S517-E057J
Apr. 2016

DAR-9400f / DAR-9500f
DICOM Conformance Statement

Revision J

Revision Date: April, 2016

SHIMADZU

Revision History

Date	Rev.	Comment
2005.10.4	First	First Revision
2006.11.10	A	Correct the description in “1.2 Sources for this document”. Add the description about Bi-plane and Printer.
2007.6.27	B	Add section 6.5. Revise Chapter 6
2008.1.15	C	Totally modified
2008.6.25	D	Revise Chapter 6
2011.3.16	E	Apply to DAR-9500.
2013.9.13	F	Apply to RDSR.
2014.4.4	G	Apply to DAR-9400f Ver.4.2 and DAR-9500f Ver.5.2.40. Add description of usage to MPPS and RDSR. Add information object definition of RDSR.
2015.4.23	H	Apply to DAR-9500f Ver.6.0 Add private tag for StentView and 3D application.
2016.4.12	J	Apply to DAR-9500f Ver.6.1. Add private tag for AWL. Apply to DAR-9500f Ver.6.2. Add information object definition of processed DICOM file. Add private tag for Post-Processing.

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1. Introduction

1.1. Purpose of this document

The purpose of this document is to describe how *DAR-9400f / DAR-9500f* conforms to the DICOM standard. It describes what parts and definition it utilizes and in what way, in order to provide interoperability with other devices that claim same conformance.

1.2. Sources for this document

American College of Cardiology –National Manufactures Association (ACR-NEMA) Digital Imaging and Communications V2.0
ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) v3.0

1.3. Acronyms and abbreviation

The following acronyms and abbreviations are used in this document.

- ACR American College of Radiology
- ACSE Association Control Service Element
- AE Application Entity
- ANSI American National Standards Institute
- AP Application Profile
- API Application Programming Interface
- ASCII American Standard Code for Information Interchange
- 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
- FSR File Set Reader
- FSU File Set Updater
- GUI Graphical User Interface
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- RDSR DICOM Radiation Dose Structure Report
- RWA Real World Activity
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier
- MPPS Modality Performed Procedure Step
- PPS Performed Procedure Step
- PS Presentation State
- VM Value Multiplicity
- VR Value Representation
- VT Value Type

1.4. Note to reader

- **Interoperability**

Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into a networked environment may require application functions that are not specified within the scope of the DICOM standard. Consequently, using only the information provided by this conformance statement does not guarantee interoperability of Shimadzu Equipment with other vendor's equipment. It is the user's responsibility to thoroughly analyze the application requirements and to specify a solution that integrates Shimadzu equipment with the projected other vendor's equipment.

- **Validation**

Although Shimadzu equipment has been completely tested to verify that the implementation of the DICOM interface for this product corresponds with this Conformance Statement, even if comparison of respective Conformance Statement indicates that successful interconnection should be possible with another vendor's equipment, additional validation will always be necessary to ensure full functionality. It is the responsibility of the user to specify the appropriate test suite and to carry out the additional validation tests.

- **Version of the DICOM standard**

Shimadzu is committed to evolve with the DICOM standard as it adapts to meet the future requirement of users and technology. In order to do so, Shimadzu reserves the right to adapt and even discontinue delivery of its equipment. The user should ensure that any vendor whose equipment is connected to Shimadzu equipment also adapts to future version of the DICOM standard. If not, enhancement of Shimadzu may lead to loss of connectivity or interoperability.

- **Version Apply to *DAR-9400f / DAR-9500f***

Dicom Conformance Statement is applied to the following version of *DAR-9400f / DAR-9500f*. Refer to the old Dicom Conformance Statement to confirm older version of *DAR-9400f / DAR-9500f*.

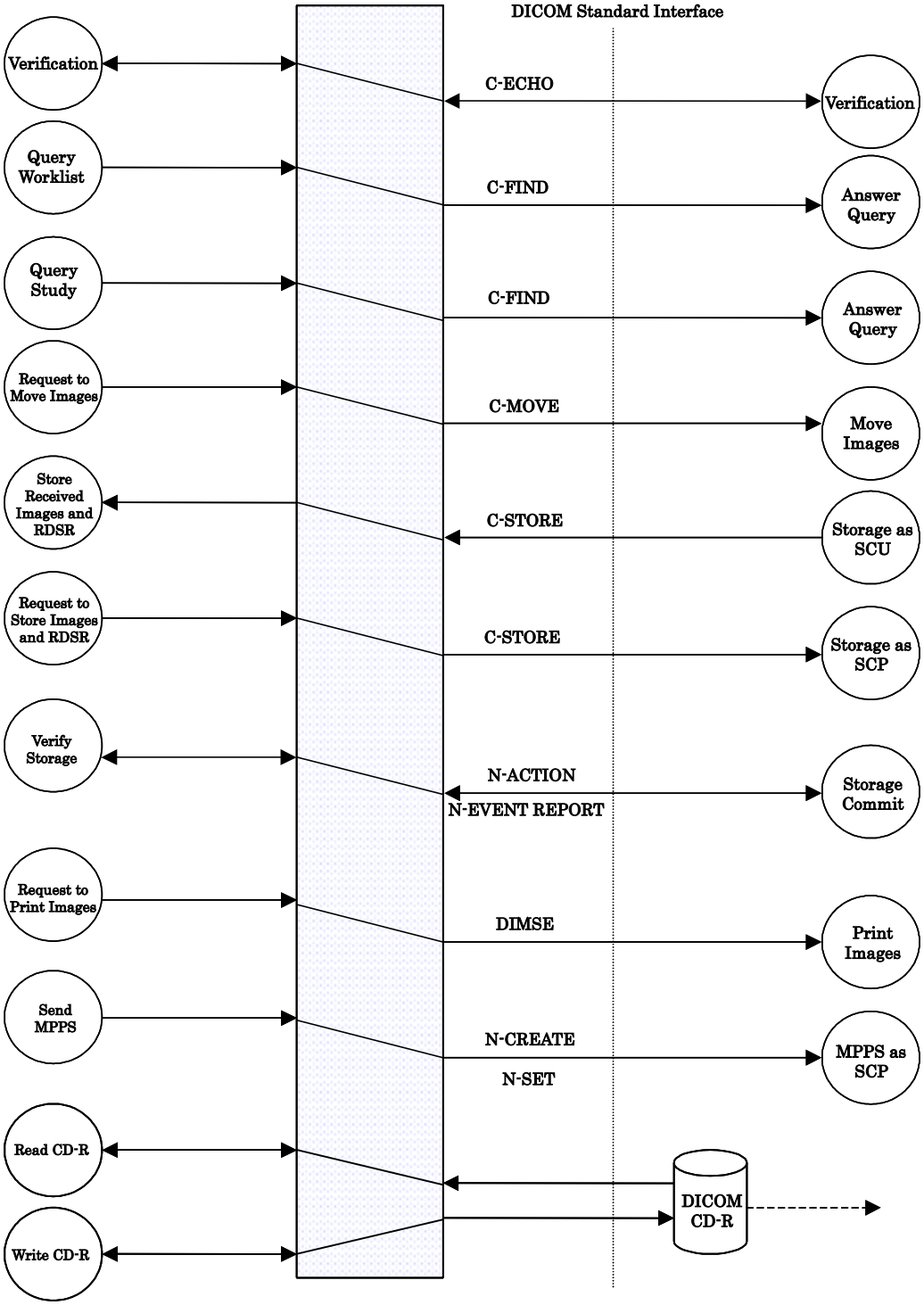
- ***DAR-9400f : Not supported. Please refer to older version.***
- ***DAR-9500f : Ver.6.1 or later***

2. Implementation Model

DAR-9400f / DAR-9500f is an acquisition and review station used in the Cardiology environment. The application, upon user request, will:

1. Acquire images from a CathLab and encapsulate them to the DICOM Standard Format.
2. Issue **C-ECHO** command to a remote DICOM SCP.
3. Issue **C-STORE** command to configured SCP in order to archive the acquired images.
4. Issue **C-MOVE** command to configured SCP.
5. Query (**C-FIND**), retrieve (**C-MOVE**) and display XA images from a remote DICOM SCP.
6. Query Modality Worklist (**C-FIND**)
7. Send **N-CREATE** and **N-SET** to MPPS server.
8. Read and display XA images from DICOM CD.
9. Act as FSC for DICOM CD. Write DICOM conformant CD-R
10. Act as FSR for DICOM CD. Read and display XA images from a DICOM conformant CD-R.
11. Print the images to remote DICOM SCP printer.

2.1. Application Data flow diagram



2.1.1. Verification

DAR-9400f / DAR-9500f can send **C-ECHO** verifications.

2.1.2. Basic Worklist Management or IHE Worklist Management

DAR-9400f / DAR-9500f will issue **a C-FIND** for the hospital Worklist.

2.1.3. Find

DAR-9400f / DAR-9500f will issue a **C-FIND** command to a remote SCP to retrieve information about the studies stored on the remote SCP.

2.1.4. Move Images

DAR-9400f / DAR-9500f will issue a **C-MOVE** command to a remote SCP to copy study information from one SCP to another or from a remote SCP to itself.

2.1.5. Store Images and RDSR as SCP

DAR-9400f / DAR-9500f will receive process and accept **C-STORE** command from a remote SCU and if the association succeeds, it will store the received data on its physical storage space.

2.1.6. Store Images and RDSR as SCU

DAR-9400f / DAR-9500f will issue a **C-STORE** command to a remote SCP. If the association is successful it will send images for storage on the remote SCP.

2.1.7. Verify storage

If the "Storage Commit" option is enabled, *DAR-9400f / DAR-9500f* will issue storage Commit N-Action command for all files sent for storage.

