FusionDR DICOM Conformance Statement

Company Name: Sound Technologies
Product Name: FusionDR
Version: 2.6.0
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1 Overview

The Fusion DR product implements the necessary DICOM services to save acquired DX images and associated Presentation States to a network storage device.

Table 1-1

SOP Classes	User of Service	Provider of Service
Transfer		
Digital X-Ray Image Storage – For Presentation	Yes	No

2 Table of Contents

3 Introduction

This conformance statement details the Sound FusionDR software's compliance with DICOM 3.0. It covers all service class roles that are supported by this product:

Storage Service Class (SCU) roles
Verification Service Class (SCU) roles
Modality Worklist Service Class (SCU) Role
Modality Preformed Procedure Step Service Class (SCU) Role

3.1 Revision History

Table 3-1

Document Version	Date of Issue	Author	Description
1.0	September 9, 2019	JC	Initial Release
2.6.0	April 11, 2024	JC	2.6.0 Release

3.2 Audience

This document is written for the people that need to understand how FusionDR 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.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between FusionDR 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.

3.4 Terms and Definitions

Table 3-2

Term	Definition
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. Basics of DICOM Communication.
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 (AET)	The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
Application Context	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
Association	A network communication channel set up between Application Entities.
Attribute	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Joint Photographic Experts Group (JPEG)	A set of standardized image compression techniques, available for use by DICOM applications.
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
Negotiation	First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context	The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Term	Definition
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 Class (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 Instance (SOP Instance)	An information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.
Tag	A 32-bit identifier for a data element, represented as a pair of four-digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element].
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This 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 several 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 CD-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.

3.6 Abbreviations

Table 3-3

Abbreviation	Description
AE	Application Entity
AET	Application Entity Title
DICOM	Digital Imaging and Communication Protocol
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DX	Digital X-Ray
GUI	Graphical User Interface
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
PACS	Picture Archiving and Communication Service
PDU	Protocol Data Unit
SCU	Service Class Object
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
VR	Value Representation
JPEG	Joint Photographic Experts Group
UID	Unique Identifier

3.7 References

FusionDR User Manual
FusionDR Service Manual
NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/

4 Network

4.1 Implementation Model

4.1.1 Application Data Flow

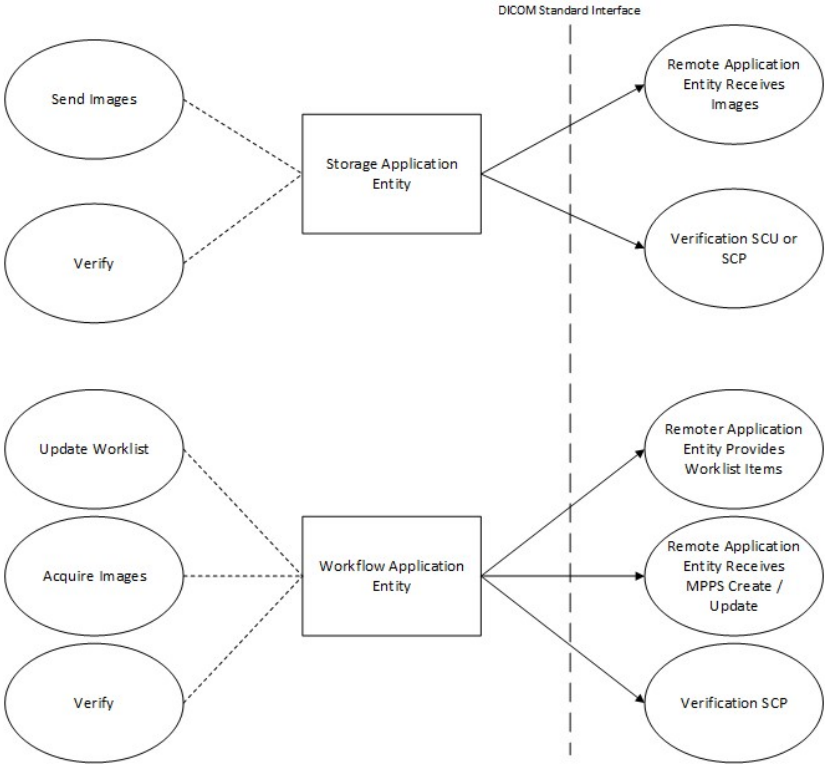

Figure 4-1 Application Data Flow Diagram

The Storage Application Entity sends images and Presentation States to a remote AE. It is associated with the local real-world activity "Send Images". "Send Images" is performed upon user request for each study selected. When activated by user's settings (auto-send), each marked set of images and associated Presentation States can be immediately stored to a preferred destination whenever a Study is closed by the user. If a send is successful, FusionDR will record this information in the local database.

The Storage Application Entity sends a DICOM Echo Request to a remote AE. It is associated with the local real-world activity “Echo”. “Echo” is performed upon user request for a specified AET, IP address, and port number. The status of the response is displayed to the user (success or fail).

The Workflow Application Entity receives Worklist information from and sends MPPS information to a remote AE. It is associated with the local real-world activities “Update Worklist” and “Acquire Images.” When the “Update Worklist” local rea-world activity is performed, the Workflow Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed as a result of an operator request. When the “Acquire Images” local real-world activity is performed, the Workflow Application Entity creates, and updates Modality Preformed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS instance. Completion of the MPPS is performed as a result of an operator action.

