Technical Publications

DOC2546373
Revision 02

OEC 3D
DICOM CONFORMANCE STATEMENT

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CONFORMANCE STATEMENT OVERVIEW

The GE OEC 3D is a system used to assist trained surgeons. The system provides X-ray images while the surgeon performs a medical procedure. 2D and 3D images from the system help the surgeon to visualize the patients' anatomy to localize surgical regions of interest and pathology.

The content covers all versions/models of the OEC 3D to date, some functionality may not be present because of the selected Options. This content is a superset of all Models and Options of the OEC 3D.

The system uses the DICOM protocol to send images to printers and PACS servers and to receive worklists of scheduled exams from the HIS (Hospital Information System), RIS (Radiology Information System), or PACS (Picture Archive Communications Server).

Table 0-1 provides an overview of the network services supported by the OEC 3D.

TABLE 0-1 NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage – For Presentation	No	Yes
Digital X-Ray Image Storage – For Processing	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	No	Yes
CT Image Storage	Yes	Yes
Ultrasound Multi-frame Image Storage	No	Yes
MR Image Storage	No	Yes
Ultrasound Image Storage	No	Yes
Secondary Capture Image Storage	Yes	Yes
Multi-frame Grayscale Byte SC	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	Yes	Yes
Nuclear Medicine Image Storage	No	Yes
X-Ray Radiation Dose SR	Yes	No
Positron Emission Tomography Image Storage	No	Yes
RT Image Storage	No	Yes
Query/Retrieve		
Patient Root Query/Retrieve Information Model – FIND	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	Yes	No
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Print Management		
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Basic Grayscale Print Management Meta SOP Class	Yes	No
Printer SOP Class	Yes	No
Presentation LUT SOP Class	Yes	No
Workflow Management		
Storage Commitment Push Model SOP Class	Yes	No
Modality Performed Procedure Step SOP Class	Yes	No
Modality Performed Procedure Step Retrieve SOP Class	No	No
Modality Worklist Information Model – FIND SOP Class	Yes	No

Table 0-2 provides an overview of the Media Storage Application Profiles supported by the OEC 3D.

TABLE 0-2 MEDIA SERVICES

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Portable Media		
Raw Data Storage	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage – For Presentation	No	Yes
Digital X-Ray Image Storage – For Processing	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	No	Yes
Digital Mammography X-Ray Image Storage – For Processing	No	Yes
CT Image Storage	Yes	Yes
Ultrasound Multi-frame Image Storage	No	Yes
MR Image Storage	No	Yes
Ultrasound Image Storage	No	Yes
Secondary Capture Image Storage	Yes	Yes
Multi-frame Grayscale Byte SC	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	Yes	Yes
Nuclear Medicine Image Storage	No	Yes
X-Ray Radiation Dose SR	Yes	No
Positron Emission Tomography Image Storage	No	Yes
RT Image Storage	No	Yes

REVISION HISTORY

Revision	Date	Description
1	30 April 2021	Initial release
2	27 May 2021	Minor content updates

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TABLE OF CONTENTS

INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

Section 2 (Network Conformance Statement), which specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (Media Storage Conformance Statement), which specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Media Storage features.

Section 4 (Common and Shared Information Modules), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of all Information Objects.

Section 5 (X-Ray Angiography Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of an X-Ray Angiography (XA) Information Object.

Section 6 (X-Ray Radiofluoroscopy Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of an X-Ray Radio Fluoroscopy (RF) Information Object.

Section 7 (Computed Radiography Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a Computed Radiography (CR) Image Information Object.

Section 8 (Computed Tomography Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a Computed Tomography (CT) Image Information Object.

Section 9 (Secondary Capture Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a Secondary Capture (SC) Image Information Objects.

Section 10 (Multi-frame Grayscale Byte Secondary Capture Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a Multi-frame Grayscale Byte SC (Multi-SC) Image Information Object.

Section 11 (X-Ray Radiation Dose Structured Report Information Object Implementation**),** which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a X-Ray Radiation Dose Structured Report (RDSR) Information Object.

Section 12 (Modality Worklist Query Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the Modality Worklist (MWL) service.

Section 13 (Modality Performed Procedure Step Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the Modality Perform Procedure Step (MPPS) service.

Section 14 (Storage Commitment Push Model Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the Storage Commitment Push Model (Store Commit) SOP Class.

Section 15 (Basic Directory Information Object Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of a Basic Directory Information Object.

Section 16 (Print Management Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the Basic Grayscale Print Meta (Print) SOP Classes.

Section 17 (Query Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the Patient Root and Study Root Query/Retrieve (Q/R) service.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEHC DICOM Conformance Statements is shown in Figure 1-1 GEHC DICOM Conformance Statement StructureFigure 1-1:

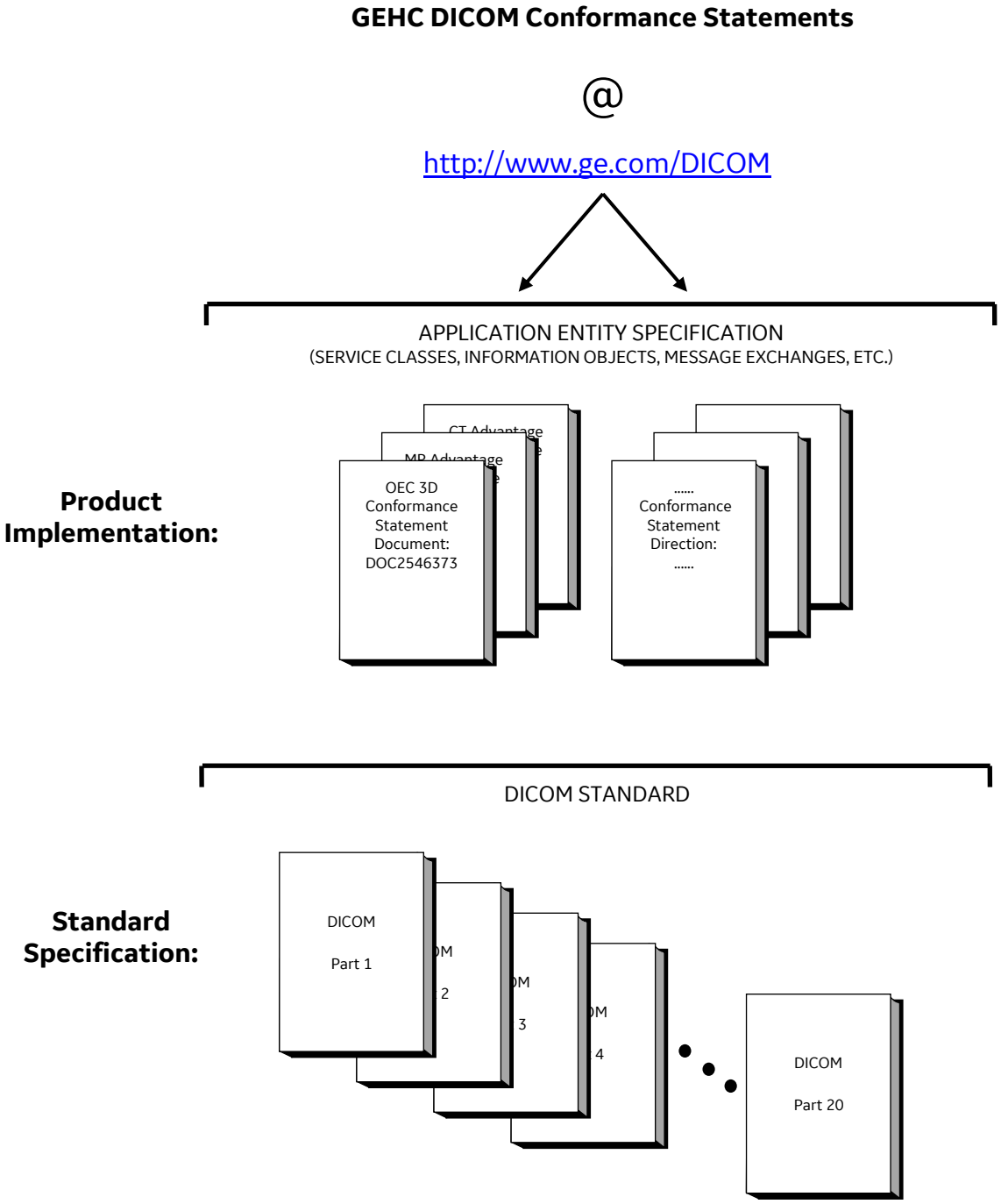

FIGURE 1-1 GEHC DICOM CONFORMANCE STATEMENT STRUCTURE

This document specifies the DICOM implementation. It is entitled:

OEC 3D 1.0
Conformance Statement for DICOM
DOC2546373

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEHC network interface.

The GEHC Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the Standard may be addressed to:

DICOM Secretariat
NEMA
1300 N. 17th Street, Suite 1752
Rosslyn, VA 22209
USA
Phone: +1.703.841.3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts which are used in that Standard.

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document to provide an unambiguous specification for GEHC implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEHC medical data exchanged using DICOM. The GEHC Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEHC devices are capable of using different Information Object Definitions. For example, a GEHC CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEHC implementation. If the user encounters unspecified private data elements while parsing a GEHC Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEHC devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to**

ensure that inter-operation will be successful. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.
- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEHC protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) described by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.
- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

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

1.7 DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitons of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association – a network communication channel set up between *Application Entities*.

Attribute – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

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).

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.

1.8 SYMBOLS AND ABBREVIATIONS

3D	Three-Dimensional
AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CAK	Cumulative Air Kerma
CDA	Clinical Document Architecture
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
CR	Computed Radiography
CT	Computed Tomography
DAP	Dose Area Product
dGy	Decigray
$dGycm^2$	Unit used for DAP
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
DNS	Domain Name System
DX	Digital X-ray
DVD	Digital Video Disc

FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State
Gy	Gray a derived unit of ionizing radiation dose.
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
IOD	Information Object Definition
JPEG	Joint Photographic Experts Group
LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format
LUT	Look-up Table
MAR	Medication Administration Record
mAs	Milliamp-seconds – unit of measure used in X-ray imaging
mGy	Milligray
$mGycm^2$	Unit used for DAP
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Schedule Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NM	Nuclear Medicine
NTP	Network Time Protocol
O	Optional (Key Attribute)

OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDI	Portable Data for Imaging
PDU	Protocol Data Unit
R	Required (Key Attribute)
RDN	Relative Distinguished Name (LDAP)
RDSR	Radiation Dose Structured Report
RF	Radiofluoroscopy
RIS	Radiology Information System
RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
µAs	Microamp-seconds – unit of measure used in X-ray imaging
U	Unique (Key Attribute)
UL	Upper Layer
US	Ultrasound
VL	Visible Light
VOI	Value of Interest
VR	Value Representation
XA	X-ray Angiography
USB	Universal Serial Bus

NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the OEC 3D compliance to DICOM requirements for **Networking** features.

This product uses healthcare industry standard DICOM 3.0 protocol to exchange information with other DICOM compliant device on the network.

The GE OEC 3D system runs on a single board computer. It allows for the following DICOM functionality:

- Initiates and responds to a DICOM C-ECHO message to assist in network diagnostics.
- Initiates a DICOM asssociation to send each image and/or report.
- Sends DICOM images and RDSR to a DICOM Store SCP (PACS).
- Sends DICOM Storage Commitment to PACS.
- Sends DICOM MPPS to RIS.
- Querying and retrieving DICOM Modality Worklist from a Worklist SCP (RIS).
- Printing acquired images to a DICOM Printer.
- Querying and retrieving saved examinations from a DICOM Query/Retrieve SCP.

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

The network application model for the OEC 3D is shown in Figure 2-1:

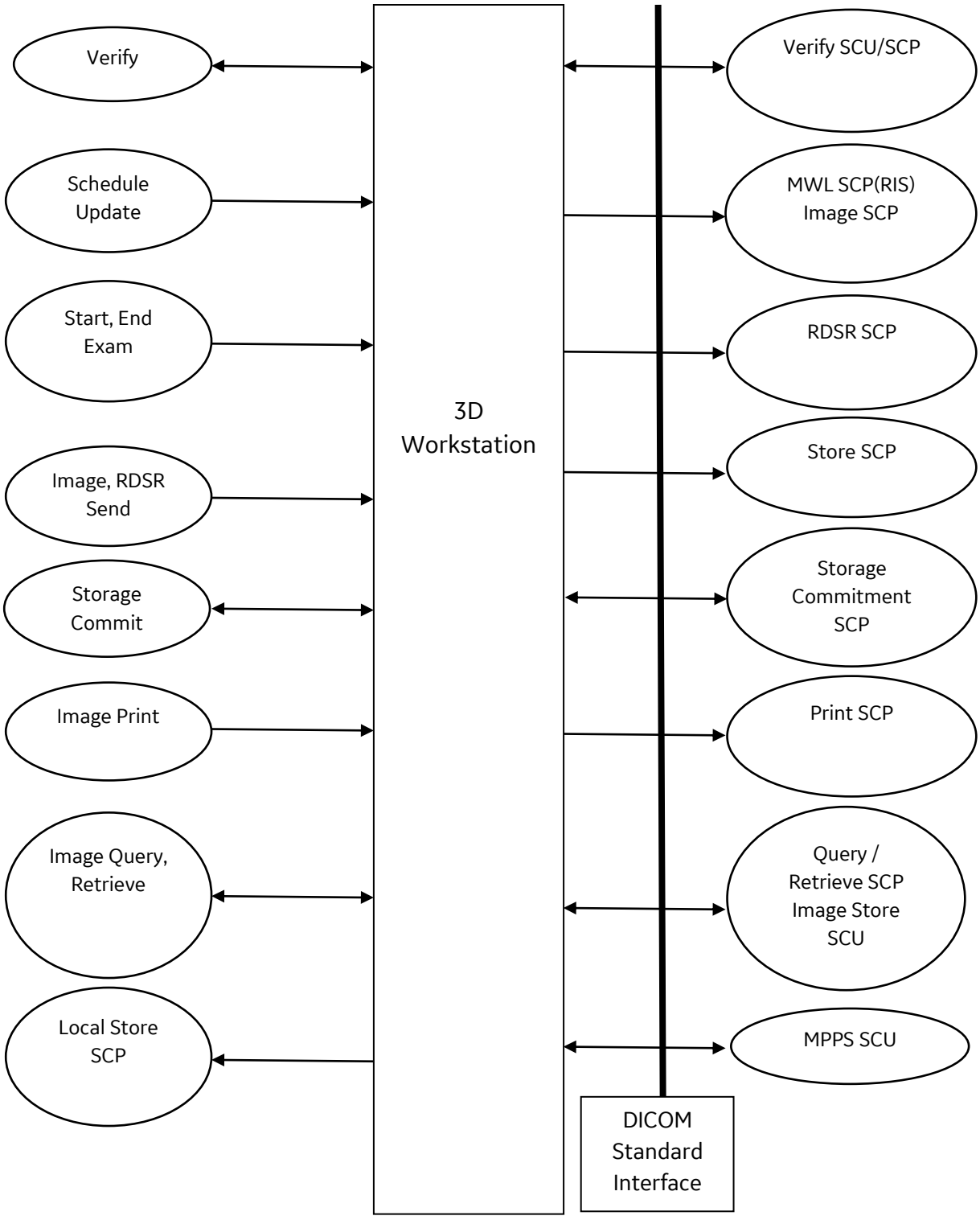

FIGURE 2-1 OEC 3D NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM

The product supports Verify which performs a check of communication to a remote server including the AE title of the Remote SCP; the results of Verify are communicated to user on the server configuration

screens(Store/Store Commit, MWL, Query/Retrieve or DICOM Print). Remote Servers can also use the Verify (C-ECHO) function to confirm communication to the 3D Workstation.

The product supports Schedule Update which performs a worklist query to a Remote MWL SCP; the results are displayed to user on the 3D Workstation

The product supports Update Schedule which performs an image query to a Remote Store SCP; the results are displayed to user on the 3D Workstation

The product supports Image, RDSR Send which performs a 'Send' to a Remote Store SCP of the image or RDSR; the user is shown status of the Send operation.

The product supports Storage Commit which performs 'Storage commit' to a Remote Store SCP of the image or RDSR; the user is shown status of the Store Commit operation.

The product supports Image Print which performs a print to a Remote Print SCP of the image(s); the user is able to layout the images for the print operation.

The product supports Image Query/Retrieve which performs a query to a Remote Query/Retrieve SCP for a series containing images ; the user is able to retrieve the series and view the images if supported on the 3D Workstation.

The product supports a Remote Image Store to the Local Store SCP which allows the user to store supported images directly to the 3D Workstation.

2.2.2 Functional Definition of AE's

Application Entity "3D Workstation" supports the following functions:

- Initiates a DICOM verification and responds to a DICOM verification to assist in network diagnostics.
- Initiates a DICOM association to query for examination information (MWL Worklist query).
- Initiates a Study Root Query to get patient demographics ("Patient Information Only" Image query to populate the scheduled exam).
- Initiates a DICOM association to send an image or RDSR.
- Transmits DICOM images and RDSR to the DICOM Storage SCP.
- Initiates a DICOM association to send MPPS messages to RIS.
- Initiates a DICOM association for storage commitment of images and RDSR.
- Initiates a DICOM association to print images.
- Transmits images data, patient and dose summary report to DICOM Print SCP.
- Initiates a DICOM association to query for desired examinations for Q/R service.
- Accepts DICOM associations for DICOM Store requests in retrieve (move) operation.
- Accepts DICOM associations for DICOM Store requests for direct image store operation.

2.2.3 Sequencing of Real-World Activities

1. Network configuration of the system should be accomplished first.

2. System configuration allows for Store, Storage Commitment, Print, MWL, and Query/Retrieve configuration of Remote SCPs which will have a server alias name on the 3D Workstation.

3. DICOM Verification should be performed during configuration enabling the user to perform network diagnostics before procedures. The verification is available for all Store/ Storage Commit server, Print server, Query/Retrieve server, and Worklist query server configurations allowed on the system.

4. Schedule Update should be performed prior to starting an exam; otherwise the user can input the exam information.

5. For Image Query, the Remote Query SCP server must be configured with the 3D Workstation AE Title, IP Address and Retrieve(C-Store)/Storage Commit port for the local server.

6. Retrieval of images should be performed prior to an exam but can be performed during the exam.

7. Image Send can be performed during or after the exam.

8. End Exam should be done when the user is done using the X-ray capabilities of the OEC 3D. This will create the RDSR(s) for the exam on a per procedure step basis. Automatic storage of the RDSR can be configured.

9. Image Print can be performed during or after the exam.

10. Networking will be terminated by the 3D Workstation if the user requests the system to create X-rays.

11. Images and RDSR can be sent to a properly formated USB mass storage device. The OEC 3D can also format the USB mass storage device up to 2 TB as FAT32.

12. MPPS messages are sent when a MPPS server is configured. N-CREATE at first x-ray or start of exam. N-SET when exam is completed or abandoned.

2.3 AE SPECIFICATIONS

Configuration must be completed and saved before the system is able to perform DICOM Store/Storage Commit, Print, MWL Query, MPPS, or Query/Retrieve.

2.3.1 3D Workstation Specification

The 3D Workstation Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU** and/or as an **SCP**:

TABLE 2-1 SUPPORTED SOP CLASSES

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes
RT Image Information Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The maximum length PDU receive size for the 3D Workstation is:

Maximum Length PDU	16384 (Not Configurable)

2.3.1.1.2 Number of Associations

The 3D Workstation will initiate a maximum of 1 simultaneous Initiator (SCU) association to remote nodes.

The 3D Workstation will support a maximum of 1 simultaneous Acceptor (SCP) association initiated by remote nodes for C-STORE.

There is one association going in each direction, one for the SCU operation and one for the SCP operation of the 3D Workstation. This allows a Storage Commit (N-EVENT-REPORT) to be received when another C-STORE may be in progress.

2.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously. The only exceptions are for N-EVENT-REPORTS for Storage Commit and Print Management operations.

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

OEC 3D Implementation UID	1.2.840.113619.6.329
OEC 3D Implementation Version Name	OEC v1.3

2.3.1.2 Association Initiation Policy

When the 3D Workstation Application Entity initiates an Association for any Real-World Activity, it will propose the Presentation Context for the Real-World Activity; i.e., there is only a single, Presentation Context Negotiation proposed by the AE for C-STORE of XA IOD.

The 3D Workstation proposes three (3) Transfer Syntaxes in each Presentation Context; i.e., for each Abstract Syntax in the following Presentation Context Tables, the AE proposes one Presentation Context with those three (3) Transfer Syntaxes.

2.3.1.2.1 Real-World Activity: Verify Connection

2.3.1.2.1.1 Associated Real-World Activity

Pressing the "Verify" button on the Server configuration screen for any of the following server screens: MWL, Store/Store Commit, Print or Query/Retrieve.

2.3.1.2.1.2 Proposed Presentation Context Table

TABLE 2-2 PRESENTATION CONTEXT – PROPOSED BY 3D WORKSTATION FOR ACTIVITY VERIFY

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Verification SOP Class	1.2.840.10008.1.1	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

2.3.1.2.2 Real-World Activity: Schedule Update

2.3.1.2.2.1 Associated Real-World Activity

The user can initiate a Schedule Update by pressing the 'Update Schedule' button on the Scheduled Exams screen.

2.3.1.2.2.2 Proposed Presentation Context Table

The Modality Worklist Information Model – FIND is used if the user has configured the MWL server on the OEC 3D to be DICOM Query Type of 'Worklist'.

The Study Root Query/Retrieve Information Model – FIND is used if the user has configured the MWL server on the OEC 3D to be DICOM Query Type of 'Image' instead of 'Worklist'.