2.1.8. MPPS Management

DAR-9400f / DAR-9500f will issue an **N-CREATE** event to notify the creation of a new acquisition study and issue an **N-SET** event when this acquisition study is completed.

2.1.9. Print

DAR-9400f / DAR-9500f will print an image or loop of images to the remote DICOM SCP printer.

2.1.10. Read CD-R

DAR-9400f / DAR-9500f will read any DICOM conformant CD-R although it will only display compatible images.

2.1.11. Write CD-R

DAR-9400f / DAR-9500f will write a DICOM conformant CD-R for the supported SOP classes.

2.2. Functional Description of AE's

The *DAR-9400f / DAR-9500f* AE acts as a SCU and a SCP.

- If configured, *DAR-9400f / DAR-9500f* can query for the patient Worklist. The list of scheduled patient will be presented to the user and all fields in the patient demographic entry forms will be filled with the chosen patient. If all mandatory fields cannot be filled a form will be presented to the user with the missing fields highlighted. *DAR-9400f / DAR-9500f* will issue a **C-Find** request to retrieve Worklist information from a remote Modality Worklist SCP.

- *DAR-9400f / DAR-9500f* is a system designed to acquire images coming from the FPD of a catheterization laboratory. The system then compresses these images and transmits these compressed images over the network to a remote server that will place them in a safe place for long-term archive and retrieval.

- If configured to do so, when a study is terminated, *DAR-9400f / DAR-9500f* will send a command to the remote server to move images to one or more secondary destinations. The move may involve all the images objects of a study or only specific images belonging to one or more series. There may be any number of secondary destinations. When "Secondary Destination" is/are configured, *DAR-9400f / DAR-9500f* will issue a C-MOVE command to the server configured as "Primary Server" using either "Move by study" or "Move by Series" UID. The command will contain the "Primary Server" as origin and the "Secondary destination" as destination.

- When a study is terminated, *DAR-9400f / DAR-9500f* will send a command to the remote server to transfer RDSR to several destinations.

- *DAR-9400f / DAR-9500f* will issue a C-FIND command to get and display the content of a STORAGE-SCP remote server; it will then issue a C-MOVE command at study root level to the same server to transfer the selected image data proposing itself as destination.

- *DAR-9400f / DAR-9500f* will issue DIMSE-N set command to print SCP to print the image.

- *DAR-9400f / DAR-9500f* will issue a C-STORE command to a configured remote SCP to store images previously read from a DICOM CD.

- *DAR-9400f / DAR-9500f* will read data from a DIOCM CD that is present in its CD drive when requested to do so by the user

- *DAR-9400f / DAR-9500f* will accept association from remote SCU and accept and process C-STORE commands for DICOM Data Object of the allowed SOP classes.

- *DAR-9400f / DAR-9500f* will issue N-CREATE and N-SET command to MPPS server to notice the implementation of study.

2.3. Sequencing of real world activity

The storage Verification is done when a study is closed, and only if files for the study have been transmitted for storage to a remote SCP.
The Storage verification is done after the current study is closed.
The physical CD-R writing can only occur after an empty CD-R is inserted in the drive.

3. AE Specifications

3.1. *DAR-9400f / DAR-9500f* Specification

DAR-9400f / DAR-9500f provides Standard Conformance to the following DICOM V3.0 SOP Class as an SCU.

Table 1 Verification SOP Class as SCU

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2
XA – X-ray Angiographic image storage	1.2.840.10008.5.1.4.1.1.12.1
Secondary Capture Image storage	1.2.840.10008.5.1.4.1.1.7
Modality Worklist SOP class	1.2.840.10008.5.1.4.31
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

3.1.1. Association establishment Policies

3.1.1.1. General

The following Application Context Name will be proposed and recognized by *DAR-9400f / DAR-9500f.*

DICOM 3.0 Application Context **1.2.840.10008.3.1.1.1**

3.1.1.2. Number of Associations

The maximum number of association accepted or maintained by *DAR-9400f / DAR-9500f* is limited only by the physical memory of the machine on which it runs. Typically it can be up to 10.

3.1.1.3. Asynchronous nature

DAR-9400f / DAR-9500f allows a single outstanding operation on any association. Therefore, *DAR-9400f / DAR-9500f* does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

3.1.1.4. Implementation Identifying Information

DAR-9400f / DAR-9500f will respond with the following implementation identifying parameters:

- For Safire

Implementation Class UID (acquisition) **1.2.392.200036.9110.13.XXXXXXXXXXXXX**
Implementation Class UID (review) **1.2.392.200036.9110.14.XXXXXXXXXXXXX**

- For Alexa

Implementation Class UID (acquisition) **1.2.392.200036.9110.15.XXXXXXXXXXXXX**
Implementation Class UID (review) **1.2.392.200036.9110.16.XXXXXXXXXXXXX**

- For Trinias

Implementation Class UID (acquisition) **1.2.392.200036.9110.17.XXXXXXXXXXXXX**
Implementation Class UID (review) **1.2.392.200036.9110.18.XXXXXXXXXXXXX**

The last number of the implementation class UID is the 13 digits maximum machine serial number.

Implementation Version Name **`VOYAGER_VX_X_X`**
Where X_X_X is the software version

The implementation version name policies are the following: product name "**`VOYAGER`**" followed by the version of the product, "**`_V1_0_0`**".

3.1.2. Association Initiation by Real World Activity

3.1.2.1. Real World Activity – Verification

(1) Associated Real World Activity – Verification

DAR-9400f / DAR-9500f will send C-ECHO to verify the other systems if they are activated.

(2) Presentation context Table – Verification

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 2. For a **Verification** request, *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 2.

Table 2 Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	**SOP Class UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

(3) SOP Specific conformance – Verification

DAR-9400f / DAR-9500f provides the standard conformance to the DICOM Verification SOP class.

3.1.2.2. Real World Activity – Query Study

(1) Associated Real World Activity – Query Study

DAR-9400f / DAR-9500f will issue a **FIND** request when a user of *DAR-9400f / DAR-9500f* wishes to view patient and study information from a remote DICOM SCP.

(2) Presentation context Table – Query Study

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 3. For a **QUERY** request, *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 3.

Table 3 Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	**SOP Class UID**	**Name List**	**UID List**		
Study Root Query/Retrieve 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

(3) SOP Specific conformance – Query Study

DAR-9400f / DAR-9500f uses Relational query with Study root level by default. If the extended negotiation is not successful, it uses Relational query with Patient root level by default. If the extended negotiation still does not succeed, *DAR-9400f / DAR-9500f* will use Hierarchical query with patient root model.

- Matching key attribution

  DAR-9400f / DAR-9500f Request matching of the following key attributes.

Table 4 Matching Key Attributes – Study Root Query/Retrieve Information Model *

Attribute Name	Type	Tag
STUDY LEVEL		
Study Date	R	(0008,0020)
Accession Number	R	(0008,0050)
Patient's Name	R	(0010,0010)
Patient ID	R	(0010,0020)
SERIES LEVEL		
Modality	R	(0008,0060)

* User can input these items on the monitor as a search key.

3.1.2.3. Real World Activity – Move Images

(1) Associated Real World Activity – Move Images

DAR-9400f / DAR-9500f will issue a MOVE request when a user of *DAR-9400f / DAR-9500f* wishes to move one or more studies from a remote DICOM SCP back to *DAR-9400f / DAR-9500f* (retrieve) or another remote DICOM SCP.

(2) Presentation context Table – Move

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 5. For a MOVE request, *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 5 and Table 6.

Table 5 Move Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 6 Move Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	SOP Class UID	Name List	UID List		
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

(3) SOP Specific Conformance – Move

DAR-9400f / DAR-9500f uses specific keys for Move operation. When doing a series move the Study UID and Series UID are used as keys. When doing a study move only the Study UID is used as key.

3.1.2.4. Real World Activity – Request to Store Images and Dose Information

(1) Associated Real World Activity – Storage as SCU

DAR-9400f / DAR-9500f will issue a **Storage** request when a user of *DAR-9400f / DAR-9500f* wishes to send a study of images to a remote DICOM SCP.

(2) Presentation context Table – Storage as SCU

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 7.

Table 7 Storage Transfer Syntaxes

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	**SOP Class UID**	**Name List**	**UID List**		
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM JPEG Lossless hierarchical, first order prediction	1.2.840.10008.1.2.4.70		
Secondary Capture Image storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM JPEG Lossless hierarchical, first order prediction	1.2.840.10008.1.2.4.70		
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

(3) Storage Presentation Contexts selection

- Transfer syntax can be configured. They can be enabled/disabled and the presented order can be selected
- If no Transfer syntax are selected in the option then the system try to negotiate the default Transfer Syntax (Original Storage Transfer Syntaxes) and Implicit VR Little Endian Transfer Syntax.

3.1.2.5. Real World Activity – Query Worklist

(1) Associated Real World Activity – Query Worklist as SCU

DAR-9400f / DAR-9500f will issue a query Worklist request when a user of DAR-9400f / DAR-9500f opens a new study if a Modality Worklist SCP is configured in its host table.

(2) Presentation context Table – Query Worklist as SCU

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 8. For a Query **Worklist** request, *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in. Table 8.

Table 8 Worklist Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	**SOP Class UID**	**Name List**	**UID List**		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

(3) SOP Specific Conformance – general purpose Worklist SOP Class as SCU

DAR-9400f / DAR-9500f supports queries against the Worklist Information Model using the baseline C-FIND SCU behaviour.

