

DICOM Conformance Statement for **Side Station i3**



NO TEXT

Overview:

This conformance statement details the compliance to DICOM 3.0 of Side Station i3 for SONIALVISION G4 system.

Table below provides an overview of the network services supported by the Side Station i3.

NETWORK SERVICES

SOP Classes	User of Services (SCU)	Provider of Services (SCP)
Transfer		
X-Ray Radiofluoroscopic Image Storage	Yes	No
X-Ray Angiographic Image Storage	Yes	No
Computed Radiography Image Storage	Yes	No
Digital X-Ray Image Storage - For Presentation	Yes	No
Digital X-Ray Image Storage - For Processing	Yes	No
Secondary Capture Image Storage	Yes	No
Print Management		
Basic Grayscale Print Management Meta	Yes	No
Basic Film Session	Yes	No
Basic Film Box	Yes	No
Basic Grayscale Image Box	Yes	No
Printer	Yes	No
Print Job	Yes	No

Table below provides an overview of the Media Storage Application Profiles supported by the Side Station i3.

MEDIA SERVICES

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
DVD		
General Purpose CD-R	Yes	No

TABLE OF CONTENTS:

1. INTRODUCTION	5
1.1. REVISION HISTORY	5
1.2. AUDIENCE	6
1.3. REMARKS	6
1.4. TERMS AND DEFINITIONS	6
1.5. BASICS OF DICOM COMMUNICATION	8
1.6. ABBREVIATIONS	9
1.7. REFERENCES	9
2. NETWORKING	10
2.1. IMPLEMENTATION MODEL	10
2.1.1. Application Data Flow	10
2.1.2. Functional Definitions of AE's	11
2.1.3. Sequencing of Real-World Activities	11
2.2. AE SPECIFICATIONS	12
2.2.1. Storage Application Entity Specification	12
2.2.2. Hardcopy Application Entity Specification	18
2.3. NETWORK INTERFACES	29
2.3.1. Physical Network Interface	29
2.3.2. IPv4 and IPv6 Support	29
2.4. CONFIGURATION	30
2.4.1. AE Title/Presentation Address Mapping	30
2.4.2. Parameters	31
3. MEDIA INTERCHANGE	32
3.1. IMPLEMENTATION MODEL	32
3.1.1. Application Data Flow	32
3.1.2. Functional Definition of AE's	32
3.1.3. Sequencing of Real-World Activities	32
3.1.4. File Meta Information Options	32
3.2. AE SPECIFICATIONS	33
3.2.1. Offline-Media Application Entity Specification	33
3.3. AUGMENTED AND PRIVATE APPLICATION PROFILES	34
3.4. MEDIA CONFIGURATION	34
4. SUPPORT OF CHARACTER SETS	35
5. SECURITY	35
6. ANNEXES	36
6.1. IOD CONTENTS	36
6.1.1. Created SOP Instances	36
6.1.2. Used Fields in received IOD by application	57
6.1.3. Attribute mapping	57
6.1.4. Coerced/Modified Fields	57
6.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES	58
6.3. CODED TERMINOLOGY AND TEMPLATES	58
6.4. GRAYSCALE IMAGE CONSISTENCY	58
6.5. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES	58
6.6. PRIVATE TRANSFER SYNTAXES	58

1. INTRODUCTION

1.1. REVISION HISTORY

Revision	Date	Description
First Edition	2014/10	New Release

1.2. AUDIENCE

This document is written for the people that need to understand how the Side Station i3 will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product.

This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

1.3. REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between the Side Station i3 and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

1.4. 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.

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.

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.

1.5. 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 section is 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.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a DVD-R). Since there is no Association Negotiation possible, they both use a *Media Application Profile* that specifies “pre-negotiated” exchange media format, Abstract Syntax, and Transfer Syntax.

1.6. ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DNS	Domain Name System
DX	Digital X-ray
GSDF	Grayscale Standard Display Function
GRSP	Grayscale Softcopy Presentation State
HIS	Hospital Information System
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
ISO	International Organization for Standardization
LDAP	Lightweight Directory Access Protocol
LUT	Look-up Table
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MWL	Modality Worklist
NTP	Network Time Protocol
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RF	Radiofluoroscopy
RIS	Radiology Information System
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
TCP/IP	Transmission Control Protocol/Internet Protocol
UL	Upper Layer
VM	Value Multiplicity
VR	Value Representation

1.7. REFERENCES

- NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://dicom.nema.org/>

2. NETWORKING

2.1. IMPLEMENTATION MODEL

2.1.1. Application Data Flow

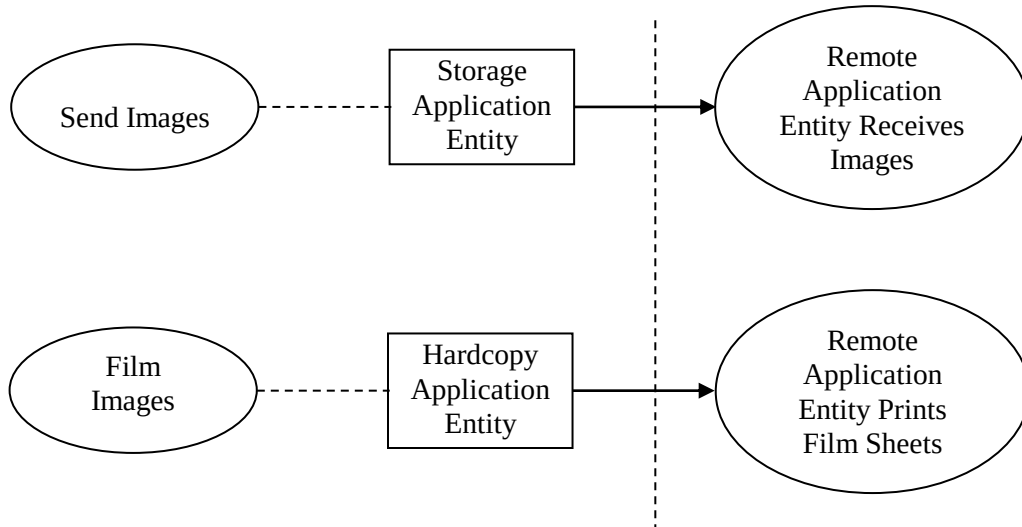


Figure 2.1-1
APPLICATION DATA FLOW DIAGRAM

The Storage Application Entity sends images to a remote AE. It is associated with the local real-world activity “Send Images”. “Send Images” is performed upon user request for each radiography/study or for specific images selected.

