No. MIICT0003EA

TOSHIBA

DICOM CONFORMANCE STATEMENT
MODALITY WORKLIST MANAGEMENT SCU
FOR
TOSHIBA WHOLE-BODY X-RAY CT SCANNER
X-SERIES
MODEL COT-19A
(MIICT0003EA)

TOSHIBA CORPORATION

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1 Introduction

This document is a DICOM Conformance Statement for Toshiba CT scanner X-Series. It is intended to provide the reader with the knowledge of how to integrate this product within a DICOM compliant hospital network. It details the DICOM Service Classes, Information Objects, and Communication Protocols which are supported by this product.

If the reader is unfamiliar with DICOM, it is recommended that they read the DICOM Specification (referenced below) prior to reading this conformance statement. Also note that this document is formatted according to the DICOM Specification, Part 2: Conformance.

1.1 References

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

1.2 Definitions

- **Association Establishment** - An Association Establishment is the first phase of communication between two DICOM Application Entities. 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.
- **Calling Application Entity Title** - The Calling AE Title defines the requestor of an Association.
- **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 a 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.

1.3 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
- CEN TC251 Comite Europeen de Normalisation - Technical Committee 251 - Medical Informatics
- 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
- HIS Hospital Information System
- HL7 Health Level 7
- IE Information Entity
- IOD Information Object Definition
- ISO International Standards Organization
- JIRA Japan Industries Association of Radiological Systems
- NEMA National Electrical Manufacturers Association
- OSI Open Systems Interconnection
- PDU Protocol Data Unit
- RIS Radiology Information System
- SCP Service Class Provider
- SCU Service Class User
- SOP Service-Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

2 Implementation Model

2.1 Application Data Flow Diagram

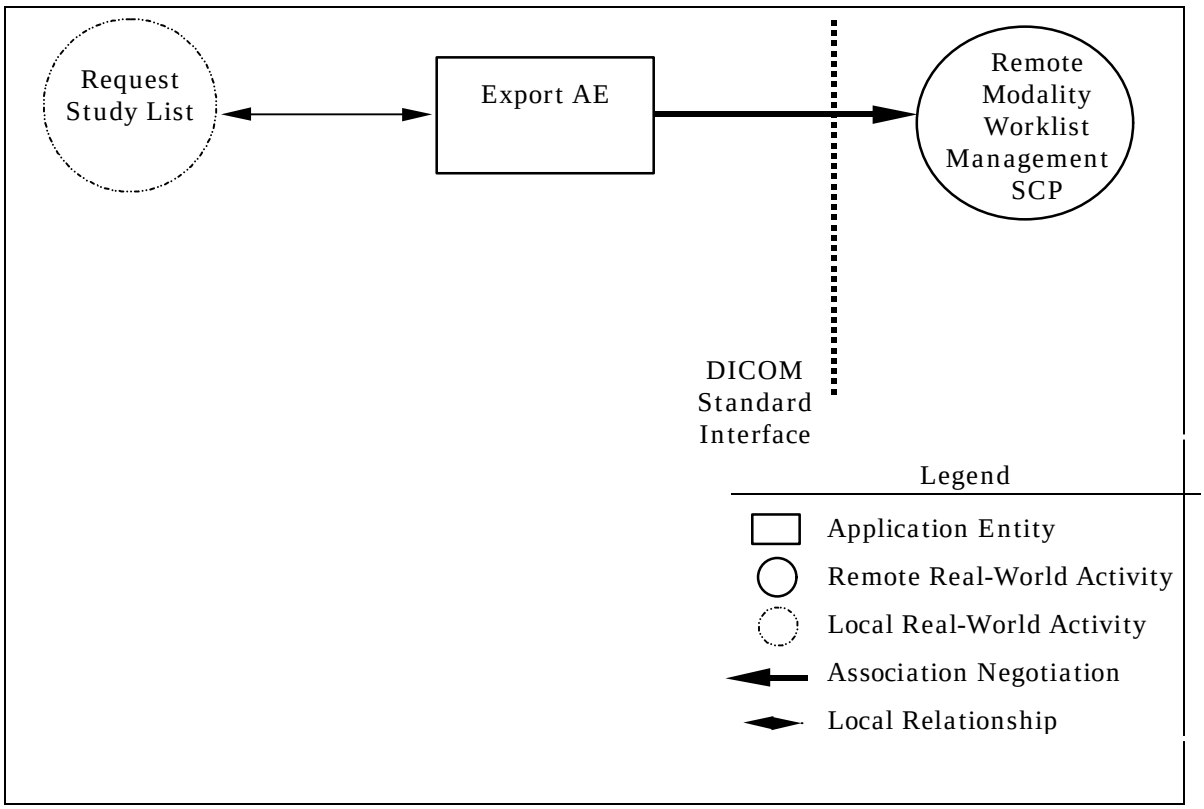

Figure 1

2.2 Functional Definitions of AE's

2.2.1 Export AE

Export AE is used to transmit request for Study List to a remote DICOM device and to retrieve Study List with Procedure Step . It therefore performs the following tasks:

- Establishes DICOM Association with remote DICOM device
- Performs request of DICOM Modality Worklist Objects to remote DICOM device
- Retrieves Study List with Procedure Step Information from remote DICOM device

2.3 Sequencing of Real World Activities

2.3.1 Features

- Operator manually requests to transmit requesting Study List and retrieves it with Procedure Step.