The 3D Workstation includes the specific character set of "ISO_IR 100" in a request. Responses with another character set are ignored.

TABLE 2-3 PRESENTATION CONTEXT – PROPOSED BY 3D WORKSTATION FOR ACTIVITY SCHEDULE UPDATE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Study Root Query/Retrieve	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

Information Model - FIND		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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 1.2.840.10008.1.2.2	SCU	None

2.3.1.2.2.2.1 SOP Specific DICOM Conformance Statement for the Modality Worklist Information Model - FIND SOP Class

The 3D Workstation includes matching keys in the Modality Worklist queries as described in Section 12.

The Scheduled Exam screen will be populated with the results of the FIND query based on the returned data from the server. If a response matches an exam that the system has in its database, the system will not display that result again. The OEC Workstation will only display 500 responses. The responses will remain on the system until they are used for an exam by being selected or another Schedule Update is performed.

If the user selects the Cancel button on the Schedule Update progress bar, a C-FIND CANCEL will be sent if the association is not yet complete.

Status codes that are more specifically processed when receiving messages from a **Modality Worklist** SCP equipment are as follows:

TABLE 2-4 STATUS CODES RECEIVED BY 3D WORKSTATION FOR MWL - FIND

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700	Refused: Out of resources	Error displayed to the user and logged for viewing in the Event Log.
	A900	Error: Identifier does not match SOP Class	Error displayed to the user and logged for viewing in the Event Log.
	C000-CFFF	Error: Unable to process	Error displayed to the user and logged for viewing in the Event Log.
	0122	SOP Class Not Supported	Error displayed to the user and logged for viewing in the Event Log.
Cancel	FE00	Matching terminated due to cancel	Logged for viewing in the Event Log.
Success	0000	Matching is complete - No final identifier is supplied	Display the list.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Show progress to user.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	Show progress to user.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the Event Log.

2.3.1.2.2.2.2 SOP Specific DICOM Conformance Statement for the Study Root Query/Retrieve Information Model – FIND SOP Class for Schedule Update

The 3D Workstation includes matching keys in the queries as described in Section 17.

The 3D Workstation includes the specific character set of "ISO_IR 100" in a request. Responses with another character set are ignored.

If the user selects the Cancel button on the Schedule Update progress bar, a C-FIND CANCEL will be sent if the association is not yet complete.

Status codes that are more specifically processed when receiving messages from a **Query** SCP equipment are as follows:

TABLE 2-5 STATUS CODES RECEIVED BY 3D WORKSTATION FOR STUDY ROOT Q/R - FIND

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700	Refused: Out of resources	Error displayed to the user and logged for viewing in the Event Log.
	A900	Error: Identifier does not match SOP Class	Error displayed to the user and logged for viewing in the Event Log.
	C000-CFFF	Error: Unable to process	Error displayed to the user and logged for viewing in the Event Log.
	0122	SOP Class Not Supported	Error displayed to the user and logged for viewing in the Event Log.
Cancel	FE00	Matching terminated due to cancel	Logged for viewing in the Event Log.
Success	0000	Matching is complete - No final identifier is supplied	Display the list.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Show progress to user.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier	Show progress to user.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the Event Log.

2.3.1.2.3 Real-World Activity: Start/End Exam

2.3.1.2.3.1 Associated Real-World Activity

The system will start collecting X-ray dose information for the selected exam as soon as the X-ray activation switch is pressed. This starts the exam.

The user is provided a control to end/abandon an exam on the Image and Saved Exams screens. This will create the RDSR and optionally send the RDSR to an RDSR SCP.

2.3.1.2.3.2 Proposed Presentation Context Table

See Section 2.3.1.2.4.

2.3.1.2.3.2.1 SOP Specific DICOM Conformance Statement for Modality Performed Procedure Step SOP Class

The 3D Workstation will send an N-CREATE MPPS message at the start of an exam (first x-ray).

The 3D Workstation will send an N-SET MPPS message completing or abandoning the exam per the instructions from the user. Using the human interface the user is able to complete or abandon (end) and exam.

The 3D Workstation includes attributes in the Modality Performed Procedure Step N-CREATE as described in Section 13.

The 3D Workstation uses many of MWL attributes in setting values for MPPS including Scheduled Protocol Code Sequence.

Status codes that are more specifically processed when receiving an **N-CREATE response** from an **MPPS** SCP equipment are as follows:

TABLE 2-6 STATUS CODES RECEIVED BY 3D WORKSTATION FOR MPPS N-CREATE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0119	Class-instance conflict	Error is logged and entry is placed into transfer status queue.

	0210	Duplicate invocation	Error is logged and entry is placed into transfer status queue.
	0111	Duplicate SOP Instance	Error is logged and entry is placed into transfer status queue.
	0106	Invalid attribute value	Error is logged and entry is placed into transfer status queue.
	0117	Invalid SOP instance	Error is logged and entry is placed into transfer status queue.
	0120	Missing attribute	Error is logged and entry is placed into transfer status queue.
	0121	Missing attribute value	Error is logged and entry is placed into transfer status queue.
	0212	Mistyped argument	Error is logged and entry is placed into transfer status queue.
	0105	No such attributes	Error is logged and entry is placed into transfer status queue.
	0118	No such SOP Class	Error is logged and entry is placed into transfer status queue.
	0112	No such SOP Instance	Error is logged and entry is placed into transfer status queue.
	0110	Processing failure	Error is logged and entry is placed into transfer status queue.
	0213	Resource limitation	Error is logged and entry is placed into transfer status queue.
	0211	Unrecognized operation	Error is logged and entry is placed into transfer status queue.
Success	0000		Success placed in the transfer status screen.
*	*	Any other status code.	Error is logged and entry is placed into transfer status queue.

The OEC 3D will set MPPS to COMPLETED or DISCONTINUED, according to the dialogs selected by the user for the exam.

The AE includes attributes in the Modality Performed Procedure Step N-SET as described in Section 13.

Following are the status codes that are more specifically processed when receiving an **N-SET response** from an **MPPS** SCP equipment:

TABLE 2-7 STATUS CODES RECEIVED BY 3D WORKSTATION FOR MPPS N-SET

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0119	Class-instance conflict	Error is logged and entry is placed into transfer status queue.
	0210	Duplicate invocation	Error is logged and entry is placed into transfer status queue.
	0106	Invalid attribute value	Error is logged and entry is placed into transfer status queue.
	0212	Mistyped argument	Error is logged and entry is placed into transfer status queue.
	0117	Invalid SOP instance	Error is logged and entry is placed into transfer status queue.
	0121	Missing attribute value	Error is logged and entry is placed into transfer status queue.
	0105	No such attributes	Error is logged and entry is placed into transfer status queue.
	0118	No such SOP Class	Error is logged and entry is placed into transfer status queue.
	0112	No such SOP Instance	Error is logged and entry is placed into transfer status queue.
	0110	Processing failure	Error is logged and entry is placed into transfer status queue.
	0213	Resource limitation	Error is logged and entry is placed into transfer status queue.
	0211	Unrecognized operation	Error is logged and entry is placed into transfer status queue.
Success	0000		Success placed in the transfer status screen.
*	*	Any other status code.	Error is logged and entry is placed into transfer status queue.

2.3.1.2.4 Real-World Activity: Image/RDSR Send and Storage Commit

2.3.1.2.4.1 Associated Real-World Activity

The user is able to store Images and RDSRs from the Images screen. Images can be stored at any time during or after the exam. RDSRs are only available after an exam is ended with a End Exam or Complete Exam.

The Abstract syntax selected is based on the configuration of the Store SCP on the 3D Workstation or by the data item selected on the Images screen(Dose Summary, Patient Summary and Radiation Dose Structure Report).

The Patient Summary and Dose Summary screens can be sent to the Store SCP and will always be sent as a Secondary Capture Image Storage.

2.3.1.2.4.2 Proposed Presentation Context Table

The 3D Workstation will negotiate the association as an SCU only. The 3D Workstation product is implementing Storage Commitment SOP Class as an SCP for this Real-World Activity (see Section 2.3.1.3.2), since N-EVENT-REPORT Request shall be sent on a separate association initiated by the SCP.

TABLE 2-8 PRESENTATION CONTEXT – PROPOSED BY 3D WORKSTATION FOR ACTIVITY IMAGE/RDSR SEND AND STORAGE COMMIT

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	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
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	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
X-Ray Radiofluoroscopic 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

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
X-Ray Radiation Dose SR Storage (RDSR)	1.2.840.10008.5.1.4.1.1.88.67	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

2.3.1.2.4.2.1 SOP Specific DICOM Conformance Statement for All Storage SOP Classes

The 3D Workstation includes optional data elements in the SOP Instances as described in Sections 5 through 11:

Status codes that are more specifically processed when receiving messages from a **Storage** SCP equipment are as follow:

TABLE 2-9 STATUS CODES RECEIVED BY 3D WORKSTATION FOR ACTIVITY IMAGE/RDSR SEND AND STORAGE COMMIT

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700-A7FF	Refused: Out of resources	Error displayed to the user and logged for viewing in the Event Log.
	A900-A9FF	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the Event Log.
	C000-CFFF	Error: Cannot Understand	Error displayed to the user and logged for viewing in the Event Log.
	0122	SOP Class Not Supported	Error displayed to the user and logged for viewing in the Event Log.
Warning	B000	Coercion of Data Elements	Error displayed to the user and logged for viewing in the Event Log.
	B006	Elements Discarded	Error displayed to the user and logged for viewing in the Event Log.
	B007	Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the Event Log.
Success	0000		Success will be logged for viewing in the Event Log.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the Event Log.

2.3.1.2.4.2.2 SOP Specific DICOM Conformance Statement for the X-Ray Radiation Dose Storage SOP Classes

See Section 2.3.1.2.4.2.1 for details on general Storage Service SCU processing also applicable to the X-Ray Radiation Dose Storage SOP Classes.

The 3D Workstation supports creation and transmission of X-Ray Radiation Dose SOP Instances referencing Instances of the following Storage SOP Classes:

TABLE 2-10 X-RAY RADIATION DOSE SOP INSTANCES

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

Note - Images must be stored (Image Send) prior to End Exam.

2.3.1.2.4.2.3 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class SCU

The 3D Workstation will request a Storage Commitment for each Image/RDSR Send, if the Store/Store Commit Server Configuration screen has 'Enable Storage Commit' enabled.

The 3D Workstation uses DICOM network storage services to transfer SOP Instances which are to be committed. It does not support the optional Storage Media File-Set ID and UID Attributes in the Storage Commitment N-ACTION for transfer of SOP Instances by media for Storage Commitment.

The 3D Workstation may request Storage Commitment for Instances of any of the Composite SOP Classes it supports as an SCU (see Section 2.3.1.2.4.2).

The Storage Commitment Information Object is described in Section 14.

Following are the status codes that are more specifically processed when receiving **N-ACTION** responses from a **Storage Commit** SCP equipment:

TABLE 2-11 STATUS CODES RECEIVED BY 3D WORKSTATION FOR STORAGE COMMIT N-ACTION

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0119	Class-instance conflict	Error displayed to the user and logged for viewing in the Event Log.
	0210	Duplicate invocation	Error displayed to the user and logged for viewing in the Event Log.
	0115	Invalid argument value	Error displayed to the user and logged for viewing in the Event Log.
	0117	Invalid SOP Instance	Error displayed to the user and logged for viewing in the Event Log.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
	0212	Mistyped argument	Error displayed to the user and logged for viewing in the Event Log.
	0123	No such action	Error displayed to the user and logged for viewing in the Event Log.
	0114	No such argument	Error displayed to the user and logged for viewing in the Event Log.
	0118	No such SOP Class	Error displayed to the user and logged for viewing in the Event Log.
	0112	No such SOP Instance	Error displayed to the user and logged for viewing in the Event Log.
	0110	Processing failure	Error displayed to the user and logged for viewing in the Event Log.
	0213	Resource limitation	Error displayed to the user and logged for viewing in the Event Log.
	0211	Unrecognized operation	Error displayed to the user and logged for viewing in the Event Log.
Success	0000		Success will be logged for viewing in the Event Log.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the Event Log.

A Storage Commit N-EVENT-REPORT can not be received on the Association initiated by this Application Entity, as SCP SCU Role selection only allows SCU Role (see Section 2.3.1.3.2).

2.3.1.2.5 Real-World Activity: Image Query/Retrieve and Local Store SCP

2.3.1.2.5.1 Associated Real-World Activity

Image Query is performed when the user requests a 'Query' from the Images > Retrieve screen.

Image Retrieve is performed when the user selects an exam to retrieve and requests a 'Retrieve' from the Images > Retrieve screen.

Configuration of the Query/Retrieve server determines the Q/R Information Model used during system operation – FIND and MOVE.

2.3.1.2.5.2 Proposed Presentation Context Table

TABLE 2-12 PRESENTATION CONTEXT – PROPOSED BY 3D WORKSTATION FOR ACTIVITY IMAGE QUERY/RETRIEVE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian 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
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	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
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	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
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	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
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	SCP	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	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	SCP	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	SCP	None
X-Ray Radiofluoroscopic 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	SCP	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	SCP	None
Multi-frame Grayscale Byte SC Image Storage	1.2.840.10008.5.1.4.1.1.7.2	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	SCP	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	SCP	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	SCP	None
Digital Mammography Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	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	SCP	None
Digital Mammography Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	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	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None

2.3.1.2.5.2.1 SOP Specific DICOM Conformance Statement for All Storage SOP Classes

Status codes that are more specifically processed when receiving messages from a **Storage** SCP equipment are as follows:

TABLE 2-13 STATUS CODES RECEIVED BY 3D WORKSTATION FOR STORAGE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700-A7FF	Refused: Out of resources	Error logged for viewing in the Event Log.
	A900-A9FF	Error: Data Set does not match SOP Class	Error logged for viewing in the Event Log.
	C000-CFFF	Error: Cannot Understand	Error logged for viewing in the Event Log.
	0122	SOP Class Not Supported	Error logged for viewing in the Event Log.
Warning	B000	Coercion of Data Elements	Error logged for viewing in the Event Log.
	B006	Elements Discarded	Error logged for viewing in the Event Log.
	B007	Data Set does not match SOP Class	Error logged for viewing in the Event Log.
Success	0000		Success will be logged for viewing in the Event Log.
*	*	Any other status code.	Error logged for viewing in the Event Log.

2.3.1.2.6 Real-World Activity: Image Print

2.3.1.2.6.1 Associated Real-World Activity

The user uses the Images screen to print selected images to a DICOM Printer.

2.3.1.2.6.2 Proposed Presentation Context Table

TABLE 2-14 PRESENTATION CONTEXT – PROPOSED BY 3D WORKSTATION FOR ACTIVITY IMAGE PRINT

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	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
Printer SOP Class	1.2.840.10008.5.1.1.16	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

2.3.1.2.6.2.1 SOP Specific DICOM Conformance Statement for Basic Grayscale Print Management SOP Classes

The 3D Workstation uses the following DIMSE services of the supported SOP Classes:

TABLE 2-15 BASIC GRAYSCALE PRINT DIMSE SERVICES

SOP Class	SOP Class UID	DIMSE Service Element	SCU Usage
Basic Film Session	1.2.840.10008.5.1.1.1	N-CREATE	Used (Mandatory)
		N-SET	Not Used
		N-DELETE	Used
Basic Film Box	1.2.840.10008.5.1.1.2	N-CREATE	Used (Mandatory)
		N-ACTION	Used (Mandatory)
		N-DELETE	Used
		N-SET	Not Used
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	N-SET	Used (Mandatory)
Presentation LUT	1.2.840.10008.5.1.1.23	N-CREATE	Used (Mandatory)
		N-DELETE	Used
Printer	1.2.840.10008.5.1.1.16	N-EVENT-REPORT	Used (Mandatory)
		N-GET	Used

.

When a manual print operation is initiated, the AE:

1. Initiates a DICOM association and negotiates Presentation Contexts

2. N-GETs printer status using the Printer SOP Class

3. N-CREATEs a Basic Film Session SOP Instance

4. N-CREATEs the Presentation LUT for the images, based on Grayscale Presentation State for the images if one is present

5. N-CREATEs a Basic Film Box SOP Instance for each film

6. N-SETs the Image Box SOP Instance for each image on the film

7. Prints by an N-ACTION on the Basic Film Box SOP Instance, followed by an N-DELETE of the Presentation LUT and Basic Film Session SOP Instance. If the SCP does not support collation and warning status B601 is returned for the N-ACTION session, the AE will ignore the warning. The AE only allows a single page print with multiple copies. Collation is not required but this is expected to create a print out.

8. Able to receive N-EVENT-REPORTs of the well known Printer SOP Instance indicating printer status

9. Performs an N-GET to obtain the printer status from the well known Printer SOP Instance

10. Releases the DICOM association after printing is successful or failure has been signalled to the user

The 3D Workstation includes data elements in the SOP Instances with associated value sets as described in Section 16.

2.3.1.2.6.2.1.1 Basic Film Session SOP Class

Status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Basic Film Session SOP Class N-CREATE are as follows:

TABLE 2-16 STATUS CODES RECEIVED BY 3D WORKSTATION FOR BASIC FILM SESSION N-CREATE

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	0106	Invalid attribute value	Error displayed to the user and logged for viewing in the Event Log.
	0213	Resource limitation	Error displayed to the user and logged for viewing in the Event Log.
Warning	B600	Memory allocation not supported	Warning logged for viewing in the Event Log.
Success	0000	Film session successfully created	Logged for viewing in the Event Log.
*	*	Any other status code.	Service log entry created.

The N-DELETE is used to delete the complete Basic Film Session SOP Instance hierarchy.

Status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Basic Film Session SOP Class N-DELETE are as follows:

TABLE 2-17 STATUS CODES RECEIVED BY 3D WORKSTATION FOR BASIC FILM SESSION N-DELETE

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	0119	Class-instance conflict	No action is taken.
Success	0000	Film session successfully deleted	Successful log entry is created.
*	*	Any other status code.	No action is taken.

2.3.1.2.6.2.1.2 Basic Film Box SOP Class

Status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Basic Film Box SOP Class N-CREATE are as follows:

TABLE 2-18 STATUS CODES RECEIVED BY 3D WORKSTATION FOR BASIC FILM BOX N-CREATE

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C616	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	Error displayed to the user and logged for viewing in the Event Log.
Warning	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	Logged in the Event Log.
Success	0000	Film box successfully created	Successful log entry is created.
*	*	Any other status code.	Service log entry created.

The N-ACTION is used to print the Film Box, and return status is used to determine if print was successful

Following are the status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Basic Film Box SOP Class N-ACTION:

TABLE 2-19 STATUS CODES RECEIVED BY 3D WORKSTATION FOR BASIC FILM BOX N-ACTION

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C602	Unable to create Print Job SOP Instance; print queue is full	Error displayed to the user and logged for viewing in the Event Log.
	C603	Image size is larger than image box size (by using the specified magnification value)	Error displayed to the user and logged for viewing in the Event Log.
	C604	Image position collision : multiple images assigned to single image position	Error displayed to the user and logged for viewing in the Event Log.
	C613	Combined Print Image size is larger than the Image Box size	Error displayed to the user and logged for viewing in the Event Log.

Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	Service log entry created.
	B604	Image size is larger than image box size, the image has been demagnified.	Service log entry created.
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Service log entry created.
	B60A	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	Service log entry created.
Success	0000	Film accepted for printing; if supported, the Print Job SOP Instance is created	Successful log entry is created.
*	*	Any other status code.	Service log entry created.

N-SET is not used to update an instance of the Basic Film Box SOP Class.

The 3D Workstation does not use the N-DELETE to request the SCP to delete the Basic Film Box SOP Instance hierarchy.

2.3.1.2.6.2.1.3 Basic Grayscale Image Box SOP Class

The 3D Workstation will only send N-SET for the Grayscale Image Boxes the user has selected to have an image in Image Print operation. If layout is 2x2 and 3 images are queued, then three N-SET messages will be sent.

Following are the status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Basic Grayscale Image Box SOP Class N-SET:

TABLE 2-20 STATUS CODES RECEIVED BY 3D WORKSTATION FOR BASIC GRAYSCALE IMAGE BOX N-SET

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	C603	Image size is larger than image box size	Error displayed to the user and logged for viewing in the Event Log.
	C605	Insufficient memory in printer to store the image	Error displayed to the user and logged for viewing in the Event Log.
	C613	Combined Print Image size is larger than the Image Box size	Error displayed to the user and logged for viewing in the Event Log.
Warning	B604	Image size larger than image box size, the image has been demagnified.	Service log entry created.
	B605	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective	Service log entry created.

		minimum or maximum density value instead.	
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Service log entry created.
	B60A	Image size or Combined Print Image size is larger than the Image Box size. The Image or Combined Print Image has been decimated to fit.	Service log entry created.
Success	0000	Image successfully stored in Image Box	N/A
*	*	Any other status code.	Error displayed to the user and logged for viewing in the Event Log.

2.3.1.2.6.2.1.4 Printer SOP Class

The 3D Workstation supports the Printer SOP Class to receive information on the status of the printer.

For the behavior description when receiving N-EVENT-REPORT requests, refer to section 16.5.1.

Status codes the Application may send back in the **N-EVENT-REPORT** response command to the **Printer SOP Class** SCP Equipment that sent the N-EVENT-REPORT request are as follows:

TABLE 2-21 STATUS CODES RECEIVED BY 3D WORKSTATION FOR PRINTER SOP N-EVENT-REPORT

Service Status	Status Code	Further Meaning	Status Code Explanation	Related Fields Sent Back to the SCU
Failure	*	Any status code.	Basic response to message.	None
Warning	*	Any status code.	Basic response to message	None
Success	0000		Basic response to message	None

The 3D Workstation uses the N-GET to request the SCP to get a Printer SOP Instance for the printer information.