The Hardcopy Application Entity prints images on a remote AE (Printer). It is associated with the real-world activity “Film Images”. “Film Images” creates a print-job within the print queue containing one or more virtual film sheets composed from images selected by the user.

2.1.2. Functional Definitions of AE's

2.1.2.1. Functional Definition of Storage Application Entity

The existence of a send-job queue entry with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state and can be restarted by the user via job control interface. By default, the Storage AE will not try to initiate another association for this send-job automatically.

2.1.2.2. Functional Definition of Hardcopy Application Entity

The existence of a print-job in the print queue will activate the Hardcopy AE. An association is established with the printer and the printer's status determined. If the printer is operating normally, the film sheets described within the print-job will be printed. Changes in printer status will be detected (e.g. out of film) and reported to the user. If the printer is not operating normally, the print-job will set to an error state and can be restarted by the user via the job control interface.

2.1.3. Sequencing of Real-World Activities

There is no intended sequencing.

2.2. AE SPECIFICATIONS

2.2.1. Storage Application Entity Specification

2.2.1.1. SOP Classes

The Side Station i3 provides Standard Conformance to the following SOP Classes:

Table 2.2-1
SOP CLASSES FOR AE STORAGE

SOP Class Name	SOP Class UID	SCU	SCP
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No

2.2.1.2. Association Policies

2.2.1.2.1. General

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

Table 2.2-2
DICOM APPLICATION CONTEXT FOR AE STORAGE

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

2.2.1.2.2. Number of Associations

The Side Station i3 initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

Table 2.2-3
NUMBER OF ASSOCIATIONS INITIATED FOR AE STORAGE

Maximum number of simultaneous Associations	1
---	---

2.2.1.2.3. Asynchronous Nature

The Side Station i3 does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-4
ASYNCHRONOUS NATURE AS A SCU FOR AE STORAGE

Maximum number of outstanding asynchronous transactions	1
---	---

2.2.1.2.4. Implementation Identifying Information

The implementation information for this Application Entity is:

Table 2.2-5
DICOM IMPLEMENTATION CLASS AND VERSION FOR AE STORAGE

Implementation Class UID	1.2.392.200036.9110.1.0.6711.2001002
Implementation Version Name	SPF XX (XX : version number)

2.2.1.3. Association Initiation Policy

2.2.1.3.1. Activity – Send Images

2.2.1.3.1.1. Description and Sequencing of Activities

A user can select images and request them to be sent to multiple destinations. Each request is forwarded to the job queue and processed individually.

The Storage AE is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the instances marked for storage and the destination. An internal daemon process triggered by a job for a specific network destination initiates a C-STORE request to store images. If the process successfully establishes an Association to a remote Application Entity, it will transfer each marked instance one after another via the open Association. Status of the transfer is reported through the job control interface. Only one job will be active at a time. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request. If the job contains multiple images then multiple C-STORE requests will be issued over the same Association.

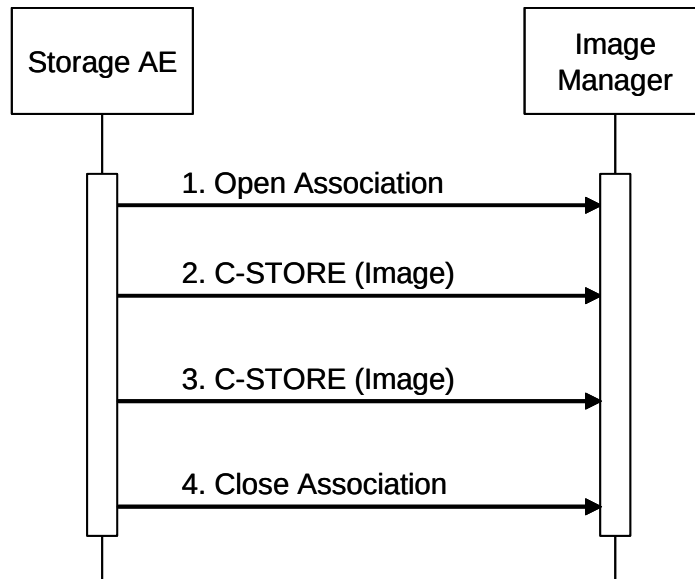


Figure 2.2-1 SEQUENCE OF ACTIVITY – SEND IMAGES

A possible sequence of interactions between the Storage AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Class as an SCP) is illustrated in Figure above:

1. The Storage AE opens an association with the Image Manager
2. An acquired image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
3. Another acquired image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
4. The Storage AE closes the association with the Image Manager.

NOTE: Many other message sequences are possible depending on the number of images to be stored.

2.2.1.3.1.2. Proposed Presentation Contexts

The Side Station i3 is capable of proposing the Presentation Contexts shown in the following table:

Table 2.2-6

PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Presentation Contexts for each Image Storage will only be proposed if the Send Job contains instances for these SOP Classes.

2.2.1.3.1.3. SOP Specific Conformance Image Storage SOP Classes

All Image Storage SOP Classes supported by the Storage AE exhibit the same behaviour, except where stated, and are described together in this section.

Table 2.2-7
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Behaviour
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.
Refused	Out of Resources	A700-A7FF	The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure.
Error	Data Set does not match SOP Class	A900-A9FF	The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Error	Cannot Understand	C000-CFFF	The Association is released using A-RELEASE and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful but the status meaning is logged.
Warning	Elements Discarded	B006	Image transmission is considered successful but the status meaning is logged.
Warning	Data Set does not match SOP Class	B007	Image transmission is considered successful. The status meaning is logged and the job warning is reported to the user via the job control application.
*	*	Any other status code.	The Association is released using A-RELEASE and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application.

The behaviour of Storage AE during communication failure is summarized in the Table below:

Table 2.2-8
STORAGE COMMUNICATION FAILURE BEHAVIOUR

Exception	Behaviour
Timeout	The Association is released using A-RELEASE and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The send job is marked as failed The reason is logged and the job failure is reported to the user via the job control application.

A failed send job can be restarted by user interaction.

The contents of each Image Storage SOP Instances created by the Side Station i3 conform to the DICOM Image IOD definition and are described in Annex A of this document.

2.2.2. Hardcopy Application Entity Specification

2.2.2.1. SOP Classes

The Side Station i3 provides Standard Conformance to the following SOP Classes:

Table 2.2-9
SOP CLASSES FOR AE HARDCOPY

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Yes	No
Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
Printer	1.2.840.10008.5.1.1.16	Yes	No
Print Job	1.2.840.10008.5.1.1.14	Yes	No

2.2.2.2. Association Policies

2.2.2.2.1. General

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

Table 2.2-10
DICOM APPLICATION CONTEXT FOR AE HARDCOPY

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

2.2.2.2.2. Number of Associations

The Side Station i3 initiates one Association at a time for each configured hardcopy device. Multiple hardcopy devices can be configured.