- *DAR-9400f / DAR-9500f* Request matching of the following key attributes

Table 9 Matching Key Attributes – Query Worklist*

Attribute Name	VR	Tag
Scheduled Procedure Step Module		
Scheduled Procedure Step Sequence	SQ	(0040,0100)
>Modality**	CS	>(0008,0060)
>Scheduled Station AE Title	AE	>(0040,0001)
>Scheduled Procedure Step Start Date	DA	>(0040,0002)
>Scheduled Performing Physician's Name	PN	>(0040,0006)
Requested Procedure Module		
Requested Procedure ID	SH	(0040,1001)
Imaging Service Request Module		
Accession Number	SH	(0008,0050)
Patient Identification Module		
Patient's Name	PN	(0010,0010)
Patient ID	LO	(0010,0020)

* User can input these items on the monitor as a search key.
** Always searching with XA.

- *DAR-9400f / DAR-9500f* supports the character sets listed in Table 24.

3.1.2.6. Real World Activity – Request to Print Images

(1) Associated Real World Activity

DAR-9400f / DAR-9500f will issue a **Print** request when the user wants to send study images to the remote DICOM printer SCP.

(2) Presentation context Table – Request to Print Images

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 10. For a **Print** request**,** *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 10.

Table 10 Request to Print Images Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	SOP Class UID	Name List	UID List		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

(3) SOP Specific Conformance

DAR-9400f / DAR-9500f provides the standard conformance to the DICOM Basic Grayscale Print Management Meta SOP class.

3.1.2.7. Real World Activity – Create a new acquisition study

(1) Associated Real World Activity – create a new acquisition study

DAR-9400f / DAR-9500f will issue an MPPS N-CREATE event when a user of DAR-9400f / DAR-9500f creates a new study in acquisition, if a PPS Manager is configured in its host table.

(2) Presentation context Table – MPPS N-CREATE

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 11 for MPPS N-CREATE event, *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 12.

Table 11 MPPS N-CREATE Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 12 MPPS N-CREATE Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Modality Performed Procedure Step SOP class	1.2.840.10008.3.1.2.3.3	all from Table 11	SCU	None

(3) SOP Specific Conformance

DAR-9400f / DAR-9500f provides the following table describes the supported attributes of a **N-CREATE** message.

Table 13 Performed Procedure Step N-CREATE Attributes

Tag	VR	Attribute Name	Value of N-CREATE
SOP Common Module			
(0008,0005)	CS	Specific Character Set	ISO IR 6 ISO IR 100 ISO 2022 IR87
Performed Procedure Step Relationship Module			
(0010,0010)	PN	Patient's Name	From Modality Worklist or user input
(0010,0020)	LO	Patient ID	From Modality Worklist or user input
(0010,0030)	DA	Patient's Birth Date	From Modality Worklist or user input
(0010,0040)	CS	Patient's Sex	From Modality Worklist or user input
(0008,1120)	SQ	Referenced Patient Sequence	Zero length
>(0008,1150)	UI	Referenced SOP Class UID	N.A.
>(0008,1155)	UI	Referenced SOP Instance UID	N.A.
>(0020,000D)	UI	Study Instance UID	From Modality Worklist
>(0008,1110)	SQ	Referenced Study Sequence	Zero length
>(0008,0050)	SH	Accession Number	From Modality Worklist or user input
>(0032,1060)	LO	Requested Procedure Description	From Modality Worklist
>(0040,0009)	SH	Scheduled Procedure Step ID	From Modality Worklist
>(0040,0007)	LO	Scheduled Procedure Step Description	From Modality Worklist
>(0040,0008)	SQ	Scheduled Protocol Code Sequence	Zero length
(0040,0270)	SQ	Scheduled Step Attributes Sequence	Zero length
>(0040,1001)	SH	Requested Procedure ID	From Modality Worklist
Performed Procedure Step Information Module			
(0040,0241)	AE	Performed Station AE Title	MPPS AE Title
(0040,0242)	SH	Performed Station Name	From configuration
(0040,0243)	SH	Performed Location	Zero length
(0040,0244)	DA	Performed Procedure Step Start Time	Actual start date
(0040,0245)	TM	Performed Procedure Step Start Time	Actual start time
(0040,0250)	DA	Performed Procedure Step End Date	Zero length
(0040,0251)	TM	Performed Procedure Step End Time	Zero length
(0040,0252)	CS	Performed Procedure Step Status	IN PROGRESS
(0040,0253)	SH	Performed Procedure Step ID	Automatically created
(0040,0254)	LO	Performed Procedure Step Description	Zero length
(0040,0255)	LO	Performed Procedure Type Description	Zero length
(0008,1032)	SQ	Procedure Code Sequence	Zero length
(0040,0281)	SQ	Performed Procedure Step Discontinuation Reason Code Sequence	N.A.
>(0008,0100)	SH	Code Value	N.A.
>(0008,0102)	SH	Coding Scheme Designator	N.A.
>(0008,0104)	LO	Code Meaning	N.A.

Tag	VR	Attribute Name	Value of N-CREATE
Image Acquisition Result Module			
(0008,0060)	CS	Modality	XA
(0020,0010)	SH	Study ID	From Modality Worklist or user input
(0040,0260)	SQ	Performed Protocol Code Sequence	Zero or more items
>(0008,0100)	SH	Code Value	An appropriate value will be sent if Sequence Item is present.
>(0008,0102)	SH	Coding Scheme Designator	An appropriate value will be sent if Sequence Item is present.
>(0008,0103)	SH	Coding Scheme Version	An appropriate value will be sent if Sequence Item is present.
>(0008,0104)	LO	Code Meaning	An appropriate value will be sent if Sequence Item is present.
(0040,0340)	SQ	Performed Series Sequence	Zero length
>(0008,1050)	PN	Performing Physician's Name	N.A.
>(0008,1070)	PN	Operator's Name	N.A.
>(0018,1030)	LO	Protocol Name	N.A.
>(0020,000E)	UI	Series Instance UID	N.A.
>(0008,103E)	LO	Series Description	N.A.
>(0008,0054)	AE	Retrieve AE Title	N.A.
>(0008,1140)	SQ	Referenced Image Sequence	N.A.
>(0040,0220)	SQ	Referenced Standalone SOP Instance Seq.	N.A.
Radiation Dose Module			
(0008,2229)	SQ	Anatomic Structure, Space or Region Sequence	No length
>(0008,0100)	SH	Code Value	N.A.
>(0008,0102)	SH	Coding Scheme Designator	N.A.
>(0008,0104)	LO	Code Meaning	N.A.
(0040,0300)	US	Total Time of Fluoroscopy	Zero length
(0040,0301)	US	Total Number of Exposures	Zero length
(0040,0302)	US	Entrance Dose	Zero length
(0040,8302)	DS	Entrance Dose in mGy	Zero length
(0018,115E)	DS	Image and Fluoroscopy Area Dose Product	Zero length
(0040,0310)	ST	Comments on Radiation Dose	Zero length
(0040,030E)	SQ	Exposure Dose Sequence	Zero length
>(0018,115A)	CS	Radiation Mode	N.A.
>(0018,0060)	DS	KVp	N.A.
>(0018,8151)	DS	X-Ray Tube Current in μA	N.A.
>(0018,1150)	IS	Exposure Time	N.A.
>(0018,1160)	SH	Filter Type	N.A.
>(0018,7050)	CS	Filter Material	N.A.
>(0040,0310)	ST	Comments on Radiation Dose	N.A.

Enable to send the following attributes from *DAR-9400f* Ver.4.2 or later version and *DAR-9500f* Ver.5.2.40 or later version.

3.1.2.8. Real World Activity – Close a study in acquisition

(1) Associated Real World Activity – close a study in acquisition

DAR-9400f / DAR-9500f will issue an MPPS N-SET event when a user of *DAR-9400f / DAR-9500f* closes a study in acquisition, if a PPS Manager is configured in its host table.

(2) Presentation context Table – MPPS N-SET

DAR-9400f / DAR-9500f supports the transfer syntaxes listed in Table 14 for MPPS N-SET event; *DAR-9400f / DAR-9500f* supports the Presentation Contexts listed in Table 15.

Table 14 MPPS N-SET Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 15 MPPS N-CREATE Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Modality Performed Procedure Step SOP class	1.2.840.10008.3.1.2.3.3	all from Table 14	SCU	None

(3) SOP Specific Conformance

DAR-9400f / DAR-9500f provides the following table describes the supported attributes of a **N-SET** message.

Table 16 Performed Procedure Step N-SET Attributes

Tag	VR	Attribute Name	Value of N-SET
SOP Common Module			
(0008,0005)	CS	Specific Character Set	N.A.
Performed Procedure Step Relationship Module			
(0010,0010)	PN	Patient's Name	N.A.
(0010,0020)	LO	Patient ID	N.A.
(0010,0030)	DA	Patient's Birth Date	N.A.
(0010,0040)	CS	Patient's Sex	N.A.
(0008,1120)	SQ	Referenced Patient Sequence	N.A.
>(0008,1150)	UI	Referenced SOP Class UID	An appropriate value will be sent
>(0008,1155)	UI	Referenced SOP Instance UID	An appropriate value will be sent
>(0020,000D)	UI	Study Instance UID	N.A.
>(0008,1110)	SQ	Referenced Study Sequence	N.A.
>(0008,0050)	SH	Accession Number	N.A.
>(0032,1060)	LO	Requested Procedure Description	N.A.
>(0040,0009)	SH	Scheduled Procedure Step ID	N.A.
>(0040,0007)	LO	Scheduled Procedure Step Description	N.A.
>(0040,0008)	SQ	Scheduled Protocol Code Sequence	N.A.
(0040,0270)	SQ	Scheduled Step Attributes Sequence	N.A.
>(0040,1001)	SH	Requested Procedure ID	N.A.
Performed Procedure Step Information Module			
(0040,0241)	AE	Performed Station AE Title	N.A.
(0040,0242)	SH	Performed Station Name	N.A.
(0040,0243)	SH	Performed Location	N.A.
(0040,0244)	DA	Performed Procedure Step Start Time	N.A.
(0040,0245)	TM	Performed Procedure Step Start Time	N.A.
(0040,0250)	DA	Performed Procedure Step End Date	Actual end date
(0040,0251)	TM	Performed Procedure Step End Time	Actual end time
(0040,0252)	CS	Performed Procedure Step Status	DISCONTINUED or COMPLETED
(0040,0253)	SH	Performed Procedure Step ID	N.A.
(0040,0254)	LO	Performed Procedure Step Description	N.A.
(0040,0255)	LO	Performed Procedure Type Description	N.A.
(0008,1032)	SQ	Procedure Code Sequence	N.A.
(0040,0281)	SQ	Performed Procedure Step Discontinuation Reason Code Sequence	Zero length
>(0008,0100)	SH	Code Value	An appropriate value will be sent if Sequence Item is present.
>(0008,0102)	SH	Coding Scheme Designator	An appropriate value will be sent if Sequence Item is present.
>(0008,0104)	LO	Code Meaning	An appropriate value will be sent if Sequence Item is present.

