Canon

No. 2G985-067EN

DICOM CONFORMANCE STATEMENT
FOR
CANON RADIOLOGY INFORMATION SYSTEM OPTION
Dose Management Workstation

DoseXross

(ERIS-5KDXA)

V1.2 SP0002J OR LATER

CANON MEDICAL SYSTEMS CORPORATION

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Global: https://www.medical.canon/Interoperability/DICOM/EN
Japan: https://www.medical.canon/Interoperability/DICOM/JP

1 CONFORMANCE STATEMENT OVERVIEW

This product consists of 2 software, DoseXross App and OCR Tool and they have DICOM interfaces separately.
This product provides the following overview of the network services.

Table 1-1
NETWORK SERVICES FOR DOSEXROSS APP

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Verification		
Verification	No	Yes
Transfer		
X-Ray Radiation Dose SR Storage	No	Yes

Table 1-2
NETWORK SERVICES FOR OCR TOOL

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Verification		
Verification	No	Yes
Transfer		
X-Ray Radiation Dose SR Storage	No	Yes*
Computed Radiography Image Storage	No	Yes*
Digital X-Ray Image Storage - for Presentation	No	Yes*
Digital Mammography X-Ray Image Storage - for Presentation	No	Yes*
Digital Intra-oral X-Ray Image Storage - for Presentation	No	Yes*
CT Image Storage	No	Yes*
Enhanced CT Image Storage	No	Yes*
Secondary Capture Image Storage	No	Yes*
XA Image Storage	No	Yes*
RF Image Storage	No	Yes*
Query/Retrieve		
Study Root Q/R Information Model - FIND	Yes	No
Study Root Q/R Information Model - MOVE	Yes	No

* C-STORE sub-operation only

2 TABLE OF CONTENTS

3 INTRODUCTION

3.1. REVISION HISTORY

REV.	Date	Author	Description
/	Apr. 30, 2020	Canon Medical Systems	Initial Version

3.2. AUDIENCE

This document is intended for hospital staff, health system integrators, software designers, service staff, and implementers. It is assumed that the reader has a working understanding of DICOM.

3.3. REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.
This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of the intended information.
The scope of this Conformance Statement is to facilitate communication with Canon Medical Systems and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself, this Conformance Statement does not guarantee the desired interoperability and successful interconnectivity.
The user should be aware of the following important issues:

— Comparison of the different conformance statements is the first step towards assessing the interconnectivity between Canon Medical Systems and non- Canon Medical Systems equipment.
— Test procedures should be defined to validate the desired level of connectivity.
— The DICOM standard is evolving to meet the future requirements of users. Canon Medical Systems Corporation is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue them.

3.4. TERMS AND DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.
Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.
Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.
Association – a network communication channel set up between *Application Entities*.
Attribute – – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.
Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data
Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)
Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.
Tag – a 32-bit identifier for a data element, represented as a pair of four-digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]
Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.
Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5. BASICS OF DICOM COMMUNICATION

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This sections not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.
Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).
DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.
For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

3.6. ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DX	Digital Radiography
IE	Information Entity
IOD	Information Object Definition
ISO	International Standards Organization
KO	Key Object Selection
MG	Mammography
NM	Nuclear Medicine
O	Optional Key Attribute
OCR	Optical Character Recognition
PDU	Protocol Data Unit
PET	Positron Emission Tomography
R	Required Key Attribute
RDSR	Radiation Dose Structured Report
RF	Radiofluoroscopy
PR	Presentation State
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique Key Attribute
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation
XA	X-Ray Angiography

3.7. REFERENCES

Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/

4 NETWORKING

4.1. IMPLEMENTATION MODEL

4.1.1. Application Data Flow

DoseXross App has the DICOM interface of ECHO SCP and STORAGE SCP which can receive only RDSR. It can display X-ray radiation data extracted from RDSR for users.
This document defines DOSE-ECHO-SCP as ECHO SCP for DoseXross app and DOSE-STORAGE-SCP as STORAGE-SCP for DoseXross app.

OCR Tool also has the DICOM interface of ECHO SCP, Q/R SCU and STORAGE SCP which can transfer RDSR to DoseXross App or can receive DICOM data to import extracted data by OCR to DoseXross App.
This document defines OCR-ECHO-SCP as ECHO SCP for OCR Tool and OCR-STORAGE-SCP as STORAGE-SCP for OCR Tool.

4.1.1.1. DoseXross App

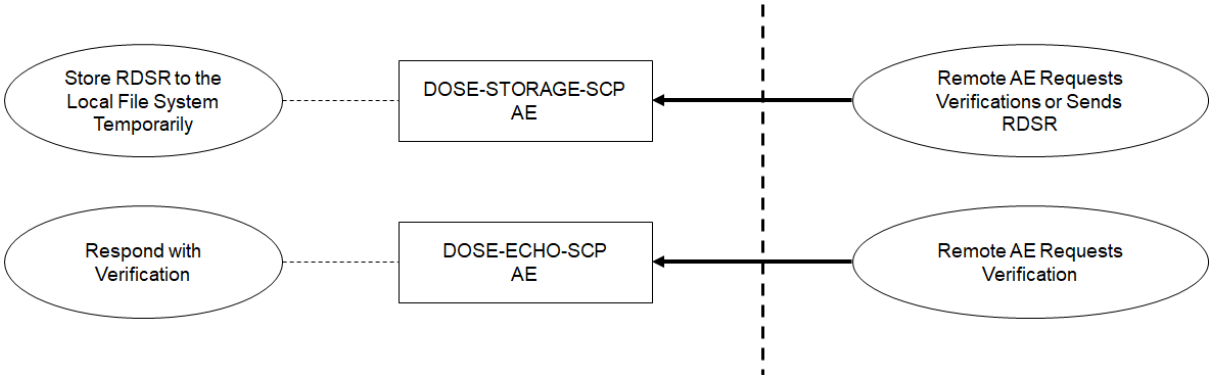

Figure 4.1-1
DICOM DATA FLOW DIAGRAM – DOSEXROSS APP

— The DOSE-STORAGE-SCP AE can receive incoming DICOM RDSR files and store them to the local disk temporarily. It can respond to external Storage and Verification Requests as a Service Class Provider (SCP) for C-STORE and C-ECHO requests.