Table 2.2-11
NUMBER OF ASSOCIATIONS INITIATED FOR AE HARDCOPY

Maximum number of simultaneous Associations	1
---	---

2.2.2.2.3. Asynchronous Nature

The Side Station i3 does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 2.2-12

ASYNCHRONOUS NATURE AS A SCU FOR AE HARDCOPY

Maximum number of outstanding asynchronous transactions	1
---	---

2.2.2.2.4. Implementation Identifying Information

The implementation information for this Application Entity is:

Table 2.2-13

DICOM IMPLEMENTATION CLASS AND VERSION FOR AE HARDCOPY

Implementation Class UID	1.2.392.200036.9110.1.0.6711.2001002
Implementation Version Name	SPF XX (XX : version number)

2.2.2.3. Association Initiation Policy

2.2.2.3.1. Activity – Film Images

2.2.2.3.1.1. Description and Sequencing of Activities

A user can compose images onto film sheets and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies. Each print-job is forwarded to the job queue and processed individually.

The Hardcopy AE is invoked by the job control interface that is responsible for processing network tasks. The job consists of data describing the images and graphics to be printed as well as the requested layout and other parameters. Each image on the sheet is sent to the specified device and will be set in the same sheet there. If no association to the printer can be established, the print-job is switched to a failed state and the user informed.

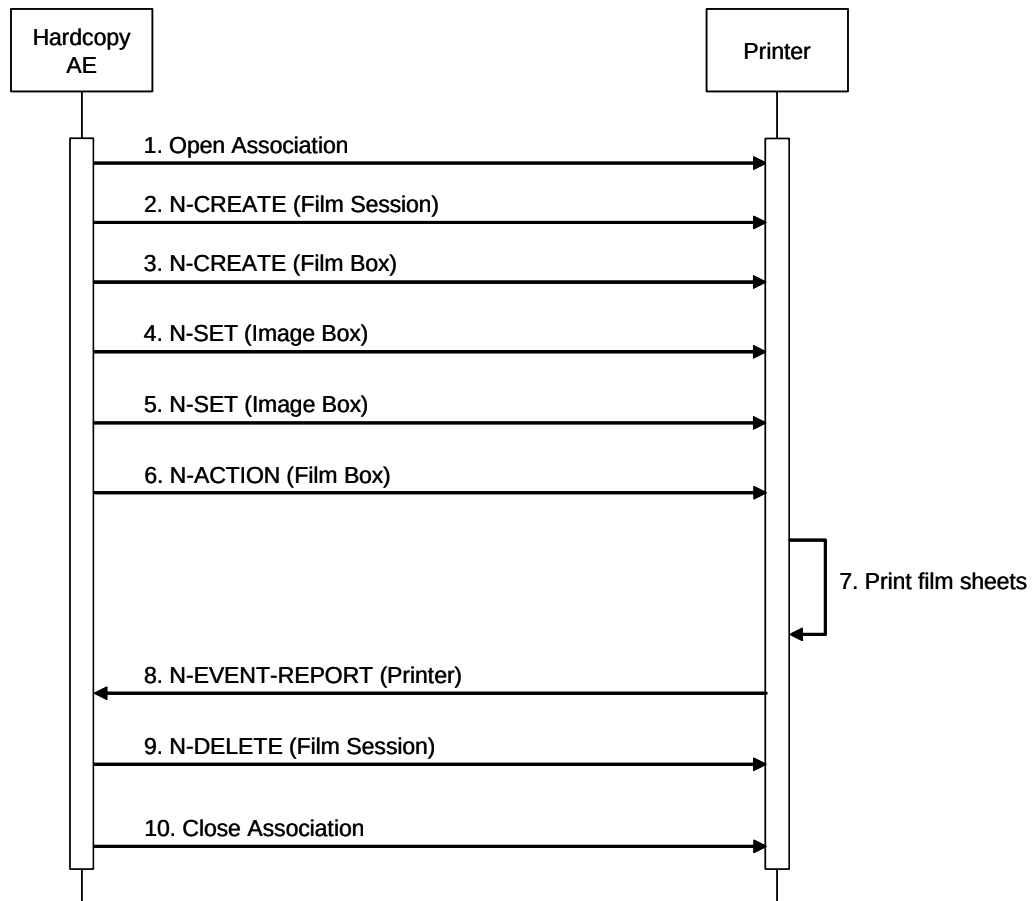


Figure 2.2-2 SEQUENCE OF ACTIVITY – FILM IMAGES

A typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer is illustrated in Figure above:

1. Hardcopy AE opens an association with the Printer
2. N-CREATE on the Film Session SOP Class creates a Film Session.
3. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session.
4. N-SET on the Image Box SOP Class transfers image of the film sheet to the printer.
5. N-SET on the Image Box SOP Class transfers another image of the film sheet to the printer.
6. N-ACTION on the Film Box SOP Class instructs the printer to print the Film Box.
7. The printer prints the requested number of film sheets.
8. The Printer asynchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class). The printer can send this message at any time. Hardcopy AE does not require the N-EVENT-REPORT to be sent. Hardcopy AE is capable of receiving an N-EVENT-REPORT

notification at any time during an association. If the Printer reports a status of FAILURE, the print-job is switched to a failed status and the user informed.

9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. Hardcopy AE closes the association with the Printer.

Status of the print-job is reported through the job control interface. Only one job will be active at a time for each separate hardcopy device. If any Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related job is switched to a failed state. It can be restarted any time by user interaction.

2.2.2.3.1.2. Proposed Presentation Contexts

The Side Station i3 is capable of proposing the Presentation Contexts shown in the following table:

Table 2.2-14

PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY FILM IMAGES

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Basic Grayscale Print Management (META)	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Print Job	1.2.840.10008.5.1.1.14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.2.2.3.1.3. Common SOP Specific Conformance for all Print SOP Classes

The general behaviour of Hardcopy AE during communication failure is summarized in the Table below. This behaviour is common for all SOP Classes supported by Hardcopy AE.

Table 2.2-15
HARDCOPY COMMUNICATION FAILURE BEHAVIOUR

Exception	Behaviour
Timeout	The Association is released using A-RELEASE and the print-job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The print-job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

2.2.2.3.1.4. SOP Specific Conformance for the Printer SOP Class

Hardcopy AE supports the following DIMSE notifications for the Printer SOP Class:

- N-EVENT-REPORT

Details of the supported attributes and status handling behaviour are described in the following subsections.