For the attribute list requested by this product and for the behavior of this product on each returned value, refer to Section 16.5.2.

Status codes that are more specifically processed when receiving messages from a **Print** SCP equipment for the Printer SOP Class N-GET are as follows:

TABLE 2-22 STATUS CODES RECEIVED BY 3D WORKSTATION FOR PRINTER SOP N-GET

Service Status	Status Codes	Further Meaning	Application Behavior When receiving Status Codes
Failure	*	Any Failure status code	Displays an error to the user.

Success	0000	Success	Continues with the print.
*	*	Any other status code.	Displays an error to the user.

2.3.1.2.6.2.1.5 Presentation LUT SOP Class

The 3D Workstation supports the Presentation LUT SOP Class. The Presentation LUT will be sent to the Print SCP with Presentation LUT Shape of IDENTITY, assuming that the SCP supports the Presentation LUT SOP Class, this will result in a reference to the Presentatin LUT in the Basic Film Box N-CREATE.

2.3.1.3 Association Acceptance Policy

2.3.1.3.1 Real-World Activity: Verify Correction

2.3.1.3.1.1 Associated Real-World Activity

The 3D Workstation will respond to a Verify request from a remote SCU. There is no check for AE Title. Verify is to be used for network diagnostics after using the network tools 'ping' or 'traceroute' in order to determine if the port assignment is responding for Storage commit and Local Storage SCP.

2.3.1.3.1.2 Accepted Presentation Context Table

TABLE 2-23 PRESENTATION CONTEXT - ACCEPTED BY 3D WORKSTATION FOR ACTIVITY VERIFY

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

2.3.1.3.1.3 Presentation Context Acceptance Criterion

The 3D Workstation evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

2.3.1.3.1.4 Transfer Syntax Selection Policies

Within each Presentation Context, the 3D Workstation will accept the first proposed transfer syntax that it also supports for that Abstract Syntax.

2.3.1.3.2 Real-World Activity: Storage Commit SCP role

2.3.1.3.2.1 Associated Real-World Activity

For Image Send with Storage Commit, the Real-World Activity of Image Send to a DICOM Store/Commit server alias on the 3D Workstation will cause an association to be initiated from Storage Commitment SCP for the N-EVENT-REPORT.

2.3.1.3.2.2 Accepted Presentation Context Table

TABLE 2-24 PRESENTATION CONTEXT - ACCEPTED BY 3D WORKSTATION FOR ACTIVITY – STORAGE COMMIT - SCP ROLE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None

2.3.1.3.2.2.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class SCP

The 3D Workstation supports only DICOM network storage services to receive notification of SOP Instances which have been committed. It does not support the optional Storage Media File-Set ID and UID Attributes in the Storage Commitment N-ACTION.

Note - The 3D Workstation will not accept an N-Event-Report Request on the association requesting the Storage Commit. See section 2.3.1.2.4.2.

2.3.1.3.2.3 Presentation Context Acceptance Criterion

The 3D Workstation evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

2.3.1.3.2.4 Transfer Syntax Selection Policies

Within each Presentation Context, the 3D Workstation will accept the first proposed transfer syntax that it also supports for that Abstract Syntax.

2.3.1.3.3 Real-World Activity: Local Storage SCP

2.3.1.3.3.1 Associated Real-World Activity

The 3D Workstation will respond to storage requests which result from a Retrieve request from the system. The 3D Workstation will also allow storage of images which are directly sent to the 3D Workstation by an Image Store SCU.

2.3.1.3.3.2 Accepted Presentation Context Table

TABLE 2-25 PRESENTATION CONTEXT - ACCEPTED BY 3D WORKSTATION FOR ACTIVITY RETRIEVE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
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	SCP	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.2.2.1	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	SCP	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.2.2.2	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	SCP	None
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	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	SCP	None
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	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	SCP	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	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	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	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	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	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	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	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	SCP	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	SCP	None
Multi-frame Grayscale Byte SC Image Storage	1.2.840.10008.5.1.4.1.1.7.2	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	SCP	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	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None

		Explicit VR Big Endian	1.2.840.10008.1.2.2		
X-Ray Radiofluoroscopic 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	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	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	SCP	None
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	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	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	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	SCP	None

2.3.1.3.3.2.1 SOP Specific DICOM Conformance Statement for all Storage SOP Classes

The 3D Workstation provides Level 2 (FULL) Conformance, and stores all standard and private data elements of received SOP Instances.

Successfully received SOP Instances may be accessed via the user interface. SOP Instances are stored for a configured time, which defaults to a value that retains images for three days, then they are automatically deleted. The timeout period can be modified by the user. The 3D Workstation will notify the user if the space allocated for the Local Store SCP is used and the user can manually delete exams at that time.

Status codes the Application may send back to the SCU Equipment after performing the requested **Storage** are as follows:

TABLE 2-26 STATUS CODES RETURNED BY 3D WORKSTATION FOR ALL SOP CLASSES

Service Status	Status Code	Further Meaning	Status Code Explanation	Related Fields Sent Back to the SCU
Failure	A700	Refused: Out of resources	Returned when file system for external images is full.	None
	A900	Error: Data Set does not match SOP Class	Returned when the message SOP Class and dataset SOP Class do not match.	None
	C000	Error: Cannot Understand	Returned when the stored data can not be loaded as a DICOM dataset. Also when the Study and/or Series UIDs are not available.	None
Success	0000			None

2.3.1.3.3.3 Presentation Context Acceptance Criterion

The 3D Workstation evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

2.3.1.3.3.4 Transfer Syntax Selection Policies

Within each Presentation Context, the 3D Workstation will accept the first proposed transfer syntax that it also supports for that Abstract Syntax.

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks

The DICOM Upper Layer Protocol is supported using TCP/IP, as specified in DICOM PS3.8.

The TCP/IP stack is inherited from the Linux Operating System.

2.4.2 Physical Media Support

This product is equipped with a 10/100 Mb/s or 1Gb/s auto-sensing Ethernet interface. The OEC 3D also supports wireless networking.

Note - For more information about the Physical Media available on the OEC 3D, please refer to the Product Data Sheet.

2.4.3 Additional Communication stack support

The Workstation supports DHCP allowing the user to configure DHCP from a System Setup screen. The default setting is to have DHCP enabled.

2.4.4 IPv4 and IPv6 Support

The Workstation supports IPv4. IPv6 is not supported.

2.5 EXTENSIONS / SPECIALIZATIONS/ PRIVATIZATIONS

2.5.1 Standard Extended / Specialized / Private SOP Classes

2.5.1.1 Standard Extended SOP Classes

This product provides Standard Extended Conformance to all supported SOP Classes, through the inclusion of additional Type 3 Standard Elements and Private Data Elements. The extensions for the RAW SOP Class (OEC Compatible) are defined in Section 3.5.1.

2.5.2 Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

2.6.1.1 Configurable Parameters

The following fields are configurable for this AE (local):

- Local AE Title
- Local Station Name
- Local IP Address (DHCP or Static IP)
- Local Listening Port Number
- Local IP Netmask
- Default Gateway (used for all remote connections)
- DNS server IP address
- Auto Negotiate (or set to specific speed and full/half duplex mode)

The following fields are configurable for every remote DICOM AE:

All Remote DICOM AE SCP: (Store/Storage Commit, Print, Modality Worklist, MPPS, Query/Retrieve)

- Server Alias
- Remote AE Title
- Remote IP Address or fully qualified host name
- Listening TCP/IP Port Number

The following fields are configurable:

- Association Establishment Timer - (this is doubled for inactivity on existing communication for Store).

2.7 SUPPORT OF EXTENDED CHARACTER SETS

The OEC 3D will support the extended character set of ISO_IR 100 (Latin alphabet Number 1 supplementary set) for the characters supported on the keyboard.

As a Storage SCP or Media Storage FSR, this product will accept SOP Instances with ISO_IR 100 compatible values found in Specific Character Set (0008,0005). As a Query SCU, it will similarly accept response items with any value of Specific Character Set. Compatible values to ISO_IR 100 are ISO_IR 6 and ISO_IR 100, according to the standard. Lack of the Specific Character set (0008,0005) tag is defined to be ISO_IR 6.

This product user interface will allow the user to enter characters from the console keyboard that are within ISO_IR 100 extended character set.

This product will accept, as a Modality Worklist SCU, Scheduled Procedure Step Identifiers with ISO_IR 100 compatible values of Specific Character Set (0008,0005). It will map that Specific Character Set value without change into the images created pursuant to that Scheduled Procedure Step. Text attributes of the Scheduled Procedure Step Identifier, including Patient and Physician names, that include extended characters will be displayed as described above. Responses with non-compatible values will be discarded.

2.7.1 Fixed Coded Terminology

This product uses the fixed (non-configurable, non-extensible) coded terminology in Image SOP Instance and X-Ray Radiation Dose Structured Report attributes, as described in Section 11.7 where the VT is CODE. In these cases the standard or extended value for the code is defined.

2.8 CODES AND CONTROLLED TERMINOLOGY

2.8.1 Mapped Coded Terminology

This product maps, without change, coded terminology values supplied in Modality Worklist Scheduled Procedure Steps into Image SOP Instance and X-Ray Radiation Dose Structured Report attributes, as described in Section 11.7 for RDSR and 12.4 for MWL.

2.9 SECURITY PROFILE

2.9.1 External Network Requirements

The following describes non-DICOM network protocols used by the OEC 3D to set the current time for the implementation and to obtain the network address for the implementation.

TABLE 2-27 EXTERNAL NETWORK REQUIREMENTS

Profile	Actor	Transaction	Protocol Used	RFCs	Security Support
Basic Time Synchronization	NTP Client	Maintain Time	NTP	RFC5905 RFC5906	Yes
		Find NTP Servers	NTP	RFC5905 RFC5906	Yes
	SNTP Client	Maintain Time	SNTP	RFC2030	No
	DHCP Client	Find NTP Servers	DHCP	RFC2131 RFC2132	Yes
Basic Network Address Management	DHCP Client	Find and Use DHCP Server	DHCP	RFC2131 RFC2132	Yes
		Maintain Lease	DHCP	RFC2131 RFC2132	Yes
	DNS Client	Resolve Hostname	DNS	RFC1035	Yes

Profile	Actor	Transaction	Protocol Used	RFCs	Security Support
				RFC2181	

2.9.2 Secure Transport Connection Profiles

Note - This section pertains only to systems with the OEC 3D Secure option.

The OEC 3D Secure option's certificate management allows:

- Creating a private key and creating and exporting self-signed certificates
- Creating a private key and exporting a corresponding certificate signing request
- Importing a signed host certificate and, optionally, a prive key. Passphrase protected keys may be imported and are unlocked prior to storage on the system.
- Importing trusted certificates for servers and certificate authorities.
- Using only PEM-encoded keys and certificate

The following describes secure transport connection profiles used by the OEC 3D.

TABLE 2-28 SECURE TRANSPORT CONNECTION PROFILES

Profile	Cipher Suite	Default Preference Order (from 1=preferred to 6=less preferred)
Non-Downgrading BCP195 TLS Secure Transport Connection	TLS_DHE_RSA_WITH_AES_128_GCM_SHA256	1
	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	2
	TLS_DHE_RSA_WITH_AES_256_GCM_SHA384	3
	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	4
AES TLS Secure Transport Connection	TLS_RSA_WITH_AES_128_CBC_SHA	5
	TLS_RSA_WITH_3DES_EDE_CBC_SHA	6

2.9.3 Secured Environment

It is assumed that this product 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 this product.

2. Firewall or router protections to ensure that this product only has network access to approved external hosts and services.

3. Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN)) or secured ports like HTTPS (443).

MEDIA STORAGE CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section of the DICOM conformance statement specifies the OEC 3D compliance to DICOM requirements for **Media Interchange**. It details the DICOM Media Storage Application Profiles and roles that are supported by this product.

The 3D Workstation is able to export images to DICOM media, browse DICOM media and read images from DICOM media.

3.2 IMPLEMENTATION MODEL

3.2.1 Application Data Flow Diagram

The media intechange application model for the OEC 3D is shown in Figure 3-1:

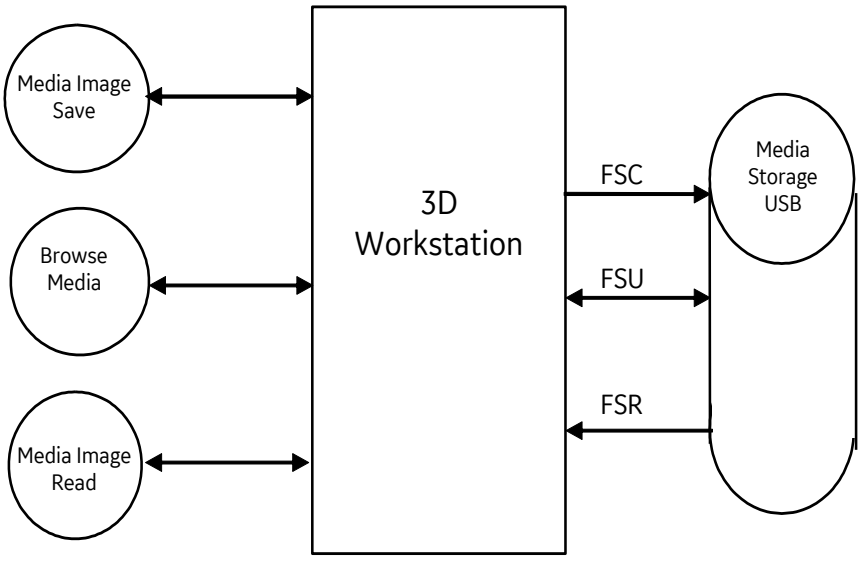

FIGURE 3-1 OEC 3D MEDIA INTERCHANGE APPLICATION MODEL AND DATA FLOW DIAGRAM

This product supports Media Storage Application Profile of General Purpose USB Interchange(STD-GEN-USB) with no compression.

3.2.2 Functional Definition of AE's

The 3D Workstation can perform these functions:

FSC, FSU and FSR function on a list of SOP Image Classes. The list of image classes supported can be found in Section 2.3.1.3.3.2. The 3D Workstation also allows OEC Compatible images to be written and read back.

3.2.3 Sequencing of Real-World Activities

The 3D Workstation performs Media Image Write (FSC/FSU) when sending copies of the selected images, Dose summary, Patient Summary or Radiation Dose Structured Report from the Images screen.

The 3D Workstation performs Browse Media (FSR) when the user is searching the media (USB) using the Retrieve screen.

The 3D Workstation performs Media Read (FSR) when the user copies images (DICOM or OEC Compatible) from the media to the system.

3.2.4 File Meta Information Options

The File Meta-Information for this implementation is:

File Meta-Information Version	1
3D Workstation Implementation UID	1.2.840.113619.6.329
Implementation Version Name	OEC v1.3

3.3 AE SPECIFICATIONS

3.3.1 3D Workstation AE Specification

The 3D Workstation Application Entity provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The supported Application Profiles and roles are listed below.

TABLE 3-1 SUPPORTED APPLICATION PROFILE AND ROLES

Supported Application Profile	Real World Activity	Role	Option
STD-GEN-USB	Media Image Save	FSC+FSU	Interchange
	Browse Media and Media Image Read	FSR	Interchange
STD-GEN-USB-JPEG	Browse Media	FSR	Interchange
	Media Image Read	FSR	Interchange

3.3.1.1 File Meta Information for the 3D Workstation Application Entity

Values set in the File Meta Information for this AE Title are as follows:

3D Workstation Implementation UID	**1.2.840.113619.6.329**
Implementation Version Name	**OEC v1.3**

Note - No private tags are added to the File Meta Information for this AE Title.

3.3.1.2 Real-World Activities for the 3D Workstation Application Entity

3.3.1.2.1 Real-World Activity- Media Image Save

The user loads/mounts a USB device into the 3D Workstation using the Load USB control on the Images screen. The user then selects the images to copy and then selects the Send control to send them to the USB device. The Options control allows the user to change the SOP Class that will be written to USB.

3.3.1.2.1.1 Media Storage Application Profile for the RWA- Media Image Save

For the list of Application Profiles that invoke this AE for the Real-World Activity Media Image Save, see the Table in Section 3.3.1 ,where the table describing the Application Profiles and Real-World Activity is defined.

3.3.1.2.1.1.1 Options for STD-GEN-USB Application Profile

The following are the optional SOP Classes supported by this AE. All SOP Instances use the Explicit VR Little Endian Uncompressed Transfer Syntax, UID 1.2.840.10008.1.2.1.

TABLE 3-2 STD-GEN-USB SUPPORTED SOP CLASSES - SAVE

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Grayscale Byte SC Image Storage	1.2.840.10008.5.1.4.1.1.7.2
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67

Common DICOMDIR Directory Records created by this AE will include key attributes as described in Section 15.2.3.

No additional DICOMDIR Keys are added to any record types.

3.3.1.2.1.1.2 Options for STD-GEN-USB-JPEG Application Profile

No additional SOP Classes / Transfer Syntaxes supported by this AE for Media Image Save.

3.3.1.2.2 Real-World Activity- Browse Media

The user loads/mounts a USB device into the 3D Workstation using the Load USB control on the Images screen. The user then selects the USB device to View the contents from the Images screen, this action starts the Retrieve screen where the user can browse the media.

3.3.1.2.2.1 Media Storage Application Profile for the Real-World Activity – Browse Media & Media Image Read

For the list of Application Profiles that invoke this AE for the Real-World Activity Browse Media and Media Image Read, see Table Table 3-1.

3.3.1.2.2.1.1 Options for STD-GEN-USB Application Profile

Following are the optional SOP Classes supported by this AE. All SOP Instances use the Explicit VR Little Endian Uncompressed Transfer Syntax, UID 1.2.840.10008.1.2.1.

TABLE 3-3 STD-GEN-USB SUPPORTED SOP CLASSES - BROWSE

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multi-frame Grayscale Byte SC Image Storage	1.2.840.10008.5.1.4.1.1.7.2
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Raw Data Storage[1]	1.2.840.10008.5.1.4.1.1.66
RT Image Information Storage	1.2.840.10008.5.1.4.1.1.481.1
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128

[1] - Raw Data Storage is used for OEC Compatible data which can be used to move an exam to another system and preserve the image processing manipulation possible on acquired images.

Common DICOMDIR Directory Records created by this AE will include key attributes as described in Section 15.2.3.

No additional DICOMDIR Keys are added to any record types.

3.3.1.2.2.1.2 Options for STD-GEN-USB-JPEG Application Profile

The following are the optional SOP Classes / Transfer Syntaxes supported by this AE:

TABLE 3-4 STD-GEN-USB-JPEG SUPPORTED TRANSFER SYNTAXES

SOP Class	SOP Class UID	Transfer Syntax	Transfer Syntax UID	Profile
See table in Section 3.3.1.2.2.1.1 exception: Raw Data Storage	See table in section 3.3.1.2.2.1.1	RLE Lossless	1.2.840.10008.1.2.5	JPEG
		JPEG Lossy, Baseline Sequential with Huffman Coding (Process 1)	1.2.840.10008.1.2.4.50	JPEG
		JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression (Process 4 only)	1.2.840.10008.1.2.4.51	JPEG
		JPEG Lossless, Non-hierarchical, Process 14	1.2.840.10008.1.2.4.57	JPEG
		JPEG Lossless, Non-hierarchical, 1st Order Prediction	1.2.840.10008.1.2.70	JPEG

Common DICOMDIR Directory Records created by this AE will include key attributes as described in Section 15.2.3.

No additional DICOMDIR Keys are added to any record types.

3.4 AUGMENTED AND PRIVATE APPLICATION PROFILES

3.4.1 Augmented Application Profiles

The 3D Workstation uses private tags to store information in the Raw Data Storage SOP Class to allow for the image to be restored to the system for image processing.

3.4.1.1 Augmented Application Profile AUG-GEN-USB-OEC

The AUG-GEN-USB-OEC Application Profile is an augmentation of the corresponding STD-GEN-USB Profile. This application profile allows for the export and import of images between systems.

3.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.5.1 Standard Extended / Specialized / Private SOP Classes

3.5.1.1 Standard Extended SOP Classes

This product provides Standard Extended Conformance to all supported SOP Classes, through the inclusion of additional Type 3 Elements. The extensions are defined in Section 4.2.6.

3.5.1.2 Private Creator Groups

The following private creator groups are added to the Raw Data SOP class instance alone. No other SOP class will have these groups.

TABLE 3-5 RAW DATA SOP PRIVATE CREATOR GROUPS

Element Name	Tag	VR	VM	Description
Private Creator	0071,0010	LO	1	OEC specific data
Private Creator	1001, 0010	SL	1	OEC specific data
Private Creator	1003, 0010	SL	1	OEC specific data
Private Creator	1005, 0010	SL	1	OEC specific data
Private Creator	1007, 0010	SL	1	OEC specific data
Private Creator	1009, 0010	SL	1	OEC specific data
Private Creator	100B, 0010	SL	1	OEC specific data
Private Creator	100D, 0010	SL	0-1	OEC specific data
Private Creator	100F, 0010	SL	1	OEC specific data
Private Creator	1F01, 0010	SL	1	OEC specific data
Private Creator	1101, 0010	SL	1	OEC specific data
Private Creator	1103, 0010	SL	1	OEC specific data
Private Creator	1105,1000	SL	1	OEC specific data
Private Creator	1109, 0010	SL	1	OEC specific data

3.6 CONFIGURATION

The following parameters are configurable by the user:

Source Application Entity Title – This is the AE Title on the Local Server Definition screen.