4.1.2 Functional Definition of AEs

4.1.2.1 Storage Application Entity

The Storage Application Entity initiates an association with a remote AE and acts as a SCU of the Storage Service Class to store images on a remote AE that act as a SCP of the Storage Service Class. When the Image transfer is complete, the send function waits for the DIMSE-C-STORE Response from the receiving AE to indicate the status of the transfer (success or fail). When the Send AE system initiates the DICOM Echo Request, it first proposes an Association with the Verification Class Presentation Context. When the DICOM Association Accept message is received, the system sends the DIMSE-C-ECHO Request message to initiate the Verification function on the receiving AE. The status of the Verification response (success or fail) is displayed.

The Workflow Application Entity receives Worklist information from and sends MPPS information to a remote AE. It is associated with the local real-world activities “Update Worklist” and “Acquire Images”. When the “Update Worklist” local real-world activity performed the Workflow Application Entity queries a remote AE for worklist items and provides a set of worklist items matching the query request. “Update Worklist” local real-world activity is performed as a result of an operator request. When the “Acquire Images” local real-world activity is performed the Workflow Application Entity creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator’s action.

4.1.2.2 Sequencing of Real-World Activities

The following describes a possible sequence of events:

1. Query Worklist
2. Receive Worklist
3. Select Workitem
4. Start Acquisition and Create MPPS
5. Acquire Images (Update MPPS)
6. Complete Acquisition (Finalize MPPS)
7. Automatically Queue Images for storage.
8. The Storage Application Entity sends a DICOM Association Request to the storage server AE.
9. If the DICOM Association request fails, then the send job is aborted.
10. If the DICOM Association request is successful, then the Storage Application Entity sends a C-STORE Request message to the storage server and waits for the C-Store response.
    a. SUCCESS – Continue with send operation.
    b. WARNING – Continues with the send operation.
    c. FAILURE (0110, A800, A900, C00, C002) – The send job is aborted. The Storage AE sends a DICOM Association Abort Request message to the storage server AE.
11. When the send job is completed the Storage Application Entity sends a DICOM Association Release Request to the storage server AE.
    Other workflow situations (e.g. unscheduled procedure steps) will have other sequencing constraints. Queuing of Images to send may be done manually.

5 AE Specification

5.1.1 Storage Application Entity

5.1.1.1 SOP Classes

FusionDR provides Standard conformance to the following SOP Classes:

Table 5-1

SOP Class Name	SOP Class UID	SCU	SCP
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Verification SOP Class	1.2.840.10008.1.1	Yes	No

5.1.1.2 Association Policies

5.1.1.2.1 General

Application Context Name 1.2.840.10008.3.1.1.1

The AE Title of the Storage Application Entity is a configurable parameter. The default AET is "OEM_StoreSCU".

The Storage AE establishes an association whenever a transfer job comes to the top of the transfer queue.

The Storage AE establishes an association whenever the user attempts to verify the DICOM Connection to a Remote AE.

The maximum PDU size is 16384.

5.1.1.2.2 Number of Associations

The Storage AE attempts only one Association establishment at a time.

5.1.1.2.3 Asynchronous Nature

The Storage AE supports asynchronous communication (multiple outstanding transactions over a single Association). The maximum number of outstanding transactions is unlimited.

5.1.1.2.4 Implementation Identifying Information

Table 5-2

Implementation Class UID	1.3.6.1.4.1.30071.8
Implementation Version Name	fo-dicom 5.0.3

5.1.1.3 Association initiation Policy

The Storage AE initiates a new association for the DIMSE-C-STORE service operation for each transfer job that comes to the top of the job queue.

The Storege AE initiates a new association for the DIMSE-C-ECHO service operation.

5.1.1.3.1 Transfer Image Object to a Remote AE

5.1.1.3.1.1 Associated Real-World Activity

The associated Real-World activity is a C-Store Request initiated by the Storage AE when a send job comes to the top of the job queue. A send job is created by the user selecting a study or group of studies to be sent to a remote AE.

5.1.1.3.1.2 Proposed presentation contexts

The Store AE proposes Presentation contexts as shown in Table 5-3
The receiving AE returns which Presentation Contexts it supports in the Association Accept message.

Table 5-3

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification Service Class	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

5.1.1.3.1.2.1 SOP Conformance

When a successful response to a C-STORE operation is received, the status display is updated to indicate the percentage of job that has been transferred at that point.

If an Association request fails or if a Failed, Refused or Warning response to a C-STORE operation is received then the currently active transfer job is put into an error state.

Extended negotiation is not supported.

See Annexes for a description of the IOD modules supported.

5.1.1.3.2 Send Echo Request to Remote AE

5.1.1.3.2.1 Associated Real-World Activity

The associated Real-World activity is a C-Echo Request initiated by the user to determine if a remote DICOM AE is responding.

5.1.1.3.2.2 Proposed presentation contexts

The Storage AE proposes a Presentation Context as shown in Table 12-1

5.1.1.3.2.2.1 SOP Specific Conformance

The Storage AE provides standard conformance to DICOM Verification Service Class as a SCU.

5.2 Workflow Application Entity Specification

5.2.1 SOP Classes

Fusion DR provides Standard Conformance to the following SOP classes:

Table 5-4

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

5.2.2 Association Policies

5.2.2.1 General

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

Table 5-5

Application Context Name	1.2.8.40.10008.3.1.1.1

5.2.2.2 Number of Associations

FusionDR initiates one Association at a time for a Worklist request.