Tag	VR	Attribute Name	Value of N-SET
Image Acquisition Result Module			
(0008,0060)	CS	Modality	N.A.
(0020,0010)	SH	Study ID	N.A.
(0040,0260)	SQ	Performed Protocol Code Sequence	Zero or more items
>(0008,0100)	SH	Code Value	An appropriate value will be sent if Sequence Item is present.
>(0008,0102)	SH	Coding Scheme Designator	An appropriate value will be sent if Sequence Item is present.
>(0008,0103)	SH	Coding Scheme Version	An appropriate value will be sent if Sequence Item is present.
>(0008,0104)	LO	Code Meaning	An appropriate value will be sent if Sequence Item is present.
(0040,0340)	SQ	Performed Series Sequence	One or more items
>(0008,1050)	PN	Performing Physician's Name	An appropriate value will be sent
>(0008,1070)	PN	Operator's Name	Zero length
>(0018,1030)	LO	Protocol Name	An appropriate value will be sent
>(0020,000E)	UI	Series Instance UID	An appropriate value will be sent
>(0008,103E)	LO	Series Description	An appropriate value will be sent
>(0008,0054)	AE	Retrieve AE Title	An appropriate value will be sent
>(0008,1140)	SQ	Referenced Image Sequence	One or more items.
>(0040,0220)	SQ	Referenced Standalone SOP Instance Seq.	Zero length
Radiation Dose Module			
(0008,2229)	SQ	Anatomic Structure, Space or Region Sequence	One or more items
>(0008,0100)	SH	Code Value	An appropriate value will be sent if Sequence Item is present.
>(0008,0102)	SH	Coding Scheme Designator	An appropriate value will be sent if Sequence Item is present.
>(0008,0104)	LO	Code Meaning	An appropriate value will be sent if Sequence Item is present.
(0040,0300)	US	Total Time of Fluoroscopy	Actual total time of fluoroscopy
(0040,0301)	US	Total Number of Exposures	Actual total number of exposures
(0040,0302)	US	Entrance Dose	Actual entrance Dose in dGy
(0040,8302)	DS	Entrance Dose in mGy	Actual entrance Dose in mGy
(0018,115E)	DS	Image and Fluoroscopy Area Dose Product	Actual image area dose product
(0040,0310)	ST	Comments on Radiation Dose	
(0040,030E)	SQ	Exposure Dose Sequence	One or more items
>(0018,115A)	CS	Radiation Mode	Specified X-Ray radiation mode
>(0018,0060)	DS	KVp	Peak kilo voltage output of the x-ray generator
>(0018,8151)	DS	X-Ray Tube Current in µA	X-Ray tube current in µA
>(0018,1150)	IS	Exposure Time	The time of X-Ray exposure
>(0018,1160)	SH	Filter Type	Type of filter(s)
>(0018,7050)	CS	Filter Material	The X-Ray absorbing material used in the filter
>(0040,0310)	ST	Comments on Radiation Dose	User-defined comments on any special conditions

Enable to send the "Radiation Dose Module" from *DAR-9400f* Ver.4.2 or later version and *DAR-9500f* Ver.5.2.40 or later version.

3.1.3. Association Acceptance Policy

3.1.3.1. Real World Activity – Store Received Images and Dose Information

(1) Associated Real World Activity – Store Received Images
DAR-9400f / DAR-9500f will archive images that are sent to it from an *SCU*.

(2) Presentation Context Table – Store Received Images
DAR-9400f / DAR-9500f supports the following transfer syntaxes listed in Table 17.

Table 17 Storage Transfer Syntaxes

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
SOP Class	**SOP Class UID**	**Name List**	**UID List**		
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR LittleEndian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossless, hierarchical, first order prediction	1.2.840.10008.1.2.4.70		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR LittleEndian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		JPEG Lossless, hierarchical, first order prediction	1.2.840.10008.1.2.4.70		
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

DAR-9400f / DAR-9500f returns one of the following status codes (Table 18).

Table 18 Storage status codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Refused	Out of resources	A700		Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions available in *DAR-9400f / DAR-9500f*.
	SOP Class not supported	A800		Indicates that the SOP Class of the Image in the **C-Store** operation did not match the Abstract Syntax negotiated for the Presentation Context.
Error	Data set does not match SOP Class	A900		Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Failed	C000		The operation was not successful.
	Cannot understand	C005		Indicates that the Data Set cannot be parsed into elements by *DAR-9400f / DAR-9500f*.
Warning	Coercion of data elements	B000		Data elements were modified before being stored.
	Data set does not match SOP Class	B007		Indicates that the Data Set does not match the SOP Class, but that the image was stored anyway.
	Elements Discarded	B006		Indicates that some of the elements of the Data Set were discarded.
	Duplicate SOP Instance UID	D000		Indicates that the SOP Instance UID of the specified image is already stored in the database.
Success	Success	0000		Operation performed properly.

(3) Presentation Context Acceptance Criterion – Store Received Images

DAR-9400f / DAR-9500f will accept any number of **Storage** Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.
The acceptable Presentation Contexts which *DAR-9400f / DAR-9500f* may accept are specified in Table 10. *DAR-9400f / DAR-9500f* will examine proposed Presentation Contexts in the order proposed. The first acceptable Presentation Context (other than Verification) determines the Abstract Syntax which will be used for the association.

3.2. DAR-9400f / DAR-9500f Storage Media Application Profile Conformance Statement

DAR-9400f / DAR-9500f Media Storage AE conforms to following application profiles.

Table 19 Supported Application Profile

Supported APS	Real World Activity	Role	SC Option
DAR-9400f/DAR-9500f	Read CD-R	FSR	Interchange
	Write CD-R	FSC	Interchange

3.2.1. Real World Activity – Read CD

The *DAR-9400f / DAR-9500f* acts as a DICOM FSR with Interchange Service Class Option for images of SOP class in **Table 20**.

Table 20 Supported SOP classes as FSR

SOP Class	SOP Class UID
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
Secondary Capture Image storage	1.2.840.10008.5.1.4.1.1.7

3.2.1.1. Media Storage Application Profile

Read CD-R applies the following profile.

Table 21 Supported Application Profile for Read CD-R

Supported APS	Real World Activity	Role	SC Option
DAR-9400f/DAR-9500f	Read CD-R	FSR	Interchange

3.2.1.2. Real World Activity – Write CD

The *DAR-9400f / DAR-9500f* acts as a DICOM FSC with Interchange Service Class Option for images of SOP class in **Table 22**.

Table 22 Supported SOP classes as FSR

SOP Class	SOP Class UID
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
Secondary Capture Image storage	1.2.840.10008.5.1.4.1.1.7

3.2.1.3. Media Storage Application Profile

Write CD-R applies the following profile

Table 23 Supported Application Profile for Write CD-R

Supported APS	Real World Activity	Role	SC Option
DAR-9400f/DAR-9500f	Write CD-R	FSC	Interchange

3.3. Storage Commitment Conformance

3.3.1.1. Introduction

The *DAR-9400f / DAR-9500f* system implements the DICOM Storage Commitment Push Model SOP Class. This system supports Storage Commitment as an SCU only.

3.3.1.2. Real World Activity – Storage as SCU

1- The Real-World activity that will cause the *DAR-9400f / DAR-9500f* to initiate an association to a remote DICOM entity that is a Service Class Provider (SCP) of the Storage Commitment SOP class is choosing a remote DICOM AE that supports Storage Commitment as provider as the archive device.
2- Then acquiring images using the CathLab. The acquired images to be committed are sent to the remote SCP entity first. The Commitment request for the transferred image instances is sent after the complete image transfer and the closure of the study.
The closure of the study is initiated by the user.
3- The Commitment response has to come on a different association.
4- The expected Real-World activity "Set Archive State" is performed by the DICOM Server AE to respond to an incoming Storage Commitment response from the remote DICOM AE.

3.3.1.3. Functional definitions

1- *DAR-9400f / DAR-9500f* initiates the following operations:
   a. Negotiate and establish association with remote Storage Commitment Provider
   b. Send the acquired images to the remote DICOM AE SCP configured as the primary archive using C-STORE.
   c. Close the association.
   d. If there are any failures in the C-STORE for images
      i. The job will be marked as failed
      ii. The Storage Commitment request will not be sent for the failed STORE images.
      iii. The image C-STORE of the failed jobs will be retried continuously until successful.
   e. If all the images are transferred (C-STORE) without failures the following steps will be executed.
      i. Establish a new association for sending the commitment request.
         1. The storage commitment request is done on a "Per study" basis.
         2. The storage commitment request will contain all SOP instance UID of all the successfully stored images for a particular study.
      ii. Receive the response on same association or on a different association.
      iii. Updates the archive flag information for successful instances.
   f. When the files are successfully committed they become eligible for automatic deletion.
   g. Each file for which the system receives a "STORAGE COMITMENT failure" status is resent and a new storage commit process is started. After N unsuccessful retries (N configurable in the GUI) the user is notified.