USB Options (Media Exchange)

- Modality to save (XA, RF, CR, SC. Default - XA)
- Image Size (Half, Full. Default – Full)
- Remove Patient Information (Default – No)
- Merge into one Overlay (Default – Yes)

Additional fields for Remote DICOM Store

- Modality to store (RF, XA, CR or SC. Default - XA)
- Image Size (Half, Full. Default – Full)
- Store Overlay(s) options (Always, If Annotated, Never. Default - Never)
- Merge Overlays (Default – Unchecked)
- Auto Store of RDSR on Exam completion(Default – Unchecked)

Additional fields for Remote DICOM Print

- Configuration information for Printer (see printer conformance statement for tag 2010,0150)
- Min/Max Density for Printer
- Ambient Illumination
- Reflective Ambient Light
- Border Density
- Empty Density
- Number of Copies
- Print Priority
- Destination
- Medium Type
- Film Size
- Format (Default 1,1)
- Bit Depth

Additional fields for Remote DICOM Query/Retrieve

- Information model (Patient, Study Root. Default is Patient Root)

Note - All configurations are accessible by the user to enable the mobility and usability of the device. The configuration is also accessible to the GE Field Engineer.

Note - The use of TLS for all DICOM service can be enabled or disabled. This functionality is available only with the OEC 3D Secure option.

3.7 SUPPORT OF EXTENDED CHARACTER SETS

The 3D Workstation only supports ISO_IR 100. Any incoming SOP instance that is encoded using another extended character set will not be read, browse operations will also not display entries.

COMMON AND SHARED INFORMATION MODULES

4.1 INTRODUCTION

This section specifies all information modules used by all IODs (unless otherwise specified) supported by this product. Corresponding attributes are conveyed using the module construct.

4.2 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by all IODs supported by this product.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

4.2.1 Patient Entity Modules

4.2.1.1 Patient Module

TABLE 4-1 PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Provided by the MWL or supplied by user input. This value is created by the system if not entered by the user as an emergency exam name. The prefix of the name is configurable and has an incrementing number appended.
Patient ID	(0010,0020)	2	Provided by the MWL or supplied by user input. This value is created by the system if not entered by the user as an emergency exam ID. The prefix of is configurable and has an incrementing number appended.
Issuer of Patient ID	(0010,0021)	3	Provided by the MWL. No user interface on this product.
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3	Provided by the MWL. No user interface on this product.
Patient's Birth Date	(0010,0030)	2	Provided by the MWL or supplied by user input.

Attribute Name	Tag	Type	Attribute Description
Patient's Sex	(0010,0040)	2	Provided by the MWL or supplied by user input.
Patient Comments	(0010,4000)	3	Supplied by user input.
Patient Identity Removed	(0012,0062)	3	Set to “YES” if Media Image Save is performed with de-identification, set to “NO” otherwise.
De-identification Method Code Sequence	(0012,0064)	1C	Set to “Basic Application Confidential Profile” when Media Image Save is performed with de-identification.

4.2.2 Study Entity Modules

4.2.2.1 General Study Module

TABLE 4-2 GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Provided by the MWL or supplied by the system.
Study Date	(0008,0020)	2	Set to when the exam is started on the system.
Study Time	(0008,0030)	2	Set to when the exam is started on the system.
Referring Physician's Name	(0008,0090)	2	Provided by the MWL or supplied by user input.
Study ID	(0020,0010)	2	Provided by the MWL, supplied by user input, or created by system.
Accession Number	(0008,0050)	2	Provided by the MWL or supplied by user input.
Study Description	(0008,1030)	3	Provided by the MWL or supplied by user input.
Referenced Study Sequence	(0008,1110)	3	Provided by the MWL, used to allow for quick query/retrieval of referenced Studies.
Procedure Code Sequence	(0008,1032)	3	Provided by the MWL or supplied by user input.

4.2.2.2 Patient Study Module

TABLE 4-3 PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010,1010)	3	Provided by the MWL or calculated by the system using birth date.
Patient's Size	(0010,1020)	3	Provided by the MWL.

Patient's Weight	(0010,1030)	3	Provided by the MWL.

4.2.3 Series Entity Modules

4.2.3.1 General Series Module

TABLE 4-4 GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Configured by setting Modality Type for DICOM Store Server or Media Image Save.
Series Instance UID	(0020,000E)	1	Created by system.
Series Number	(0020,0011)	2	Created by system.
Laterality	(0020,0060)	2C	Blank. If a Marker Annotation is used, this is set to “R” or “L”.
Series Date	(0008,0021)	3	Set to date of exam start.
Series Time	(0008,0031)	3	Set to time of exam start.
Performing Physicians’ Name	(0008,1050)	3	Provided by the MWL or supplied by user input.
Protocol Name	(0018,1030)	3	Provided by the MWL or supplied by user input.
Series Description	(0008,103E)	3	Provided by the MWL or supplied by user input, displayed as “Protocol Description” field.
Patient Position	(0018,5100)	2C	Derived from values set for the exam. Possible values are “Patient Orientation”, “Orientation Modifier”, and “Patient/Table Relationship”.
Request Attributes Sequence	(0040,0275)	3	Sequence set with values from the MWL. No user interface on this product.
>Requested Procedure ID	(0040,1001)	1C	Provided by the MWL.
>Accession Number	(0008,0050)	3	Provided by the MWL.
>Study Instance UID	(0020,000D)	3	Provided by the MWL.
>Requested Procedure Description	(0032,1060)	3	Provided by the MWL.
>Scheduled Procedure Step ID	(0040,0009)	1C	Provided by the MWL.
>Scheduled Procedure Step Description	(0040,0007)	3	Provided by the MWL.
>Scheduled Protocol Code Sequence	(0040,0008)	3	Provided by the MWL.
Performed Procedure Step ID	(0040,0253)	3	Provided by the MWL, supplied by user input, or created by system.
Performed Procedure Step Start Date	(0040,0244)	3	Set to date of exam start.
Performed Procedure Step Start Time	(0040,0245)	3	Set to time of exam start.
Performed Procedure Step Description	(0040,0254)	3	Provided by the MWL or supplied by user input.
Performed Protocol Code Sequence	(0040,0260)	3	Provided by the MWL.

4.2.4 Equipment Entity Modules

4.2.4.1 General Equipment Module

TABLE 4-5 GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Set to system value, non-editable.
Institution Name	(0008,0080)	3	Set to configurable value.
Station Name	(0008,1010)	3	Set to configurable value.
Manufacturer's Model Name	(0008,1090)	3	Set to system value, non-editable.
Device Serial Number	(0018,1000)	3	Set to system value, non-editable.
Software Versions	(0018,1020)	3	Set to system value, non-editable.
Date of Last Calibration	(0018,1200)	3	Set to Dose Accuracy Calibration date of the system.
Time of Last Calibration	(0018,1201)	3	Set to Dose Accuracy Calibration time of the system.

4.2.5 Image Entity Modules

4.2.5.1 General Image Module

TABLE 4-6 GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	2	Set to number that starts at 1 and increments by 1 for each image until the exam is completed.
Patient Orientation	(0020,0020)	2C	Blank.
Content Date	(0008,0023)	2C	Set date of image save.
Content Time	(0008,0033)	2C	Set time of image save.
Image Type	(0008,0008)	3	See 4.2.5.1.1
Acquisition Number	(0020,0012)	3	Set to image's irradiation event number.
Acquisition Date	(0008,0022)	3	Set to date of image's irradiation event.
Acquisition Time	(0008,0032)	3	Set to time of image's irradiation event.
Acquisition DateTime	(0008,002A)	3	Set to date/time of image's irradiation event
Derivation Description	(0008,2111)	3	See 4.2.5.1.2
Source Image Sequence	(0008,2112)	3	See 4.2.5.1.2
Irradiation Event UID	(0008,3010)	3	Unique identification of image'sirradiation event.
Burned In Annotation	(0028,0301)	3	Set to "NO".
Lossy Image Compression	(0028,2110)	3	Set to "00".

Attribute Name	Tag	Type	Attribute Description
Icon Image Sequence	(0088,0200)	3	See 4.2.5.1.3
>Include "Image Pixel Macro"		See 4.2.5.1.3	
Presentation LUT Shape	(2050,0020)	3	Set to "IDENTITY".

4.2.5.1.1 Image Type

Values of Image Type (0008,0008) that may be sent and under what circumstances are as follows:

Value 1 will have the following Enumerated Value:

ORIGINAL	identifies an Original Image
DERIVED	identifies a Derived Image

Value 2 will have the following Enumerated Value:

PRIMARY	identifies a Primary Image
SECONDARY	identifies a Secondary Image

Value 3 will have the following Enumerated Value:

SINGLE PLANE	identifies a 2D Image
AXIAL	identifies a 3D Image

Only the Enumerated Value "3D INTEROP" for Value 4 is supported.

4.2.5.1.2 Derivation Description and Source Image Sequence

The value will vary based on the type of image:

- Zoomed images: "Zoomed instance. See Source Image Sequence for source image."
- Cine-derived images: "Single Frame from Cine. See Source Image Sequence for source image."
- If not all cine frames are stored: "Cine run incomplete. All images were not stored. There is no Source Image Sequence for this partial image."
- 3D volume data: "3D Recon from 3D Projection mobile C-Arm"
- 3D secondary capture: "Screenshot from 3D viewer"

4.2.5.1.3 Icon Image Key Definition

The Icon Image Sequence is always saved with the following information:

- The Samples per Pixel (0028,0002) is always set to 1
- Photometric Interpretations (0028,0004) is set to MONOCHROME 2
- Row/Column size is 64 by 64
- The value of 8 is set for Bits Allocated (0028,0100) and Bits Stored (0028,0101)
- The value of 7 is set for High Bit (0028,0102)
- The value of 0 is set for Pixel Representation (0028,0103)

The Icon Image Sequence tag (0088,0200) is not present for 3D volumes.

4.2.5.2 Image Pixel Module

TABLE 4-7 IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	Set to 1. For 3D SC and live preview camera, this is set to 3.
Photometric Interpretation	(0028,0004)	1	Set to "MONOCHROME2". For 3D SC and w, this is set to "RGB".
Rows	(0028,0010)	1	Set to 1280 for Full Size and 640 for Half Size images. For non-3D SC and Multi-SC, this is set to 1280. For 3D SC, this is set to 512. For live preview camera, this is set to 460.
Columns	(0028,0011)	1	Set to 1280 for Full Size and 640 for Half Size images. For non-3D SC and Multi-SC, this is set to 1280. For 3D SC, this is set to 512. For live preview camera, this is set to 460.
Bits Allocated	(0028,0100)	1	Set to 16. For SC, Multi-SC, and live preview camera, this is set to 8.
Bits Stored	(0028,0101)	1	Set to 10. For SC, Multi-SC, and live preview camera, this is set to 8.
High Bit	(0028,0102)	1	Set to 1 less than the value for Bits Stored (0028,0012).
Pixel Representation	(0028,0103)	1	Set to 0.
Pixel Data	(7FE0,0010)	1	Pixel data of the image.

4.2.5.3 Contrast/Bolus Module

TABLE 4-8 CONTRAST/BOLUS MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Contrast/Bolus Agent	(0018,0010)	2	Set to contrast agent provided. Blank for XA, RF, CR, and CT.
Contrast/Bolus Start Time	(0018,1042)	3	Present only for multi-frame images which have an injector signal, set to time of contrast injection.

4.2.5.4 Overlay Plane Module

This product supports up to 2 overlays in an image. The two overlays can be merged based on configuration by the user. Demographic information is also configurable.

TABLE 4-9 OVERLAY PLANE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Overlay Rows	(60xx,0010)	1	Set to 1280 for Full Size and 640 for Half Size images.
Overlay Columns	(60xx,0011)	1	Set to 1280 for Full Size and 640 for Half Size images.
Overlay Type	(60xx,0040)	1	Set to 'G' (Graphics).
Overlay Origin	(60xx,0050)	1	Set to '1\1'.
Overlay Bits Allocated	(60xx,0100)	1	Set to 1.
Overlay Bit Position	(60xx,0102)	1	Set to 0.
Overlay Data	(60xx,3000)	1	Graphic data with monochrome values.
Overlay Label	(60xx,1500)	3	See 4.2.5.4.1.

4.2.5.4.1 Overlay Label

Overlay labels vary depending on which information is sent and Portable Media/PACS configurations:

- Demographic Information Overlay – no annotations are present
- Image Information Overlay – de-identified data (Media Image Save only)
- Demographic-Image Information Overlay – merged overlays
- Image Annotation Overlay – second overlay when image is annotated
- Image Info-Image Annotation Overlay – de-dentified data and merged overlays (Media Image Save only)

4.2.5.5 VOI LUT module

TABLE 4-10 VOI LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Window Center	(0028,1050)	1C	Set to 511 for 10-bit images. Set to 127 for 8-bit images.
Window Width	(0028,1051)	1C	Set to 1023 for 10-bit images. Set to 255 for 8-bit images.

4.2.5.6 SOP Common Module

TABLE 4-11 SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Set to modality-defined value.
SOP Instance UID	(0008,0018)	1	Set to system-defined value.
Specific Character Set	(0008,0005)	1C	Set to ISO_IR 100 (Latin Alphabet No. 1).

Instance Creation Date	(0008,0012)	3	Set to the date the SOP Instance was created. For images, this is the date the image was copied to PACS or Portable Media. For RDSR, this is the date the report was created.
Instance Creation Time	(0008,0013)	3	Set to the time the SOP Instance was created. For images, this is the time the image was copied to PACS or Portable Media. For RDSR, this is the time the report was created.
Instance Creator UID	(0008,0014)	3	Set to system-defined value.
Instance Number	(0020,0013)	3	Set to image number.

4.2.6 Standard Extended Attributes

This product supports the following attributes in SOP Instances as Type 3 data elements for images.

TABLE 4-12 STANDARD EXTENDED ATTRIBUTES

Information Entity Name	Attribute Name	Tag	Use
Patient	N/A	N/A	N/A
Study	N/A	N/A	N/A
Series	N/A	N/A	N/A
Image	Comments on Radiation Dose	(0040,0310)	Set to “Low Dose On/Off”.

X-RAY ANGIOGRAPHY INFORMATION OBJECT IMPLEMENTATION

5.1 INTRODUCTION

This section specifies the use of the DICOM X-Ray Angiographic Image IOD to represent the information included in XA Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

5.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 5-1 XA MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

5.3 IOD MODULE TABLE

The XA Image Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes.

TABLE 5-2 XA IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used for MWL data.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	4.2.3.1
	Clinical Trial Series	Not Used	N/A
Frame of Reference	Synchronization	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
Image	General Image	Used	4.2.5.1
	General Reference	Not Used	N/A

	Image Pixel	Used	4.2.5.2
	Contrast/Bolus	Present, required if contrast media was used.	4.2.5.3
	Cine	Used for multi-frame images.	5.4.1.1
	Multi-frame	Used for multi-frame images.	5.4.1.2
	Frame Pointers	Used for multi-frame images.	5.4.1.3
	Mask	Used for Subtract mode images.	5.4.1.4
	Display Shutter	Not Used	N/A
	Device	Not Used	N/A
	Intervention	Not Used	N/A
	Specimen	Not Used	N/A
	X-Ray Image	Used	5.4.1.5
	X-Ray Acquisition	Used	5.4.1.6
	X-Ray Collimator	Not Used	N/A
	X-Ray Table	Not Used	N/A
	XA Positioner	Used	5.4.1.7
	DX Detector	Used	5.4.1.8
	Overlay Plane	Used when overlays are configured to be stored via DICOM Store or Media Image Save.	4.2.5.4
	Multi-Frame Overlay	Not Used	N/A
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.5.5
	SOP Common	Used	4.2.5.6
	Common Instance Reference	Not Used	N/A
	Frame Extraction	Not Used	N/A

5.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by the XA Image IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

5.4.1 Image Entity Modules

5.4.1.1 Cine Module

TABLE 5-3 CINE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Preferred Playback Sequencing	(0018,1244)	3	Set to 0 (for looping).
Frame Time	(0018,1063)	1C	Set to millisecond value (2 decimal places).
Recommeneded Display Frame Rate	(0018,0040)	3	Set to system acquisition rate.
Cine Rate	(0018,0040)	3	Set to system acquisition rate.
Effective Duration	(0018,0072)	3	Set to total number frames divided by acquisition rate.
Actual Frame Duration	(0018,1242)	3	Set to system pulse width.

5.4.1.2 Multi-Frame Module

TABLE 5-4 MULTI-FRAME MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Number of Frames	(0028,0008)	1	Set to number of frames acquired.
Frame Increment Pointer	(0028,0009)	1	Set to Frame Time (0018,1063).

5.4.1.3 Frame Pointers Module

TABLE 5-5 FRAME POINTERS MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Representative Frame Number	(0028,6010)	3	Set to frame number used for thumbnail on system.

5.4.1.4 Mask Module

TABLE 5-6 MASK MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Mask Subtraction Sequence	(0028,6100)	1	
>Mask Operation	(0028,6101)	1	Set to “NONE”.
Recommeneded Viewing Mode	(0028,1090)	2	Set to “NAT”.

5.4.1.5 X-Ray Image Module

TABLE 5-7 X-RAY IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Lossy Image Compression	(0028,2110)	1C	Set to 00.
Image Type	(0008,0008)	1	See 4.2.5.1.1
Pixel Intensity Relationship	(0028,1040)	1	Set to “DISP”.
Samples per Pixel	(0028,0002)	1	Set to 1.
Photometric Interpretation	(0028,0004)	1	Set to “MONOCHROME2”.
Bits Allocated	(0028,0100)	1	Set to 16.
Bits Stored	(0028,0101)	1	Set to 10.
High Bit	(0028,0102)	1	Set to 9.
Pixel Representation	(0028, 0103)	1	Set to 0.

5.4.1.6 X-Ray Acquisition Module

TABLE 5-8 X-RAY ACQUISITION MODULE

Attribute Name	Tag	Type	Attribute Description
KVP	(0018,0060)	2	Set to average value of x-ray exposure.
Radiation Setting	(0018,1155)	1	Set to “SC”. For Digital Spot and Digital Cine modes, this is set to “GR”.
X-Ray Tube Current	(0018,1151)	2C	Set to average value in milliamps of this irradiation event, reported as ceiling of decimal number of the current (integer).
X-Ray Tube Current in µA	(0018,8151)	3	Set to average value in microamps of this irradiation event, reported as ceiling of decimal number of the current (integer).
Exposure Time	(0018,1150)	2C	Set to time reported as ceiling of milliseconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.
Exposure	(0018,1152)	2C	Set to exposure reported as ceiling of milliamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.
Exposure in µAs	(0018,1153)	3	Set to exposure reported as ceiling of microamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.

Attribute Name	Tag	Type	Attribute Description
Grid	(0018,1166)	3	Set to “IN” if the grid is present during the irradiation event, otherwise this is set to “NONE”.
Average Pulse Width	(0018,1154)	3	Present only when using pulsed mode, set to commanded value in milliseconds for pulsed mode irradiation event.
Radiation Mode	(0018,115A)	3	Set to “CONTINUOUS”. For pulsed mode, this is set to “PULSED”.
Imager Pixel Spacing	(0018,1164)	3	Set to “0.198” (mm).
Pixel Spacing	(0028,0030)	1C	Derived from configured measurement calibration values.
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	Set to X-ray dose in dGycm^2. For derived images, this is set to 0 or will be blank.
Entrance Dose	(0040,0302)	3	Set to CAK value in dGy at system reference point (integer, can be rounded to zero).
Entrance Dose in mGy	(0040,8302)	3	Set to CAK value in mGy at system reference point (decimal string, not rounded).

5.4.1.7 XA Positioner Module

TABLE 5-9 XA POSITIONER MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Distance Source to Detector	(0018,1110)	3	Set to 1000 (mm, nominal).
Positioner Motion	(0018,1500)	2C	Set to “DYNAMIC”.
Positioner Primary Angle	(0018,1510)	2	Calculated by system.
Positioner Secondary Angle	(0018,1511)	2	Calculated by system.
Positioner Primary Angle Increment	(0018,1520)	2C	Calculated by system.
Positioner Secondary Angle Increment	(0018,1521)	2C	Calculated by system.

5.4.1.8 DX Detector Module

TABLE 5-10 DX DETECTOR MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Detector Type	(0018,7004)	2	Set to “SCINTILLATOR”.
Imager Pixel Spacing	(0018,1164)	1	Set to 0.198 (mm).
Pixel Spacing	(0028,0030)	1C	Derived from configured measurement calibration values.

5.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the X-Ray Angiographic SOP Instance.

5.5.1 Standard Attributes

See Section 4.2.6 for Standard Attributes supported in the X-Ray Angiographic SOP Instance.

5.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology but no extension is made for the X-Ray Angiographic SOP Instance. No Private Context Groups are supported.

X-RAY RADIOFLUOROSCOPY INFORMATION OBJECT IMPLEMENTATION

6.1 INTRODUCTION

This section specifies the use of the DICOM X-Ray Radiofluoroscopy Image IOD to represent the information included in XRF Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

6.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 6-1 XRF MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

6.3 IOD MODULE TABLE

The XRF Image Information Object Definition comprises the modules of the following table, plus Standard Extended attributes.