2.3.2 Operation

The operation for manual transmitting request for study list :

Step-1: Retrieves today's Study List from SCP to the CT scanner.

Step-2: Select one of the Study List for the CT examination.

The patient's name, patient ID, patient's birth date, patient's sex, requested contrast agent, requesting service and referring physician's name are used for the patient registration.

3 AE Specifications

3.1 Export Specification

Export AE provides Standard Conformance to the following DICOM SOP Classes as an SCU:

Table 1

SOP Class Name	SOP Class UID
Modality Worklist Information Model-FIND	1.2.840.10008.5.1.4.31

3.1.1 Export Association Establishment Policies

3.1.1.1 Export General

Export AE will utilize and understand the following Application Context Name:

Table 2

DICOM V3.0 Application Context	1.2.840.10008.3.1.1.1

Export AE supports the PDU size of 16 Kbytes only. The default value is set to 16 Kbytes.

3.1.1.2 Export Number of Associations

Export AE can only establish one association at a time, independent of the number of destinations chosen.

3.1.1.3 Export Asynchronous Nature

Export AE allows a single outstanding operation on any association. Therefore, Export AE does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

3.1.1.4 Export Implementation Identifying Information

Export AE will specify the following Implementation Identifying Information:

- Implementation Class UID 1.2.392.200036.9116.2.1
- Implementation Version Name TM_CT_DCM_V1.0

3.1.2 Export Association Initiation by Real-World Activity

Export AE initiates an association when the following activity is chosen by the operator:

- "Request Study List"
  - — Request Worklist - Query and Retrieve Study List

3.1.2.1 Export Real-World Activity - Request Worklist

3.1.2.1.1 Export Associated Real-World Activity - Request Worklist

Export AE performs Query and Retrieve Study List automatically or manually to destination device.

3.1.2.1.2 Export Proposed Presentation Contexts - Request Worklist

Export AE proposes the following Presentation Contexts shown below:

Table 3

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

3.1.2.1.2.1 Export SOP Specific Conformance - Request Worklist

Export AE operation involves the following sequence of steps for each Query and Retrieve Study List.

(1) Association establishment (requestor only)

(2) Query and Retrieve Study List (SCU only)

(3) Association release (requestor only)

Export AE judges that the request worklist succeeded when the result of (2) "Query and Retrieve Study List" is "Success" even if the result of (3) "Association release" is "Failure".

3.1.3 Export Association Acceptance Policy

Export AE does not accept any associations generated by remote applications.

4 Communication Profiles

4.1 Supported Communication Stacks

This product provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.2 OSI Stack

Not applicable to this product.

4.3 TCP/IP Stack

This product inherits its TCP/IP stack from the computer system upon which it executes.

4.3.1 API

Not applicable to this product.

4.3.2 Physical Media Support

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

4.4 Point-to-Point Stack

Not applicable to this product.

5 Extensions/Specializations/Privatizations

Not applicable to this product.

6 Configuration

For X-Series, the configuration can be set through interaction.

Note: Settings and changes are performed by Toshiba Service Personnel at a time of installation of the X-Series .

6.1 AE Title/Presentation Address Mapping

Mapping from the AE titles to the presentation addresses are as follows:

- One port number and one AE title can be described for one host name.
- Each AE title is mapped to one port number.

6.2 Configurable Parameters

6.2.1 Time-out Value,Retry Count, Retry Interval

The time-out value, retry count, and retry interval in each status are shown below.