2.2.2.3.1.4.1. Printer SOP Class Operation (N-EVENT-REPORT)

Hardcopy AE is capable of receiving an N-EVENT-REPORT request at any time during an association.

The behaviour of Hardcopy AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below:

Table 2.2-16
PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOUR

Event Type Name	Event Type ID	Behaviour
Normal	1	The print-job continues to be printed.
Warning	2	The print-job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
Failure	3	The print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
*	*	An invalid Event Type ID will cause a status code of 0113H to be returned in a N-EVENT-REPORT response.

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below:

Table 2.2-17
PRINTER SOP CLASS N-EVENT-REPORT RESPONSE STATUS REASONS

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The notification event has been successfully received.
Failure	No Such Event Type	0113	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Processing Failure	0110	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).

2.2.2.3.1.5. SOP Specific Conformance for the Film Session SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Session SOP Class:

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behaviour are described in the following subsections.

2.2.2.3.1.5.1. Film Session SOP Class Operation (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

Table 2.2-18
FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Copies	(2000,0010)	IS	1 ..	ALWAYS	USER
Print Priority	(2000,0020)	CS		ALWAYS	AUTO
Medium Type	(2000,0030)	CS		ALWAYS	AUTO
Film Destination	(2000,0040)	CS		ALWAYS	AUTO

The behaviour of Hardcopy AE when encountering status codes in a N-CREATE response is summarized in the Table below:

Table 2.2-19

FILM SESSION SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.

2.2.2.3.1.5.2. Film Session SOP Class Operation (N-DELETE)

The behaviour of Hardcopy AE when encountering status codes in a N-DELETE response is summarized in the Table below:

Table 2.2-20

FILM SESSION SOP CLASS N-DELETE RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.

2.2.2.3.1.6. SOP Specific Conformance for the Film Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Film Box SOP Class:

- N-CREATE
- N-ACTION

Details of the supported attributes and status handling behaviour are described in the following subsections.

2.2.2.3.1.6.1. Film Box SOP Class Operation (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

Table 2.2-21
FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Display Format	(2010,0010)	ST	From user input	ALWAYS	USER
Film Orientation	(2010,0040)	CS	From user input	ALWAYS	USER
Film Size ID	(2010,0050)	CS	From user input	ALWAYS	USER
Magnification Type	(2010,0060)	CS	From Configuration	ALWAYS	AUTO
Smoothing Type	(2010,0080)	CS	From Configuration	ALWAYS	AUTO
Border Density	(2010,0100)	CS	From Configuration	ALWAYS	AUTO
Empty Image Density	(2010,0110)	CS	From Configuration	ALWAYS	AUTO
Trim	(2010,0140)	CS	From Configuration	ALWAYS	AUTO
Configuration Information	(2010,0150)	CS	From Configuration	ALWAYS	AUTO
Referenced Film Session Sequence	(2010,0500)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO

The behaviour of Hardcopy AE when encountering status codes in a N-CREATE response is summarized in the Table below:

Table 2.2-22

FILM BOX SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.

2.2.2.3.1.6.2. Film Box SOP Class Operation (N-ACTION)

An N-ACTION Request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behaviour of Hardcopy AE when encountering status codes in a N-ACTION response is summarized in the Table below:

Table 2.2-23

FILM BOX SOP CLASS N-ACTION RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The SCP has completed the operation successfully. The film has been accepted for printing.
*	*	Any other status code.	The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.

2.2.2.3.1.7. SOP Specific Conformance for the Image Box SOP Class

Hardcopy AE supports the following DIMSE operations for the Image Box SOP Class:

- N-SET

Details of the supported attributes and status handling behaviour are described in the following subsections.

2.2.2.3.1.7.1. Image Box SOP Class Operation (N-SET)

The attributes supplied in an N-SET Request are listed in the Table below:

Table 2.2-24
IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Box Position	(2020,0010)	US	Depends on image position	ALWAYS	AUTO
Basic Grayscale Image Sequence	(2020,0110)	SQ		ALWAYS	AUTO
>Samples Per Pixel	(0028,0002)	US	“1”	ALWAYS	AUTO
>Photometric Interpretation	(0028,0004)	CS	“MONOCHROME2”	ALWAYS	AUTO
>Rows	(0028,0010)	US	Depends on image size	ALWAYS	AUTO
>Columns	(0028,0011)	US	Depends on image size	ALWAYS	AUTO
>Bits Allocated	(0028,0100)	US	From Configuration	ALWAYS	AUTO
>Bits Stored	(0028,0101)	US	From Configuration	ALWAYS	AUTO
>High Bit	(0028,0102)	US	From Configuration	ALWAYS	AUTO
>Pixel Representation	(0028,0103)	US	“0”	ALWAYS	AUTO
>Pixel Data	(7FE0,0010)	OW	Pixels of rendered image	ALWAYS	AUTO

The behaviour of Hardcopy AE when encountering status codes in a N-SET response is summarized in the Table below:

Table 2.2-25
IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOUR

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The SCP has completed the operation successfully. Image successfully stored in Image Box.
*	*	Any other status code.	The Association is released using A-RELEASE and the print-job is marked as failed. The status meaning is logged and reported to the user.

2.3. NETWORK INTERFACES

2.3.1. Physical Network Interface

The Side Station i3 supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

Table 2.3-1
SUPPORTED PHYSICAL NETWORK INTERFACES

Ethernet 1000baseT
Ethernet 100base-TX
Ethernet 10baseT

2.3.2. IPv4 and IPv6 Support

This product only supports IPv4 connections.

2.4. CONFIGURATION

2.4.1. AE Title/Presentation Address Mapping

2.4.1.1. Local AE Titles

All local applications use the AE Titles and TCP/IP Ports configured via the Service Tool. The default AE Titles is listed below.

Table 2.4-1
AE TITLE CONFIGURABLE TABLE

Application Entity	Default AE Title	Default TCP/IP Port
Storage	G4WS_StoreSCU	
Hardcopy	G4WS_PrintSCU	

2.4.1.2. Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the Side Station i3 Service Tool.

2.4.1.2.1. Storage

The Side Station i3 Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Storage SCPs. Associations will only be accepted from known AE Titles and associations from unknown AE Titles will be rejected (an AE Title is known if it can be selected within the Service Tool). Multiple remote Storage SCPs can be defined.