TABLE 6-2 XRF IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used for MWL data.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	4.2.3.1
	Clinical Trial Series	Not Used	N/A
Frame of Reference	Synchronization	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
Image	General Image	Used	4.2.5.1
	General Reference	Not Used	N/A
	Image Pixel	Used	4.2.5.2

Entity Name	Module Name	Usage	Reference
	Contrast/Bolus	Present, required if contrast media was used.	4.2.5.3
	Cine	Used for multi-frame images.	5.4.1.1
	Multi-frame	Used for multi-frame images.	5.4.1.2
	Frame Pointers	Used for multi-frame images.	5.4.1.3
	Mask	Used for Subtract mode images.	5.4.1.4
	X-Ray Image	Used	5.4.1.5
	X-Ray Acquisition	Used	5.4.1.6
	X-Ray Collimator	Not Used	N/A
	Display Shutter	Not Used	N/A
	Device	Not Used	N/A
	Intervention	Not Used	N/A
	Specimen	Not Used	N/A
	X-Ray Table	Not Used	N/A
	XRF Positioner	Used	6.4.1
	X-Ray Tomo Acquisition	Not Used	N/A
	DX Detector	Used	5.4.1.8
	Overlay Plane	Used when overlays are configured to be stored via DICOM Store or Media Image Save.	4.2.5.4
	Multi-Frame Overlay	Not Used	N/A
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.5.5
	SOP Common	Used	4.2.5.6
	Common Instance Reference	Not Used	N/A
	Frame Extraction	Not Used	N/A

6.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used the XRF Image IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

6.4.1 Image Entity Modules

6.4.1.1 XRF Positioner Module

TABLE 6-3
XRF POSITIONER MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Distance Source to Detector	(0018,1110)	3	Set to 1000 (mm, nominal).

6.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the X-Ray RF SOP Instance.

6.5.1 Standard Attributes

See Section 4.2.6 for Standard Attributes supported in the X-Ray RF SOP Instance.

6.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology but no extension is made for the X-Ray RF SOP Instances. No Private Context Groups are supported.

COMPUTED RADIOGRAPHY INFORMATION OBJECT IMPLEMENTATION

7.1 INTRODUCTION

This section specifies the use of the DICOM Computed Radiography Image IOD to represent the information included in CR Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

7.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 7-1 CR MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

7.3 IOD MODULE TABLE

The CR Image Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes.

TABLE 7-2 CR IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used for MWL data.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	4.2.3.1
	CR Series	Used	7.4.1.1
	Clinical Trial Series	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
Image	General Image	Used	4.2.5.1
	General Reference	Not Used	N/A
	Image Pixel	Used	4.2.5.2
	Contrast/Bolus	Present, required if contrast media was used.	4.2.5.3

Entity Name	Module Name	Usage	Reference
	Display Shutter	Not Used	N/A
	Device	Not Used	N/A
	Specimen	Not Used	N/A
	CR Image	Used	7.4.2.1
	Overlay Plane	Used when overlays are configured to be stored via DICOM Store or Media Image Save.	4.2.5.4
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.5.54.2.5.5
	SOP Common	Used	4.2.5.6
	Common Instance Reference	Not Used	N/A

7.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used the CR Image IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

7.4.1 Series Entity Modules

7.4.1.1 CR Series Module

TABLE 7-3
CR SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Body Part Examined	(0018,0015)	2	Blank.
View Position	(0018,5101)	2	Blank.

7.4.2 Image Entity Modules

7.4.2.1 CR Image Module

TABLE 7-4
CR IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Photometric Interpretation	(0028,0004)	1	Set to “MONOCHROME2”.
KVP	(0018,0060)	3	Set to average value of x-ray exposure.
Distance Source to Detector	(0018,1110)	3	Set to 1000 (mm, nominal).
Exposure Time	(0018,1150)	3	Set to time reported as ceiling of milliseconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.
X-Ray Tube Current	(0018,1151)	3	Set to average value in milliamps of this irradiation event, reported as ceiling of decimal number of the current (integer).
Exposure	(0018,1152)	3	Set to exposure reported as ceiling of milliamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.
Exposure in μAs	(0018,1153)	3	Set to exposure reported as ceiling of microamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. The single, continuous-mode scout irradiation is not counted in this value.
Imager Pixel Spacing	(0018,1164)	3	Set to “0.198” (mm).
Pixel Spacing	(0028,0030)	1C	Derived from configured measurement calibration values.
Anatomic Region Sequence	(0008,2218)	3	Provided by user input (See 0). Default value is “Topography Unknown”.
> Include “Code Sequence Macro”			See 0

7.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the CR SOP Instance.

7.5.1 Standard Attributes

See Section 4.2.6 for Standard Attributes supported in the CR SOP Instance.

7.5.1.1 Context ID 4031/4009 Common Anatomic Regions

Values used for Anatomic Region Sequence (0008,2218) are as follows:

TABLE 7-5 CID 4031/4009 COMMON ANATOMIC REGIONS

Code Meaning	Code Value	Coding Scheme Designator
Topography Unknown[1]	T-D0001	SRT
Abdomen	T-D4000	SRT
Ankle joint	T-15750	SRT
Bile duct	T-60610	SRT
Bladder	T-74000	SRT
Calcaneus	T-12770	SRT
Cervical spine	T-11501	SRT
Chest	T-D3000	SRT
Clavicle	T-12310	SRT
Coccyx	T-11BF0	SRT
Elbow	T-D8300	SRT
Esophagus	T-56000	SRT
Facial bones	T-11196	SRT
Femur	T-12710	SRT
Finger	T-D8800	SRT
Foot	T-D9700	SRT
Forearm bone	T-12402	SRT
Gall bladder	T-63000	SRT
Hand	T-D8700	SRT
Heart	T-32000	SRT
Hip joint	T-15710	SRT
Humerus	T-12410	SRT
Knee	T-D9200	SRT
Leg	T-D9400	SRT
Lumbar spine	T-11503	SRT
Mandible	T-11180	SRT
Maxilla	T-11170	SRT
Nasal bone	T-11149	SRT
Orbital structure	T-D14AE	SRT
Pancreatic duct and bile duct systems	T-65600	SRT
Paranasal sinus	T-22000	SRT
Patella	T-12730	SRT
Pelvis	T-D6000	SRT

Code Meaning	Code Value	Coding Scheme Designator
Rib	T-11300	SRT
Sacroiliac joint	T-15680	SRT
Sacrum	T-11AD0	SRT
Scapula	T-12280	SRT
Shoulder	T-D2220	SRT
Skull	T-11100	SRT
Sternum	T-11210	SRT
Stomach	T-57000	SRT
Temporomandibular joint	T-15290	SRT
Thoracic spine	T-11502	SRT
Thumb	T-D8810	SRT
Toe	T-D9800	SRT
Upper urinary tract	T-70010	SRT
Ureter	T-73000	SRT
Urethra	T-75000	SRT
Uterus and fallopian tubes	T-88920	SRT
Wrist joint	T-15460	SRT

[1] – This value is an extension of the CID 4009/4031 extensible list

7.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology but no extension is made for the CR SOP instance. No Private Context Groups are supported.

COMPUTED TOMOGRAPHY INFORMATION OBJECT IMPLEMENTATION

8.1 INTRODUCTION

This section specifies the use of the DICOM Computed Tomography Image IOD to represent the information included in CT Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

8.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 8-1 CT MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

8.3 IOD MODULE TABLE

The CT Image Information Object Definition comprises the modules of the following table, plus Standard Extended attributes.

TABLE 8-2 CT IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used for MWL data.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	4.2.3.1
	Clinical Trial Series	Not Used	N/A
Frame of Reference	Frame of Reference	Used	8.4.1.1
Equipment	General Equipment	Used	4.2.4.1
Image	General Image	Used	4.2.5.1
	General Reference	Not Used	N/A
	Image Plane	Used	8.4.2.1
	Image Pixel	Used	4.2.5.2

Entity Name	Module Name	Usage	Reference
	Contrast/Bolus	Not Used	N/A
	Device	Not Used	N/A
	Specimen	Not Used	N/A
	CT Image	Used	8.4.2.2
	Overlay Plane	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.5.5
	SOP Common	Used	4.2.5.6
	Common Instance Reference	Not Used	N/A

8.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by the CT Image IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

8.4.1 Frame of Reference Entity Modules

8.4.1.1 Frame of Reference Module

Attribute Name	Tag	Type	Use
Frame of Reference UID	(0020,0052)	1	Created by the system.
Position Reference Indicator	(0020,1040)	2	Created by the system.

8.4.2 Image Entity Modules

8.4.2.1 Image Plane Module

Attribute Name	Tag	Type	Use
Pixel Spacing	(0028,0030)	1	Set to image measurement value.
Image Orientation (Patient)	(0020,0037)	1	Set to current orientation of system.
Image Position (Patient)	(0020,0032)	1	Set to current position of system.
Slice Thickness	(0018,0050)	2	Set to specified slice thickness.

Slice Location	(0020,1041)	3	Set to selected slice location.

8.4.2.2 CT Image Module

Attribute Name	Tag	Type	Use
Image Type	(0008,0008)	1	See 4.2.5.1.1
Samples per Pixel	(0028,0002)	1	Set to 1.
Photometric Interpretation	(0028,0004)	1	Set to “MONOCHROME2”.
Bits Allocated	(0028,0100)	1	Set to 16.
Bits Stored	(0028,0101)	1	Set to 10.
High Bit	(0028,0102)	1	Set to 9.
Rescale Intercept	(0028,1052)	1	Set to 0.
Rescale Slope	(0028,1053)	1	Set to 1.
Rescale Type	(0028,1054)	1C	Set to “US” (unspecified).
KVP	(0018,0060)	2	Set to average value of the x-ray exposure.
Acquisition Number	(0020,0012)	2	Set to image’s irradiation event number.
Distance Source to Detector	(0018,1110)	3	Set to 1000 (mm, nominal).
Exposure Time	(0018,1150)	3	Set to time reported as ceiling of milliseconds of this irradiation event. The single, continuous-mode scout irradiation is not counted in this value.
X-Ray Tube Current	(0018,1151)	3	Set to average value of this irradiation event, reported as ceiling of decimal number of the current (integer).
Exposure	(0018,1152)	3	Set to exposure reported as ceiling of milliamp-seconds of this irradiation event. The single, continuous-mode scout irradiation is not counted in this value.
Exposure in µAs	(0018,1153)	3	Set to exposure reported as ceiling of microamp-seconds of this irradiation event. The single, continuous-mode scout irradiation is not counted in this value.

8.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the CT SOP Instance.

8.5.1 Standard Attributes

See Section 4.2.6 for Standard Attributes supported in the CT SOP Instance.

8.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology but no extension is made for the CT SOP instance. No Private Context Groups are supported.

SECONDARY CAPTURE INFORMATION OBJECT IMPLEMENTATION

9.1 INTRODUCTION

This section specifies the use of the DICOM Secondary Capture Image IOD to represent the information included in SC Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

3D secondary captures and live preview camera images are stored as SC objects.

9.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 9-1 SC MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

9.3 IOD MODULE TABLE

The SC Image Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes.

TABLE 9-2 SC IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used for MWL data.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	4.2.3.1
	Clinical Trial Series	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
	SC Equipment	Used	
Image	General Image	Used	4.2.5.1
	General Reference	Not Used	N/A
	Image Pixel	Used	4.2.5.2
	Device	Not Used	N/A
	Specimen	Not Used	N/A
	SC Image	Used	
	Overlay Plane	Used when overlays are configured to be stored via DICOM Store or Media Image Save.	4.2.5.4
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.5.5
	ICC Profile	Not Used	N/A
	SOP Common	Used	4.2.5.6
	Common Instance Reference	Not Used	N/A

9.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by the SC Image IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

9.4.1 Equipment Entity Modules

9.4.1.1 SC Equipment Module

TABLE 9-3 SC EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Conversion Type	(0008,0064)	1	Set to “WSD”.
Modality	(0008,0060)	3	Set to “OT”.
Secondary Capture Device ID	(0018,1010)	3	Set to system serial number.
Secondary Capture Device Manufacturer	(0018,1016)	3	Set to “GE Healthcare”.
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	Set system model.
Secondary Capture Device Software Version	(0018,1019)	3	Set to system software version.

9.4.2 Image Entity Modules

9.4.2.1 SC Image Module

TABLE 9-4 SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Date of Secondary Capture	(0018,1012)	3	Set to date of image creation.
Time of Secondary Capture	(0018,1014)	3	Set to time of image creation.

9.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

This product does not support any additional standard extended attributes in Standard Extended SC SOP Instances.

9.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product does not support coded terminology using any Standard Extended, Private, or Configurable Context Groups.

MULTI-FRAME GRAYSCALE BYTE SECONDARY CAPTURE INFORMATION OBJECT IMPLEMENTATION

10.1 INTRODUCTION

This section specifies the use of the DICOM Multi-frame Grayscale Byte Secondary Capture Image IOD to represent the information included in Multi-SC Images produced or received by this implementation. Corresponding attributes are conveyed using the module construct.

10.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 10-1 MULTI-SC MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

10.3 IOD MODULE TABLE

The Multi-SC Image Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes.

TABLE 10-2 MULTI-SC IMAGE IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	**Error! Reference source not found.**
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	**Error! Reference source not found.**
	Patient Study	Used when the data is passed by the Modality Worklist.	**Error! Reference source not found.**
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	**Error! Reference source not found.**
	Clinical Trial Series	Not Used	N/A
Equipment	General Equipment	Used	**Error! Reference source not found.**
	SC Equipment	Used	**Error! Reference source not found.**
Frame of Reference	Frame of Reference	Not Used	N/A
	Synchronization	Not Used	N/A
Image	General Image	Used	**Error! Reference source not found.**
	General Reference	Not Used	N/A
	Image Pixel	Used	**Error! Reference source not found.**
	Cine	Used	5.4.1.1
	Multi-frame	Used	5.4.1.2
	Frame Pointers	Used	5.4.1.3
	Device	Not Used	N/A
	Multi-frame Functional Groups	Not Used	N/A

Multi-frame Dimension	Not Used	N/A
Specimen	Not Used	N/A
SC Image	Used	**Error! Reference source not found.**
SC Multi-frame Image	Used	0
SC Multi-frame Vector	Not applicable. No required conditions are met.	N/A
VOI LUT	Used to provide the Window Width and Center for the image.	4.2.5.5
SOP Common	Used	5.4.1.1
Common Instance Reference	Not Used	N/A
Frame Extraction	Not applicable, condition not met.	N/A

10.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by the Multi-SC IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

10.4.1 SC Multi-frame Image Module

TABLE 10-3 MULTI-SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Burned in Annotation	(0028,0301)	1	Set to “NO”.
Presentation LUT Shape	(2050,0020)	1C	Set to “IDENTITY”.
Rescale Intercept	(0028,1052)	1C	Set to 0.
Rescale Slope	(0028,1053)	1C	Set to 1.
Rescale Type	(0028,1054)	1C	Set to “US” (unspecified).

10.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

This product does not support any additional standard extended attributes in Standard Extended Multi-SC SOP Instances.

10.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product does not support coded terminology using any Standard Extended, Private, or Configurable Context Groups.

X-RAY RADIATION DOSE STRUCTURED REPORT INFORMATION OBJECT IMPLEMENTATION

11.1 INTRODUCTION

This section specifies the use of the DICOM X-Ray Radiation Dose Structured Report IOD to represent results produced by this implementation. Corresponding attributes are conveyed using the module construct.

11.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 11-1 RDSR MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM IE	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Series
Document	Document

11.3 IOD MODULE TABLE

The RDSR Information Object Definitions comprise the modules of the following tables, plus Standard Extended and Private attributes.

The SR Document Content is constrained by the supported templates contained in the Document Entity Modules. Standard, Standard Extended and Private templates are further described in Section 11.7.

TABLE 11-2 RDSR IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	4.2.2.1
	Patient Study	Used when the data is passed by the Modality Worklist.	4.2.2.2
	Clinical Trial Study	Not Used	N/A
Series	SR Document Series	Used	11.4.1.1
	Clinical Trial Series	Not Used	N/A
Frame Of Reference	Synchronization	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
Document	SR Document General	Used	11.4.2.1

SR Document Content	Used	11.4.2.2
SOP Common	Used	4.2.5.6

11.4 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by RDSR IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

11.4.1 Series Entity Modules

11.4.1.1 SR Document Series Module

TABLE 11-3 SR DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Modality	(0008,0060)	1	Value = SR
Series Instance UID	(0020,000E)	1	Value generated by the system.
Series Number	(0020,0011)	1	Value generated by the system.
Series Date	(0008,0021)	3	Value of the Series date is the procedure step start date. Each procedure step defines a new series.
Series Time	(0008,0031)	3	Value of the Series time is the procedure step start time. Each procedure step defines a new series.
Series Description	(0008,103E)	3	Value of the Protocol Description on the Additional Information screen.
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Value generated by the system. Currently does not correspond to an actual PPS generated by the system.
> “Referenced SOP Class / Instance UIDs”			

11.4.2 Document Entity Modules

11.4.2.1 SR Document General Module

TABLE 11-4 SR DOCUMENT GENERAL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Instance Number	(0020,0013)	1	Value assigned by the system.
Completion Flag	(0040,A491)	1	Value equals COMPLETE = Complete content.

Attribute Name	Tag	Type	Use
Verification Flag	(0040,A493)	1	Value equals UNVERIFIED = Not attested to.
Content Date	(0008,0023)	1	Value equal to the date the exam is completed/abandoned.
Content Time	(0008,0033)	1	Value equal to the time the exam is completed/abandoned.
Verifying Observer Sequence	(0040,A073)	1C	Not present. Currently not supported on the AE
Author Observer Sequence	(0040,A078)	3	Value is set to Device macro values.
>Include “Identified Person or Device Macro”			
Custodial Organization Sequence	(0040,A07C)	3	
>Institution Name	(0008,0080)	2	Value set to Hospital Name entered on Setup > Regional Settings screen.
>Institution Code Sequence	(0008,0082)	2	Empty sequence
>>Include “Code Sequence Macro”			
Predecessor Documents Sequence	(0040,A360)	1C	Not present.
Identical Documents Sequence	(0040,A525)	1C	Not present.
Referenced Request Sequence	(0040,A370)	1C	Populated with values from the system.
>Study Instance UID	(0020,000D)	1	Populated with the Study Instance UID.
>Referenced Study Sequence	(0008,1110)	2	Contains the Referenced Study Sequence received in the MWL
>>Include “SOP Instance Reference Macro”			
>Accession Number	(0008,0050)	2	Populated with the value from the MWL or entered by the user.
>Placer Order Number/Imaging Service Request	(0040,2016)	2	Populated with the value from the MWL or blank.
>Filler Order Number/Imaging Service Request	(0040,2017)	2	Populated with the value from the MWL or blank.
>Requested Procedure ID	(0040,1001)	2	Populated with the value from the MWL or blank.
>Requested Procedure Description	(0032,1060)	2	Populated with the value from the MWL or blank.
>Requested Procedure Code Sequence	(0032,1064)	2	Populated with the value from the MWL or empty.
>>”Include “Code Sequence Macro”			
>Reason for the Requested Procedure	(0040,1002)	3	Populated with the value from the MWL
>Reason for Requested Procedure Code Sequence	(0040,100A)	3	Populated with the value from the MWL
>>Include “Code Sequence Macro”			
Performed Procedure Code Sequence	(0040,A372)	2	Populated with the value from the MWL
>Include “Code Sequence Macro”			
Current Requested Procedure Evidence Sequence	(0040,A375)	1C	Populated with the SOP instances of all images stored to PACS.
>Include “Hierarchical SOP Instance Reference Macro”			

Attribute Name	Tag	Type	Use
Pertinent Other Evidence Sequence	(0040,A385)	1C	Not present per conditional
> Include “Hierarchical SOP Instance Reference Macro”			
Referenced Instance Sequence	(0008,114A)	1C	Not present per conditional
>Include “SOP Instance Reference Macro”			

11.4.2.2 SR Document Content Module

TABLE 11-5 SR DOCUMENT CONTENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Observation DateTime	(0040,A032)	1C	Not present per conditional
Content Template Sequence	(0040,A504)	1C	
>Mapping Resource	(0008,0105)	1	Value set to DCMR.
>Template Identifier	(0040,DB00)	1	Value set to 10001
Value Type	(0040,A040)	1	
Continuity of Content	(0040,A050)	1C	Set to ‘SEPARATE’.
Concept Name Code Sequence	(0040,A043)	1C	
>Code Value	(0008,0100)	1	Value set to 113701.
>Code Value	(0008,0102)	1	Value set to DCM.
>Code Meaning	(0008,0104)	1	Value set to “X-Ray Radiation Dose Report”
Content Sequence	(0040,A730)	1C	
> Relationship Type	(0040,A010)	1	Value set to ‘HAS CONCEPT MOD’
> Referenced Content Item Identifier	(0040,DB73)	1C	Not present since not a reference.
> Insert SR Document Content Module			Recursive inclusion to create document content tree. See 11.4.2.2.1.1 for supported templates.

11.4.2.2.1 SR Document Content Descriptions

11.4.2.2.1.1 Content Template

This product supports the following root Template for SR SOP Instances created by this product. Refer to section 11.7 for a detailed description of the supported templates.

TABLE 11-6 SR ROOT TEMPLATES

SOP Class	Template ID	Template Name	Use
X-Ray Radiation Dose SR	10001	X-Ray Radiation Dose	Create

11.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

This product does not support Standard Extended Attributes for Standard Extended SR SOP Instances.

11.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports coded terminology using Standard Extended Context Groups as defined in the following sections.

11.6.1 Standard Extended Context Groups

This product supports the following extensions to standard Context Groups for SR SOP Instances created by this product. Extensions are indicated by **bold text.**

11.6.1.1 Context ID 4031/4009 Common Anatomic Regions

See Table 7-5.

