedure Step Start Time	(0040,0245)	3	Not set
Performed Procedure Step Description	(0040,0254)	3	Not set
Performed Action Item Code Sequence	(0040,0260)	3	Not set
>Code Value	(0008,0100)	1C	Required if Performed Action Item Code Sequence is present
>Coding Scheme Designator	(0008,0102)	1C	Required if Performed Action Item Code Sequence is present
>Coding Scheme Version	(0008,0103)	1C	Required if Performed Action Item Code Sequence is present and its value is available
>Code Meaning	(0008,0104)	1C	Required if Performed Action Item Code Sequence is present

11.1.1.5. CR Series Module

Attribute Name	Tag	Type	Attribute Assignment
Body Part Examined	(0018, 0015)	2	Always set
View Position	(0018,5101)	2	Always set
Filter Type	(0018,1160)	3	Not set
Colimator/grid Name	(0018,1180)	3	Not set
Focal Spot	(0018, 1190)	3	Not set
Plate Type	(0018, 1260)	3	Not set
Phosphor Type	(0018, 1261)	3	Not set

11.1.1.6. General Equipment Module

Attribute Name	Tag	Type	Attribute Assignment
Manufacturer	(0008, 0070)	2	Always set
Institution Name	(0008, 0080)	3	Always set
Institution Address	(0008, 0080)	3	Not set
Station Name	(0008,1010)	3	Always Set
Institutional Department Name	(0008,1040)	3	Not set
Performing Physicians' Name	(0008,1050)	3	Set From User
Operators' Name	(0008,1070)	3	Always Set
Manufacturer's Model Name	(0008,1090)	3	Always set
Device Serial Number	(0018,1000)	3	Not set
Software Versions	(0018,1020)	3	Not set

11.1.1.7. General Image Module

Attribute Name	Tag	Type	Attribute Assignment
Instance Number	(0020, 0013)	2	Always set
Patient Orientation	(0020,0020)	2C	Length=0
Content Date	(0008, 0023)	2C	Not set

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Content Time	(0008, 0033)	2C	Not set
Image Type	(0008, 0008)	3	Not set
Derivation Description	(0008, 2111)	3	Not set
Pixel Spacing	(0028, 0030)	3	Always set
Lossy Image Compression	(0028, 2110)	3	Not set

11.1.1.8. Image Pixel Module

Attribute Name	Tag	Type	Attribute Assignment
Samples per Pixel	(0028, 0002)	1	1
Photometric Interpretation	(0028, 0004)	1	MONOCHROME2
Rows	(0028, 0010)	1	Always set
Columns	(0028, 0011)	1	Always set
Bits Allocated	(0028, 0100)	1	Always set (16)
Bits Stored	(0028, 0101)	1	Always set (12)
High Bit	(0028, 0102)	1	Always set (11)
Pixel Representation	(0028, 0103)	1	Always set (0)
Pixel Data	(7FE0, 0010)	1	Always set
Planar Configuration	(0028, 0006)	1C	Not set
Pixel Aspect Ratio	(0028, 0034)	1C	Always set (1\1)
Smallest Image Pixel Value	(0028, 0106)	3	Always set
Largest Image Pixel Value	(0028, 0107)	3	Always set

11.1.1.9. CR Image Module

Attribute Name	Tag	Type	Attribute Assignment
KVP	(0018, 0060)	3	Set in Grayling mode
Plate ID	(0018,1004)	3	Always set
X-Ray Tube Current	(0018, 1151)	3	Not set
Exposure Time	(0018,1150)	3	Not set
Exposure	(0018,1152)	3	Not set
Exposure in uAs	(0018,1153)	3	Set in Grayling mode
Image Area Dose Product	(0018,115E)	3	Set in Grayling mode

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Imager Pixel Spacing	(0018,1164)	3	Always Set
Focal Spot	(0018,1190)	3	Not set
Relative X-Ray Exposure	(0018,1405)	3	Always set
Sensitivity	(0018,6000)	3	Always set

11.1.1.10. Modality LUT Module

Attribute Name	Tag	Type	Attribute Assignment
Modality LUT Sequence	(0028, 3000)	1C	Not set
>LUT Descriptor	(0028,3002)	1C	Not set
>LUT Explanation	(0028,3003)	3	Not set
>Modality LUT Type	(0028,3004)	1C	Not set
>LUT Data	(0028,3006)	1C	Not set
Rescale Intercept	(0028,1052)	1C	Always set (0)
Rescale Slope	(0028,1053)	1C	Always set (1)
Rescale Type	(0028, 1054)	1C	Always US

11.1.1.11. VOI LUT Module

Attribute Name	Tag	Type	Attribute Assignment
VOI LUT Sequence	(0028,3010)	3	Not set
>LUT Descriptor	(0028,3002)	1C	Not set
>LUT Explanation	(0028,3003)	1C	Not set
>LUT Data	(0028,3006)	1C	Not set
Window Center	(0028,1050)	1C	Always set
Window Width	(0028,1051)	1C	Always set

11.1.1.12. SOP Common Module

Attribute Name	Tag	Type	Attribute Assignment
SOP Class UID	(0008, 0016)	1	Always set
SOP Instance UID	(0008, 0018)	1	Always set
Specific Character Set	(0008, 0005)	1C	As in Support of Extended Character Sets