2.4.1.2.2. Hardcopy

The Side Station i3 Service Tool must be used to set the AE Titles, port-numbers, host-names and capabilities for the remote Print SCPs. Multiple remote Print SCPs can be defined.

2.4.2. Parameters

A large number of parameters related to acquisition and general operation can be configured using the Service Tool. The Table below only shows those configuration parameters relevant to DICOM communication. See the Side Station i3 Service Manual for details on general configuration capabilities.

Table 2.4-2
CONFIGURATION PARAMETERS TABLE

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
PDU Size	Yes	16kB
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	None
General DIMSE level time-out values	No	None
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	None
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	None
Time-out for waiting for data between TCP/IP packets.(Low-level timeout)	No	None
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None

3. MEDIA INTERCHANGE

3.1. IMPLEMENTATION MODEL

3.1.1. Application Data Flow

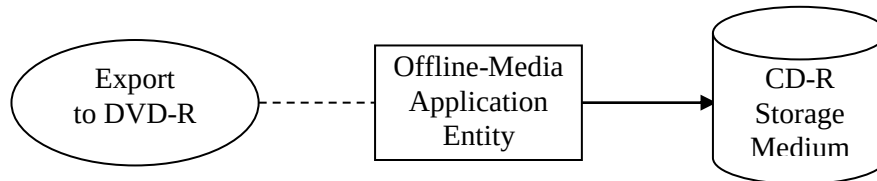


Figure 3.1-1 APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE

The Offline-Media Application Entity exports images to a DVD-R Storage medium. It is associated with the local real-world activity “Export to DVD-R”. “Export to DVD-R” is performed upon user request for selected patients, studies, series, or images.

3.1.2. Functional Definition of AE’s

3.1.2.1. Functional Definition of Offline-Media Application Entity

Activation of the “Export to DVD-R” menu entry will pass the currently selected patients, studies, series or images to the Offline-Media Application Entity. The SCP Instances associated with the selection will be collected into one or more export jobs. The contents of each export job will be written to a single DVD-R media.

3.1.3. Sequencing of Real-World Activities

At least one image must exist and be selected before the Offline-Media Application Entity can be invoked. The operator can insert a new DVD-R media at any time before or after invocation of the Offline-Media Application Entity. The Offline-Media Application Entity will wait indefinitely for a media to be inserted before starting to write to the DVD-R device. If no DVD-R media is available the export job can be canceled from the job queue.

3.1.4. File Meta Information Options

The implementation information written to the File Meta Header in each file is:

Table 3.1-1

DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE

Implementation Class UID	1.2.392.200036.9110.1.0.6711.2001002
Implementation Version Name	SPF XX (XX : version number)

3.2. AE SPECIFICATIONS

3.2.1. Offline-Media Application Entity Specification

The Offline-Media Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below:

Table 3.2-1
APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA

Application Profiles Supported	Real World Activity	Role	
STD-GEN-CD	Export to CD-R	FSC	

3.2.1.1. File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is fixed (see section 3.4).

3.2.1.2. Real-World Activities

3.2.1.2.1. Activity – Export to DVD-R

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to a DVD-R medium.

A dialogue will be presented informing the user about the required / available media capacity. If the contents of the current selection do not fit on a single media selection will be canceled and ask the user to select SOP Instances again.

The user will be prompted to insert a DVD-R media which is empty or written in this system for each export job. The contents of the export job will be written together with a corresponding DICOMDIR. The user can cancel an export job in the job queue.

3.2.1.2.1.1. Media Storage Application Profiles

The Offline-Media Application Entity supports the STD-GEN-CD Application Profile.

3.2.1.2.1.1. Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table below:

Table 3.2-2
IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR OFFLINEMEDIA

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1

3.3. AUGMENTED AND PRIVATE APPLICATION PROFILES

The Side Station i3 does not support any augmented for private application profiles.

3.4. MEDIA CONFIGURATION

All local applications use the fixed AE Title listed in the Table below:

Table 3.4-1
AE TITLE CONFIGURATION TABLE

Application Entity	Default AE Title
Offline-Media	G4WS-0000000000

4. SUPPORT OF CHARACTER SETS

All the Side Station i3 applications support the following character sets:

ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No.1 supplementary set)

ISO 2022 IR 87 (JIS X 0208: Kanji)

ISO 2022 IR 159 (JIS X 0212: Supplementary Kanji set)

The Side Station i3 will set the corresponding character set based on its configuration as listed below:

Table 3.4-1
CHARACTER SET

Configuration	Character Set
English mode	ISO_IR 100
Japanese mode	\ISO 2022 IR 87\ISO 2022 IR 159 or \ISO 2022 IR 87

5. SECURITY

The Side Station i3 does not support any specific security measures.

It is assumed that the Side Station i3 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 Side Station i3.
- b. Firewall or router protections to ensure that the Side Station i3 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.

6. ANNEXES

6.1. IOD CONTENTS

6.1.1. Created SOP Instances

The attributes of each IODs transmitted by the Side Station i3 storage application are specified in the Table listed below:

Table 6.1-1
ATTRIBUTES FOR EACH IOD

IOD	Specified Table
X-Ray Radio Fluoroscopic Image IOD	Table 6.1-2
X-Ray Angiographic Image IOD	Table 6.1-3
Digital X-Ray Image IOD - For Presentation	Table 6.1-4
Digital X-Ray Image IOD - For Processing	Table 6.1-4
Computed Radiography Image IOD	Table 6.1-5
Secondary Capture Image IOD	Table 6.1-6

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Module” column are:

VNAP	Value Not Always Present (attribute sent zero length if no value is present)
ANAP	Attribute Not Always Present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value

The abbreviations used in the “Source” column are:

MWL	the attribute value source Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
MPPS	the attribute value is the same as that use for Modality Performed Procedure Step
CONFIG	the attribute value source is a configurable parameter

NOTE: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the Windows Date and Time configuration.