4.1.1.2. OCR Tool

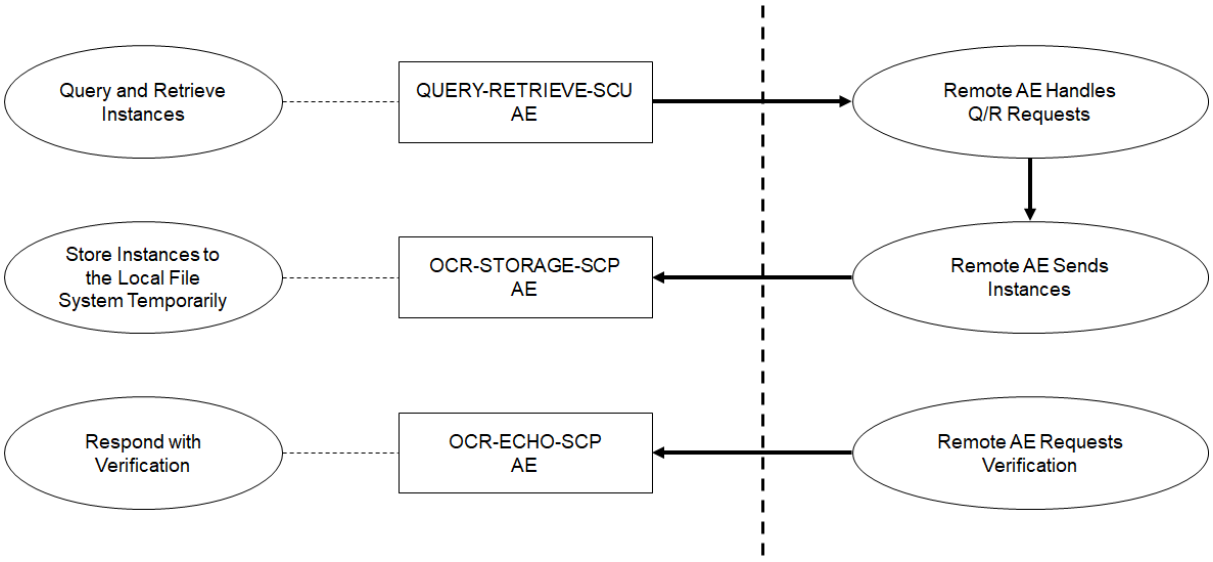

Figure 4.1-2
DICOM DATA FLOW DIAGRAM – OCR TOOL

— The QUERY-RETRIEVE-SCU AE can query a remote AE for lists of studies, series, images and send the retrieve requests for the specific images, SC files or RDSR files.
— The OCR-STORAGE-SCP AE can receive incoming DICOM files and store them to the local disk temporarily. It can respond to external Storage and Verification Requests as a Service Class Provider (SCP) for C-STORE and C-ECHO requests.

4.1.2. Functional Definition of AEs

4.1.2.1. Functional Definition of STORAGE-SCP AE

4.1.2.1.1. DoseXross App

The DOSE-STORAGE-SCP AE continuously runs in background, waiting for connections and will accept Verification and X-Ray Radiation Dose SR Storage Presentation Contexts from association. It will store X-Ray Radiation Dose SR to the local disk temporarily and extract information of X-Ray irradiations from it. It describes it doesn't allow to receive DICOM files except RDSR.

4.1.2.1.2. OCR Tool

The OCR-STORAGE-SCP AE waits for another application to connect at the presentation address configured for its AE Title. When another application connects, the OCR-STORAGE-SCP AE expects it to be a DICOM application. The OCR-STORAGE-SCP AE will accept Associations with Presentation Contexts for SOP Classes of the Storage Classes. Any images received on such Presentation Contexts will be added to the database.

4.1.2.2. Functional Definition of QUERY-RETRIEVE-SCU AE

The QUERY-RETRIEVE-SCU AE continuously runs in the background. It works from the user interface when a user performs a query to a remote AE, or it works by task scheduler to query to a remote AE automatically. It will search for the specific studies which are target modality equipment and request retrieving images, SC files or RDSR files.
The QUERY-RETRIEVE-SCU AE is activated when the user selects a remote node to query and enters some key information, Patient's Name, Patient ID, Modality and/or Study Date. The user can select studies to be retrieved. The images will be received at the STORAGE-SCP AE.

4.1.3. Sequencing of Real-World Activities

4.1.3.1. DoseXross App

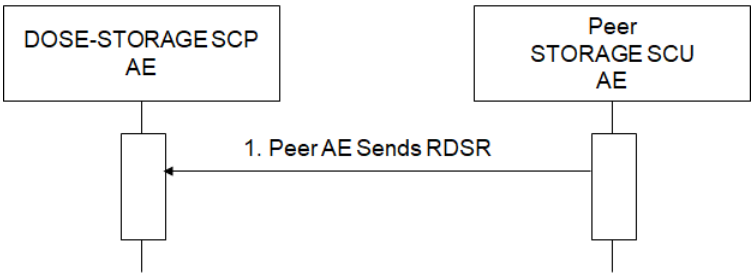

Figure 4.1-3
SEQUENCING CONSTRAINTS – DOSEXROSS APP

4.1.3.2. OCR Tool

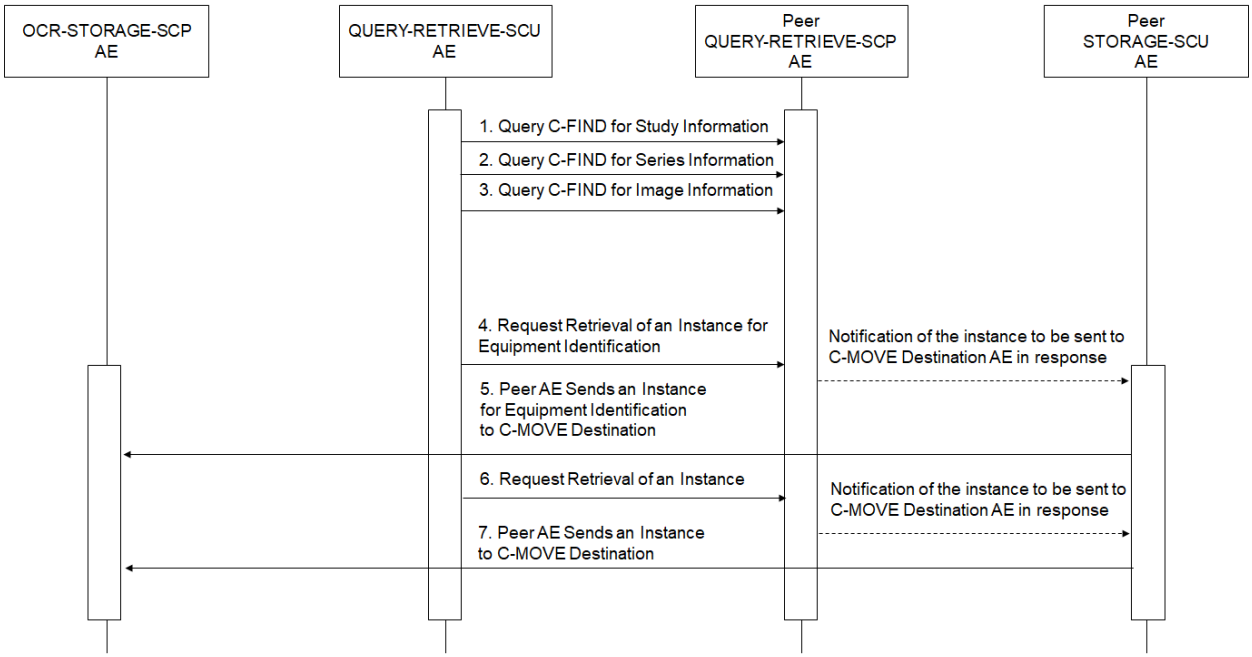

Figure 4.1-4
SEQUENCING CONSTRAINTS – OCR TOOL

4.2. AE SPECIFICATIONS

4.2.1. STORAGE-SCP AE Specification

4.2.1.1. SOP Classes

4.2.1.1.1. DoseXross App

The DOSE-STORAGE-SCP AE provides Standard Conformance to the following SOP Class:

Table 4-1
SOP CLASSES FOR DOSE-STORAGE-SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes

4.2.1.1.2. OCR Tool

The OCR-STORAGE-SCP AE provides Standard Conformance to the following SOP Classes:

Table 4-2
SOP CLASSES FOR OCR-STORAGE-SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes*
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes*
Digital X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes*
Digital Mammography X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes*
Digital Intra-oral X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes*
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes*
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes*
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes*

SOP Class Name	SOP Class UID	SCU	SCP
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes*
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes*

* C-STORE sub-operation only

4.2.1.2. Association Policies

4.2.1.2.1. General

4.2.1.2.1.1. DoseXross App

The DICOM standard Application Context Name for DICOM is always accepted.