Table 5-6

Maximum number of simultaneous Associations	1

5.2.2.3 Asynchronous Nature

The Workflow AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 5-7

Maximum number of outstanding asynchronous transactions	N/A

5.2.2.4 Implementation Identifying Information

The implementation information for this Application entity is:

Table 5-8

Implementation Class UID	1.3.6.1.4.1.30071.8
Implementation Version Name	fo-dicom 5.0.3

5.2.3 Association Initiation Policy

5.2.3.1 Activity – Worklist Update

5.2.3.1.1 Description and Sequencing of Activities

The request for a Worklist Update is initiated by user interaction, i.e. pressing the button "Worklist Search". Options and keywords for search are used for matching keys if configured to Send when the "Include Worklist Constraints in Query" configuration option is enabled.
Upon initiation of the request, FusionDR will build an Identifier for the C-FIND request, will initiate an Association to send the request and will wait for the Worklist response. After retrieval of all responses, Fusion DR will Display a list of Worklist Items. To protect the system from overflow, FusionDR will limit the number of displayed worklist items to a configurable maximum. Fusion DR will initiate an Association to issue a C-FIND request according to the Modality Worklist information Model.

5.2.3.1.2 Proposed Presentation Context

FusionDR will propose Presentation Contexts as shown in the following table:

Table 5-9

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model – Find	1.2.840.10008.5.1.4.31	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 1.2.840.10008.102.2	SCU	None

5.2.3.1.3 SOP Specific Conformance for Modality Worklist

The behavior of FusionDR when encountering status codes in the Modality Worklist C-FIND response is summarized in the Table below. If FusionDR receives any other SCP response status than "Success" or "Pending", an error message will appear on the user interface.

Table 5-10

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display.
Refused	Out of Resources	A700	The Association is released using A-RELEASE. The status meaning is logged and reported to the users.

Failed	Identifier does not match SOP Class	A900	The Association is released using A-RELEASE. The status meaning is logged and reported to the users.
Failed	Unable to Process	C000-CFFF	The Association is released using A-RELEASE. The status meaning is logged and reported to the users.
Cancel	Matching terminated due to Cancel request	FE00	The Association is released using A-RELEASE. The status meaning is logged and reported to the users.
Pending	Matches are continuing	FF00	The worklist item contained in the identifier is collected for later display.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The worklist item contained in the identifier is collected for later display.
*	*	Any other status codes.	The Association is released using A-RELEASE. The status meaning is logged and reported to the users.

The behavior of FusionDR during communication failure is summarized in Table 5-11.

Table 5-11

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

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The table below provides a description of FusionDR Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matches keys are ignored.

Table 5-12

Module Name **Attribute Name**	**Tag**	**VR**	M	R	Q	D	**IOD**

Patient Identification							
Patient ID	(0010,0020)	LO	S	x	x	x	x
Patient Name	(0010,0010)	PN	S	x	x	x	x
Issuer of Patient ID	(0010,0021)	LO		x			
Patient Demographics							
Patient Sex	(0010,0040)	CS		x		x	x
Patient Sex Neutered	(0010,2203)	CS				x	x
Patient Weight	(0010,1030)	DS		x		x	x
Patient Birth Date	(0010,0030)	DA		x		x	x
Patient Comments	(0010,4000)	LT		x			
Patient Species Description	(0010,2201)	LO		x		x	x
Patient Breed Description	(0010,2292)	LO		x		x	x
Responsible Person	(0010,2297)	PN		x		x	x
Patient Medical							
Medical Alerts	(0010,2000)	LO		x			
Pregnancy Status	(0010,21C0)	US		x			
Allergies	(0010,2110)	LO		x			
Special Needs	(0038,0050)	LO		x			
Patient State	(0038,0500)	LO		x			
Visit Status							
Current Patient Location	(0038,0008)	LO		x			
Visit Identification							
Institution Name	(0008,0080)	LO		x			
Admission ID	(0038,0010)	LO		x			
Imaging Service Request							
Accession Number	(0008,0050)	SH		x		x	x
Referring Physician Name	(0008,0090)	PN		x			
Requesting Physician	(0032,1032)	PN		x			
Visit Admission							
Admitting Diagnosis Description	(0008,1080)	LO		x			
Requested Procedure							
Study Instance UID	(0020,000D)	UI		x			x
Reason For the Requested Procedure	(0040,1002)	LO		x			
Requested Procedure ID	(0040,1001)	SH		x			x
Requested Procedure Description	(0032,1060)	LO		x		x	x
Requested Procedure Priority	(0040,1003)	SH		x			
Requested Procedure Code Sequence	(0023,1064)	SQ		x			
Reference Study Sequence	(0008,1110)	SQ		x			
Study Date	(0008,0020)	DA		x			
Study Time	(0008,0021)	DT		x			
Scheduled Procedure Step							
Scheduled Procedure Step Sequence	(0040,0100)	SQ		x			
> Scheduled Station AE Title	(0040,0001)	AE	S	x			
> Scheduled Station Name	(0040,0010)	SH	S	x			

> Scheduled Procedure Step Start Date	(0040,0002)	DA	R	x	x		
> Scheduled Procedure Step Start Time	(0040,0003)	TM	R	x	x		
> Scheduled Procedure Step Start Date Time	(0040,4005)	DT					
> Modality	(0008,0060)	CS	S	x			
> Scheduled Performing Physician Name	(0040,0006)	PN		x			
> Scheduled Procedure Step Description	(0040,0007)	LO		x			x
> Scheduled Protocol Code Sequence	(0040,0008)	SQ		x			
> Scheduled Procedure Step Location	(0040,0007)	LO		x			
> Scheduled Procedure Step ID	(0040,0009)	SH		x			x
> Requested Contrast Agent	(0032,1070)	LO		x			
> PreMedication	(0040,0012)	LO		x			
> Anatomical Orientation Type	(0010,2210)	CS		x			
Study Description	(0008,1030)	LO		x			
Study ID	(0020,0010)	SH		x			
Procedure Code Sequence	(0008,1032)	SQ		x			
Requesting AE	(0074,1236)	AE	S	x			

Table 5-12 should be read as follows:

Module Name: The name of the associated module for supported worklist attributes

Attribute Name: Attributes supported to build a FusionDR Worklist Request Identifier.