3.3.1.4. Sequencing of real-world activities

1- The user has to declare a new study using the GUI
2- The user has to acquire new images
3- The user has to close the study.

4. Communication Profiles

DAR-9400f / DAR-9500f provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard.

4.1. TCP/IP Stack

DAR-9400f / DAR-9500f inherits its TCP/IP stack from the computer upon which it executes.

4.1.1. Physical media support

DAR-9400f / DAR-9500f is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the system upon which it executes.

4.2. Extensions/Specialization/Privatization

NA

4.3. Configuration

4.3.1. AE Title/Presentation address Mapping

DAR-9400f / DAR-9500f maps Application Entity titles to host name and port number via an internal configuration method. The mapping can be accessed in the configuration menu under the Database tab. Only a privileged user can change the mapping.
DAR-9400f / DAR-9500f is connected to network via a router. There are 2 or 3 computers running behind the router, and each computer could be as Storage SCU and Storage Commitment SCU.
Therefore, the same IP addresses, 3 AE titles and ports settings might be needed for the system which implements the service class SCP.
For other service class, only one computer could be SCU, so an IP address and AE title should be set.

4.3.2. Configurable parameters

DAR-9400f / DAR-9500f receives its configuration parameters from the user through the AE's GUI.
Configurable parameters are:

1. Local/remote application Entity title
2. Local/remote host name
3. Local/remote TCP/IP port
4. MAX PDU size
5. Time out for association
6. Time out for sub-operations
7. Machine serial Number
8. IHE configurations

4.4. Support for Extended Character Sets

DAR-9400f / DAR-9500f is known to support the following character sets:

Table 24 Supported Character Sets

ISO-IR 100 (default)	Latin Alphabet No. 1
ISO-IR 6	Basic G0 Set
ISO-IR 87	Japanese

5. UID Generation

This section will describe how UID are generated by the *DAR-9400f / DAR-9500f* system.

5.1. Definitions

Serial Number: A thirteen digit maximum, number unique to this type of system (*DAR-9400f / DAR-9500f*).
Study Date: Date in format YYYYMMDD at which the study was created.
Study Time: Time in format HHMMSS at which the study was created.
Series Number: Type of the encoding/object:
1: Lossless Cine,
3: Little Endian Implicit Cine,
13: Annotated images,
15: Reference Image,
51: DSA Lossless Cine
53: DSA Little Endian Implicit Cine
Instance Number: Sequential Number of the DICOM object generated by the *DAR-9400f / DAR-9500f* for all objects of the same type in the same study.
Instance Date: Date in format YYYYMMDD at which the image was created.
Instance Time: Time formatted HHMMSS.
Instance MS: The milliseconds portion of the time at which the image was created in format mmm.

5.2. Root and implementation class UID

DAR-9400f / DAR-9500f **root is 1.2.392.200036.9110**
Acquisition station: **Implementation Class UID** = **<Root>.13.<Serial Number>**
Review station: **Implementation Class UID** = **<Root>.14.<Serial Number>**

For the Anonymize function:
This root is used only when competitor's files are being anonymized. Otherwise, the above roots are used.
DAR-9400f / DAR-9500f **Root for anonymization** = **<Root>.66**
Acquisition station: **Implementation Class UID** = **<Root>.66.13.<Serial Number>**
Review station: **Implementation Class UID** = **<Root>.66.14.<Serial Number>**

5.3. Study UID

Study Instance UID = <ImplementationClassUID>.<StudyDate>.<StudyTime>

5.4. Series UID

Series Instance UID= <StudyInstanceUID>.<SeriesNumber>

5.5. SOP instance UID

The Instance sequential number is a number that is generated by the *DAR-9400f / DAR-9500f* sequentially for each new sequence of the same type is a study.

1- **Cine files**

<SeriesInstanceUID>.<Instance Number>

2- **Annotated files**

<ImplementationClassUID>.<InstanceDate>.<InstanceTime>.<SeriesNumber>.<InstanceMS>

3- **Reference Image files**

<ImplementationClassUID>.<InstanceDate>.<InstanceTime>.<SeriesNumber>.<InstanceMS>

4- **Anonymized files**

<ImplementationClassUID(anonymize)>.<SerialNumber>.<InstanceDate>.<InstanceTime>.<SeriesNumber>.<InstanceMS>

6. Information Object Definitions

This system generates the following images.

X-ray Angiographic Image

DA image:	X-ray radiography image (Live image) that is used for such as cardiac catheterization study.
3D-DA image:	X-ray image (Live image) that acquires the image by rotating C-arm for 3D reconstruction.
DSA image:	Subtraction image (Live image) that is used for such as head study.

* This is a live image normally, but when using Gate Way, the subtracted image can be sent.

Reference image:	Reference image that represents a selected 1 frame of X-ray radiography image.

* For DA and DSA, those images would be Single-plane or Bi-plane image depending on the system configuration and radiography program.

Secondary Capture Image

Photo File:	Still image file that captured the X-ray radiography image.

RDSR

RDSR:	Used for study record information such as dose information determined in DICOM standard as Structured Report format.

The following DICOM tag is in each image.
(This conformance is described on *DAR-9400f* Ver.4.2 and *DAR-9500f* Ver5.2.40)

6.1. X-ray Angiographic Image

6.1.1. Dicom Meta Information

Tag	VR	Type	Attribute Name	Remarks
(0002,0000)	UL	1	File Meta Information Group Length	
(0002,0001)	OB	1	File Meta Information Version	
(0002,0002)	UI	1	Media Storage SOP Class UID	
(0002,0003)	UI	1	Media Storage SOP Instance UID	
(0002,0010)	UI	1	Transfer Syntax UID	
(0002,0012)	UI	1	Implementation Class UID	
(0002,0013)	SH	3	Implementation Version Name	
(0002,0016)	AE	3	Source Application Entity Title	

6.1.2. Patient Module

Tag	VR	Type	Attribute Name	Remarks
(0010,0010)	PN	2	Patient's Name	
(0010,0020)	LO	2	Patient ID	
(0010,0030)	DA	2	Patient's Birth Date	
(0010,0040)	CS	2	Patient's Sex	

6.1.3. General Study Module

Tag	VR	Type	Attribute Name	Remarks
(0020,000D)	UI	1	Study Instance UID	
(0008,0020)	DA	2	Study Date	
(0008,0030)	TM	2	Study Time	
(0008,0050)	SH	2	Accession Number	
(0008,0090)	PN	2	Referring Physician's Name	
(0020,0010)	SH	2	Study ID	
(0008,1030)	LO	3	Study Description	

6.1.4. Patient Study Module

Tag	VR	Type	Attribute Name	Remarks
(0010,1020)	DS	3	Patient's Size	
(0010,1030)	DS	3	Patient's Weight	

6.1.5. General Series Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0060)	CS	1	Modality	
(0020,000E)	UI	1	Series Instance UID	
(0020,0011)	IS	2	Series Number	
(0020,0060)	CS	2C	Laterality	
(0008,0021)	DA	3	Series Date	
(0008,0031)	TM	3	Series Time	
(0008,103E)	LO	3	Series Description	
(0008,1050)	PN	3	Performing Physician's Name	
(0008,1070)	PN	3	Operator's Name	
(0018,0015)	CS	3	Body Part Examined	
(0018,5100)	CS	2C	Patient Position	

6.1.6. General Equipment Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0070)	LO	2	Manufacturer	
(0008,0080)	LO	3	Institution Name	
(0008,0081)	ST	3	Institution Address	
(0008,1010)	SH	3	Station Name	
(0008,1040)	LO	3	Institutional Department Name	
(0018,1020)	LO	3	Software Version(s)	

6.1.7. Contrast/Bolus Module

Tag	VR	Type	Attribute Name	Remarks
(0018,0010)	LO	2	Contrast/Bolus Agent	
(0018,1042)	TM	3	Contrast/Bolus Start Time	

6.1.8. Cine Module

Tag	VR	Type	Attribute Name	Remarks
(0018,1065)	DS	1C	Frame Time Vector	Not available on Reference image.
(0008,2144)	IS	3	Recommended Display Frame Rate	Not available on Reference image.
(0018,0040)	IS	3	Cine Rate	Only Fluoro image

6.1.9. Multi-Frame Module

Tag	VR	Type	Attribute Name	Remarks
(0028,0008)	IS	1	Number of Frames	Not available on Reference image.
(0028,0009)	AT	1	Frame Increment Pointer	Not available on Reference image.

6.1.10. Frame Pointers Module

Tag	VR	Type	Attribute Name	Remarks
(0028,6010)	US	3	Representative Frame Number	Not available on Reference image.
(0028,6020)	US	3	Frame Numbers of Interest (FOI)	Not available on Reference image.
(0028,6022)	LO	3	Frame(s) of Interest Description	Not available on Reference image.

6.1.11. Mask Module

(This module is available only if the image is DSA.)