Table 4-3
DICOM APPLICATION CONTEXT FOR DOSE-STORAGE-SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.1.2. OCR Tool

The OCR-STORAGE-SCP AE can accept Association Requests. The OCR-STORAGE-SCP AE will accept Association Requests for the Verification and Storage Services.
The DICOM standard Application Context Name for DICOM 3.0 is always accepted and proposed:

Table 4-4
DICOM APPLICATION CONTEXT FOR OCR-STORAGE-SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

4.2.1.2.2.1. DoseXross App

The DOSE-STORAGE-SCP AE can support up to 3 Associations at a time.

Table 4-5
NUMBER OF SIMULTANEOUS ASSOCIATIONS AS AN SCP FOR DOSE-STORAGE-SCP AE

Maximum number of simultaneous associations requested by peer AEs	3 (Not Configurable)

4.2.1.2.2.2. OCR Tool

The OCR-STORAGE-SCP AE can support up to 3 Associations at a time.

Table 4-6
NUMBER OF SIMULTANEOUS ASSOCIATIONS AS AN SCP FOR OCR-STORAGE-SCP AE

Maximum number of simultaneous associations requested by peer AEs	3 (Not Configurable)

4.2.1.2.3. Asynchronous Nature

4.2.1.2.3.1. DoseXross App

The DOSE-STORAGE-SCP AE does not support asynchronous communication.

4.2.1.2.3.2. OCR Tool

The OCR-STORAGE-SCP AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4-7
ASYNCHRONOUS NATURE AS A SCP FOR OCR-STORAGE-SCP AE

Maximum number of outstanding asynchronous transactions	1 (Not Configurable)

4.2.1.2.4. Implementation Identifying Information

4.2.1.2.4.1. DoseXross App

Table 4-8
DICOM IMPLEMENTATION CLASS AND VERSION FOR DOSE-STORAGE-SCP AE

Implementation Class UID	1.2.392.200036.9116.7.20.1
Implementation Version Name	CM_TRS_DCM_V1.0

.

4.2.1.2.4.2. OCR Tool

Table 4-9
DICOM IMPLEMENTATION CLASS AND VERSION FOR OCR-STORAGE-SCP AE

Implementation Class UID	1.2.826.0.1.3680043.2.60.0.1
Implementation Version Name	jdt270_5685

4.2.1.3. Association Initiation Policy

4.2.1.3.1. DoseXross App

The DOSE-STORAGE-SCP AE does not initiate associations.

4.2.1.3.2. OCR Tool

The OCR-STORAGE-SCP AE does not initiate associations.

4.2.1.4. Association Acceptance Policy

4.2.1.4.1. DoseXross App

When the DOSE-STORAGE-SCP accepts an association, it will respond to storage requests.

4.2.1.4.2. OCR Tool

When the OCR-STORAGE-SCP accepts an association, it will respond to storage requests.

4.2.1.4.3. Activity – Receive Storage Request

4.2.1.4.3.1. Description and Sequencing of Activity

4.2.1.4.3.1.1. DoseXross App

As instances are received they are written to the local disk. If Presentation Contexts do not contain Verification or X-Ray Radiation Dose SR Storage, this product returns an error. At a later time, the received DICOM instances will be parsed to extract information of X-ray irradiations. Afterwards, the extracted DICOM instances will be deleted from the local disk. If the extracted DICOM instances are invalid, they are retained in the local disk. If the module to delete DICOM instances in the Windows Task Scheduler, the DICOM instances in the local disk will be deleted automatically.

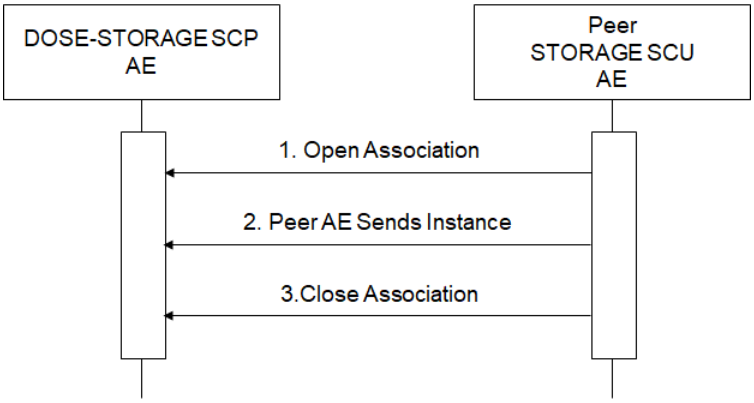

Figure 4.2-1
SEQUENCING OF ACTIVITY – RECEIVE STORAGE REQUEST

4.2.1.4.3.1.2. OCR Tool

The OCR-STORAGE-SCP AE accepts Associations only if they have valid Presentation Contexts. If none of the requested Presentation Contexts are accepted then the Association Request itself is rejected. It can be configured to only accept Associations with certain hosts (using TCP/IP address) and/or AE Titles.

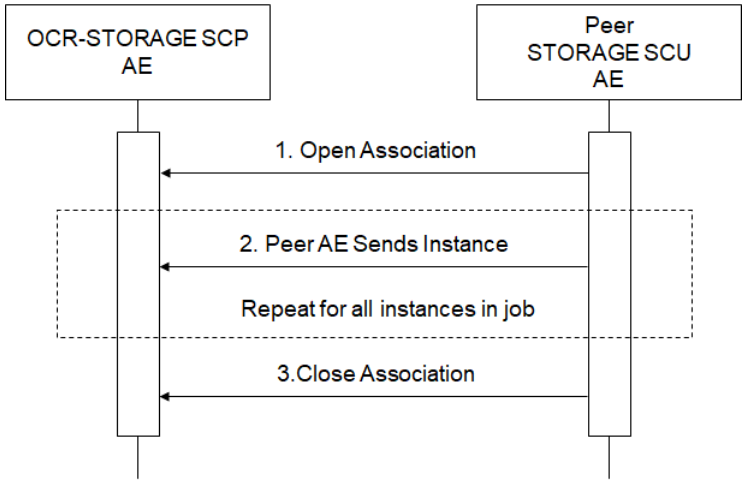

Figure 4.2-2
SEQUENCING OF ACTIVITY – RECEIVE STORAGE REQUEST

4.2.1.4.3.2. Accepted Presentation Contexts

4.2.1.4.3.2.1. DoseXross App

The DOSE-STORAGE-SCP AE will accept Presentation Contexts as shown in the following table.

Table 4-10
ACCEPTED PRESENTATION CONTEXTS BY THE DOSE-STORAGE-SCP AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	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	SCP	None

4.2.1.4.3.2.2. OCR Tool

The OCR-STORAGE-SCP AE will accept Presentation Contexts as shown in the following table:

Table 4-11
ACCEPTED PRESENTATION CONTEXTS BY THE OCR-STORAGE-SCP AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	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	SCP	None
Digital X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.1	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	SCP	None
Digital Mammography X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.2	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	SCP	None
Digital Intra-oral X-Ray Image Storage - for Presentation	1.2.840.10008.5.1.4.1.1.1.3	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	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	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	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	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	SCP	None
		DICOM JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	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	SCP	None
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	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	SCP	None
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	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	SCP	None
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	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	SCP	None

4.2.1.4.3.3. SOP Specific Conformance for Storage SOP Class

4.2.1.4.3.3.1. DoseXross App

The associated Activity with the Storage service is the storage of RDSR data received over the network on a designated hard disk. The STORAGE-SCP AE will reject the instances other than RDSR.

Table 4-12
DOSE-STORAGE-SCP AE C-STORE RESPONSE STATUS RETURN REASONS

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	The Composite SOP Instance was successfully received, verified, and stored in the system database.

4.2.1.4.3.3.2. OCR Tool

The associated Activity with the Storage service is the storage of medical image data received over the network on a designated hard disk. The OCR-STORAGE-SCP AE will return a failure status if it is unable to store the images on to the hard disk.