Tag: DICOM tag.

VR: DICOM VR for this attribute.

M: Matching keys for Worklist Update. An “S” will indicate that FusionDR will supply an attribute for Single Value Matching, an “R” will indicate Range Matching, and a “*” will denote wildcard matching.

R: Return keys. An “x” will indicate that FusionDR will supply this attribute as Return Key with zero length for Universal Matching.

Q: Query key. An “x” will indicate FusionDR will supply this attribute as matching key if entered in the Search query. For example, the Patient Name can be entered thereby restricting Worklist responses to Procedure Steps scheduled for the patient.

D: Display keys. An “x” indicates that this worklist attribute is displayed to the user. For example, Patient ID.

IOD: An “x” indicates that this worklist attribute is included into all Object Instances created during performance of the related Procedure Step.

5.2.3.2 Activity – Acquire Images

5.2.3.2.1 Description and Sequencing of Activities

When a user selects a worklist item to perform, the user will create a Patient. When this is complete, a study will be created. This is the trigger to create an MPPS SOP Instance. An

association to the configured MPPS SCP system is established immediately and the related MPPS SOP Instance will be created.

An MPPS Instance that has been sent with the state of “COMPLETED” or “DISCONTINUED” can no longer be updated.

FusionDR supports the creation of “unscheduled cases” by allowing MPPS Instances to be communicated for locally registered Patients.

FusionDR will initiate an Association to issue an:

- N-CREATE request to the CREATE Modality Preformed Procedure Step SOP Instance.
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

  A possible sequence of interaction between the Workflow AE and the Departmental Scheduler (e.g. a device such as a RIS or DIS which supports the MPPS SOP Class as an SCP):

  1. The Worklist AE opens an association with the Departmental Scheduler.
  2. The Worklist AE sends an N-CREATE request to the Departmental Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Departmental Scheduler acknowledges the MPPS create with an N-CREATE response (status success)
  3. The Worklist AE closes the association with the Departmental Scheduler.
  4. After each image is acquired, the Worklist AE opens an Association with the Departmental Scheduler.
  5. The Worklist AE sends an N-SET request to update the MPPS instance will all necessary attributes with a status of “IN PROGRESS”. The Departmental Scheduler acknowledges the MPPS update with an N-SET response (status success).
  6. The Worklist AE closes the association with the Departmental Scheduler.
  7. When All images have been acquired and the study is complete, the Worklist AE opens an Association with the Departmental Scheduler.
  8. The Worklist AE sends an N-SET request to the Departmental Scheduler with status “COMPLETED” and sets all necessary attributes. The Departmental Scheduler acknowledges the MPPS update with an N-SET response (status success).
  9. The Worklist AE closes the association with the Departmental Scheduler.

5.2.3.2.2 Proposed Presentation Context

Table 5-13

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	UID	Name List	UID List		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	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

5.2.3.2.3 SOP Specific Conformance for MPPS

The behavior of FusionDR when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in the following table. If any other SCP response status that "Success" or "Warning" is received by FusionDR, an error message will appear on the user interface.

Table 5-14

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Failure	Processing Failure – Performed Procedure Step Object may no longer be updated	0110	The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user.
Warning	Attribute Value Out of Range	0116	The MPPS operation is considered successful. The status meaning is logged.
*	*	Any other status code.	The Association is released using A-RELEASE and the MPPS is marked as failed. The status meaning is logged and reported to the user.

The behavior of FusionDR during communication failure is summarized in Table 5-15:

Table 5-15

Exception	Behavior
Timeout	The send job is marked as failed. The reason is logged and reported to the user.
Association aborted by the SCP or network layers	The MPPS is marked as failed. The reason is logged and reported to the user.

Table 5-16 provides a description of the MPPS N-CREATE and N-SET request identifiers sent by FusionDR. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. A "Zero Length" attribute will be sent with zero length.