6.1.1.1. X-Ray Radio Fluoroscopic Image IOD

Table 6.1-2
IOD OF CREATED RF SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 6.1-7	ALWAYS
Study	General Study	Table 6.1-8	ALWAYS
	Patient Study	Table 6.1-9	ALWAYS
Series	General Series	Table 6.1-10	ALWAYS
Equipment	General Equipment	Table 6.1-13	ALWAYS
Image	General Image	Table 6.1-15	ALWAYS
	Image Pixel	Table 6.1-17	ALWAYS
	Contrast/Bolus	Table 6.1-18	ALWAYS
	Cine	Table 6.1-19	Only if Multi-frame
	Multi-frame	Table 6.1-20	Only if Multi-frame
	Frame Pointers	Table 6.1-21	Only if Multi-frame
	Mask	Table 6.1-22	Only if subtracted image
	Display Shutter	Table 6.1-23	ALWAYS
	X-Ray Image	Table 6.1-25	ALWAYS
	X-Ray Acquisition	Table 6.1-26	ALWAYS
	X-Ray Collimator	Table 6.1-27	ALWAYS
	XRF Positioner	Table 6.1-28	ALWAYS
	VOI LUT	Table 6.1-29	ALWAYS
	SOP Common	Table 6.1-36	ALWAYS

6.1.1.2. X-Ray Angiographic Image IOD

Table 6.1-3
IOD OF CREATED XA SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 6.1-7	ALWAYS
Study	General Study	Table 6.1-8	ALWAYS
	Patient Study	Table 6.1-9	ALWAYS
Series	General Series	Table 6.1-10	ALWAYS
Equipment	General Equipment	Table 6.1-13	ALWAYS
Image	General Image	Table 6.1-15	ALWAYS
	Image Pixel	Table 6.1-17	ALWAYS
	Contrast/Bolus	Table 6.1-18	ALWAYS
	Cine	Table 6.1-19	Only if Multi-frame
	Multi-frame	Table 6.1-20	Only if Multi-frame
	Frame Pointers	Table 6.1-21	Only if Multi-frame
	Mask	Table 6.1-22	Only if subtracted image
	Display Shutter	Table 6.1-23	ALWAYS
	X-Ray Image	Table 6.1-25	ALWAYS
	X-Ray Acquisition	Table 6.1-26	ALWAYS
	X-Ray Collimator	Table 6.1-27	ALWAYS
	VOI LUT	Table 6.1-29	ALWAYS
	XA Positioner	Table 6.1-31	ALWAYS
	SOP Common	Table 6.1-36	ALWAYS

6.1.1.3. Digital X-Ray Image IOD

Table 6.1-4
IOD OF CREATED DX SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 6.1-7	ALWAYS
Study	General Study	Table 6.1-8	ALWAYS
	Patient Study	Table 6.1-9	ALWAYS
Series	General Series	Table 6.1-10	ALWAYS
	DX Series	Table 6.1-12	ALWAYS
Equipment	General Equipment	Table 6.1-13	ALWAYS
Image	General Image	Table 6.1-15	ALWAYS
	Image Pixel	Table 6.1-17	ALWAYS
	Contrast/Bolus	Table 6.1-18	ALWAYS
	Display Shutter	Table 6.1-23	ALWAYS
	X-Ray Collimator	Table 6.1-27	ALWAYS
	VOI LUT	Table 6.1-29	ALWAYS
	X-Ray Acquisition Dose	Table 6.1-30	ALWAYS
	DX Anatomy Imaged	Table 6.1-32	ALWAYS
	DX Image	Table 6.1-33	ALWAYS
	DX Detector	Table 6.1-34	ALWYAS
	Acquisition Context	Table 6.1-35	ALWAYS
	SOP Common	Table 6.1-36	ALWAYS

6.1.1.4. Computed Radiography Image IOD

Table 6.1-5
IOD OF CREATED CR SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 6.1-7	ALWAYS
Study	General Study	Table 6.1-8	ALWAYS
	Patient Study	Table 6.1-9	ALWAYS
Series	General Series	Table 6.1-10	ALWAYS
	CR Series	Table 6.1-11	ALWAYS
Equipment	General Equipment	Table 6.1-13	ALWAYS
Image	General Image	Table 6.1-15	ALWAYS
	Image Pixel	Table 6.1-17	ALWAYS
	Display Shutter	Table 6.1-23	ALWAYS
	CR Image	Table 6.1-24	ALWAYS
	VOI LUT	Table 6.1-29	ALWAYS
	SOP Common	Table 6.1-36	ALWAYS

6.1.1.5. Secondary Capture Image IOD

Table 6.1-6
IOD OF CREATED SC SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 6.1-7	ALWAYS
Study	General Study	Table 6.1-8	ALWAYS
	Patient Study	Table 6.1-9	ALWAYS
Series	General Series	Table 6.1-10	ALWAYS
Equipment	SC Equipment	Table 6.1-14	ALWAYS
Image	General Image	Table 6.1-15	ALWAYS
	SC Image	Table 6.1-16	ALWAYS
	Image Pixel	Table 6.1-17	ALWAYS
	VOI LUT	Table 6.1-29	ALWAYS
	SOP Common	Table 6.1-36	ALWAYS

6.1.1.6. Modules

6.1.1.6.1. Patient Module

Table 6.1-7

PATIENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Original	ALWAYS	AUTO
Patient ID	(0010,0020)	LO	Original	ALWAYS	AUTO
Patient's Birth Date	(0010,0030)	DA	Original	VNAP	AUTO
Patient's Sex	(0010,0040)	CS	Original	VNAP	AUTO
Patient Comments	(0010,4000)	LT	Original	VNAP	AUTO

6.1.1.6.2. General Study Module

Table 6.1-8

GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Date	(0008,0020)	DA	Original	ALWAYS	AUTO
Study Time	(0008,0030)	TM	Original	ALWAYS	AUTO
Accession Number	(0008,0050)	SH	Original	VNAP	AUTO
Referring Physician's Name	(0008,0090)	PN	Original	VNAP	AUTO
Study Description	(0008,1030)	LO	Original	ALWAYS	AUTO
Physician(s) of Record	(0008,1048)	PN	Original	VNAP	AUTO
Name of Physician(s) Reading Study	(0008,1060)	PN	Original	VNAP	AUTO
Study Instance UID	(0020,000D)	UI	Original	ALWAYS	AUTO
Study ID	(0020,0010)	SH	Original	ALWAYS	AUTO

6.1.1.6.3. Patient Study Module**Table 6.1-9****PATIENT STUDY MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Original	VNAP	AUTO
Patient's Size	(0010,1020)	DS	Original	VNAP	AUTO
Patient's Weight	(0010,1030)	DS	Original	VNAP	AUTO

6.1.1.6.4. General Series Module**Table 6.1-10****GENERAL SERIES MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Date	(0008,0021)	DA	Original	ALWAYS	AUTO
Series Time	(0008,0031)	TM	Original	ALWAYS	AUTO
Modality	(0008,0060)	CS	Original	ALWAYS	AUTO
Series Description	(0008,103E)	LO	Original	ALWAYS	AUTO
Performing Physician's Name	(0008,1050)	PN	Original	VNAP	AUTO
Operator's Name	(0008,1070)	PN	Original	VNAP	AUTO
Body Part Examined	(0018,0015)	CS	Original	VNAP	AUTO
Protocol Name	(0018,1030)	LO	Original	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Original	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Original	ALWAYS	AUTO
Laterality	(0020,0060)	CS	Original	EMPTY	AUTO