Table 4-13
OCR-STORAGE-SCP AE C-STORE RESPONSE STATUS RETURN REASONS

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	The Composite SOP Instance was successfully received, verified, and stored in the system database.
Refused	Out of Resources	A700	Indicates that there was not enough disk space to store the image. Error message is output to the Service Log. The SOP Instance will not be saved.
Error	Data Set does not match SOP Class	A900	Indicates that the Data Set does not encode a valid instance of the SOP Class specified. This status is returned if the DICOM Object stream can be successfully parsed but does not contain values for one or more mandatory Elements of the SOP Class. The OCR-STORAGE-SCP AE does not perform a comprehensive check, as it only checks a subset of required Elements. In addition, if the SOP Class is for a type of image but the SOP Instance does not contain values necessary for its display then this status is returned. Error message is output to the Service Log.
	Cannot understand	C000	Indicates that the OCR-STORAGE-SCP AE cannot parse the Data Set into Elements. Error message is output to the Service Log.

4.2.2. QUERY-RETRIEVE-SCU AE Specification

4.2.2.1. SOP Classes

The QUERY-RETRIEVE-SCU AE provides Standard Conformance to the following SOP Classes:

Table 4-14
SOP CLASSES FOR THE QUERY-RETRIEVE-SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.2.2		

4.2.2.2. Association Policies

4.2.2.2.1. General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 4-15
DICOM APPLICATION CONTEXT FOR THE QUERY-RETRIEVE-SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

The QUERY-RETRIEVE-SCU AE can initiate up to 3 Associations at a time.

Table 4-16
NUMBER OF ASSOCIATIONS INITIATED FOR THE QUERY-RETRIEVE-SCU AE

Maximum number of simultaneous associations	3 (Not Configurable)

4.2.2.2.3. Asynchronous Nature

The QUERY-RETRIEVE-SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

Table 4-17
ASYNCHRONOUS NATURE FOR THE Q/R SCU AE

Maximum number of outstanding asynchronous transactions	1 (Not Configurable)

4.2.2.2.4. Implementation Identifying Information

The implementation information for this Application Entity is:

Table 4-18
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE QUERY-RETRIEVE-SCU AE

Implementation Class UID	1.2.826.0.1.3680043.2.60.0.1
Implementation Version Name	jdt270_5685

4.2.2.3. Association Initiation Policy

4.2.2.3.1. Activity – Query and Retrieve Images

4.2.2.3.1.1. Description and Sequencing of Activities

The QUERY-RETRIEVE-SCU AE is activated when the user selects a remote node to query and enters some key information, Patient's Name, Patient ID, Modalities in Study and/or Study Date. The user can select studies, series and images to be retrieved. The images will be received at the STORAGE-SCP AE.

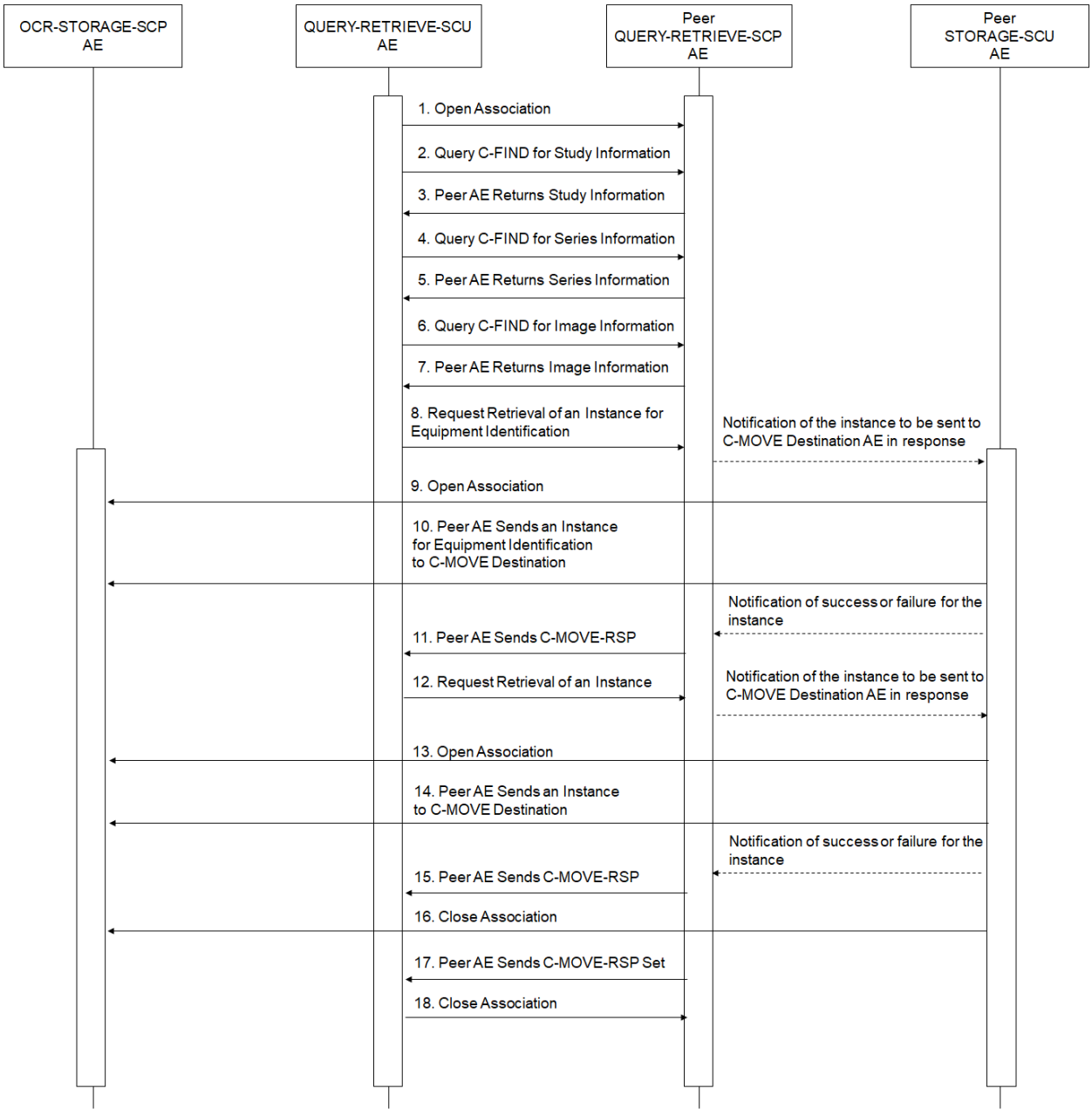

Figure 4.2-3
SEQUENCING OF ACTIVITY – QUERY AND RETRIEVE IMAGES

The following sequencing constraints illustrated in the Figure above:

1. The QUERY-RETRIEVE-SCU AE opens an association with the QUERY-RETRIEVE-SCP AE.
2. The QUERY-RETRIEVE-SCU AE sends a C-FIND-RQ Message
3. The QUERY-RETRIEVE-SCP AE returns a C-FIND-RSP Message to the QUERY-RETRIEVE-SCU AE with matching information.
   A C-FIND-RSP is sent for each entity matching the identifier specified in the C-FIND-RQ. A final C-FIND-RSP is sent indicating that the matching is complete.
4. The QUERY-RETRIEVE-SCU AE closes the association.
5. The QUERY-RETRIEVE-SCU AE opens an association with the QUERY-RETRIEVE-SCP AE.
6. The QUERY-RETRIEVE-SCU AE sends a C-MOVE-RQ Message. The QUERY-RETRIEVE-SCP AE notifies the STORAGE-SCU AE to send the Composite SOP Instances to the peer C-MOVE Destination AE as indicated in the C-MOVE-RQ.
7. The STORAGE-SCU AE opens an association with the C-MOVE Destination AE.
8. The STORAGE-SCU AE sends images to the C-MOVE Destination AE. The STORAGE-SCU AE indicates to the Query-Retrieve SCP AE whether the transfer succeeded or failed.
9. The Query-Retrieve SCP AE then returns a C-MOVE-RSP indicating this success or failure.
10. The STORAGE-SCU AE closes the association.
11. The QUERY-RETRIEVE-SCU AE closes the association.