11.6.1.2 Context ID 3629 Procedure Intent

TABLE 11-7 CID 3629

Code Meaning	Code Value	Coding Scheme Designator
Diagnostic Intent	R-408C3	SRT
Therapeutic Intent	R-41531	SRT
Combined Diagnostic and Therapeutic Procedure	R-002E9	SRT
Staging intent	R-408F2	SRT
Guidance Intent	R-40641	SRT
Forensic Intent	R-40644	SRT
Screening Intent	R-42453	SRT
Palliative Intent	R-40644	SRT
Adjunct intent	R-41564	SRT
Adjuvant intent	R-41561	SRT
Curative intent	R-41560	SRT
Neo-adjuvant intent	R-41562	SRT
Supportive intent	R-41563	SRT
Preventive intent	P0-02179	SRT
Prophylactic intent	P0-02180[1]	SRT
Quality Control Intent	G-C0E8	SRT

[1] - Value in DICOM PS3.16 2014c is P0-02180.

11.7 STANDARD, STANDARD EXTENDED AND PRIVATE TEMPLATES

This product supports the Standard Extended Templates defined in the following sections.

11.7.1 Standard Templates

This product supports the following standard templates for SOP Instances created by this product.

11.7.1.1 Template ID 10001 X-Ray Radiation Dose

TABLE 11-8 TID 10001

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		CONTAINER	EV (113701, DCM, "X-Ray Radiation Dose Report")	1	M		Root Node
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, "Procedure reported")	1	M		DT (113704, DCM, "Projection X-Ray")
>>	HAS CONCEPT MOD	CODE	EV (G-C0E8, SRT, "Has Intent")")	1	M		DCID 3629 “Procedure Intent” See 11.6.1.2, value is user selectable from Additional Info screen.
>	CONTAINS	CODE	EV (122142, DCM,"Acquisition Device Type")	1	U		DT (113704, DCM, "Projection X-Ray")
>		INCLUDE	DTID 1002 “Observer Context”	1	M		See 11.7.1.2
>	HAS OBS CONTEXT	CODE	EV (113705, DCM, "Scope of Accumulation")	1	M		DCID 10000 “Scope of Accumulation”
>>	HAS PROPERTIES	UIDREF	DCID 10001 “UID Types”	1	M		Value generated by the system.
>	CONTAINS	CODE	EV(“113945, DCM, “X-Ray Detectpr Data Available”)	1	U		Value of (R-0038D, SRT, “Yes”)
>	CONTAINS	CODE	EV(“113943, DCM, “X-Ray Source Data Available”)	1	U		Value of (R-0038D, SRT, “Yes”)
>	CONTAINS	CODE	EV(“113943, DCM, “X-Ray Mechanical Data Available”)	1	U		Value of (R-0038D, SRT, “Yes”)

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>	CONTAINS	INCLUDE	DTID 10002 “Accumulated X-Ray Dose”	1	MC	IFF Single Plane system	$Plane = EV (113622,DCM, "Single Plane"). See section 11.7.1.3.
>	CONTAINS	INCLUDE	DTID 10003 “Irradiation Event X-Ray Data”	1-n	MC	Condition met	All Irradiation events from the exam are recorded. See section 11.7.1.4.
>	CONTAINS	TEXT	EV (121106, DCM, ”Comment")	1	U		Comment from Patient Information screen.
>	CONTAINS	IMAGE	EV (121342,, DCM, ”Dose Image")	1-n	U		Any image stored to PACS from the exam.
>	CONTAINS	CODE	EV (113854, DCM,"Source of Dose Information")	1	M		DT (113940, DCM, "System Calculated")

11.7.1.2 Template ID 1001 Observer Context

Only one observer context instance is contained in the report.

TABLE 11-9 TID 1001

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>	HAS OBS CONTEXT	CODE	EV (121005, DCM,"Observer Type")	1	M	Observer is device	DT (121007, DCM, "Device")
>		UIDREF	EV (121012, DCM, "Device Observer UID")	1	M		UID of Device
>		TEXT	EV (121013, DCM, "Device Observer Name")	1	U		Station Name entered by the user
>		TEXT	EV (121014, DCM, "Device Observer Manufacturer")	1	U		GE Healthcare Surgery
>		TEXT	EV (121015, DCM, "Device Observer Model Name")	1	U		Model Name of the system
>		TEXT	EV (121015, DCM, "Device Observer Serial Number")	1	U		Serial Number of the system
>		TEXT	EV (121017, DCM, "Device Observer Physical Location During Observation")	1	U		Station Name entered by the user

11.7.1.3 Template ID 10002 Accumulated X-Ray Dose

TABLE 11-10 TID 10002

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		CONTAINER	EV (113702, DCM, "Accumulated X-Ray Dose Data")	1	M		
>	HAS CONCEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	1	M		Single Plane
>	CONTAINS	CONTAINER	EV (122505, DCM, "Calibration")	1-n	MC	If the user saves the values in Quality Control Mode.	This container will be present with the values from the last Quality Control save operation.
>>	HAS CONCEPT MOD	CODE	EV(113794, DCM, ”Dose Measurement Device”)	1	M	Defaults to value from DCID 10010 Dose Measurement Devices value.	Value set to “SRT, A-2C090, Dosimeter”
>>	CONTAINS	DATETIME	EV(113723, DCM, “Calibration DateTime”)	1	M	Value set when Quality Control Mode save is performed.	
>>	CONTAINS	NUM	EV(122322, DCM, “Calibration Factor”)	1	M	Value set by user in Quality Control Mode.	No units.
>>	CONTAINS	NUM	EV(113763, DCM, “Calibration Uncertainty”)	1	M	Value set by user in Quality Control Mode.	EV (%, UCUM, “Percent”)
>>	CONTAINS	TEXT	EV(113724, DCM, “Calibration Responsible Party”)	1	M	Value set by user in Quality Control Mode.	
>>	CONTAINS	TEXT	EV(113720, DCM, “Calibration Protocol”)	1	U	Value set by user in Quality Control Mode.	

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>		INCLUDE	DTID 10004 "Accumulated Fluoroscopy and Acquisition Projection X-Ray Dose"	1	M	Projection X-RAY and Row 4 is absent	See section 11.7.1.3.1.
>		INCLUDE	DTID 10007 "Accumulated Total Projection Radiography Dose"	1	M	Projection X-RAY and Row 4 is absent	See section 11.7.1.3.2.
>		INCLUDE	DTID 1021 "DeviceParticipant"	1	MC	Irradiation device is the recording device	Present. See section 11.7.1.3.3

11.7.1.3.1 Template ID 10004 Accumulated Fluoroscopy and Acquisition Projection X-Ray Dose

TABLE 11-11 TID 10004

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		NUM	EV (113726, DCM, "Fluoro Dose Area Product Total")	1	MC	Fluoroscopy provided by system	Units - $Gy.m^2$
		NUM	EV (113728, DCM, "Fluoro Dose (RP) Total")	1	MC	Fluoroscopy provided by system	Units - Gy
		NUM	EV (113730, DCM, "Total Fluoro Time")	1	M	Projection X-RAY and Row 4 is absent	Units - s (seconds)
		NUM	EV (113727, DCM,"Acquisition Dose Area Product Total")	1	M	Digital Spot and Digital Cine	Units - $Gy.m^2$
		NUM	EV (113729, DCM, "Acquisition Dose (RP) Total")	1	M	Digital Spot and Digital Cine	Units - Gy
		NUM	EV (113730, DCM, "Total Acquisition Time")	1	M	Digital Spot and Digital Cine	Units - s (seconds)

11.7.1.3.2 Template ID 10007 Accumulated Total Projection Radiography Dose

TABLE 11-12 TID 10007

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		NUM	EV (113722, DCM, " Dose Area Product Total")	1	M		Units - $Gy.m^2$
		NUM	EV (113725, DCM, "Dose (RP) Total")	1	MC	Dose system calculated.	Units - Gy
		NUM	EV (113737, DCM, "Distance Source to Reference Point")	1	U		Units – mm Data found in each irradiation event
		NUM	EV (113731, DCM,"Total Number of Radiographic Frames")	1	U		Units – no units.
		NUM	EV (113780, DCM, "Reference Point Definition")	1	MC	Have Acquisition Dose (RP) Total	Units – mm. Data found in each irradiation event

11.7.1.3.3 Template ID 1021 Device Participant

TABLE 11-13 TID 1021

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		CODE	EV (113876, DCM, "Device Role in Procedure")	1	M		“Irradiating Device”
>		NUM	EV (113877, DCM, "Device Name")	1	U		System Station Name
>		NUM	EV (113878, DCM, "Device Manufacturer")	1	M		“GE Healthcare Surgery”
>		NUM	EV (113879, DCM,"Device Model Name")	1	M		Set to Product name

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>		NUM	EV (113880, DCM, "Device Serial Number")	1	M		Set to device serial number
>		NUM	EV (113881, DCM, "Device Observer UID")	1	M		Set to device unique value using the GE Root, location of manufacture information.

11.7.1.4 Template ID 10003 Irradiation Event X-Ray Data

TABLE 11-14 TID 10003

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
		CONTAINER	EV (113706, DCM, "Irradiation Event X-Ray Data")	1	M		
>	HAS CONCEPT MOD	CODE	EV (113764, DCM, "Acquisition Plane")	1	M		(113622, DCM, "Single Plane")
>	CONTAINS	UIDREF	EV (113769, DCM, "Irradiation Event UID")	1	M		Generated by the system
>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		DateTime of the event
>	CONTAINS	CODE	EV (113721, DCM, "Irradiation Event Type")	1	M		Set to (P5-06000, SRT, "Fluoroscopy") for all system X-Ray modes except for Digital Spot
>	CONTAINS	TEXT	EV (125203, DCM, "Acquisition Protocol")	1	U		The Protocol Description text from the additional information screen. MWL Protocol Code sequence used if available.

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>	CONTAINS	CODE	EV (123014, SRT, "Patient Table Relationship")	1	U		The value set for the from the user interface conforming to DCID 21 "Patient Equipment Relationship"
>	CONTAINS	CODE	EV (123014, SRT, "Patient Orientation")	1	U		The value set for the from the user interface conforming to DCID 19 "Patient Orientation"
>>	CONTAINS	CODE	EV (123014, SRT, "Patient Orientation Modifier")	1	M		The value set for the from the user interface conforming to DCID 20 "Patient Orientation Modifier"
>	CONTAINS	CODE	EV (123014, SRT, "Target Region")	1	U		The value set for the Anatomic Region using the values defined in section 7.5.1.1
>	CONTAINS	NUM	EV (122130, DCM, "Dose Area Product")	1	MC	Projection X-Ray	Units - Gy.m2
>	CONTAINS	NUM	EV (111636, DCM, "Entrance Exposure at RP")	1	MC	Same as 113738 so not included	
>	CONTAINS	CODE	EV (113780, DCM, "Reference Point Definition")	1	MC		DCID Radiation Dose Reference Point (113861, DCM, "30cm in Front of Image Input Surface")
>	CONTAINS	IMAGE	EV (113795, DCM, "Acquired Image")	1-n	MC	IFF image is stored to PACS	
>	CONTAINS	NUM	EV (113738, DCM, "Dose (RP)")	1	MC	Projection X-Ray	Units - Gy

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>	CONTAINS	NUM	EV (111631, DCM, "Average Glandular Dose")	1	MC	Not present - This is not a Mammography system.	
>	CONTAINS	CODE	EV (113732, DCM, "Fluoro Mode")	1	UC		DCID 10004 "Fluoro Modes" (Continuous or Pulsed depending on what mode was used)
>	CONTAINS	NUM	EV (113791, DCM, "Pulse Rate")	1	MC	IFF Fluoro Mode == Pulsed	Units - pulse/s
>	CONTAINS	NUM	EV (113768, DCM, "Number of Pulses")	1	MC	IFF Fluoro Mode == Pulsed	no units
>	CONTAINS	NUM	EV (113793, DCM, "Pulse Width")	1	U	IFF Fluoro Mode == Pulsed	Average width: Units - ms (milliseconds)
>	CONTAINS	NUM	EV (113742, DCM, "Irradiation Duration")	1	U		Units - s (seconds)
>	CONTAINS	NUM	EV (113733, DCM, "KVP")	1	U		Average kVp
>	CONTAINS	NUM	EV (113734, DCM, "X-Ray Tube Current")	1	MC		Average mA
>	CONTAINS	NUM	EV (113767, DCM, "Average X-Ray Tube Current")	1	U		Average mA
>	CONTAINS	NUM	EV (113824, DCM, "Exposure Time")	1	MC		Units - ms
>	CONTAINS	NUM	EV (113736, DCM, "Exposure")	1	MC		Total for the event. Units - µA.s
>	CONTAINS	NUM	EV (113766, DCM, "Focal Spot Size")	1	U		Units - mm
>	CONTAINS	CODE	EV (111632, DCM, "Anode Target Material")	1	U		DCID 10016 "Anode Target Material" - Tungsten
>		CONTAINER	EV (113771, DCM, "X-Ray Filters")	1	U		
>>	CONTAINS	CODE	EV (113772, DCM, "X-Ray Filter Type")	1	U		DCID 10007 "X-Ray Filter Types"

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
>>	CONTAINS	CODE	EV (113757, DCM, "X-Ray Filter Material")	1	U		DCID 10006 "X-Ray Filter Materials"
>>	CONTAINS	NUM	EV (113758, DCM, "X-Ray Filter Thickness Minimum")	1	U		Units - mm
>>	CONTAINS	NUM	EV (113773, DCM, "X-Ray Filter Thickness Maximum")	1	U		Units - mm
>	CONTAINS	NUM	EV (113790, DCM, "Collimated Field Area")	1	U		Units - m^2
>	CONTAINS	CODE	EV (111635, DCM, "X-RayGrid")	1	U		DCID 10017 "X-Ray Grid" - Fixed
>	CONTAINS	NUM	EV (112011, DCM, "Positioner Primary Angle")	1	UC		Units - deg. Set to 'Value unknown' for all but MD systems.
>	CONTAINS	NUM	EV (112012, DCM, "Positioner Secondary Angle")	1	UC		Units - deg. Set to 'Value unknown' for all but MD systems.
>	CONTAINS	NUM	EV (113740, DCM, "Positioner Primary End Angle")	1	UC		Units - deg. Set to 'Value unknown' for all but MD systems.
>	CONTAINS	NUM	EV (113790, DCM, "Positioner Secondary End Angle")	1	UC		Units - deg. Set to 'Value unknown' for all but MD systems.

11.7.2 Standard Extended Templates

This product does not supports extensions to the standard templates for SOP Instances created by this product. Extensions or restrictions are indicated by **bold text.**

MODALITY WORKLIST QUERY IMPLEMENTATION

12.1 INTRODUCTION

This section specifies the use of the DICOM Modality Worklist Information Model used to organize data and against which a MWL Query will be performed.

12.2 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 12-1 MWL MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM	OEC 3D Entity
Scheduled Procedure Step	Exam
Requested Procedure	Exam
Imaging Service Request	Exam
Visit	Exam
Patient	Patient

12.3 IOD MODULE TABLE

Refer to DICOM PS3.3 and PS3.4 for a complete definition of the entities, modules, and attributes.

TABLE 12-2 MWL IOD MODULES

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	12.4.1.1
	Scheduled Procedure Step	12.4.1.2
Requested Procedure	Requested Procedure	12.4.2.1
Imaging Service Request	Imaging Service Request	12.4.3.1
Visit	Visit Identification	Not used.
	Visit Status	Not used.
	Visit Relationship	Not used.
	Visit Admission	12.4.4.1
Patient	Patient Relationship	Not used.
	Patient Identification	12.4.5.1
	Patient Demographic	0
	Patient Medical	0

12.4 WORKLIST QUERY MODULE DEFINITIONS

Refer to DICOM PS3.3 for descriptions of the query key attributes contained within the MWL Information Model.

12.4.1 Common Scheduled Procedure Step Entity Modules

12.4.1.1 SOP Common Module

TABLE 12-3 MWL SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Specific Character Set	(0008,0005)	O	1C	No	Checked only to allow data of supported character sets.

12.4.1.1.1 Specific Character Set

The attribute Specific Character Set (0008,0005) will be sent. Only non-ASCII characters that may be entered from the console keyboard, as described in Section 2.7, may be included in the matching key value.

The AE will use only the supported Specific Character Set value returned in a Scheduled Procedure Step Identifier in the images created pursuant to that Scheduled Procedure Step. Text attributes, including Patient and Physician names, that include non-ASCII characters will be displayed as described in Section 2.7.

12.4.1.2 Scheduled Procedure Step Module

TABLE 12-4 MWL SCHEDULED PROCEDURE STEP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Scheduled Procedure Step Sequence	(0040,0100)	R	1	No/No	
>Scheduled Station AE Title	(0040,0001)	R	1	No/No	Single Value matching is supported for this data element. The matching value is dynamically configurable by the user on the Schedule Filter screen.
>Scheduled Procedure Step Start Date	(0040,0002)	R	1 *	No/No	Range matching is supported for this data element. The range value is dynamically configurable on the Scheduled Exams screen.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1 *	No/No	Value is always sent as “”

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
>Modality	(0008,0060)	R	1 *	No/Yes	Matching is supported and can be set to XA, RF, SC, CR or All(which is blank in the request). The modality is determined by the DICOM Server alias configuration on the OEC Workstation.
>Scheduled Performing Physician's Name	(0040,0006)	R	2 *	Yes/Yes (to Performing Physician's Name)	Wildcard matching is supported for this data element. User can enter characters and a wildcard character ('*') is automatically added to the end of the last and first name data entered. Displayed on Patient information screen.
>Scheduled Procedure Step Description	(0040,0005)	O	1C	Yes/Yes	Displayed on Additional information screen.
>Scheduled Station Name	(0040,0010)	O	2	No/Yes (to Performed Station Name)	Single Value matching is supported for this data element. The matching value is dynamically configurable by the user on the Schedule Filter screen.
>Scheduled Protocol Code Sequence	(0040,0008)	O	1C	Yes/Yes (to Performed Series Sequence)	
>>Code Value	(0008,0100)	O	1	Yes/Yes	Displayed on Additional information screen.
>>Coding Scheme Designator	(0008,0102)	O	1	Yes/Yes	
>>Code Meaning	(0008,0104)	O	3	Yes/Yes	Displayed on Additional information screen.
>Scheduled Procedure Step ID	(0040,0009)	O	1 *	Yes/Yes	Displayed on Additional information screen.
>Requested Contrast Agent	(0032,1070)	O	2C	No/No	Currently not used in the Image or displayed on the screen.

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.1.2.1 Scheduled Station AE Title

Note - The RIS generally only knows one AE Title for the modality - the one that will be scheduled (identified in the MWL key), that is the source of the images (C-Store), that is identified as the performer in the MPPS, and that will respond to a C-Echo. That AE Title is presumably the DICOM image sending AE, not the Worklist Client (whose only role is to query the MWL). The 3D Workstation AE has the same AE Title for all DICOM services.

12.4.2 Common Requested Procedure Entity Modules

Unless specified otherwise, all attributes listed are requested with a blank value.

12.4.2.1 Requested Procedure Module

TABLE 12-5 MWL REQUESTED PROCEDURE MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Requested Procedure ID	(0040,1001)	O	1 *	Yes / Yes	The system sends the characters entered by the user. Wildcard matching is supported if the user types '?' for any single character or '*' for any multiple characters. This assumes that the server supports wildcard processing on this attribute. No truncation of this value occurs in the transfer of this value. The display on the scheduled exams screen of this value is truncated and will be shown with an elipsis (...) to show the truncation.
Requested Procedure Description	(0032,1060)	O	1C *	Yes / Yes	No truncation of this value occurs in the transfer of this value. The display on the scheduled exams screen of this value is truncated and will be shown with an elipsis (...) to show the truncation.
Requested Procedure Code Sequence	(0032,1064)	O	1C	Yes / Yes	Only mapped to Radiation Dose Structured Report.
>Code Value	(0008,0100)	O	1	Yes / Yes	Displayed on Patient Information.
>Coding Scheme Designator	(0008,0102)	O	1	Yes / Yes	Displayed on Patient Information.
>Code Meaning	(0008,0104)	O	3 *	Yes / Yes	Displayed on Patient Information.
Study Instance UID	(0020,000D)	O	1	Yes / Yes	
Referenced Study Sequence	(0008,1110)	O	2	Yes / Yes	Used to support Retrieve screen.
>Referenced SOP Class UID	(0008,1150)	O	1C	Yes / Yes	See section 2.3.1 for the list of SOP Class UIDs supported by the 3D Workstation.
>Referenced SOP Instance UID	(0008,1155)	O	1C	Yes / Yes	
Reason for the Requested Procedure	(0040,1002)	O	3	Yes / No	

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.2.1.1 Study Instance UID

This product does support grouped procedures. If the system does not get a Study Instance UID in the response, the system will generate one.

12.4.3 Common Imaging Service Request Entity Modules

Unless specified otherwise, all attributes listed are requested with a blank value.

12.4.3.1 Imaging Service Request Module

TABLE 12-6 MWL IMAGING SERVICE REQUEST MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Accession Number	(0008,0050)	O	2 *	Yes / Yes	The system sends the characters entered by the user. Wildcard matching is supported if the user types '?' for any single character or '*' for any multiple characters. This assumes that the server supports wildcard processing on this attribute. No truncation of this value occurs in the transfer of this value or in the display of the Scheduled exam screen.
Referring Physician's Name	(0008,0090)	O	2 *	Yes / Yes	This value will be used if the Scheduled Performing Physician attribute is blank.
Placer Order Number / Imaging Service Request	(0040,2016)	O	3	Yes / Yes	This value is not displayed on the system.
Filler Order Number / Imaging Service Request	(0040,2017)	O	3	Yes / Yes	This value is not displayed on the system.