6.1.1.6.5. CR Series Module**Table 6.1-11****CR SERIES MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Body Part Examined	(0018,0015)	CS	Original	VNAP	AUTO
View Position	(0018,5101)	CS	Original	EMPTY	AUTO

6.1.1.6.6. DX Series Module

Table 6.1-12

DX SERIES MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	Original	ALWAYS	AUTO
Presentation Intent Type	(0008,0068)	CS	Original	ALWAYS	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Original	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	Original	ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Original	ANAP	AUTO

6.1.1.6.7. General Equipment Module

Table 6.1-13

GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	Original	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	Original	ALWAYS	AUTO
Institution Address	(0008,0081)	ST	Original	ALWAYS	AUTO
Station Name	(0008,1010)	SH	Original	ALWAYS	AUTO
Institution Department Name	(0008,1040)	LO	Original	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	"Side Station i3"	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	From Configuration	ALWAYS	CONFIG
Software Versions	(0018,1020)	LO	From Configuration	ALWAYS	CONFIG

6.1.1.6.8. SC Equipment Module**Table 6.1-14****SC EQUIPMENT MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	“OT”	ALWAYS	AUTO
Conversion Type	(0008,0064)	CS	“WSD”	ALWAYS	AUTO

6.1.1.6.9. General Image Module**Table 6.1-15****GENERAL IMAGE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Date	(0008,0022)	DA	Original	ALWAYS	AUTO
Content Date	(0008,0023)	DA	Original	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	Original	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Original	ALWAYS	AUTO
Source Image Sequence	(0008,2112)	SQ	Original	ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	Original	ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Original	ANAP	AUTO
>Referenced Frame Number	(0008,1160)	IS	Original	ANAP	AUTO
Acquisition Number	(0020,0012)	IS	Original	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	Original	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	Original	VNAP	AUTO
Image Comments	(0020,4000)	LT	Original	VNAP	AUTO
Burned In Annotation	(0028,0301)	CS	Original	ALWAYS	AUTO

6.1.1.6.10. SC Image Module

Table 6.1-16
SC IMAGE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Date of Secondary Capture	(0018,1012)	DA	<yyyymmdd> format date when the image is secondary captured	ALWAYS	AUTO
Time of Secondary Capture	(0018,1014)	DA	<hhmmss> format time when the image is secondary captured	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	TM	Original	EMPTY	AUTO

6.1.1.6.11. Image Pixel Module

Table 6.1-17
IMAGE PIXEL MODULE OF CREATED SOP INSTANCES

In case of SC;

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	“3”	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	“RGB”	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	“0”	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	“8”	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	“8”	ALWAYS	AUTO
High Bits	(0028,0102)	US	“7”	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	“0”	ALWAYS	AUTO

Other cases than above;

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rows	(0028,0010)	US	Number of rows in the image	ALWAYS	AUTO
Columns	(0028,0011)	US	Number of columns in the image	ALWAYS	AUTO
Pixel Aspect Ratio	(0028,0034)	IS	“1\1”	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	The Pixel Data itself	ALWAYS	AUTO

6.1.1.6.12. Contrast/Bolus Module**Table 6.1-18****CONTRAST/BOLUS MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO	Original	EMPTY	AUTO
Contrast/Bolus Start Time	(0018,1042)	TM	Original	VNAP	AUTO

6.1.1.6.13. Cine Module**Table 6.1-19****CINE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Recommended Display Frame Rate	(0008,2144)	IS	Original	ANAP	AUTO
Cine Rate	(0018,0040)	IS	Original	ANAP	AUTO
Frame Time Vector	(0018,1065)	DS	Original	ANAP	AUTO

6.1.1.6.14. Multi-Frame Module**Table 6.1-20****MULTI-FRAME MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Original	ANAP	AUTO
Frame Increment Pointer	(0028,0009)	AT	Original	ANAP	AUTO

6.1.1.6.15. Frame Pointers Module**Table 6.1-21****FRAME POINTERS MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Representative Frame Number	(0028,6010)	US	Original	ANAP	AUTO

6.1.1.6.16. Mask Module**Table 6.1-22****MASK MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Recommended Viewing Mode	(0028,1090)	CS	Original	ANAP	AUTO
Mask Subtraction Sequence	(0028,6100)	SQ	Original	ANAP	AUTO
>Mask Operation	(0028,6101)	CS	Original	ANAP	AUTO
>Mask Frame Numbers	(0028,6110)	US	Original	ANAP	AUTO
>Mask Sub-pixel Shift	(0028,6114)	FL	Original	ANAP	AUTO

6.1.1.6.17. Display Shutter Module**Table 6.1-23****DISPLAY SHUTTER MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Shutter Shape	(0018,1600)	CS	“RECTANGULAR”	ALWAYS	AUTO
Shutter Left Vertical Edge	(0018,1602)	IS	Left edge of the shutter	ALWAYS	AUTO
Shutter Right Vertical Edge	(0018,1604)	IS	Right edge of the shutter	ALWAYS	AUTO
Shutter Upper Horizontal Edge	(0018,1606)	IS	Upper edge of the shutter	ALWAYS	AUTO
Shutter Lower Horizontal Edge	(0018,1608)	IS	Lower edge of the shutter	ALWAYS	AUTO

6.1.1.6.18. CR Image Module**Table 6.1-24****CR IMAGE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	Original	ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	DS	Original	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	Original	ALWAYS	AUTO
Exposure Time	(0018,1150)	IS	Original	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	Original	ALWAYS	AUTO
Image Pixel Spacing	(0018,1164)	DS	Original	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	Original	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Original	ALWAYS	AUTO

6.1.1.6.19. X-Ray Image Module**Table 6.1-25****X-RAY IMAGE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	Original	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	Original	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	Original	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Original	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	Original	ALWAYS	AUTO
High Bits	(0028,0102)	US	Original	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	Original	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	CS	Original	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Original	ALWAYS	AUTO