4.2.2.3.1.2. Proposed Presentation Contexts

The QUERY-RETRIEVE-SCU AE will propose Presentation Contexts shown in the following table:

Table 4-19
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY QUERY AND RETRIEVE IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Study Root Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.2.3.1.3. SOP Specific Conformance for Q/R Find SOP Classes

The QUERY-RETRIEVE-SCU AE provides standard conformance to the Query/Retrieve Find SOP Classes as an SCU.
The behavior of the QUERY-RETRIEVE-SCU AE when encountering status codes in a Q/R C-FIND response is summarized in the table below:

Table 4-20
THE QUERY-RETRIEVE-SCU AE C-FIND RESPONSE STATUS BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete	0000	Next low level query is automatically requested based on returned information. After IMAGE level query is finished, results are displayed.
Refused	Out of Resources	A700	The association is aborted and the worklist query is marked as failed. The status meaning is logged and reported to the user.
Failed	Identifier does not match SOP Class	A900	
Failed	Unable to Process	Cxxx	The association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user.
Cancel	Matching terminated due to Cancel request	FE00	
Pending	Matches are continuing	FF00	
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	
*	*	Any other status code	

The behavior of the QUERY-RETRIEVE-SCU AE during communication failure is summarized in the table below.

Table 4-21
Q/R FIND COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The association is aborted and the study, series or image query is marked as failed. The reason is logged and reported to the user.
Association aborted by the SCP or network layers	The study, series or image query is marked as failed. The reason is logged and reported to the user.

The table below provides a description of the QUERY-RETRIEVE-SCU AE C-FIND Request Identifier.

Table 4-22
STUDY ROOT REQUEST IDENTIFIER FOR C-FIND

Name	Tag	Types of Matching
Study Level		
Study Date	(0008,0020)	S,U,R
Study Time	(0008,0030)	U
Accession Number	(0008,0050)	S,U,*
Modality	(0008,0060)	U
Modalities in Study	(0008,0061)	S,U,L
Referring Physician's Name	(0008,0090)	U
Station Name	(0008,1010)	U
Study Description	(0008,1030)	S,U,*
Patient's Name	(0010,0010)	S,U,*
Patient's ID	(0010,0020)	S,U,*
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	U
Patient Comment	(0010,4000)	U
Body Part Examined	(0018,0015)	U
Study Instance UID	(0020,000D)	UNIQUE
Study ID	(0020,0010)	U
Number of Study Related Series	(0020,1206)	U
Number of Study Related Instances	(0020,1208)	U
Series Level		
Study Date	(0008,0020)	U
Series Date	(0008,0021)	U
Series Time	(0008,0031)	U
Accession Number	(0008,0050)	U
Modality	(0008,0060)	U
Modalities in Study	(0008,0061)	U
Manufacturer	(0008,0070)	U
Station Name	(0008,1010)	U
Study Description	(0008,1030)	U
Series Description	(0008,103E)	U
Manufacturer's Model Name	(0008,1090)	U
Patient's Name	(0010,0010)	U
Patient ID	(0010,0020)	U
Patient's Birth Date	(0010,0030)	U
Patient's Sex	(0010,0040)	U
Body Part Examined	(0018,0015)	U
Series Instance UID	(0020,000E)	UNIQUE
Study ID	(0020,0010)	U
Series Number	(0020,0011)	U
Number of Study Related Instances	(0020,1208)	U
Number of Series Related Instances	(0020,1209)	U

Name	Tag	Types of Matching
Image Level		
Image Type	(0008,0008)	U
SOP Class UID	(0008,0016)	U
SOP Instance UID	(0008,0018)	UNIQUE
Study Date	(0008,0020)	U
Series Date	(0008,0021)	U
Content Date	(0008,0023)	U
Content Time	(0008,0033)	U
Patient's Birth Date	(0010,0030)	U
Instance Number	(0020,0013)	U
Image Comments	(0020,4000)	U
Number of Frames	(0028,0008)	U
Rows	(0028,0010)	U
Columns	(0028,0011)	U
Bits Allocated	(0028,0100)	U

Types of Matching:
The types of Matching supported by the QUERY-RETRIEVE-SCU AE.
A "S" indicates the identifier attribute uses single value matching, a "R" indicates range matching, a "*" indicates wildcard matching, a 'L' indicates list matching and a 'U' indicates universal matching. "UNIQUE" indicates that this is the Unique Key for that query level, in which case universal matching or single value matching is used depending on the query level.

4.2.2.3.1.4. SOP Specific Conformance for Q/R Move SOP Classes

The QUERY-RETRIEVE-SCU AE provides standard conformance to the Query/Retrieve Move SOP Classes as an SCU.
The behavior of the QUERY-RETRIEVE-SCU AE when encountering status codes in a Q/R C-MOVE response is summarized in the table below:

Table 4-23
THE QUERY-RETRIEVE-SCU AE C-MOVE RESPONSE STATUS BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Sub-operations complete – No Failures	0000	The OCR-STORAGE-SCP AE has successfully received the SOP Instance. If all SOP Instances in a move job have status success then the job is marked as complete.
Refused	Out of Resources – Unable to calculate number of matches	A701	The association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
	Out of Resources – Unable to perform sub-operations	A702	
	Move destination unknown	A801	
Failed	Identifier does not match SOP Class	A900	
Warning	Sub-operations complete but one or more failures.	B000	The association is aborted and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.

The behavior of the QUERY-RETRIEVE-SCU AE during communication failure is summarized in the table below.

Table 4-24
Q/R MOVE COMMUNICATION FAILURE BEHAVIOR

Exception	Behavior
Timeout	The association is aborted using A-ABORT and the retrieve is marked as failed. The reason is logged and reported to the user if an interactive query.
Association aborted by the SCP or network layers	The retrieve is marked as failed. The reason is logged and reported to the user if an interactive query.

4.2.2.4. Association Acceptance Policy

The QUERY-RETRIEVE-SCU AE does not accept associations.

4.2.3. ECHO-SCP AE Specifications

4.2.3.1. SOP Class

4.2.3.1.1. DoseXross App

The DOSE-ECHO-SCP AE provides Standard Conformance to the following DICOM SOP classes:

Table 4-25
SOP CLASSES FOR ECHO-SCP AE

SOP Class	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes

4.2.3.1.2. OCR Tool

The OCR-ECHO-SCP AE provides Standard Conformance to the following DICOM SOP classes:

Table 4-26
SOP CLASSES FOR ECHO-SCP AE

SOP Class	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes

4.2.3.2. Association Policies

4.2.3.2.1. General

4.2.3.2.2. DoseXross App

The DOSE-ECHO-SCP AE accepts but never initiates associations.
The DICOM Standard Application Context Names for DICOM is always proposed.

Table 4-27
DICOM APPLICATION CONTEXTS FOR DOSE-ECHO-SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.3. OCR Tool

The OCR-ECHO-SCP AE accepts but never initiates associations.
The DICOM Standard Application Context Names for DICOM is always proposed.