Table 5-16

Attribute Name	Tag	VR	N-CREATE	N-SET

Specified Character Set	(0008,0005)	CS	"ISO_IR 100"	"ISO_IR 100"
Scheduled Step Attribute Sequence	(0040,0270)	SQ	From Modality Worklist	
>Study Instance UID	(0020,000D)	UI	From Modality Worklist	
>Accession Number	(0008,0050)	SH	From Modality Worklist	
>Requested Procedure ID	(0040,1001)	SH	From Modality Worklist	
>Requested Procedure Description	(0032,1060)	LO	Zero Length	
>Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	
>Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist	
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	Empty Sequence	
Patient Name	(0010,0010)	PN	From Modality Worklist	
Patient ID	(0010,0020)	LO	From Modality Worklist	
Patient Birth Date	(0010,0030)	DA	From Modality Worklist	
Patient Sex	(0010,0040)	CS	Zero Length	
Referenced Patient Sequence	(0008,1120)	SQ	Empty Sequence	
Performed Procedure Step ID	(0040,0253)	SH	From Modality Worklist	
Performed Station AE Title	(0040,0241)	AE	From Configuration	
Performed Station Name	(0040,0242)	SH	From Configuration	
Performed Location	(0040,0243)	SH	Zero Length	
Performed Procedure Step Start Date	(0040,0244)	DA	Actual Start Time	
Performed Procedure Step Start Time	(0040,0245)	TM	Actual Start Time	
Performed Procedure Step Status	(0040,0252)	CS	"IN PROGRESS"	"IN PROGRESS", "COMPLETED"
Performed Procedure Step Description	(0040,0254)	LO	Zero Length	Zero Length
Performed Procedure Type Description	(0040,0255)	LO	Zero Length	Zero Length
Procedure Code Sequence	(0008,1032)	SQ	Zero Length	Zero Length
Performed Procedure Step End Date	(0040,0250)	DA	Zero Length	Actual Time Completed
Performed Procedure Step End Time	(0040,0251)	TM	Zero Length	Actual Time Completed
Modality	(0008,0060)	CS	"DX"	Zero Length
Study ID	(0020,0010)	SH	Automatically Generated	Zero Length
Performed Protocol Code Sequence	(0040,0260)	SQ	Zero Length	Zero Length
Performed Series Sequence	(0040,0340)	SQ	Zero Length	One or more items
Performing Physicians Name	(0008,1050)	PN		User Input
Protocol Name	(0018,1030)	LO		User Input

Series Instance UID	(0020,000E)	UI		Automatically Generated
Series Description	(0008,103E)	LO		Zero Length
Retrieve AE Title	(0008,0054)	AE		Zero Length
Referenced Image Sequence	(0008,1140)	SQ		Zero Length
Referenced Non Image Composite SOP Instance Sequence	(0040,0200)	SQ		Zero Length

5.2.4 Association Acceptance Policy

The Workflow Application Entity does not accept Associations.

6 Network Interfaces

6.1.1 Physical Network Interface

FusionDR Supports a single network interface. One of the following physical network interfaces will be available:

Ethernet 10/100/1000baseT
IEEE 802.11b/a/g/n/ac

6.1.2 Additional Protocols

DHCP can be used to obtain TCP/IP network configuration information (e.g., own IP address, subnet mask, default gateway, DNS server, etc.).
DNS can be used for address resolution.
NTP can be used to synchronize the system clock with a time server.
WPA2-Personal can be used for wireless network security in conjunction with a pre-shared key.
WPA2-Enterprise can be used for wireless network security in conjunction with an authentication server.

6.1.3 IPv4 and IPv6 Support

FusionDR only supports IPv4 connections.

7 Configuration

7.1.1 AE Title/Presentation Address Mapping

The Presentation Address Mapping is defined in the Database. The destination AE title, IP address, and port for each Remote AE that the FusionDR system can connect to are defined in the Database.

7.1.1.1 Local AE Titles

All local AE uses the default AE Title “OEM_StoreSCU”. This can be configured in the Management screen of the software.

7.1.2 Parameters

Many parameters related to acquisition and general operation can be configured using the Management Screen of the Software. The table below only shows those configuration parameters relevant to DICOM communication. See the FusionDR Service Manual for details on the general configuration capabilities.

Table 7-1

Parameter	Configurable (Yes/No)	Default Value
Number of times a failed send job may be retried	Yes	0
Delay between retrying failed send jobs	Yes	10
Worklist Query Limit	Yes	100
Include Constraints in Query	Yes	False
Process Images	Yes	True
Embed Annotations	Yes	True
Burn-In Overlays to PACS	Yes	False
Scheduled Station AE Title	Yes	

8 Support of Character Sets

FusionDR supports the ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 Supplementary Set)

9 Security

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

1. Firewall or router protections to ensure that only approved external hosts have network access to FusionDR.
2. Firewall or router protections to ensure that FusionDR only has network access to approved external hosts and services.
3. 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.

10 Annexes

10.1.1 IOD Content

10.1.1.1 Created SOP Instances

Table 17-1 Specifies the attributes of a Digital X-Ray Image created by FusionDR
The following tables use several abbreviations. The abbreviations used in the “Presence of …” column:

Table 10-1

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

The abbreviations used in the “Source” column:

Table 10-2

Abbreviation	Description
USER	The attribute value source is from User input
AUTO	The attribute value is generated automatically
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 through the standard Windows interface.

10.1.1.1.1 Digital X-Ray Image IOD

Table 10-3

IE	Module	Reference	Presence of Module
Patient	Patient	Table 10-4	ALWAYS
Study	General Study	Table 10-5	ALWAYS
	Patient Study	Table 10-6	ALWAYS
Series	General Series	Table 10-7	ALWAYS
	DX Series	Table 10-12	ALWAYS
Equipment	General Equipment	Table 10-8	ALWAYS
Image	General Image	Table 10-9	ALWAYS
	Image Pixel	Table 10-10	ALWAYS
	DX Anatomy Imaged	Table 10-13	ALWAYS
	DX Image	Table 10-14	ALWAYS
	DX Detector	Table 10-15	ALWAYS
	DX Positioning	Table 10-16	ALWAYS
	VOI LUT	Table 10-17	ALWAYS
	Acquisition Context	Table 10-11	ALWAYS
	SOP Common	Table 10-18	ALWAYS
	X-Ray Acquisition Dose	Table 10-19	ALWAYS