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.4 Common Visit Entity Modules

12.4.4.1 Visit Admission

TABLE 12-7 MWL VISIT ADMISSION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Admitting Diagnoses Description	(0008,1080)	O	3	Yes / No	Not displayed.
Admitting Diagnoses Code Sequence	(0008,1084)	O	3	Yes / No	
>Code Value	(0008,0100)	O	1	Yes / No	
>Coding Scheme Designator	(0008,0102)	O	1	Yes / No	
>Code Meaning	(0008,0104)	O	3 *	Yes / No	

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.5 Common Patient Entity Modules

Unless specified otherwise all attributes listed are requested with a blank value.

12.4.5.1 Patient Identification

TABLE 12-8 MWL PATIENT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Patient's Name	(0010,0010)	R	1 *	Yes / Yes	Wildcard matching is supported for this data element. The matching value is dynamically configurable. No truncation of this value occurs in the transfer of this value to the Instance. The display on the scheduled exams screen of this value is truncated and will be shown with an elipsis (...) to show the truncation. The value is displayed in full on the Patient Information screen.
Patient ID	(0010,0020)	R	1 *	Yes / Yes	Single Value matching is supported for this data element and the matching value is dynamically configurable. No truncation of this value occurs in the transfer of this value to the Instance. The display on the scheduled exams screen of this value is truncated and will be shown with an elipsis (...) to show the truncation. The value is displayed in full on the Patient Information screen.
Other Patient IDs	(0010,1000)	O	3	No / No	Displayed on the Previous Exams screen
Issuer of Patient ID	(0010,0021)	O	3	Yes / Yes	Not displayed
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	O	3	Yes / Yes	Not displayed

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.5.2 Patient Demographic

TABLE 12-9 MWL PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Patients Birth Date	(0010,0030)	O	2 *	Yes / Yes	No truncation of this value occurs in the transfer of this value to the Instance. The data is displayed on the Patient Information screen.
Patient's Sex	(0010,0040)	O	2 *	Yes / Yes	No truncation of this value occurs in the transfer of this value to the Instance. The data is displayed on the Patient Information screen.
Patient's Weight	(0010,1030)	O	2 *	Yes / No	Displayed on Additional Information screen.
Patient's Size	(0010,1020)	O	3 *	Yes / No	Displayed on Additional Information screen.
Patient's Age	(0010,1010)	O	3 *	Yes / No	Displayed on Additional Information screen.

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

12.4.5.3 Patient Medical

TABLE 12-10 MWL PATIENT MEDICAL MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Pregnancy Status	(0010,21C0)	O	2 *	No / No	Displayed on the Patient Information screen.
Medical Alerts	(0010,2000)	O	2	No / No	Not displayed
Contrast Allergies	(0010,2110)	O	2	No / No	Not displayed

Note - The *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

MODALITY PERFORMED PROCEDURE STEP IMPLEMENTATION

13.1 INTRODUCTION

This section specifies the use of the DICOM Modality Performed Procedure Step information to be communicated to the Hospital/Radiology information system.

This feature works in conjunction with DICOM Modality Worklist feature, if installed. However the conformance of this feature is independent of the MWL feature.

13.2 RELATIONSHIP BETWEEN SCHEDULED AND PERFORMED PROCEDURE STEPS

The OEC 3D supports a one-to-one relationship between Scheduled Procedure Step and PPS, a multiple-to-one relationship (aka Group Case), a one/multiple-to-multiple relationship (aka Append Case or Post-processing), and a zero-to-one relationship (aka Unscheduled Case or Acquisition without MWL Data).

13.3 IOD MODULE TABLE

Refer to DICOM PS3.3 and PS3.4 for a complete definition of the entities, modules, and attributes.

TABLE 13-1 MPPS IOD MODULES

Module Name	Reference
SOP Common	13.4.1
Performed Procedure Step Relationship	13.4.2
Performed Procedure Step Information	13.4.3
Image Acquisition Results	13.4.4
Radiation Dose	13.4.5
Billing and Material Management Codes	13.4.6

13.4 MODALITY PERFORMED PROCEDURE STEP MODULE DEFINITIONS

Refer to DICOM PS3.3 for descriptions of the query key attributes contained within the MPPS IOD.

13.4.1 SOP Common Module

TABLE 13-2 MPPS SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Specific Character Set	(0008,0005)	1C	1C	Used to indicate character set of this message.

13.4.2 Performed Procedure Step Relationship Module

This product does not support post-processing PPS (i.e. with scheduled data read from images).

The following table contains data for the "'DICOM Type" of the tag and where the source of the data for that tag with or without MWL being involved.

TABLE 13-3 MPPS PERFORMED PROCEDURE STEP RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU - N-CREATE	
		Acquisition without MWL Entry	Acquisition with MWL Entry
Scheduled Step Attributes Sequence	(0040,0270)	1, sequence containing 10 mostly empty items.	1 sequence containing 12 items populated with data from the MWL.
>Study Instance UID	(0020,000D)	1, created by the system	1, Filled with data from MWL
>Referenced Study Sequence	(0008,1110)	2, Empty sequence	2, Filled with sequence from MWL
>>Referenced SOP Class UID	(0008,1150)	1, Not sent	1, Filled from MWL
>>Referenced SOP Instance UID	(0008,1155)	1, Not sent	1, Filled from MWL
>Accession Number	(0008,0050)	2, Filled from user interface	2, Filled from MWL
>Placer Order Number/Imaging Service Request	(0040,2016)	3, Empty sequence	3, Filled from MWL
>Filler Order Number/Imaging Service Request	(0040,2017)	3, Empty sequence	3, Filled from MWL
>Requested Procedure ID	(0040,1001)	2, Empty	2, Filled from MWL
>Requested Procedure Code Sequence	(0032,1064)	3, Empty sequence	3, Filled from MWL unless the user modifies the value in the user interface then an empty sequence is sent.
>>Code Value	(0008,0100)	1, Not sent	1, Filled from MWL
>>Coding Scheme Designator	(0008,0102)	1, Not sent	1, Filled from MWL
>>Code Meaning	(0008,0104)	1, Not sent	1, Filled from MWL
>Requested Procedure Description	(0032,1060)	2, Empty	2, Filled from MWL
>Scheduled Procedure Step ID	(0040,0009)	2, Empty	2, Filled from MWL
>Scheduled Procedure Step Description	(0040,0007)	2, Empty	2, Filled from MWL

>Scheduled Protocol Code Sequence	(0040,0008)	2, Empty sequence	2, Filled with sequence from MWL
>>Code Value	(0008,0100)	1, Not sent	1, Filled from MWL
>>Coding Scheme Designator	(0008,0102)	1, Not sent	1, Filled from MWL
>>Coding Scheme Version	(0008,0103)	3, Not sent	3, Filled from MWL
>>Code Meaning	(0008,0104)	3, Not sent	3, Filled from MWL
Patient's Name	(0010,0010)	2, Filled from user interface	2, Filled from MWL
Patient ID	(0010,0020)	2, Filled from user interface	2, Filled from MWL
Issuer of Patient ID	(0010,0021)	3, Empty	3, Filled from MWL
Patient's Birth Date	(0010,0030)	2, Filled from user interface	2, Filled from MWL
Patient's Sex	(0010,0040)	2, Filled from user interface	2, Filled from MWL
Referenced Patient Sequence	(0008,1120)	2, Empty sequence	2, Empty sequence
>Referenced SOP Class UID	(0008,1150)	1, Not sent	1, Not sent
>Referenced SOP Instance UID	(0008,1155)	1, Not sent	1, Not sent
Admission ID	(0038,0010)	3, Not sent	3, Not sent
Issuer of Admission ID	(0038,0011)	3, Not sent	3, Not sent
Service Episode ID	(0038,0060)	3, Not sent	3, Not sent
Issuer of Service Episode ID	(0038,0061)	3, Not sent	3, Not sent
Service Episode Description	(0038,0062)	3, Not sent	3, Not sent

13.4.3 Performed Procedure Step Information Module

TABLE 13-4 MPPS PERFORMED PROCEDURE STEP INFORMATION MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Performed Procedure Step ID	(0040,0253)	1	-	Populated from MWL or from the user interface Additional Info screen. If not entered by the user, the system will create value of 'PPS Step ID'.
Performed Station AE Title	(0040,0241)	1	-	Populated from system configuration for AE Title.
Performed Station Name	(0040,0242)	2	-	Populated from system configuration for Station Name.
Performed Location	(0040,0243)	2	-	Empty value is sent.
Performed Procedure Step Start Date	(0040,0244)	1	-	Date of the first x-ray for the exam.
Performed Procedure Step Start Time	(0040,0245)	1	-	Time of the first x-ray for the exam.
Performed Procedure Step Status	(0040,0252)	1	3	Set to "IN-PROGRESS" for N-CREATE. Only one N-SET will be sent when the exam is 'ended' (completed - COMPLETED or abandoned - DISCONTINUED).
Performed Procedure Step Description	(0040,0254)	2	3	Set to value from MWL. User has the ability to enter text on Additional Info screen.
Performed Procedure Type Description	(0040,0255)	2	3	Set to value from MWL. User has the ability to enter Procedure description text on Patient Info screen.
Procedure Code Sequence	(0008,1032)	2	3	Set to value from MWL is values not modified prior to start of exam by the user. For manual data entry, User is able to enter these values on the Patient Info screen but all three values, code, designator and description (meaning) need to be present. For N-CREATE of an Append step this sequence will always be empty.
>Code Value	(0008,0100)	1	1	From MWL or user interface.
>Coding Scheme Designator	(0008,0102)	1	1	From MWL or user interface.
>Coding Scheme Version	(0008,0103)	3	3	From MWL else not sent.
>Code Meaning	(0008,0104)	3	3	From MWL or user interface.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Performed Procedure Step End Date	(0040,0250)	2	3	Date when the user 'ends' the exam from the user interface.
Performed Procedure Step End Time	(0040,0251)	2	3	Time when the user 'ends' the exam from the user interface.
Comments on the Performed Procedure Step	(0040,0280)	3	3	Not sent.
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	3	3	The N-CREATE will always have an empty sequence sent. The N-SET will contain the sequence values the user selected from the user interface when 'abandoning' an exam.
>Code Value	(0008,0100)	1	1	Not sent for N-CREATE. Value selected from user interface for N-SET.
>Coding Scheme Designator	(0008,0102)	1	1	Not sent for N-CREATE. Value selected from user interface for N-SET.
>Coding Scheme Version	(0008,0103)	3	3	Not sent.
>Code Meaning	(0008,0104)	3	3	Not sent for N-CREATE. Value selected from user interface for N-SET.

13.4.4 Image Acquisition Results Module

TABLE 13-5 MPPS IMAGE ACQUISITION RESULTS MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Modality	(0008,0060)	1	-	Set to Modality sent in the MWL. Set to default configured DICOM Store server definition on the system for Manual exams else set to 'XA'.
Study ID	(0020,0010)	2	-	Set to value from MWL or value entered by the user on the Patient Info screen.
Performed Protocol Code Sequence	(0040,0260)	2	3	Set to an empty sequence for N-CREATE and N-SET in all cases.
>Code Value	(0008,0100)	1	1	Not sent.
>Coding Scheme Designator	(0008,0102)	1	1	Not sent.
>Coding Scheme Version	(0008,0103)	3	3	Not sent.
>Code Meaning	(0008,0104)	3	3	Not sent.
Performed Series Sequence	(0040,0340)	2	3	Sent with values from MWL or user interface.
>Performing Physician's Name	(0008,1050)	2	2	Set to Physician name on Patient Info screen.
>Protocol Name	(0018,1030)	1	1	Set to the value found in the Protocol Description on the Additional Info screen.
>Operator's Name	(0008,1070)	2	2	Set to a blank value.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
>Series Instance UID	(0020,000E)	1	1	Set to the value created by the system for the series which will contain the images for the step.
>Series Description	(0008,103E)	2	2	Set to the value found in the Protocol Description on the Additional Info screen.
>Retrieve AE Title	(0008,0054)	2	2	N-CREATE will contain an empty value, N-SET will contain the value of system configured AE Title.
> Archive Requested	(0040,A494)	3	3	Not sent.
>Referenced Image Sequence	(0008,1140)	2	2	Empty sequence sent in N-CREATE. N-SET will contain list of any images stored to PACS prior to exam completion.
>>Referenced SOP Class UID	(0008,1150)	1	1	N-SET - Set to the SOP Class UID used for storage.
>>Referenced SOP Instance UID	(0008,1155)	1	1	N-SET - Set to the SOP Instance UID used for storage.
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2	2	Empty sequence sent in N-CREATE. N-SET will contain the RDSR stored to PACS prior to exam completion for each step.
>>Referenced SOP Class UID	(0008,1150)	1	1	N-SET - Set to the RDSR SOP Class UID for this step.
>>Referenced SOP Instance UID	(0008,1155)	1	1	N-SET - Set to the RDSR Instance UID used for storage for this step.

13.4.5 Radiation Dose Module

TABLE 13-6 MPPS RADIATION DOSE MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	3	N-CREATE and N-SET will contain the value set in the user interface on the Additional Info screen.
> 'Code Sequence Macro'	(0020,0010)	3	3	Set to values that match the selection on the user interface from Part 16 of the DICOM Standard.
Total Time of Fluoroscopy	(0040,0300)	3	3	N-CREATE will be empty. N-SET will contain the total pedal time for the procedure step.
Total Number of Exposures	(0040,0301)	3	3	N-CREATE will be empty. N-SET will contain the number of exposures for the procedure step.
Distance Source to Detector (SID)	(0018,1110)	3	3	N-CREATE and N-SET will contain the value defined by the system configuration.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Distance Source to Entrance	(0040,0306)	3	3	N-CREATE and N-SET will contain the value defined by the system configuration, which will be a reference point.
Entrance Dose	(0040,0302)	3	3	N-CREATE will be empty. N-SET will contain the entrance dose in dGy for the procedure step.
Entrance Dose in mGy	(0040,8302)	3	3	N-CREATE will be empty. N-SET will contain the entrance dose in mGy for the procedure step.
Exposed Area	(0040,0303)	3	3	Not sent
Image Area Dose Product	(0018,115E)	3	3	N-CREATE will be empty. N-SET will contain the Image Area Dose Product for the procedure step in dGy*cm*cm.
Comments on Radiation Dose	(0040,0310)	3	3	Not sent.
Exposure Dose Sequence	(0040,030E)	3	3	Contains respective value for each x-ray taken during this procedure step.
>Radiation Mode	(0018,115A)	3	3	CONTINUOUS or PULSED
>KVP	(0018,0060)	3	3	kVp of the shot
>X-ray Tube Current in µA	(0018,8151)	3	3	µA of the shot
>Exposure Time	(0018,1150)	3	3	Exposure time in milliseconds
>Filter Type	(0018,1160)	3	3	Set to STRIP
>Filter Material	(0018,7050)	3	3	Aluminum compound

13.4.6 Billing and Material Management Codes Module

TABLE 13-7 MPPS BILLING AND MATERIAL MANAGEMENT CODES MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Billing Procedure Step Sequence	(0040,0320)	3	3	Not sent.
> 'Code Sequence Macro'	(0020,0010)	3	3	Not sent.
Film Consumption Sequence	(0040,0321)	3	3	Not sent.
>Number of Films	(2100,0170)	3	3	Not sent.
>Medium Type	(2000,0030)	3	3	Not sent.
>Film Size ID	(2010,0050)	3	3	Not sent.
Billing Supplies and Devices Sequence	(0040,0324)	3	3	Not sent.
>Billing Item Sequence	(0040,0296)	3	3	Not sent.
>> 'Code Sequence Macro'	(0040,0303)	3	3	Not sent.
>Quantity Sequence	(0040,0293)	3	3	Not sent.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
>>Quantity	(0040,0294)	3	3	Not sent.
>>Measuring Units Sequence	(0040,0295)	3	3	Not sent.
>>> "Code Sequence Macro"	(0018,115A)	3	3	Not sent.

STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION

14.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION

Refer to DICOM PS3.3 for descriptions of the query key attributes contained within the Storage Commitment Information Object.

The Storage Commitment Information Object is used both for N-ACTION Storage Commitment requests by the SCU and N-EVENT-REPORT Storage Commitment notifications by the SCP.

14.1.1 Storage Commitment Module for N-ACTION

TABLE 14-1 STORAGE COMMITMENT MODULE FOR N-ACTION

Attribute Name	Tag	SCU Use	SCP Use
Transaction UID	(0008,1195)	Product generates a transaction UID for each instance stored to PACS. Each C-STORE is paired with an N-ACTION. If the N-ACTION is not completed the system will report a storage failure.	The AE does not act as an SCP for Storage Commit.
Storage Media File-Set ID	(0088,0130)	Not used	Not used
Storage Media File-Set UID	(0088,0140)	Not used	Not used
Referenced SOP Sequence	(0008,1199)	Only one pair will be present.	
>Referenced SOP Class UID	(0008,1150)	Set to the configured modality.	
>Referenced SOP Instance UID	(0008,1155)	Set to the value generated by the system.	
>Storage Media File-Set ID	(0088,0130)	Not used	Not used
>Storage Media File-Set UID	(0088,0140)	Not used	Not used

14.1.2 Storage Commitment Module for N-EVENT-REPORT

TABLE 14-2 STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

Attribute Name	Tag	SCU Use	SCP Use
Transaction UID	(0008,1195)	The AE uses the attribute to confirm storage of the instance and marks the instance as confirmed on the Images screen.	The AE does not act as an SCP for Storage Commit.
Retrieve AE Title	(0008,0054)	Not used	Not used
Storage Media File-Set ID	(0088,0130)	Not used	Not used
Storage Media File-Set UID	(0088,0140)	Not used	Not used
Referenced SOP Sequence	(0008,1199)	The AE uses the attribute to confirm storage of the instance and marks the instance as confirmed on the Images screen.	
>Referenced SOP Class UID	(0008,1150)		
>Referenced SOP Instance UID	(0008,1155)		
>Retrieve AE Title	(0008,0054)	Not used	Not used
>Storage Media File-Set ID	(0088,0130)	Not used	Not used
>Storage Media File-Set UID	(0088,0140)	Not used	Not used
Failed SOP Sequence	(0008,1198)	The AE uses the attribute to confirm failed storage of the instance.	
>Referenced SOP Class UID	(0008,1150)		
>Referenced SOP Instance UID	(0008,1155)		
>Failure Reason	(0008,1197)	See Section 14.1.2.1 for the list of processed values.	Not used

14.1.2.1 Processing of Failure Reason when received in a N-EVENT-REPORT

When receiving a N-Event-Report request with a Event Type ID equal to 2, meaning that Storage Commitment is complete, but failure exists, the set of value that this Storage Commitment SCU AE is able to process are as follows:

TABLE 14-3 STATUS CODES FOR N-EVENT-REPORT FAILURE

Failure Reason	Meaning	Application Behavior When Receiving Reason Code
0110H	Processing failure	Display error status in Transfer status screen.
0112H	No such object instance	Display error status in Transfer status screen.
0213H	Resource limitation	Display error status in Transfer status screen.
0122H	Referenced SOP Class not supported	Display error status in Transfer status screen.
0119H	Class / Instance conflict	Display error status in Transfer status screen.

0131H	Duplicate transaction UID	Display error status in Transfer status screen.
*	Other Failure Reason code values	Display error status in Transfer status screen.

BASIC DIRECTORY INFORMATION OBJECT IMPLEMENTATION

15.1 IOD MODULE TABLE

Table 15-1 identifies the defined modules within the entities which comprise the Basic Directory IOD. Modules are identified by Module Name.

TABLE 15-1 BASIC DIRECTORY IOD MODULES

Entity Name	Module Name	Reference
File Set Identification	File Set Identification	0
Directory Information	Directory Information	15.2.2

The FSC of this implementation creates a Directory Information Module, and an FSR supports it.

15.2 INFORMATION MODULE DEFINITIONS

Refer to DICOM PS3.3 for a description of each of the entities, modules, and attributes used by the Basic Directory IOD.

The following modules convey supported Enumerated Values, Defined Terms, and Optional Attributes. Type 1 & Type 2 attributes are also included for completeness and to define what values they may take and where these values are obtained from when generating the instance. These attributes match those defined in DICOM PS3.3. Attributes not present in these tables are not supported.