Table 4-28
DICOM APPLICATION CONTEXTS FOR OCR-ECHO-SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.4. Number of Associations

4.2.3.2.4.1. DoseXross App

The DOSE-ECHO-SCP AE can support up to 3 Associations at a time.

Table 4-29
NUMBERS OF ASSOCIATIONS FOR DOSE-ECHO-SCP AE

Maximum Number of Simultaneous Associations	3 (Not Configurable)

4.2.3.2.4.2. OCT Tool

The OCR-ECHO-SCP AE can support up to 3 Associations at a time.

Table 4-30
NUMBERS OF ASSOCIATIONS FOR OCR-ECHO-SCP AE

Maximum Number of Simultaneous Associations	3 (Not Configurable)

4.2.3.2.5. Asynchronous Nature

4.2.3.2.5.1. DoseXross App

The DOSE-ECHO-SCP AE does not support asynchronous communication.

4.2.3.2.5.2. OCR Tool

The OCR-ECHO-SCP AE does not support asynchronous communication.

4.2.3.2.6. Implementation Identification Information

4.2.3.2.6.1. DoseXross App

Table 4-31
DICOM IMPLEMENTATION CLASS AND VERSION FOR DOSE-ECHO-SCP AE

Implementation Class UID	1.2.392.200036.9116.7.20.1
Implementation Version Name	CM_TRS_DCM_V1.0

All the product AEs have the same implementation version name. This version name is updated with each new software release; therefore, independent releases of different AE versions will not occur.

4.2.3.2.6.2. OCR Tool

Table 4-32
DICOM IMPLEMENTATION CLASS AND VERSION FOR OCR-ECHO-SCP AE

Implementation Class UID	1.2.826.0.1.3680043.2.60.0.1
Implementation Version Name	jdt270_5685

All the product AEs have the same implementation version name. This version name is updated with each new software release; therefore, independent releases of different AE versions will not occur.

4.2.3.3. Association Initiation Policy

4.2.3.3.1. DoseXross App

DOSE-ECHO-SCP AE does not initiate associations.

4.2.3.3.2. OCR Tool

OCR-ECHO-SCP AE does not initiate associations.

4.2.3.4. Association Acceptance Policy

4.2.3.4.1. Activity - Verify Connectivity

4.2.3.4.1.1. Destination and Sequencing of Activity

4.2.3.4.1.1.1. DoseXross App

The DOSE-ECHO-SCP AE accepts an association, it will respond to a verification request (C-ECHO).

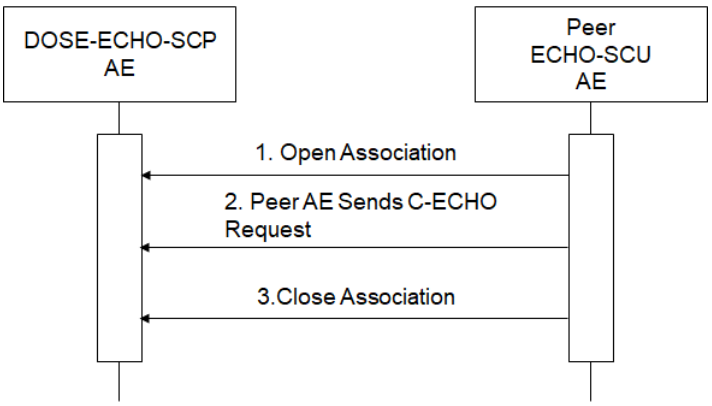

Figure 4.2-4
SEQUENCING OF ACTIVITY – ECHO FOR DOSEXROSS APP

The following sequencing restrictions, illustrated in figure 4.2-2, apply when the DOSE-ECHO-SCP AE:

1. The Remote ECHO-SCU AE opens a new association with the DOSE-ECHO-SCP AE.
2. The Remote ECHO-SCU AE sends C-ECHO requests and the DOSE-ECHO-SCP AE replies with a C-ECHO response (status success).
3. The Remote ECHO-SCU AE closes the Association.

4.2.3.4.1.1.1. OCR Tool

The OCR-ECHO-SCP AE accepts an association, it will respond to a verification request (C-ECHO).

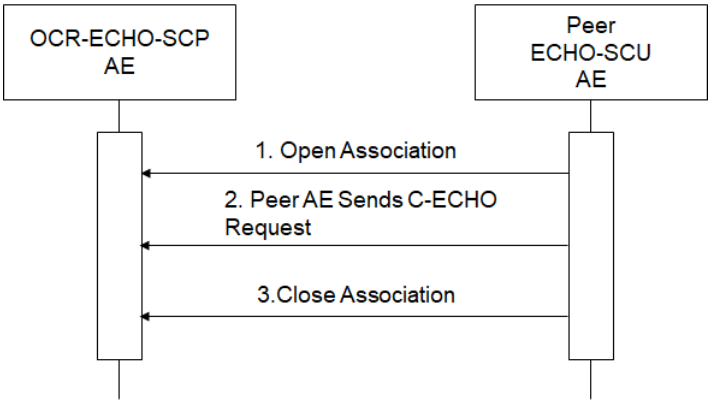

Figure 4.2-5
SEQUENCING OF ACTIVITY – ECHO FOR OCR TOOL

The following sequencing restrictions, illustrated in figure 4.2-2, apply when the OCR-ECHO-SCP AE:

1. The Remote ECHO-SCU AE opens a new association with the OCR-ECHO-SCP AE.
2. The Remote ECHO-SCU AE sends C-ECHO requests and the OCR-ECHO-SCP AE replies with a C-ECHO response (status success).
3. The Remote ECHO-SCU AE closes the Association.

4.2.3.4.1.2. Accepted Presentation Context

4.2.3.4.1.2.1. DoseXross App

The DOSE-ECHO-SCP AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4-33
PROPOSED PRESENTATION CONTEXTS BY THE DOSE-ECHO-SCP AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

4.2.3.4.1.2.2. OCR Tool

The OCR-ECHO-SCP AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4-34
PROPOSED PRESENTATION CONTEXTS BY THE OCR-ECHO-SCP AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

4.2.3.4.1.3. SOP Specific Conformance for Verification SOP Class

4.2.3.4.1.3.1. DoseXross App

The DOSE-ECHO-SCP AE provides standard conformance to the Verification Service Class as an SCP. The behavior of DOSE-ECHO-SCP AE when encountering status codes in a C-ECHO response is summarized in the table below:

Table 4-35
DOSE-ECHO-SCP AE C-ECHO RESPONSE STATUS ACTIONS

Service Status	Detailed Meaning	Error Code	Action
Success	Success	0000	No message is posted to the User Interface.

4.2.3.4.1.3.2. OCR Tool

The OCR-ECHO-SCP AE provides standard conformance to the Verification Service Class as an SCP. The behavior of OCR-ECHO-SCP AE when encountering status codes in a C-ECHO response is summarized in the table below:

Table 4-36
OCR-ECHO-SCP AE C-ECHO RESPONSE STATUS ACTIONS

Service Status	Detailed Meaning	Error Code	Action
Success	Success	0000	No message is posted to the User Interface.

4.2.3.4.1.4. Presentation Context Acceptance Criteria

4.2.3.4.1.4.1. DoseXross App

The DOSE-ECHO-SCP AE will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.3.4.1.4.2. OCR Tool

The OCR-ECHO-SCP AE will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.3.4.1.5. Transfer Syntax Selection Policies

4.2.3.4.1.5.1. DoseXross App

DOSE-ECHO-SCP AE will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting the Transfer Syntax to each.

4.2.3.4.1.5.2. OCR Tool

DOSE-ECHO-SCP AE will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting the Transfer Syntax to each.