10.1.1.2 Common Modules

Table 10-4

Patient Module PS3.3 Section C.7.1.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Patient's name	0010,0010	2	Patient's full legal Name	User Input	ALWAYS	MWL/ USER
Patient ID	0010,0020	2	Primary hospital ID number or code for the patient	User Input	ALWAYS	MWL/ USER/ AUTO
Other Patient IDs	0010,1000	3	Other identification numbers or codes used to identify the patient.	User Input	ANAP	MWL/ USER
Other Patient IDs Sequence	0010,1002	3	A sequence of identification numbers or codes used to identify the patient, which may or may not be human readable, and may or may not have been obtained from an implanted or attached device such as an RFID or barcode. One or more Items are permitted in this Sequence	User Input	ANAP	MWL/ USER
>Patient ID	0010,0020	1	An identifier for the patient.	User Input	ANAP	USER
>Type of Patient ID	0010,0022	1	The type of identifier in the Patient ID (0010,0020) in this item.	“TEXT”	ANAP	AUTO
Patient's birth date	0010,0030	2	Birth date of patient	User Input	VNAP	MWL/ USER
Patient's sex	0010,0040	2	Sex of patient	User Selection	VNAP	MWL/ USER
Patient Species Description	0010,2201	1C	Patient Species Description	User Selection	ALWAYS	MWL/ USER
Patient Species Code Sequence	0010,2202	1C	The taxonomic rank value (e.g., genus, subgenus, species or subspecies) of the Patient.	User Selection	ALWAYS	MWL/ USER
>Code Value						MWL/ USER

Patient Module PS3.3 Section C.7.1.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
>Code Schema Designator						MWL/ USER
>Code Meaning						MWL/ USER
Patient Breed Description	0010,2292	2C	Patient Breed Description	User Selection	VNAP	MWL/ USER
Patient Breed Code Sequence	0010,2293	2C	Patient Breed	User Selection	VNAP	MWL/ USER
>Code Value						MWL/ USER
>Code Schema Designator						MWL/ USER
>Code Meaning						MWL/ USER
Breed Registration Sequence	0010,2294	2C	Information identifying an animal within a breed registry.	User Selection	EMPTY	AUTO
Responsible Person	0010,2297	2C	Name of person with medical decision authority for patient	User Input	ALWAYS	MWL/ USER
Responsible Person Role	0010,2298	1C	Relationship of Responsible Person to the patient	"OWNER "	ALWAYS	AUTO
Responsible Organization	00010,2299	1C	Name of organization with medical or welfare decision making authority for the Patient.	Zero Length	EMPTY	AUTO

Table 10-5

General Study Module PS3.3 Section C.7.2.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Study Instance UID	0020,000D	1	Unique identifier for study	From Modality Worklist or generated	ALWAYS	MWL/ AUTO
Study Date	0008,0020	2	Date the Study started	<yyyymmdd>	ALWAYS	AUTO
Study Time	0008,0030	2	Time the Study started	<hhmmss>	ALWAYS	AUTO
Referring Physician's name	0008,0090	2	Patient's referring physician	User Selection / Options configurable / Required Configurable / Vet as Performing Physician or Referring Physician	ANAP	USER / CONFIG
Study Id	0020,0010	2	User or equipment generated Study Identifier	Generated	ALWAYS	AUTO
Accession Number	0008,0050	2	A RIS generated study number	From Modality Worklist or User Input	VNAP	MWL/ USER
Study Description	0008,1030	3	Institution-generated description or classification of the Study (component) performed.	From modality worklist or User input or from first anatomy in study or from protocol name.	VNAP	MWL/ USER

Table 10-6

Patient Study Module PS3.3 Section C.7.2.2						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Patient Weight	0010,1030	3	Patient weight in kg	From Modality Worklist or User input Only if not null	ANAP	MWL/ USER
Patients Sex Neutered	0010,2203	1C	Whether or not a procedure has been performed to render the patient sterile	From Modality Worklist or Generated by the Users Sex Selection	VNAP	MWL/ AUTO

Table 10-7

General Series Module PS3.3 Section C.7.3.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Modality	0008,0060	1	Type of equipment that originally acquired the data used to create the images in this Series.	"DX"	ALWAYS	AUTO
Series Instance UID	0020,000E	1	Unique identifier of the Series	Generated	ALWAYS	AUTO
Series Number	0020,0011	2	A number that identifies this Series	Generated	ALWAYS	AUTO
Series Date	0008,0021	3	Date the Series started	<yyyymmdd>	ALWAYS	AUTO
Series Time	0008,0031	3	Time the Series started	<hhmmss>	ALWAYS	AUTO
Performing Physician Name	0008,1050	3	Name of the physician administering the Series	User Selection / Options configurable / Required Configurable / Vet as Performing Physician or Referring Physician	ANAP	USER / CONFIG
Body Part Examined	0018,0015	3	Text description of the part of the body examined	User Selection	ALWAYS	USER

General Series Module PS3.3 Section C.7.3.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Anatomical Orientation Type	0010,2210	1	The anatomical orientation type used in instances generated by this equipment.	Selected View Position / Value configurable	ALWAYS	USER / CONFIG
Series Description	0008,103E	1	Description of the Series	Selected View Position	ALWAYS	USER