Tag	VR	Type	Attribute Name	Remarks
(0028,6100)	SQ	1	Mask Subtraction Sequence	Present in original DICOM file, not in processed DICOM file
>(0028,6101)	CS	1	Mask Operation	Present in original DICOM file, not in processed DICOM file
>(0028,6110)	US	1C	Mask Frame Numbers	Present in original DICOM file, not in processed DICOM file
>(0028,6112)	US	3	Contrast Frame Averaging	Present in original DICOM file, not in processed DICOM file
>(0028,6114)	FL	3	Mask Sub-pixel Shift	Present in original DICOM file, not in processed DICOM file
>(0028,6190)	ST	3	Mask Operation Explanation	Present in original DICOM file, not in processed DICOM file
(0028,1090)	CS	2	Recommended Viewing Mode	Present in original DICOM file, not in processed DICOM file

6.1.12. Display Shutter Module

Tag	VR	Type	Attribute Name	Remarks
(0018,1600)	CS	1	Shutter Shape	Present in original DICOM file, not in processed DICOM file
(0018,1602)	IS	1C	Shutter Left Vertical Edge	Present in original DICOM file, not in processed DICOM file
(0018,1604)	IS	1C	Shutter Right Vertical Edge	Present in original DICOM file, not in processed DICOM file
(0018,1606)	IS	1C	Shutter Upper Horizontal Edge	Present in original DICOM file, not in processed DICOM file
(0018,1608)	IS	1C	Shutter Lower Horizontal Edge	Present in original DICOM file, not in processed

				DICOM file
(0018,1622)	US	3	Shutter Presentation Value	Present in original DICOM file, not in processed DICOM file

6.1.13. General Image Module

Tag	VR	Type	Attribute Name	Remarks
(0020,0013)	IS	2	Instance Number	
(0008,0023)	DA	2C	Content Date	
(0008,0033)	TM	2C	Content Time	
(0020,0020)	CS	2C	Patient Orientation	
(0008,0022)	DA	3	Acquisition Date	
(0008,0032)	TM	3	Acquisition	
(0008,2111)	ST	3	Derivation Description	This tag is present in processed DICOM file but not in original DICOM file. Value is "SUBTRACTED" or “ENHANCED”
(0020,4000)	LT	3	Image Comments	

6.1.14. Image Pixel Module

Tag	VR	Type	Attribute Name	Remarks
(0028,0010)	US	1	Rows	
(0028,0011)	US	1	Columns	
(7FE0,0010)	OW	1	Pixel Data	

6.1.15. X-ray Image Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0008)	CS	1	Image Type	
(0028,0002)	US	1	Samples per Pixel	
(0028,0004)	CS	1	Photometric Interpretation	
(0028,0100)	US	1	Bits Allocated	
(0028,0101)	US	1	Bits Stored	
(0028,0102)	US	1	High Bit	
(0028,0103)	US	1	Pixel Representation	
(0028,1040)	CS	1	Pixel Intensity Relationship	
(0008,1140)	SQ	1C	Referenced Image Sequence	Available on Reference, Bi-plane DA and Bi-plane DSA image.
>(0008,1150)	UI	3	Referenced SOP Class UID	Available on Reference, Bi-plane DA and Bi-plane DSA image.
>(0008,1155)	UI	3	Referenced SOP Instance UID	Available on Reference, Bi-plane DA and Bi-plane DSA image.

6.1.16. Curve Module

Tag	VR	Type	Attribute Name	Remarks
(5000,0005)	US	1	Curve Dimensions	Available when ECG is connected.
(5000,0010)	US	1	Number of Points	Available when ECG is connected.
(5000,0020)	CS	1	Type of Data	Available when ECG is connected.
(5000,0030)	SH	3	Axis Units	Available when ECG is connected.
(5000,0103)	US	1	Data Value Representation	Available when ECG is connected.
(5000,3000)	OW	1	Curve Data	Available when ECG is connected.
(5000,0110)	US	1C	Curve Data Descriptor	Available when ECG is connected.
(5000,0112)	US	1C	Coordinate Start Value	Available when ECG is connected.
(5000,0114)	US	1C	Coordinate Step Value	Available when ECG is connected. The unit DPPS:data points per seconds.
(5000,0022)	LO	3	Curve Description	Available when ECG is connected.
(5000,0030)	SH	3	Axis Units	Available when ECG is connected.
(5000,2500)	LO	3	Curve Label	Available when ECG is connected.

6.1.17. X-Ray Acquisition Module

Tag	VR	Type	Attribute Name	Remarks
(0018,1155)	CS	1	Radiation Setting	
(0018,0060)	DS	2	KVP	
(0018,1147)	CS	3	Field of View Shape	
(0018,1149)	IS	3	Field of View Dimension(s)	
(0018,1150)	IS	2C	Exposure Time	
(0018,1151)	IS	2C	X-Ray Tube Current	
(0018,1152)	IS	2C	Exposure	
(0018,1154)	DS	3	Average Pulse Width	
(0018,1155)	CS	1	Radiation Setting	
(0018,115A)	CS	3	Radiation Mode	
(0018,115E)	DS	3	Image Area Dose Product	Available when dosimeter is connected, but not available on 3D-DA image.
(0018,1164)	DS	3	Image Pixel Spacing	
(0018,1166)	CS	3	Grid	
(0018,1190)	DS	3	Focal Spot(s)	
(0018,8150)	DS	3	Exposure Time (us)	
(0028,0030)	DS	1C	Pixel Spacing	
(0028,0A02)	CS	3	Pixel Spacing Calibration Type	
(0028,0A04)	LO	1C	Pixel Spacing Calibration Description	
(0040,8302)	DS	3	Entrance Dose in mGy	

6.1.18. X-Ray Collimator Module

Tag	VR	Type	Attribute Name	Remarks
(0018,1700)	CS	1	Collimator Shape	
(0018,1702)	IS	1C	Collimator Left Vertical Edge	
(0018,1704)	IS	1C	Collimator Right Vertical Edge	
(0018,1706)	IS	1C	Collimator Upper Horizontal Edge	
(0018,1708)	IS	1C	Collimator Lower Horizontal Edge	
(0018,1720)	IS	1C	Vertices of the Polygonal Collimator	

6.1.19. XA Positioner Module

Tag	VR	Type	Attribute Name	Remarks
(0018,1510)	DS	2	Positioner Primary Angle	
(0018,1511)	DS	2	Positioner Secondary Angle	
(0018,1500)	CS	2C	Positioner Motion	
(0018,1520)	DS	2C	Positioner Primary Angle Increment	Available on 3D-DA image.
(0018,1521)	DS	2C	Positioner Secondary Angle Increment	Available on 3D-DA image.
(0018,1110)	DS	3	Distance Source to Detector	
(0018,1111)	DS	3	Distance Source to Patient	
(0018,1114)	DS	3	Estimated Radiographic Magnification Factor	
(0018,1530)	DS	3	Detector Primary Angle	Available on 3D and rotational image.
(0018,1531)	DS	3	Detector Secondary Angle	Available on 3D and rotational image.

6.1.20. SOP Common Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0005)	CS	1C	Specific Character Set	
(0008,0016)	UI	1C	SOP Class UID	
(0008,0018)	UI	1C	SOP Instance UID	
(0008,0012)	DA	3	Instance Creation Date	
(0008,0013)	TM	3	Instance Creation Time	

6.1.21. VOI LUT Module

Tag	VR	Type	Attribute Name	Remarks
(0028,1051)	DS	1C	Window Width	
(0028,1050)	DS	3	Window Center	

6.1.22. Additional Attributes Module

Tag	VR	Type	Attribute Name	Remarks
(0008,1160)	IS	3	Referenced Frame Number	Available on Reference image.
(0018,1160)	SH	3	Filter Type	
(0018,7050)	CS	3	Filter Material	
(0018,7052)	DS	3	Filter Thickness Minimum	
(0018,7054)	DS	3	Filter Thickness Maximum	

6.2. Secondary Capture Image

6.2.1. Dicom Meta Information

Tag	VR	Type	Attribute Name	Remarks
(0002,0000)	UL	1	File Meta Information Group Length	
(0002,0001)	OB	1	File Meta Information Version	
(0002,0002)	UI	1	Media Storage SOP Class UID	
(0002,0003)	UI	1	Media Storage SOP Instance UID	
(0002,0010)	UI	1	Transfer Syntax UID	
(0002,0012)	UI	1	Implementation Class UID	
(0002,0013)	SH	3	Implementation Version Name	
(0002,0016)	AE	3	Source Application Entity Title	

6.2.2. Patient Module

Tag	VR	Type	Attribute Name	Remarks
(0010,0010)	PN	2	Patient's Name	
(0010,0020)	LO	2	Patient ID	
(0010,0030)	DA	2	Patient's Birth Date	
(0010,0040)	CS	2	Patient's Sex	

6.2.3. General Study Module

Tag	VR	Type	Attribute Name	Remarks
(0020,000D)	UI	1	Study Instance UID	
(0008,0020)	DA	2	Study Date	
(0008,0030)	TM	2	Study Time	
(0008,0050)	SH	2	Accession Number	
(0008,0090)	PN	2	Referring Physician's Name	
(0020,0010)	SH	2	Study ID	
(0008,1030)	LO	3	Study Description	

6.2.4. Patient Study Module

Tag	VR	Type	Attribute Name	Remarks
(0010,1020)	DS	3	Patient's Size	
(0010,1030)	DS	3	Patient's Weight	

6.2.5. General Series Module

Tag	VR	Type	Attribute Name	Remarks
(0020,000E)	UI	1	Series Instance UID	
(0020,0011)	IS	2	Series Number	
(0020,0060)	CS	2C	Laterality	
(0008,0021)	DA	3	Series Date	
(0008,0031)	TM	3	Series Time	
(0008,103E)	LO	3	Series Description	
(0008,1050)	PN	3	Performing Physician's Name	
(0008,1070)	PN	3	Operators' Name	
(0018,0015)	CS	3	Body Part Examined	
(0018,5100)	CS	2C	Patient Position	