6.1.1.6.20. X-Ray Acquisition Module**Table 6.1-26****X-RAY ACQUISITION MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	Original	ALWAYS	AUTO
Field of View Shape	(0018,1147)	CS	Original	ALWAYS	AUTO
Field of View Dimension(s)	(0018,1149)	IS	Original	ALWAYS	AUTO
Exposure Time	(0018,1150)	IS	Original	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	Original	ALWAYS	AUTO
Radiation Setting	(0018,1155)	CS	Original	ALWAYS	AUTO
Radiation Mode	(0018,115A)	CS	Original	ALWAYS	AUTO
Image and Fluoroscopy Area Dose Product	(0018,115E)	DS	Original	ALWAYS	AUTO
Image Pixel Spacing	(0018,1164)	DS	Original	ALWAYS	AUTO
Exposure Time in uS	(0018,8150)	DS	Original	ALWAYS	AUTO
X-Ray Tube Current in uA	(0018,8151)	DS	Original	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Original	ALWAYS	AUTO

6.1.1.6.21. X-Ray Collimator Module**Table 6.1-27****X-RAY COLLIMATOR MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Collimator Shape	(0018,1700)	CS	Original	ALWAYS	AUTO
Collimator Left Vertical Edge	(0018,1702)	IS	Original	ALWAYS	AUTO
Collimator Right Vertical Edge	(0018,1704)	IS	Original	ALWAYS	AUTO
Collimator Upper Horizontal Edge	(0018,1706)	IS	Original	ALWAYS	AUTO
Collimator Lower Horizontal Edge	(0018,1708)	IS	Original	ALWAYS	AUTO

6.1.1.6.22. XRF Positioner Module**Table 6.1-28****XRF POSITIONER MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	Original	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	Original	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	DS	Original	ALWAYS	AUTO

6.1.1.6.23. VOI LUT Module**Table 6.1-29****VOI LUT MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS	In case of SC, “127” Other, from current parameters	ALWAYS	AUTO
Window Width	(0028,1051)	DS	In case of SC, “255” Other, from current parameters	ALWAYS	AUTO

6.1.1.6.24. X-Ray Acquisition Dose Module**Table 6.1-30****X-RAY ACQUISITION DOSE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	Original	ALWAYS	AUTO
Distance Source to Detector	(0018,1110)	DS	Original	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	Original	ALWAYS	AUTO
Exposure Time	(0018,1150)	IS	Original	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	Original	ALWAYS	AUTO
Image and Fluoroscopy Area Dose Product	(0018,115E)	DS	Original	ALWAYS	AUTO
Exposure Time in uS	(0018,8150)	DS	Original	ALWAYS	AUTO
X-Ray Tube Current in uA	(0018,8151)	DS	Original	ALWAYS	AUTO

6.1.1.6.25. XA Positioner Module**Table 6.1-31****XA POSITIONER MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	Original	ALWAYS	AUTO
Distance Source to Patient	(0018,1111)	DS	Original	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	DS	Original	ALWAYS	AUTO
Positioner Motion	(0018,1500)	CS	Original	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS	Original	ALWAYS	AUTO
Positioner Secondary Angle	(0018,1511)	DS	Original	ALWAYS	AUTO

6.1.1.6.26. DX Anatomy Imaged Module**Table 6.1-32****DX ANATOMY IMAGED MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Anatomic Region Sequence	(0008,2218)	SQ	Original	EMPTY	AUTO
Image Laterality	(0020,0062)	CS	Original	ALWAYS	AUTO

6.1.1.6.27. DX Image Module

Table 6.1-33

DX IMAGE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	Original	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	Original	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	Original	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	Original	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	Original	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	Original	ALWAYS	AUTO
High Bits	(0028,0102)	US	Original	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	Original	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Original	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	CS	Original	ALWAYS	AUTO
Pixel Intensity Relationship Sign	(0028,1041)	SS	Original	ALWAYS	AUTO
Window Center	(0028,1050)	DS	Original	ALWAYS	AUTO
Window Width	(0028,1051)	DS	Original	ALWAYS	AUTO
Rescale Intercept	(0028,1052)	DS	Original	ALWAYS	AUTO
Rescale Slope	(0028,1053)	DS	Original	ALWAYS	AUTO
Rescale Type	(0028,1054)	LO	Original	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Original	ALWAYS	AUTO
Presentation LUT Shape	(2050,0020)	CS	Original	ALWAYS	AUTO

6.1.1.6.28. DX Detector Module**Table 6.1-34****DX DETECTOR MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Field of View Shape	(0018,1147)	CS	Original	ALWAYS	AUTO
Field of View Dimension(s)	(0018,1149)	IS	Original	ALWAYS	AUTO
Image Pixel Spacing	(0018,1164)	DS	Original	ALWAYS	AUTO
Detector Type	(0018,7004)	CS	Original	EMPTY	AUTO
Pixel Spacing	(0028,0030)	DS	Original	ALWAYS	AUTO

6.1.1.6.29. Acquisition Context Module**Table 6.1-35****ACQUISITION CONTEXT MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)	SQ	Original	EMPTY	AUTO

6.1.1.6.30. SOP Common Module

Table 6.1-36

SOP COMMON MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	Original	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	Original	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	Original	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	Original	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Original	ALWAYS	AUTO

6.1.2. Used Fields in received IOD by application

The Side Station i3 storage application does not receive SOP Instances. The usage of attributes received via Modality Worklist is described in section 2.2.2.3.2.3.

6.1.3. Attribute mapping

The relationship between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in the Table below.

6.1.4. Coerced/Modified Fields

The Side Station i3 does not coerce/modify any attribute values received in the response to a Modality Worklist Query.

6.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES

The Private Attributes added to create SOP Instances are listed in the Table below. The Side Station i3 reserves block of private attributes in groups 6B07.

These Private Attributes will be added to all the Image Instances created by the Side Station i3.

Table 6.2-1
DATA DICTIONARY OF PRIVATE ATTRIBUTES

Tag	Attribute Name	VR	VM	Attribute Description
(6B07,0030)	Private Creator	LO	1	SHPF0730.0
(6B07,3000)	Last Modifier	UI	1	UID of the system who modified this image last.
(6B07,3001)	Last Modify Date	DA	1	Data at which this image was last modified.
(6B07,3002)	Last Modify Time	TM	1	Time at which this image was last modified.

6.3. Coded Terminology and Templates

The Workflow AE is capable of supporting arbitrary coding scheme for Procedure and Protocol Codes. The contents of Requested Procedure Code Sequence (0032,1064) and Scheduled Protocol Code Sequence (0040,0008) supplied in Worklist items will be mapped to MPPS attributes as described in Table 6-5.

6.4. Grayscale Image Consistency

The high resolution display monitor attached to the Side Station i3 should be adjusted by the Service Personnel during the installation.

6.5. Standard Extended/Specialized/Private SOP Classes

No Specialized or Private SOP Classes are supported.

6.6. Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.