Table 10-8

General Equipment Module PS3.3 Section C.7.5.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Manufacturer	0008,0070	2	Manufacturer of the equipment that produced the images	"Sound"	ALWAYS	AUTO
Institution Name	0008,0080	3	Institution where the equipment that produced the images is located	Config options (Site Name)	VNAP	CONFIG
Institution Address	0008, 0081	3	Mailing address of the institution where the equipment that produces the images is located	Config options (Site Address)	VNAP	CONFIG
Station Name	0008,1010	3	User defined name identifying the machine that produced the images	Config options (Local AE Title)	ALWAYS	CONFIG
Manufactures Model Name	0008,1090	3	Manufacturer's model number of the equipment that produced the images	"Sound Fusion DR"	ALWAYS	AUTO
Device Serial Number	0018,1000	3	Manufacturer's serial number of the equipment that produced the images	System Serial Number	ALWAYS	CONFIG
Software Version	00180,1020	3	Manufacturer's designation of software version of the equipment that produced the images	Software version	ALWAYS	AUTO

Table 10-9

General Image Module Section C.7.6.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Instance Number	0020,0013	2	A number that identifies the image	Generated	ALWAYS	AUTO
Patient Orientation	0020,0020	2C	Patient direction of the rows and columns of the image	Selected View Position / Value Configurable	ALWAYS	USER / CONFIG
Content Date	0008,0023	2C	Date the image pixel data creation started	Generated	ALWAYS	AUTO
Content Time	0008,0033	2C	Time the image pixel data creation started	Generated	ALWAYS	AUTO
Image Type	0008,0008	3	See IOD Image Module	"ORIGINAL \PRIMARY"	ALWAYS	AUTO
Acquisition Number	0020,0012	3	A number identifying the single continuous gathering of data over a period which resulted in this image.	Generated	ALWAYS	AUTO
Acquisition Date	0008,0022	3	The date the acquisition of data that resulted in this image started.	Generated	ALWAYS	AUTO
Acquisition Time	0008,0032	3	The time the acquisition of data that resulted in this image started.	Generated	ALWAYS	AUTO
Lossy Image Compression	0028,2110	3	Specifies whether an image has undergone lossy compression	"00"	ALWAYS	AUTO
Image Laterality	0020,0062	3	Laterality of (possibly paired) body part (as described in Anatomic Region Sequence (0080,2218)) examined.	Selected View Position / Value Configurable	ALWAYS	USER / CONFIG
Anatomic Region Sequence	0008,2218	2	Sequence that identifies the anatomic region of interest in this Instance (i.e., external anatomy, surface anatomy, or general region of the body).	User Selection	ALWAYS	USER
Presentation LUT Shape	2050,0020	1	Specifies an identity transformation for the Presentation LUT, other than to account for the value of Photometric Interpretation (0028,0004), such that the output of all grayscale transformations defined in the IOD containing this Module are defined to be P-Values.	"INVERSE" if image is inverted else "IDENTITY"	ALWAYS	USER

General Image Module Section C.7.6.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Burned In Annotation	0028,0301	3	Indicates whether image contains enough burned in annotation to identify the patient and date the image was acquired.	"NO" “YES”	ALWAYS	CONFIG

Table 10-10

Image Pixel Module PS3.3 Section C.7.6.3						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Samples Per Pixel	0028,0002	1	See IOD Image Module	From acquisition parameters	ALWAYS	AUTO
Photometric Interpretation	0028,0004	1	See IOD Image Module	"MONOCHROME2"	ALWAYS	AUTO
Rows	0028,0010	1	Number of rows in the image.	Size of image after user applied processing	ALWAYS	USER
Columns	0028,0011	1	Number of columns in the image.	Size of image after user applied processing	ALWAYS	USER
Bits Allocated	0028,0100	1	See IOD Image Module	From acquisition parameters	ALWAYS	AUTO
Bits Stored	0028,0101	1	See IOD Image Module	From acquisition parameters	ALWAYS	AUTO
High bit	0028,0102	1	See IOD Image Module	From acquisition parameters	ALWAYS	AUTO
Pixel Representation	0028,0103	1	See IOD Image Module	0x000	ALWAYS	AUTO
Pixel Data	7FE0,0010	1	Data stream of pixel samples which comprise the image.	From acquisition parameters	ALWAYS	AUTO

Table 10-11

Acquisition Context Module PS3.3 Section C.7.6.14						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Acquisition Context Sequence	0040,0555	2	A Sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance.	Zero Length	EMPTY	AUTO

10.1.1.3 Modality Specific Modules

Table 10-12

DX Series Module PS3.3 Section C.8.11.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Modality	0008,0060	1	Type of equipment that originally acquired the data used to create the images in this Series.	"DX"	ALWAYS	AUTO
Presentation Intent Type	0008,0068	1	Identifies the intent of the images that are contained within this Series.	"FOR PRESENTATION"	ALWAYS	AUTO

Table 10-13

DX Anatomy Imaged Module PS3.3 Section C.8.11.2						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Image Laterality	0020,0062	1	Laterality of (possibly paired) body part (as described in Anatomic Region Sequence (0080,2218)) examined.	Selected View Position / Value Configurable	ALWAYS	USER/CONFIG
Anatomic Region Sequence	0008,2218	2	Sequence that identifies the anatomic region of interest in this Instance (i.e., external anatomy, surface anatomy, or general region of the body).	User Selection	ALWAYS	USER