6.2.6. General Equipment Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0070)	LO	2	Manufacturer	
(0008,0080)	LO	3	Institution Name	
(0008,0081)	ST	3	Institution Address	
(0008,1010)	SH	3	Station Name	
(0008,1040)	LO	3	Institutional Department Name	
(0018,1020)	LO	3	Software Version(s)	

6.2.7. SC Equipment Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0064)	CS	1	Conversion Type	
(0008,0060)	CS	3	Modality	

6.2.8. General Image Module

Tag	VR	Type	Attribute Name	Remarks
(0020,0013)	IS	2	Instance Number	
(0008,0023)	DA	2C	Content Date	
(0008,0033)	TM	2C	Content Time	
(0020,0020)	CS	2C	Patient Orientation	
(0008,0008)	CS	3	Image Type	
(0008,0022)	DA	3	Acquisition Date	
(0008,0032)	TM	3	Acquisition Time	
(0008,2111)	ST	3	Derivation Description	
(0020,4000)	LT	3	Image Comments	
(0008,1140)	SQ	3	Referenced Image Sequence	
>(0008,1150)	UI	3	Referenced SOP Class UID	
>(0008,1155)	UI	3	Referenced SOP Instance UID	

6.2.9. ImagePixel Module

Tag	VR	Type	Attribute Name	Remarks
(0028,0002)	US	1	Samples per Pixel	
(0028,0004)	CS	1	Photometric Interpretation	
(0028,0010)	US	1	Rows	
(0028,0011)	US	1	Columns	
(0028,0100)	US	1	Bits Allocated	
(0028,0101)	US	1	Bits Stored	
(0028,0102)	US	1	High Bit	
(0028,0103)	US	1	Pixel Representation	
(7FE0,0010)	OW	1	Pixel Data	

6.2.10. SC Image Module

Tag	VR	Type	Attribute Name	Remarks
(0028,0030)	DS	1C	Pixel Spacing	
(0028,0A02)	CS	3	Pixel Spacing Calibration Type	
(0028,0A04)	LO	1C	Pixel Spacing Calibration Description	

6.2.11. SOP Common Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0005)	CS	1C	Specific Character Set	
(0008,0016)	UI	1C	SOP Class UID	
(0008,0018)	UI	1C	SOP Instance UID	
(0008,0012)	DA	3	Instance Creation Date	
(0008,0013)	TM	3	Instance Creation Time	

6.2.12. VOI LUT Module

Tag	VR	Type	Attribute Name	Remarks
(0028,1051)	DS	1C	Window Width	
(0028,1050)	DS	3	Window Center	

6.2.13. Additional Attributes Module

Tag	VR	Type	Attribute Name	Remarks
(0008,1160)	IS	3	Referenced Frame Number	
(0018,1154)	DS	3	Average Pulse Width	
(0018,1160)	SH	3	Filter Type	
(0018,7050)	CS	3	Filter Material	
(0018,7052)	DS	3	Filter Thickness Minimum	
(0018,7054)	DS	3	Filter Thickness Maximum	
(0028,1040)	CS	3	Pixel Intensity Relationship	
(0040,8302)	DS	3	Entrance Dose in mGy	

6.3. RDSR

6.3.1. Dicom Meta Information

Tag	VR	Type	Attribute Name	Remarks
(0002,0000)	UL	1	File Meta Information Group Length	
(0002,0001)	OB	1	File Meta Information Version	
(0002,0002)	UI	1	Media Storage SOP Class UID	
(0002,0003)	UI	1	Media Storage SOP Instance UID	
(0002,0010)	UI	1	Transfer Syntax UID	
(0002,0012)	UI	1	Implementation Class UID	
(0002,0013)	SH	3	Implementation Version Name	
(0002,0016)	AE	3	Source Application Entity Title	

6.3.2. Patient Module

Tag	VR	Type	Attribute Name	Remarks
(0010,0010)	PN	2	Patient's Name	
(0010,0020)	LO	2	Patient ID	
(0010,0030)	DA	2	Patient's Birth Date	
(0010,0040)	CS	2	Patient's Sex	

6.3.3. General Study Module

Tag	VR	Type	Attribute Name	Remarks
(0020,000D)	UI	1	Study Instance UID	
(0008,0020)	DA	2	Study Date	
(0008,0030)	TM	2	Study Time	
(0008,0050)	SH	2	Accession Number	
(0008,0090)	PN	2	Referring Physician's Name	
(0020,0010)	SH	2	Study ID	
(0008,1030)	LO	3	Study Description	

6.3.4. Patient Study Module

Tag	VR	Type	Attribute Name	Remarks
(0010,1020)	DS	3	Patient's Size	
(0010,1030)	DS	3	Patient's Weight	

6.3.5. SR Document Series Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0060)	CS	1	Modality	
(0020,000E)	UI	1	Series Instance UID	
(0020,0011)	IS	1	Series Number	
(0008,0021)	DA	3	Series Date	
(0008,0031)	TM	3	Series Time	
(0008,103E)	LO	3	Series Description	

6.3.6. General Equipment Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0080)	LO	3	Institution Name	
(0008,0081)	ST	3	Institution Address	
(0008,1010)	SH	3	Station Name	
(0008,1040)	LO	3	Institutional Department Name	

6.3.7. Enhanced General Equipment Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0070)	LO	1	Manufacturer	
(0008,1090)	LO	1	Manufacturer's Model Name	
(0018,1000)	LO	1	Device Serial Number	
(0018,1020)	LO	1	Software Version(s)	

6.3.8. SR Document General Module

Tag	VR	Type	Attribute Name	Remarks
(0020,0013)	IS	1	Instance Number	
(0040,A491)	CS	1	Completion Flag	
(0040,A493)	CS	1	Verification Flag	
(0008,0023)	DA	1	Content Date	
(0008,0033)	TM	1	Content Time	

6.3.9. SOP Common Module

Tag	VR	Type	Attribute Name	Remarks
(0008,0005)	CS	1C	Specific Character Set	
(0008,0016)	UI	1	SOP Class UID	
(0008,0018)	UI	1	SOP Instance UID	

6.3.10. Additional Attributes Module

Tag	VR	Type	Attribute Name	Remarks
(0008,1050)	PN	3	Performing Physician's Name	
(0008,1070)	PN	3	Operators' Name	
(0018,5100)	CS	3	Patient Position	
(0040,A050)	CS	3	Continuity of Content	
(0040,A504)	SQ	3	Content Template Sequence	
(0008,0105)	CS	3	Mapping Resource	
(0040,DB00)	CS	3	Template Identifier	

6.3.11. SR Document Content Module

6.3.11.1. TID 10001 Projection X-Ray Radiation Dose

VT	Concept Name	VM	Value Set Constraint	Remarks
CONTAINER	EV(113701, DCM, "X-Ray Radiation Dose Report")	1		
CODE	EV(121058, DCM, "Procedure reported")	1	DT(113704, DCM, "Projection X-Ray")	
CODE	EV(G-C0E8, SRT, "Has Intent")	1	DCID(3629) procedure Intent	
INCLUDE	DTID(1002) Observer Context	1-n		Refer to DTID(1002).
CODE	EV(113705, DCM, "Scope of Accumulation")	1	DCID(10000) Scope of Accumulation	
UIDREF	DCID(10001) UID Types	1		
INCLUDE	DTID(10002) Accumulated X-Ray Dose	1	EV(113622, DCM, "Single Plane")	Refer to DTID(10002). For Single-plane
INCLUDE	DTID(10002) Accumulated X-Ray Dose	1	EV(113620, DCM, "Plane A")	Refer to DTID(10002). For Bi-plane Frontal
INCLUDE	DTID(10002) Accumulated X-Ray Dose	1	EV(113621, DCM, "Plane B")	Refer to DTID(10002). For Bi-plane Lateral
INCLUDE	DTID(10003) Irradiation Event X-Ray Data	1-n		
CODE	EV(113854, DCM, "Source of Dose Information")	1-n	DCID(10020) Source of Projection X-Ray Dose Information	

6.3.11.2. TID 1002 Observer Context

VT	Concept Name	VM	Value Set Constraint	Remarks
CODE	EV(121005, DCM, "Observer Type")	1	DCID(270) Observer Type	
INCLUDE	DTID(1004) Device observer identifying attributes	1		Refer to DTID (1004)

6.3.11.3. TID 1004 Device Observer Identifying Attributes

VT	Concept Name	VM	Value Set Constraint	Remarks
UIDREF	EV(121012, DCM, "Device Observer UID")	1		Implementation Class UID
TEXT	EV(121013, DCM, "Device Observer Name")	1	Defaults to value of Station Name(0008,1010) in General Equipment Module	
TEXT	EV(121014, DCM, "Device Observer Manufacturer")	1	Defaults to value of Manufacturer (0008,0070) in General Equipment Module	
TEXT	EV(121015, DCM, "Device Observer Model Name")	1	Defaults to value of Manufacturer's Model Name(0008,1090) in GeneralEquipment Module	
TEXT	EV (121016,DCM, "Device Observer Serial Number")	1	Defaults to value of DeviceSerial Number (0018,1000) in General Equipment Module	

6.3.11.4. TID 10002 Accumulated X-Ray Dose

VT	Concept Name	VM	Value Set Constraint	Remarks
CONTAINER	EV(113702, DCM, “Accumulated X-Ray Dose Data”)	1		
INCLUDE	EV(113764, DCM, “Acquisition Plane”)	1		Either one of the following: 113622, DCM, Single Plane 113620, DCM, “PlaneA” 113621, DCM, “PlaneB”
CONTAINER	EV(122505, DCM, “Calibration”)	1-n		
CODE	EV(113794,DCM, “Dose measurement”)	1	DCID(10010) Dose measurement Devices	
DATETIME	EV(113723, DCM, “Calibration Date”)	1		
NUM	EV(122322, DCM, “Calibration Factor”)	1	Units = EV(1, UCUM, “no units”)	
NUM	EV(113763, DCM, “Calibration Uncertainty”)	1	Units = EV(%, UCUM, “Percent”)	
TEXT	EV(113724, DCM, “Calibration Responsible Party”)	1		
INCLUDE	DTID(10004) Accumulated Projection X-Ray Dose	1		Refer to DTID(10004).