4.3. NETWORK INTERFACES

4.3.1. Physical Network Interface

This product supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

Table 4-37
SUPPORTED PHYSICAL NETWORK INTERFACES

Ethernet 1000baseT

4.3.2. Additional Protocols

None.

4.4. CONFIGURATION

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

The mapping from AE Title to TCP/IP addresses and ports is configurable and set at the time of installation by Installation Personnel.

4.4.1.1.1. DoseXross App

Table 4-38
DEFAULT AE CHARACTERISTICS

AE	Default AE Title	Default TCP/IP Port
DOSE-STORAGE-SCP	DOSEXROSSAE	3002
DOSE-ECHO-SCP	DOSEXROSSAE	3002

4.4.1.1.2. OCR Tool

Table 4-39
DEFAULT AE CHARACTERISTICS

AE	Default AE Title	Default TCP/IP Port
QUERY-RETRIEVE-SCU	ERISDX_AE	N/A
OCR-STORAGE-SCP	ERISDX_AE	50000
OCR-ECHO-SCP	ERISDX_AE	50000

4.4.1.2. Remote AE Title/Presentation Address Mapping

4.4.1.2.1. DoseXross App

The AE Titles, host names and port numbers of remote applications are configured in the setting file.

4.4.1.2.2. OCR Tool

The AE Titles, host names and port numbers of remote applications are configured by the Service Tool.

4.4.2. Parameters

4.4.2.1. DoseXross App

Table 4-40
CONFIGURATION PARAMETERS

Parameter	Configurable (Yes/No) [RANGE]	Default Value
General Parameters		
Maximum PDU size as a SCP	No	262144bytes
Time-out waiting for an acceptance or rejection response to an Association Request (Application Level Timeout)	No	60sec
STORAGE-SCP AE Parameters		
Maximum PDU Size	No	262144bytes
Maximum number of simultaneous Associations	No	3

4.4.2.2. OCR Tool

Table 4-41
CONFIGURATION PARAMETERS

Parameter	Configurable (Yes/No) [RANGE]	Default Value
General Parameters		
Time-out waiting for an acceptance or rejection response to an Association Request (Application Level Timeout)	No	10sec
Time-out waiting for completion of a TCP/IP connect request (Low-level timeout)	No	10sec
Time-out for waiting for data between TCP/IP packets (Low Level Timeout)	No	10sec
STORAGE-SCP AE Parameters		
Maximum PDU size as a SCP	No	16384byte
Maximum number of simultaneous Associations	No	3
QUERY-RETRIEVE-SCU AE Parameters		
Maximum PDU size as a SCU	No	16384byte
Maximum number of simultaneous Associations	No	Same as the number of CPU cores

5 MEDIA INTERCHANGE

This product does not support Media Storage.

6 SUPPORT OF EXTENDED CHARACTER SETS

This product supports the following character sets:

・ ISO-IR 6 (default) ISO 646
・ ISO-IR 87 (Japanese) JIS X 0208 (Kanji)

Character sets other than ISO-IR 6 can be set to the RDSR tags listed in the Table below;

Table 6-1
CONFIGURATION PARAMETERS

Attribute Name	Tag	VR
Patient ID	(0010,0020)	LO
Patient's Name	(0010,0010)	PN
Institution Name	(0008,0080)	LO
Referring Physician Name	(0008,0090)	PN
Performing Physician Name	(0008,1050)	PN
Operators' Name	(0008,1070)	PN
Study Description	(0008,1030)	LO
Protocol Name	(0018,1030)	LO
The text value in EV (125203, DCM, "Acquisition Protocol")	(0040,A160)	UT

Character sets other than ISO-IR 6 can be set to the SC tags listed in the Table below;

Table 6-2
CONFIGURATION PARAMETERS

Attribute Name	Tag	VR
Patient's Name	(0010,0010)	PN
Study Description	(0008,1030)	LO
Protocol Name	(0018,1030)	LO

7 SECURITY

7.1. SECURITY PROFILES

This product does not support any specific security measures.
It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

a) Firewall or router protections to ensure that only approved external hosts have network access to the product.

b) Firewall or router protections to ensure that the product only has network access to approved external hosts and services.

c) Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8 ANNEXES

8.1. IOD CONTENTS

8.1.1. STORAGE-SCP AE Element Use for RDSR

Table 8-1
SIGNIFICANT ELEMENTS OF PATIENT MODULE ATTRIBUTES IN RECEIVED SOP INSTANCE

Attribute Name	Tag ID	Significance	Remark
Patient's Name	(0010,0010)	Mandatory	
Patient ID	(0010,0020)	Mandatory	
Patient's Birth Date	(0010,0030)	Optional	When this is blank, this product cannot provide the analysis capability based on patient's age if Patient's Age is also blank.
Patient's Age	(0010,1010)	Optional	When this is blank, this product cannot provide the analysis capability based on patient's age and Study Date and Study Time.
Patient's Sex	(0010,0040)	Optional	When this is blank, this product automatically recognizes as "O".
Patient's Size	(0010,1020)	Optional	
Patient's Weight	(0010,1030)	Optional	When this is blank, this product cannot provide the analysis capability based on patient's weight.

Table 8-2
SIGNIFICANT ELEMENTS OF GENERAL STUDY MODULE ATTRIBUTES IN RECEIVED SOP INSTANCE

Attribute Name	Tag ID	Significance	Remark
Study Instance UID	(0020,000D)	Mandatory	
Study Date	(0008,0020)	Mandatory	This product calculates exam time of the study based on Study Date and Study Time.
Study Time	(0008,0030)	Mandatory	This product calculates exam time of the study based on Study Date and Study Time.
Referring Physician's Name	(0008,0090)	Optional	
Accession Number	(0008,0050)	Optional	
Study Description	(0008,1030)	Mandatory	This product recognizes this value as protocol name for XA, RF and DX. When this is blank, protocol name for XA, RF and DX will be unknown.

Table 8-3
SIGNIFICANT ELEMENTS OF GENERAL SERIES MODULE ATTRIBUTES IN RECEIVED SOP INSTANCE

Attribute Name	Tag ID	Significance	Remark
Performing Physician's Name	(0008,1050)	Optional	When this is blank, this product cannot provide the analysis capability based on performing physician's name.
Protocol Name	(0018,1030)	Optional	When RDSR doesn't have "Acquisition Protocol" tag, this product will use this as protocol name for CT.
Operator's Name	(0008,1070)	Optional	When this is blank, this product cannot provide the analysis capability based on operator's name.

Table 8-4
SIGNIFICANT ELEMENTS OF GENERAL EQUIPMENT MODULE ATTRIBUTES IN RECEIVED SOP INSTANCE

Attribute Name	Tag ID	Significance	Remark
Manufacturer	(0008,0070)	Optional	
Institution Name	(0008,0080)	Optional	
Station Name	(0008,1010)	Mandatory	When this is blank, this product cannot identify the modality equipment.
Manufacturer's Model Name	(0008,1090)	Optional	
Device Serial Number	(0018,1000)	Mandatory	When this is blank, this product cannot identify the modality equipment.
Software Versions	(0018,1020)	Optional	

Table 8-5
SIGNIFICANT ELEMENTS OF TID 10001 PROJECTION X-RAY RADIATION DOSE IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (121058, DCM, "Procedure reported")	Mandatory	This value should be DT (113704, DCM, "Projection X-Ray") or DT (71651007, SCT, Mammography") When this is blank or other than above value, this product cannot receive this RDSR.