Table 10-14

DX Image Module PS3.3 Section C.8.11.3						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Pixel Intensity Relationship	0028,1040	1	The relationship between the Pixel sample values and the X-Ray beam intensity.	"LIN"	ALWAYS	AUTO
Pixel Intensity Relationship Sign	0028,1041	1	The sign of the relationship between the Pixel sample values stored in Pixel Data (7FE0,0010) and the X-Ray beam intensity.	1	ALWAYS	AUTO
Rescale Intercept	0028,1052	1	The value b in the relationship between stored values (SV) in Pixel Data (7FE0,0010) and the output units specified in Rescale Type (0028,1054).	0	ALWAYS	AUTO
Rescale Slope	0028,1053	1	m in the equation specified by Rescale Intercept (0028,1052).	1	ALWAYS	AUTO
Rescale Type	0028,1054	1	Specifies the output units of Rescale Slope (0028,1053) and Rescale Intercept (0028,1052).	“US”	ALWAYS	AUTO

Table 10-15

DX Detector Module PS3.3 Section C.8.11.4						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Detector Type	0018,7004	2	The type of detector used to acquire this image.	"SCINTILLATOR"	ALWAYS	AUTO
Imager Pixel Spacing	0018,1164	1	Physical distance measured at the front plane of the detector housing between the center of each image pixel specified by a numeric pair - row spacing value(delimiter) column spacing value in mm.	From Acquisition parameters	ALWAYS	AUTO
Detector Id	0018,700A	3	The ID or serial number of the detector used to acquire this image.	Serial number of detector used to acquire the imgage.	ALWAYS	AUTO

Table 10-16

DX Positioning Module PS3.3 Section C.8.11.5						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Positioner Type	0018,1508	2	Type of the positioner.	Zero Length	EMPTY	AUTO

10.1.1.4 Look Up Tables and Presentation States

Table 10-17

VOI LUT Module PS3.3 Section C.11.2						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Window Center	0028,1050	1C	Window Center for display.	User Input	ALWAYS	USER
Window Width	0028,1051	1C	Window Width for display	User Input	ALWAYS	USER

10.1.1.5 General Modules

Table 10-18

SOP Common Module PS3.3 Section C.12.1						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
SOP Class UID	0008,0016	1	Uniquely identifies the SOP Class Digital X-Ray Image Storage - For Presentation	"1.2.840.10008.5.1.4.1.1.1.1"	ALWAYS	AUTO
SOP Instance UID	0008,0018	1	Uniquely identifies the SOP Instance	Generated	ALWAYS	AUTO
Specific Character Set	0008,0005	1C	Character Set that expands or replaces the Basic Graphic Set.	"ISO_IR 100"	ALWAYS	AUTO

10.1.1.6 X-Ray Dose Module

Table 10-19

X-Ray Acquisition Does Module PS3.3 Section C.8.7						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
KVP	0018,0060	3	Peak kilo voltage output of the X-Ray generator used.	Generated or user input	VNAP	AUTO/ USER
X-Ray Tube Current	0018,1151	3	X-Ray Tube Current in mA	Generated or user input	VNAP	AUTO/ USER
Exposure Time	0018,1150	3	Duration of X-Ray exposure in msec	Generated or user input	VNAP	AUTO/ USER
Exposure Time in µS	0018,8150	3	X-Ray Tube current in µA	Generated or user input	VNAP	AUTO/ USER
Exposure	0018,1152	3	The exposure expressed in mAs, for example calculated from Exposure time and X-Ray Tube Current	Generated or user input	VNAP	AUTO/ USER

X-Ray Acquisition Does Module PS3.3 Section C.8.7						
Attribute Name	**Tag**	**Type**	**Description**	**Value**	**Presence of Value**	**Source**
Exposure in µAs	0018,1153	3	The exposure expressed in µAs for example calculated from Exposure Time and X-Ray Tube Current	Generated or user input	VNAP	AUTO/ USER

10.1.2 Attribute Mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in Table 10-20.

Table 10-20

Modality Worklist	Image IOD	MPPS IOD
Patient Name	Patient Name	Patient Name
Responsible Person	Responsible Person	----
Patient ID	Patient ID	Patient ID
Patient's Birth Date	Patient's Birth Date	Patient's Birth Date
Patient Species Description	Patient Species Description	----
----	Patient Species Code Sequence	----
----	> Code Value	----
----	> Coding Schema Designator	----
----	> Code Meaning	----
Patient's Breed Description	Patient Breed Description	----
----	Patient Breen Code Sequence	----
----	> Code Value	----
----	> Coding Schema Designator	----
----	> Code Meaning	----
Patient's Sex	Patient's Sex	----
Patient's Weight	Patient's Weight	----
----	----	Scheduled Step Attributes Sequence
Study Instance UID	Study Instance UID	> Study Instance UID
Requested Procedure ID	----	> Requested Procedure ID
Accession Number	Accession Number	> Accession Number
----	----	Scheduled Step Attributes Sequence
Requested Procedure ID	----	> Requested Procedure ID
Requested Procedure Description	----	----

Scheduled Procedure Step Description	----	> Scheduled Procedure Step Description
Scheduled Procedure Step Start Date Time	----	Performed Procedure Step Start Date
Scheduled Procedure Step Start Date Time	----	Performed Procedure Step Start Time
----	Study ID	Study ID
----	Study Date	----
----	Study Time	----
Scheduled Procedure Step ID	----	Performed Procedure Step ID
----	----	Performed Procedure Step Description
----	----	Procedure Code Sequence
----	----	Performed Series Sequence
----	Study Description	> Protocol Name
----	Series Description	> Series Description
----	Series Instance UID	> Series Instance UID
----	----	> Referenced Image Sequence
----	----	> Referenced Non Image Composite Sequence
----	SOP Class UID	----
----	SOP Instance UID	----