6.3.11.5. TID 10004 Accumulated Projection X-Ray Dose

VT	Concept Name	VM	Value Set Constraint	Remarks
NUM	EV(113722, DCM, “Dose Area Product Total”)	1	Units = EV(Gym2, UCUM, “Gym2”)	
NUM	EV(113725, DCM, “Dose (RP) Total”)	1	Units = EV(Gy, UCUM, “Gy”)	
NUM	EV(113726, DCM,”Fluoro Dose Area Product Total”)	1	Units = EV(Gy.m2, UCUM, “Gy.m2”)	
NUM	EV(113728, DCM, “Fluoro Dose (RP) Total”)	1	Units = EV(Gy, UCUM, “Gy”)	
NUM	EV(113730, DCM, “Total Fluoro Time”)	1	Units = EV(s, UCUM, “s”)	
NUM	EV(113727, DCM, “Acquisition Dose Area product Total”)	1	Units = EV(Gy.m2, UCUM, “Gy.m2”)	
NUM	EV(113729, DCM, “Acquisition Dose (RP) Total”)	1	Units = EV(Gy, UCUM, “Gy”)	
NUM	EV(113855, DCM, “Total Acquisition Time”)	1	Units = EV(s, UCUM, “s”)	
NUM	EV(113731, DCM, “Total Number of Radiographic Frames”)	1	Units = EV(1, UCUM, “no units”)	
NUM	DCID(10008) Dose related Distance Measurements	1-n	Units = EV(mm, UCUM, “mm”)	Set [Distance Source to Reference Point] of the first or the last acquisition.

6.3.11.6. TID 10003 Irradiation Event X-Ray Data

VT	Concept Name	VM	Value Set Constraint	Remarks
CONTAINER	EV(113706, DCM, “Irradiation Event X-Ray Data”)	1		
CODE	EV(113764, DCM, “Acquisition Plane “)	1	DCID(10003) Equipment Plane Identification	Either one of the following: 113620, DCM, Plane A 113621, DCM, Plane B 113622, DCM, Single
DATATIME	DT(111526, DCM, “DataTime Started”)	1		
CODE	EV(113721, DCM, “Irradiation Event Type”)	1	DCID(10002) Irradiation Event Type	
TEXT	EV(125203, DCM, “Acquisition Protocol”)	1		Set DUP name during acquisition.
CODE	EV(113780, DCM, “Reference Point Definition”)	1		
UIDREF	EV(113769, DCM, “Irradiation Event UID”)	1		
NUM	EV(122130, DCM, “Dose Area Product”)	1	Units = EV(Gy.m2, UCUM, “Gy.m2”)	
NUM	EV(113738, DCM, “Dose(RP)”)	1	Units = EV(Gy, UCUM, “Gy”)	
NUM	EV(112011, DCM, Positioner Primary Angle)	1	Units = EV(deg, UCUM, “deg”)	
NUM	EV(112012, DCM, “Positioner Secondary Angle”)	1	Units = EV(deg, UCUM, deg)	

VT	Concept Name	VM	Value Set Constraint	Remarks
NUM	EV(113739, DCM, “Positioner Primary End Angle”)	1	Units = EV(deg, UCUM, “deg”)	
NUM	EV(113740, DCM, “Positioner Secondary End Angle”)	1	Units = EV(deg, UCUM, “deg”)	
NUM	EV(113790, DCM, “Collimated Field Area”)	1	Units = EV(m2, UCUM, “m^2”)	
CONTAINER	EV(113771, DCM, “X-Ray Filter”)	1-n		
CODE	EV(113772, DCM, “X-Ray Filter Type”)	1	DCID(10007) X-Ray Filter Types	
CODE	EV(113757, DCM, “X-Ray Filter material”)	1	DCID(10006) X-Ray Filter Material	
NUM	EV(113758, DCM, “X-Ray Filter Thickness Minimum”)	1	Units = EV(mm, UCUM, “mm”)	
NUM	EV(113773, DCM, “X-Ray Filter Thickness Maximum”)	1	Units = EV(mm, UCUM, “mm”)	
CODE	EV(113732, DCM, “Fluoro Mode”)	1	DCID(10004) Fluoro Modes	
NUM	EV(113791, DCM, “Pulse Rate”)	1	Units = EV({pulse}/s, UCUM, “pulse/s”)	
NUM	EV(113768, DCM, “Number of Pulses”)	1	Units = EV(1, UCUM, “no units”)	
NUM	EV(113733, DCM “KVP”)	1-n	EV(kV, UCUM, “kV”)	Configure only for radiography.
NUM	EV(113724, DCM, ”X-Ray Tube Current”)	1-n	Units = EV(ms, UCUM, “ms”)	Configure only for radiography.
NUM	EV(113824, DCM, “Exposure Time”)	1-n	Units = EV(ms, UCUM, “ms”)	Configure Only for radiography.
NUM	EV(113793, DCM, “Pulse Width”)	1-n	Units = EV(ms, UCUM, “ms”)	
NUM	EV(113736, DCM, Exposure)	1-n	Units = EV(uAs, UCUM, ”uAs”)	
NUM	EV(113766, DCM, “Focal Spot Size”)	1	Units = EV(mm, UCUM, “mm”)	
NUM	EV(113742, DCM, “Irradiation Duration”)	1	Units = EV(s, UCUM, “s”)	
CODE	EV(113745, DCM, “Patient table Relationship”)	1	DCID(21) Patient Gantry Relationship	

VT	Concept Name	VM	Value Set Constraint	Remarks
CODE	EV(113743, DCM, “Patient Orientation”)	1	DCID(19) Patient Orientation	
CODE	EV(113744, DCM, “Patient Orientation Modifier”)	1	DCID(20) Patient Orientation Modifier	
NUM	DCID(10008) Dose Related Distance Measurements	1-n	Units = EV(mm, UCUM, “mm”)	
CODE	EV(123014, DCM, “Target Region”)	1	DCID(4031) Common Anatomic Region	
IMAGE	EV(113795, DCM, “Acquired Image”)	1-n		

6.4. Data Dictionary of Private Attributes

Use the following tags for all images.

Tag	VR	Type	Attribute Name	Remarks
(0029,0015)	LO	1	Private Creator	
(0029,1002)	DS	—	Private Time Vector	
(0029,1501)	DS	1	Tilting Angle	
(0029,1502)	IS	1	FPD Size	
(0029,1509)	LO	1	DUP Name	
(0029,1517)	US	1	Pre-Processing Horixontal Flip	
(0029,1518)	US	1	Pre-Processing Vertical Flip	
(0029,1519)	US	1	Post-Processing String: Proc file at end grab	Present in original DICOM file, not in processed DICOM file. This tag contains the string indicating the default post-processing to do on the image when it is acquired.
(0029,151A)	US	1	Pre-Processing Sub-Divisional AWL: 0=Normal AWL, 1=Sub AWL	
(7FDF,0010)	LO	—	Header Padding Group	
(7FDF,1001)	OB	—	Header Padding	

Use the following tags only for radiography images.

Tag	VR	Type	Attribute Name	Remarks
(0029,1516)	ID	—	Rad Type	

Use the following tags for StentView images.

Tag	VR	Type	Attribute Name	Remarks
(0029,1513)	LO	1	Technique Name : StentView or ValveView	
(0029,1530)	US	1	Number of StentView ROIs	
(0029,1531)	US	1C	Rows of Proximal ROI	
(0029,1532)	US	1C	Columns of Proximal ROI	
(0029,1533)	LO	1C	Position of Proximal ROI	
(0029,1534)	US	1C	Rows of Distal ROI	
(0029,1535)	US	1C	Columns of Distal ROI	
(0029,1536)	LO	1C	Position of Distal ROI	

Use the following tags for 3D images.

Tag	VR	Type	Attribute Name	Remarks
(0029,1506)	DS	1	Field Of View	
(0029,1507)	DS	1	Distance of Source to Detector	
(0029,1508)	DS	1	Distance of Source to Patient	
(0029,1528)	DS	1	Table Top Vertical Position	
(0029,1529)	DS	1	Table Top Longitudinal Position	
(0029,152A)	DS	1	Table Top Lateral Position	
(0029,152D)	DS	1	Ceiling Travel Longitudinal Position	
(0029,152E)	DS	1	Ceiling Travel Transversal Position	
(0029,152F)	DS	1	ISO Center Height	
(6B01,0001)	LO	—	Private Creator	
(6B01,0100)	LO	—	3D-DSA, 3D-DA, 3D-RSM, (CB Future)	
(6B01,0101)	CS	—	Sensor Type: 0=I.I, 1=FPD	
(6B01,0102)	CS	—	08:MH200, 09:MH300, 10:MH200S	
(6B01,0103)	DS	—	Mask Frames Count/Frames Before Rotation/Total Frames	
(6B01,0108)	DS	—	Rotation Speed (degrees/sec)	
(6B01,010A)	IS	3	BH Filter	
(6B01,0110)	IS	—	3D Reconstruction Mode	
(6B01,0180)	OB	—	mAs	