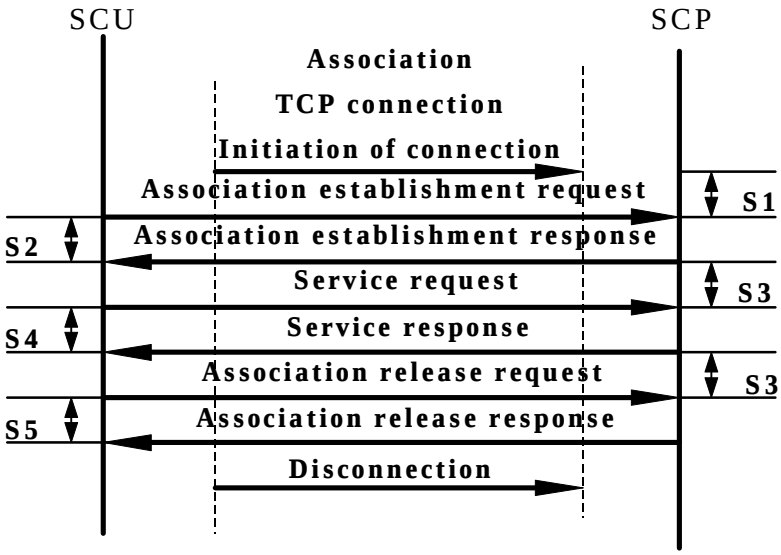

Figure 2

Table 4

Status	Item	Time-out Value	Retry Count	Retry Interval	Remarks
S1	Association establishment request waiting time	Not set	Not set	Not set	Not applicable to this product
S2	Association establishment response waiting time	default: 30 seconds range: 1 to 99999	default: once range: 0 to 99	default: 5 seconds range: 0 to 99999	Only one parameter can be set in the X-Series.
S3	Service request waiting time	Not set	Not set	Not set	Not applicable to this product
S4	Service response waiting time	default: 60 seconds range: 1 to 99999	Not set	Not set	Only one parameter can be set in the X-Series.
S5	Association release waiting time	default: 5 seconds range: 1 to 99999	Not set	Not set	Only one parameter can be set in the X-Series.

Performed value may be different from the setting value, because of the condition of the communication line of the burden of the environment of the X-Series.

6.3 Implementation Information and Maximum Reception PDU Size

The default value for X-Series are used for the Implementation Class UID, the Implementation Version name, and the Maximum length received.

Table 5

Parameter	Default
Implementation Class UID	1.2.392.200036.9116.2.1
Implementation Version name	TM_CT_DCM_V1.0
Maximum length received(unit:byte)	16 Kbytes

6.4 Default Transfer Syntax

In Modality Worklist Information Model - FIND, the X-Series sends only one syntax.

Default = "Implicit VR Little Endian"

7 Support of Extended Character Sets

This product supports the following character sets:

- ISO-IR 6 (default) Basic G0 Set

8 Matching Key Attributes and Return Key Attributes

8.1 Matching Key Attributes

The supported Matching Key Attributes is listed as follows.

8.1.1 Scheduled Procedure Step Module

Table 6

Description / Module	Tag	Matching Key Type	Matching Type
Scheduled Procedure Step Sequence	(0040, 0100)	Required	
>Scheduled station AE title	(0040, 0001)	Required	Single value matching only.
>Scheduled Procedure Step Start Date	(0040, 0002)	Required	Single value matching only.
>Modality	(0008, 0060)	Required	Single value matching only.

8.2 Return Key Attributes

The supported Return Key Attributes is listed as follows.

8.2.1 Patient Identification Module

Table 7

Description / Module	Tag	Return Key Type	Note
Patient's Name	(0010,0010)	1	
Patient ID	(0010,0020)	1	

8.2.2 Patient Demographic Module

Table 8

Description / Module	Tag	Return Key Type	Note
Confidentiality Constraint on Patient Data Description	(0040,3001)	2	
Patient's Birth Date	(0010,0030)	2	
Patient's Sex	(0010,0040)	2	
Patient's Weight	(0010,1030)	2	

8.2.3 Scheduled Procedure Step Module

Table 9

Description / Module	Tag	Return Key Type	Note
Scheduled Procedure Step Sequence	(0040, 0100)	1	
>Scheduled station AE title	(0040, 0001)	1	
>Scheduled Procedure Step Start Date	(0040, 0002)	1	
>Scheduled Procedure Step Start Time	(0040, 0003)	1	
>Scheduled Performing Physician's Name	(0040, 0006)	2	
>Scheduled Procedure Step Description	(0040, 0007)	1C	
>Scheduled Procedure Step ID	(0040, 0009)	1	
>Scheduled Procedure Step Location	(0040,0011)	2	
>Pre-Medication	(0040,0012)	2C	
>Scheduled Procedure Step Status	(0040,0020)	3	
>Modality	(0008, 0060)	1	
>Requested Contrast Agent	(0032,1070)	2C	

8.2.4 Requested Procedure Module

Table 10

Description / Module	Tag	Return Key Type	Note
Requested Procedure ID	(0040, 1001)	1	
Reason for requested Procedure	(0040,1002)	3	
Study Instance UID	(0020, 000D)	1	
Requested Procedure Description	(0032,1060)	1C	
Requested Procedure Priority	(0040,1003)	2	
Patient Transport Arrangements	(0040,1004)	2	

8.2.5 Imaging Service Request Module

Table 11

Description / Module	Tag	Return Key Type	Note
Requesting Physician	(0032,1032)	2	
Referring Physician's Name	(0008,0090)	2	
Requesting Service	(0032,1033)	3	
Accession Number	(0008,0050)	2	

8.2.6 Patient Medical Module

Table 12

Description / Module	Tag	Return Key Type	Note
Medical Alerts	(0010,2000)	2	
Contrast Allergies	(0010,2110)	2	
Pregnancy Status	(0010,21C0)	2	
Special Needs	(0038,0050)	2	
Patient State	(0038,0500)	2	