Table 8-6
SIGNIFICANT ELEMENTS OF TID 10003 IRRADIATION EVENT X-RAY DATA IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (113764, DCM, “Acquisition Plane”)	Optional	
EV (113769, DCM, “Irradiation Event UID”)	Mandatory	This product recognizes each irradiation event by this value.
EV (111526, DCM, “DateTime Started”)	Mandatory	This product calculates exam time for XA, RF and DX by this value.
EV (113721, DCM, “Irradiation Even Type”)	Mandatory	This product uses this value to recognize fluoroscopy or acquisition
EV (125203, DCM, “Acquisition Protocol”)	Optional	
EV (111031, DCM, “Image View”)	Optional	
EV (113743, DCM, “Patient Orientation”)	Optional	
EV (113744, DCM, “Patient Orientation Modifier”)	Optional	
EV (123014, DCM, “Target Region”)	Optional	When this is blank, this product cannot provide the analysis capability based on target region.
EV (272741003, SCT, “Laterality”)	Optional	
EV (122130, DCM, “Dose Area Product”)	Mandatory	Units should be “Gy.m2” When this is blank, this product cannot provide the analysis capability for dose. This product accumulates this value for all irradiations.
EV (111634, DCM, “Half Value Layer”)	Optional	Units should be “mm”
EV (111636, DCM, “Entrance Exposure at RP”)	Mandatory	Units should be “mGy” When this is blank, this product cannot provide the analysis capability for dose. This product displays this value in each irradiation event.

Table 8-7
SIGNIFICANT ELEMENTS OF TID 10003A IRRADIATION EVENT X-RAY DETECTOR DATA IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (113845, DCM, “Exposure Index”)	Optional	
EV (113846, DCM, “Target Exposure Index”)	Optional	
EV (113847, DCM, “Deviation Index”)	Optional	
EV (113795, DCM, “Acquired Image”)	Optional	

Table 8-8
SIGNIFICANT ELEMENTS OF TID 10003B IRRADIATION EVENT X-RAY SOURCE DATA IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (113738, DCM, “Dose (RP)”)	Mandatory	Units should be “Gy” When this is blank, this product cannot provide the analysis capability for dose. This product accumulates this value for all irradiations.
EV (111631, DCM, “Average Glandular Dose”)	Mandatory	Units should be “mGy” When this is blank, this product cannot provide the analysis capability for dose. This product displays this value in each irradiation event.
EV (113791, DCM, “Pulse Rate”)	Optional	Units should be “pulse/s”
EV (113768, DCM, “Number of Pulses”)	Optional	
EV (113793, DCM, “Pulse Width”)	Optional	Units should be “ms”
EV (113733, DCM, “KVP”)	Optional	Units should be “kV”
EV (113734, DCM, “X-Ray Tube Current”)	Optional	Units should be “mA”
EV (113824, DCM, “Exposure Time”)	Mandatory	Units should be “ms” When this is blank, this product cannot provide the analysis capability for time. When this is for angiography, fluoroscopy or X-ray radiography, this product accumulates this value for all irradiations and this product defines fluoro time or radiation time based on irradiation event type. When this is for mammography, this product displays this value in each irradiation event. If EV(113735, DCM, “Exposure Time”) is existed instead of this tag, this product handles EV(113735, DCM, “Exposure Time”). Units for EV(113735, DCM, “Exposure Time”) should be “ms”.
EV (111632, DCM, “Anode Target Material”)	Optional	
EV (113757, DCM, “X-Ray Filter Material”)	Optional	
EV (113790, DCM, “Collimated Field Area”)	Optional	Units should be “m2”

Table 8-9
SIGNIFICANT ELEMENTS OF TID 10003C IRRADIATION EVENT X-RAY MECHANICAL DATA IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (112011, DCM, “Positioner Primary Angle”)	Optional	Units should be “deg”
EV (112012, DCM, “Positioner Secondary Angle”)	Optional	Units should be “deg”
EV (113754, DCM, “Table Head Tilt Angle”)	Optional	Units should be “deg”
EV (113755, DCM, “Table Horizontal Rotation Angle”)	Optional	Units should be “deg”
EV (113756, DCM, “Table Cradle Tilt Angle”)	Optional	Units should be “deg”
EV (111633, DCM, “Compression Thickness”)	Optional	Units should be “mm”

Table 8-10
SIGNIFICANT ELEMENTS OF CID 10008 DOSE RELATED DISTANCE MEASUREMENTS IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (113748, DCM, “Distance Source to Detector”)	Optional	Units should be “mm”
EV (113751, DCM, “Table Longitudinal Position”)	Optional	Units should be “mm”
EV (113752, DCM, “Table Lateral Position”)	Optional	Units should be “mm”
EV (113753, DCM, “Table Height Position”)	Optional	Units should be “mm”

Table 8-11
SIGNIFICANT ELEMENTS OF TID 10011 CT RADIATION DOSE IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (121058, DCM, “Procedure reported”)	Mandatory	This value should be “EV (P5-08000, SRT, “Computed Tomography X-Ray”). When this is blank, this product cannot receive this RDSR.
EV (113809, DCM, “Start of X-Ray Irradiation”)	Mandatory	
EV (113810, DCM, “End of X-Ray Irradiation”)	Mandatory	

Table 8-12
SIGNIFICANT ELEMENTS OF TID 10013 CT IRRADIATION EVENT DATA IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (125203, DCM, “Acquisition Protocol”)	Mandatory	When this is blank, this product cannot provide the analysis capability.
EV (123014, DCM, “Target Region”)	Optional	When this is blank, this product cannot provide the analysis capability based on target region.
EV (113820, DCM, “CT Acquisition Type”)	Optional	
EV (113605, DCM, “Irradiation Event UID”)	Mandatory	This product recognizes each irradiation event by this value.
EV (113824, DCM, “Exposure Time”)	Mandatory	Units should be “s” When this is blank, this product cannot provide the analysis capability for time.
EV (113825, DCM, “Scanning Length”)	Optional	Units should be “mm”
EV (113827, DCM, “Nominal Total Collimation Width”)	Optional	Units should be “mm”
EV (113828, DCM, “Pitch Factor”)	Optional	Units should be “ratio”
EV (113823, DCM, “Number of X-Ray Sources”)	Optional	Units should be “X-Ray sources” This value should be integer
EV (113733, DCM, “KVP”)	Optional	Units should be “kV”
EV (113833, DCM, “Maximum X-Ray Tube Current”)	Optional	Units should be “mA”
EV (113734, DCM, “X-Ray Tube Current”)	Optional	Units should be “mA”
EV (113834, DCM, “Exposure Time per Rotation”)	Optional	Units should be “s”
EV (113830, DCM, “CTDIvol”)	Mandatory	Units should be “mGy”
EV (113835, DCM, “CTDIw Phantom Type”)	Optional	
EV (113838, DCM, “DLP”)	Mandatory	Units should be “mGy.cm2”
EV (113842, DCM, “X-Ray Modulation Type”)	Optional	

Table 8-13
SIGNIFICANT ELEMENTS OF TID 10015 CT DOSE CHECK DETAILS IN RECEIVED SOP INSTANCE

Concept Name	Significance	Remark
EV (113903, DCM, “DLP Alert Value”)	Optional	
EV (113904, DCM, “CTDIvol Alert Value”)	Optional	
EV (113911, DCM, “DLP Notification Value”)	Optional	
EV (113912, DCM, “CTDIvol Notification Value”)	Optional	

8.2. DATA DICTIONARY OF PRIVATE ATTRIVUTES

Not applicable to this product.

8.3. CONTROLLED TERMINOLOGY AND TEMPLATES

Not applicable to this product

8.4. GRAYSCALE IMAGE CONSISTENCY

Not applicable to this product

8.5. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

8.5.1. Private SOP Class - Toshiba US Private Data Storage

Not applicable to this product

8.6. PRIVATE TRANSFER SYNTAXES

Not applicable to this product