15.2.1 File Set Identification Module

TABLE 15-2 FILE-SET IDENTIFICATION MODULE

Attribute Name	Tag	Type	Attribute Description
File-set ID	(0004,1130)	2	The AE creates a value when the Basic Directory IOD does not exist. The value is set to “GE_YYYYMMDDHHMM”.
Specific Character Set of File-set Descriptor File	(0004,1142)	1C	Not used

15.2.2 Directory Information Module

TABLE 15-3 BASIC DIRECTORY INFORMATION MODULE

Attribute Name	Tag	Type	Attribute Description
Offset of the First Directory Record of the Root Directory Entity	(0004,1200)	1	Is set
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	1	Is set
File-set Consistency Flag	(0004,1212)	1	FSC/FSU: Set to value 0000H: no known inconsistencies

Attribute Name	Tag	Type	Attribute Description
Directory Record Sequence	(0004,1220)	2	Is created by FSC
>Offset of the Next Directory Record	(0004,1400)	1C	Is set
>Record In-use Flag	(0004,1410)	1C	FSC/FSU Is set to FFFFH FSR: A value of 0000H: imply skipping this record.
>Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1C	Is set
>Directory Record Type	(0004,1430)	1C	The values supported by FSC and FSU and are: PATIENT STUDY SERIES IMAGE SR DOCUMENT The values supported by the FSR are: PATIENT STUDY SERIES IMAGE
>Private Record UID	(0004,1432)	1C	Not used
>Referenced File ID	(0004,1500)	1C	Set when the record type is IMAGE or SR DOCUMENT. It contains the relative path to the file that represents the instance.
>Referenced SOP Class UID in File	(0004,1510)	1C	Set when the record type is IMAGE or SR DOCUMENT. Set to the SOP Class UID of the instance stored
>Referenced SOP Instance UID in File	(0004,1511)	1C	Set when the record type is IMAGE or SR DOCUMENT. Set to the SOP Instance UID of the instance stored
>Referenced Transfer Syntax UID in File	(0004,1512)	1C	Set when the record type is IMAGE or SR DOCUMENT. Set to the transfer syntax UID of the instance stored
> Referenced Related General SOP Class UID in File	(0004,151A)	1C	Not used
>Record Selection Keys			See 15.2.3.

15.2.3 Definition of Specific Directory Records

15.2.3.1 Patient Directory Record Definition

TABLE 15-4 PATIENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC/ FSU writes as described in 2.7. FSR uses this to filter data which is not understood by the AE.
Patient's Name	(0010,0010)	2	Is set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.
Patient ID	(0010,0020)	1	Is set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.
Patient's Birth Date	(0010,0030)	3	Is set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.
Patient's Sex (Gender)	(0010,0030)	3	Is set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.

15.2.3.2 Study Directory Record Definition

TABLE 15-5 STUDY KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC/ FSU writes as described in 2.7. FSR uses this to filter data which is not understood by the AE.
Study Date	(0008,0020)	1	Is set by the FSC/FSU as defined in 4.2.2. FSR support reads the value as stored.
Study Time	(0008,0030)	1	Is set by the FSC/FSU as defined in 4.2.2. FSR support reads the value as stored.
Study Description	(0008,1030)	2	Is set by the FSC/FSU as defined in 4.2.2. FSR support reads the value as stored.
Study Instance UID	(0020,000D)	1C	Is set by the FSC/FSU as defined in 4.2.2. FSR support reads the value as stored.
Study ID	(0020,0010)	1	Is set by the FSC/FSU as defined in 4.2.2.
Accession Number	(0008,0050)	2	Is set by the FSC/FSU as defined in 4.2.2. FSR support reads the value as stored.

15.2.3.3 Series Directory Record Definition

TABLE 15-6 SERIES KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC/ FSU writes as described in 2.7. FSR uses this to filter data which is not understood by the AE. The value will be set to ISO_IR 192 if the series contains OEC Compatible data.
Modality	(0008,0060)	1	Is set by the FSC/FSU as defined in 4.2.3.1. FSR support reads the value as stored.

Key	Tag	Type	Attribute Description
Series Instance UID	(0020,000E)	1	Is set by the FSC/FSU as defined in 4.2.3.1.
Series Number	(0020,0011)	1	Is set by the FSC/FSU as defined in 4.2.3.1.
Icon Image Sequence	(0088,0200)	3	Not used

15.2.3.4 Image Directory Record Definition

TABLE 15-7 IMAGE KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC/ FSU writes as described in 2.7. FSR uses this to filter data which is not understood by the AE. The value will be set to ISO_IR 192 if the SOP Class UID is Raw Data Storage SOP which is created when OEC Compatible data is written.
Instance Number	(0020,0013)	1	Is set by the FSC/FSU as defined in 4.2.5.
Icon Image Sequence	(0088,0200)	3	See 15.2.3.4.1.
>Include 'Image Pixel Macro'			See 15.2.3.4.1.
Image Type	(0008,0008)	3	See 4.2.5.1.1.

15.2.3.4.1 Icon Image Key Definition

The icon image key is created by the FSC and updated by the FSU.

- The FSC or FSU creates a 64x64 image which represents the full size image.
- The icon is used by an FSR to display to the user enabling more timely and easier selection of images.
- Photometric Interpretation (0028,0004) MONOCHROME2 is created. FSR supports MONOCHROME1, MONOCHROME2 or PALETTE COLOR.
- Icon image size of 64 by 64 is created/supported.
- Bits Allocated (0028,0100) is set to 8 and Bits Stored (0028,0101) is set to 8 and are created/supported.

15.2.3.4.2 Raw Image data storage

The AE writes a Raw SOP Class UID instance if the user selects 'OEC Compatible' in the Media Options. This allows the user to move the image to another compatible system. For this case the Image Directory record has a private group with information needed by the AE (see section). This is defined in section 15.3.

15.2.3.5 SR Document Directory Record Definition

TABLE 15-8 SR DOCUMENT KEYS

Key	Tag	Type	Attribute Description
Specific Character Set	(0008,0005)	1C	FSC/ FSU writes as described in Section 2.7. FSR uses this to filter data which is not understood by the AE.
Instance Number	(0020,0013)	1	Is set by the FSC/FSU as defined in section 11.4.2.1.
Completion Flag	(0040,A491)	1	Is set by the FSC/FSU as defined in section 11.4.2.1.
Verification Flag	(0040,A493)	1	Is set by the FSC/FSU as defined in section 11.4.2.1.
Content Date	(0008,0023)	1	Is set by the FSC/FSU as defined in section 11.4.2.1.
Content Time	(0008,0033)	1	Is set by the FSC/FSU as defined in section 11.4.2.1.
Verification DateTime	(0040,A030)	1C	Not present.
Concept Name Code Sequence	(0040,A043)	1	This information is found in section 11.4.2.2, which defines the content of the report.
Content Sequence	(0040,A730)	1C	This information is found in section 11.4.2.2, which defines the content of the report.
>Relationship Type	(0040,A010)	1	This information is found in section 11.4.2.2, which defines the content of the report.
The SR content start here			There are two “HAS CONCEPT MOD” content items; one for the type of report and one for the intent of report. This can be found in section 11.7.1.1

Note - The content sequence that the system provides, which can be modified by the user, is the ‘HAS CONCEPT MOD’ with ‘Has Intent’ and contains the value of the Procedure Intent selected by the user from the Additional Info screen.

15.3 PRIVATE DATA DICTIONARY

This private group is used in the Basic Directory Information object within an Image Record.

TABLE 15-9 PRIVATE CREATOR IDENTIFICATION (GEHC_OEC)

Attribute Name	Tag	VR	VM
Private Creator	(110B,0010)	LO	1
Value 1	(110B,xx01)	LO	1
Value 2	(110B, xx10)	LO	1
Value 3	(110B, xx20)	LO	1
Value 4	(110B, xx21)	LO	1
Value 5	(110B, xx30)	LO	1
Value 6	(110B, xx31)	LO	1
Value 7	(110B, xx32)	LO	1
Value 8	(110B, xx40)	LO	1

PRINT MANAGEMENT IMPLEMENTATION

16.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the implementation for the specific SOP Classes supported in the Basic Grayscale Print Management Meta SOP Class, the attributes supported for both IODs and services, and the valid range of values for mandatory and optional attributes.

16.2 BASIC FILM SESSION SOP CLASS

16.2.1 Basic Film Session N-CREATE Attributes

The following table lists the attributes that are sent in the Basic Film Session N-CREATE Request:

TABLE 16-1 BASIC FILM SESSION N-CREATE ATTRIBUTES

Attribute name	Tag	Use
Specific Character Set	(0008,0005)	The value is set as described in Section 2.7.
Number of Copies	(2000,0010)	This value is set by the user.
Print Priority	(2000,0020)	This value is set by the user.
Medium Type	(2000,0030)	This value is set by the user.
Film Destination	(2000,0040)	This value is set by the user.
Film Session Label	(2000,0050)	Not used
Memory Allocation	(2000,0060)	Not used
Owner ID	(2100,0160)	Not used

16.2.2 Basic Film Session N-DELETE

This is sent after the Presentation LUT N-DELETE.

16.3 BASIC FILM BOX SOP CLASS

16.3.1 Basic Film Box N-CREATE Attributes

The following table lists the attributes that are sent to the SCP in the Basic Film Box N-CREATE Request, and that are received in the Basic Film Box N-CREATE Response from the SCP.

TABLE 16-2 BASIC FILM BOX N-CREATE ATTRIBUTES

Attribute Name	Tag	Use
Image Display Format	(2010,0010)	Specify Enumerated Values sent and range: STANDARD\C,R The value for C and R are configured by the user from a system defined set of values on the DICOM Print configuration screen and the main user interface on the Images screen. Supported values include : 1x1, 1x2, 2x2, 2x3,3x3, 3x4, 4x4 and 4x5.
Referenced Film Session Sequence	(2010,0500)	Used
>Referenced SOP Class UID	(0008,1150)	Set to 1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	(0008,1155)	This value should be returned from SCP in N-CREATE-RSP Basic Film Session SOP Class; This value is sent to SCP in N-CREATE-RQ Basic Film Box SOP Class requesting for Basic Grayscale Image Box SOP Class Instance UID which contained in Referenced Image Box Sequence from SCP.
Referenced Image Box Sequence	(2010,0510)	Used
>Referenced SOP Class UID	(0008,1150)	Set to 1.2.840.10008.5.1.1.4
>Referenced SOP Instance UID	(0008,1155)	Received in the N-Create Response from SCP, the value is sent to SCP in N-SET-RQ Basic Grayscale Image Box SOP Class
Referenced Basic Annotation Box Sequence	(2010,0520)	Not used
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
Film Orientation	(2010,0040)	Specify Enumerated Values sent: PORTRAIT or LANDSCAPE Configured by user in the Print Options from the Images screen.
Film Size ID	(2010,0050)	Specify Defined Terms sent: 8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX30CM
Magnification Type	(2010,0060)	Not used

Attribute Name	Tag	Use
Max Density	(2010,0130)	0-400, default value is 300. User configurable.
Configuration Information	(2010,0150)	User configurable. The allowable values for a specific printer can be found in the DICOM Conformance statement of the Printer.
Referenced Presentation LUT Sequence	(2050,0500)	Used
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	Received in the N-Create Response from SCP, this value should be sent to SCP in N-CREATE-RQ Basic Film Box SOP Class
Annotation Display Format ID	(2010,0030)	Not used
Smoothing Type	(2010,0080)	Not used
Border Density	(2010,0100)	Specify Defined Terms or range of values of sent: BLACK or WHITE or blank
Empty Image Density	(2010,0110)	Specify Defined Terms or range of values of sent: BLACK or WHITE or blank
Min Density	(2010,0120)	Specify range of values sent. 0-400 with 0 as the default and is user configurable.
Trim	(2010,0140)	Not used
Illumination	(2010,015E)	Specify range of values sent. 0-4000 with 2000 as the default and is user configurable.
Reflected Ambient Light	(2010,0160)	Specify range of values sent. 0-400 with 10 as the default and is user configurable.
Requested Resolution ID	(2020,0050)	Not used
ICC Profile	(0028,2000)	Not used

16.3.2 Basic Film Box N-ACTION Attributes

Action Reply arguments that are supported if present in the N-ACTION response of the Basic Film Box SOP Class are as follows:

TABLE 16-3 BASIC FILM SESSION N-ACTION ATTRIBUTES

Action Type Name	Action Type ID	Attribute	Tag	Usage SCU
Print	1	Referenced Print Job Sequence	(2100,0500)	Not used
		>Referenced SOP Class UID	(0008,1150)	Not used
		>Referenced SOP Instance UID	(0008,1155)	Not used
		>Print Job ID	(2100,0010)	Not used

16.4 BASIC GRAYSCALE IMAGE BOX SOP CLASS

16.4.1 Basic Grayscale Image Box Pixel N-SET Attributes

The following table lists the attributes that are sent in the Basic Grayscale Image Box N-SET request.

TABLE 16-4 BASIC GRAYSCALE IMAGE BOX N-SET ATTRIBUTES

Attribute Name	Tag	Use
Image Position	(2020,0010)	Value determined by the position of the image in the print layout selected by the user.
Basic Grayscale Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	Set to 1.
>Photometric Interpretation	(0028,0004)	Set to MONOCHROME2
>Rows	(0028,0010)	Set to 1280
>Columns	(0028,0011)	Set to 1280
>Pixel Aspect Ratio	(0028,0034)	Set to 1\1
>Bits Allocated	(0028,0100)	Dependent on the setting for Bit Depth set by the user 8 is sent for 8 bits depth or 16 is sent for 12 bits depth.
>Bits Stored	(0028,0101)	Dependent on the setting for Bit Depth set by the user 8 is sent for 8 bits depth or 12 is sent for 12 bits depth.
>High Bit	(0028,0102)	Dependent on the setting for Bit Depth set by the user 7 is sent for 8 bits depth or 11 is sent for 12 bits depth.
>Pixel Representation	(0028,0103)	Set to 0x0000
>Pixel Data	(7FE0,0010)	
Polarity	(2020,0020)	Not used
Magnification Type	(2010,0060)	Not used
Smoothing Type	(2010,0080)	Not used
Min Density	(2010,0120)	Not used
Max Density	(2010,0130)	Not used
Configuration Information	(2010,0150)	Not used
Requested Image Size	(2020,0030)	Not used
Requested Decimate/Crop Behavior	(2020,0040)	Not used
Referenced Presentation LUT Sequence	(2050,0500)	Not used
> Referenced SOP Class UID	(0008,1150)	Not used
> Referenced SOP Instance UID	(0008,1155)	Not used

16.5 PRINTER SOP CLASS

16.5.1 Printer N-EVENT-REPORT Attributes

The following table describes the system behavior when receiving a N-EVENT-REPORT request from the Printer SCP depending on the Event Type ID value.

TABLE 16-5 PRINTER N-EVENT-REPORT ATTRIBUTES

Event Type Name	Event Type ID	Attribute	Tag	Use
Normal	1			The message is handled but ignored. N-GET used for status.
Warning	2	Printer Status Info	(2110,0020)	The message is handled but ignored. N-GET used for status.
		Film Destination	(2000,0040)	The message is handled but ignored. N-GET used for status.
		Printer Name	(2110,0030)	The message is handled but ignored. N-GET used for status.
Failure	3	Printer Status Info	(2110,0020)	The message is handled but ignored. N-GET used for status.
		Film Destination	(2000,0040)	The message is handled but ignored. N-GET used for status.
		Printer Name	(2110,0030)	The message is handled but ignored. N-GET used for status.

16.5.2 Printer N-GET Attributes

The following table defines the set of attributes that this product may request using the Printer N-GET service. It also describes what is the system behavior when receiving the N-GET response from the Printer SCP.

TABLE 16-6 PRINTER N-GET ATTRIBUTES

Attribute Name	Tag	Use
Printer Status	(2110,0010)	Requested by the system. Also for each Enumerated Values, describe what is the system behaviour: NORMAL – No action WARNING – reports Supply Empty FAILURE – reports failure to user.

Attribute Name	Tag	Use
Printer Status Info	(2110,0020)	Requested by the system. Any status with EMPTY included is treated as an 'Out of Paper' status.
Printer Name	(2110,0030)	Requested by the system.
Manufacturer	(0008,0070)	Requested by the system.
Manufacturer Model Name	(0008,1090)	Requested by the system.
Device Serial Number	(0018,1000)	Requested by the system.
Software Versions	(0018,1020)	Requested by the system.
Date Of Last Calibration	(0018,1200)	Requested by the system.
Time Of Last Calibration	(0018,1201)	Requested by the system.

16.6 PRESENTATION LUT SOP CLASS

16.6.1 Presentation LUT N-CREATE Attributes

The following table describes the list of attributes that is sent when sending a Presentation LUT N-CREATE message is sent to the Printer.

TABLE 16-7 PRESENTATION LUT N-CREATE ATTRIBUTES

Attribute Name	Tag	Use
Presentation LUT Sequence	(2050,0010)	Not used
>LUT Descriptor	(0028,3002)	
>LUT Explanation	(0028,3003)	
>LUT Data	(0028,3006)	
Presentation LUT Shape	(2050,0020)	Set to "IDENTITY"

QUERY IMPLEMENTATION

17.1 OEC 3D MAPPING OF DICOM ENTITIES

The OEC 3D maps DICOM Information Entities to local Information Entities in this product's database and user interface.

TABLE 17-1 MAPPING OF DICOM ENTITIES TO OEC 3D ENTITIES

DICOM	OEC 3D Entity
Patient	Patient
Study	Exam
Series	Exam
Image	Image

17.2 INFORMATION MODEL KEYS

Refer to DICOM PS3.4 for descriptions of the levels contained within the Query/Retrieve Information Model.

17.2.1 Common Query Keys

The query key attributes specified in this section are used at all levels and in all classes of query.

TABLE 17-2 Q/R PATIENT LEVEL COMMON RETRIEVE ATTRIBUTES

Attribute Name	Tag	Type	SCU Use
Specific Character Set	(0008,0005)	-	See 17.2.1.1.1.
Query Retrieve Level	(0008,0052)	-	Set to level of query: PATIENT STUDY SERIES
Retrieve AE Title	(0008,0054)	-	Attribute is not requested.
Storage Media File-set ID	(0088,0130)	-	Attribute is not requested. Returned value is ignored
Storage Media File-set UID	(0088,0140)	-	Attribute is not requested. Returned value is ignored

17.2.1.1 Q/R Common Attribute Descriptions

17.2.1.1.1 Specific Character Set

Only non-ASCII characters that may be entered from the console keyboard, as described in Section 2.7, may be included in the matching key value. Query response item text attributes, including patient and physician names, that include non-ASCII characters will be displayed as described in Section 2.7.

17.2.2 Patient Level

This section defines the keys at the Patient Level of the Patient Root Query/Retrieve Information Models that are supported by this implementation.

TABLE 17-3 PATIENT LEVEL ATTRIBUTES FOR PATIENT ROOT Q/R INFORMATION MODEL

Attribute Name	Tag	Type	SCU Use
Patient's Name	(0010,0010)	R*	Wildcard matching is requested automatically.
Patient ID	(0010,0020)	U*	Single value matching is supported from the 'Image > Retrieve' screen.

Note - * in the *Type* column indicates that this information is displayed on screen, if available.

17.2.3 Study Level – Patient Root

This section defines the keys at the Study Level of the Patient Root Query/Retrieve Information Models that are supported by this implementation.

TABLE 17-4 STUDY LEVEL ATTRIBUTES FOR PATIENT ROOT Q/R INFORMATION MODEL

Attribute Name	Tag	Type	SCU Use
Study Date	(0008,0020)	R*	Range matching is performed depending on the Study Date dropdown selection.
Study Time	(0008,0030)	R*	Always set to ""
Accession Number	(0008,0050)	R*	Always set to ""
Study ID	(0020,0010)	R*	Always set to ""
Study Instance UID	(0020,000D)	U	Always set to "" unless the MWL Studies button is used from a Referenced Study in the MWL.
Modalities in Study	(0008,0061)	O	Always set to ""
Study Description	(0008,1030)	O*	Always set to ""
Performing Physician's Name	(0008,1050)	O*	Always set to ""
Patient's Birthdate	(0010,0030)	O*	Always set to ""
Patient's Sex	(0010,0040)	O	Always set to ""
Number of Study related Instances	(0020,1208)	O	Always set to ""

Note - * in the *Type* column indicates that this information is displayed on screen, if available.

17.2.4 Study Level – Study Root

This section defines the keys at the Study Level of the Study Root Query/Retrieve Information Model that are supported by this implementation.

TABLE 17-5 STUDY LEVEL ATTRIBUTES FOR STUDY ROOT Q/R INFORMATION MODEL

Attribute Name	Tag	Type	SCU Use
Study Date	(0008,0020)	R*	Range matching is performed depending on the Study Date dropdown selection.
Study Time	(0008,0030)	R*	Always set to “”
Accession Number	(0008,0050)	R*	Always set to “”
Study ID	(0020,0010)	R*	Always set to “”
Patient's Name	(0010,0010)	R*	Wildcard matching is requested automatically.
Patient ID	(0010,0020)	R*	Single value matching is supported from the ‘Image > Retrieve’ screen.
Patient’s Sex	(0010,0040)	O	Always set to “”
Study Instance UID	(0020,000D)	U	Always set to “”
Modalities in Study	(0008,0061)	O	Always set to “”
Study Description	(0008,1030)	O*	Always set to “”
Performing Physician's Name	(0008,1050)	O*	Always set to ““
Number of Study related Instances	(0020,1208)	O	Always set to “”
Patient’s Birthdate	(0010,0030)	O*	Always set to “”

Note - * in the *Type* column indicates that this information is displayed on screen, if available.

17.2.5 Series Level

This section defines the keys at the Series Level of the Patient Root and Study Root Query/Retrieve Information Models that are supported by this implementation.

TABLE 17-6 SERIES LEVEL ATTRIBUTES FOR Q/R INFORMATION MODEL

Attribute Name	Tag	Type	SCU Use
Modality	(0008,0060)	R*	Always set to ""
Series Number	(0020,0011)	R	Always set to ""
Series Instance UID	(0020,000E)	U	Always set to ""
Number of Series Related Instances	(0020,1209)	O*	Always set to "". Number may be used to display the instance count to the user in the progress bar.

Note - * in the *Type* column indicates that this information is displayed on screen, if available.

17.2.6 Image Level

The 3D Workstation does not send an Image level query of the Patient Root or Study Root Query/Retrieve Information Models that are supported by this implementation.

17.3 PRIVATE DATA ATTRIBUTES

This product does not support any Private Attributes in Query identifiers.