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DOC2238423
Revision 07

OEC Elite 1.4
DICOM CONFORMANCE STATEMENT

GE HealthCare

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CONFORMANCE STATEMENT OVERVIEW

The OEC Elite is a mobile fluoroscopic system used to assist trained surgeons. The system provides X-ray images while the surgeon performs a medical procedure. These images help the surgeon to visualize the patient's anatomy and to localize surgical regions of interest and pathology.

The contents of this document cover all versions/models of the OEC Elite to date, although some functionality may not be present depending on the selected options, the system's Option Package, and the system's model. This content is a superset of all models and options of the OEC Elite.

The OEC Elite 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 Elite.

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	No	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

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
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
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 Elite.

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	No	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

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
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	Author	Date	Description
1	Brett C. Anderson	19 April 2019	Initial release using 1.1 DICOM Template
2	Brett C. Anderson	30 September 2019	Clarification to also indicate conformance to prior DICOM standard 2016c
3	Mahy Hussain	20 April 2020	Updated information regarding Secure option package
4	Mahy Hussain	29 May 2020	Updated TLS ciphers
5	Laura Bentivegna	13 April 2023	Remove Radiation Dose Module from MPPS Updated company name
6	Laura Bentivegna	27 April 2023	Clarify what SOP Classes cannot be generated Add information that system has a single network interface Update DICOM Tag (0018,1164) description to clarify that it does not adjust due to magnification or geometric calibration
7	Laura Bentivegna	See MyWorkshop	Replace abbreviation GE and GEHC with GE Healthcare Added section 4 Common and Shared Information Modules Update to match current Software implementation. Clarify what SOP Classes cannot be generated Add information that system has a single network interface Add section about De-Identification profiles Update Status Codes to match DICOM Standard wording. Insert the C-Find & C-Move statuses in

			section 2 Update information about Association Acceptance for Storage Commit. Clarify and standardize language used. Correct spelling & grammar.

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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 GE HealthCare equipment compliance to the DICOM requirements for the implementation of Networking features.

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

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

Section 5 (X-Ray Angiography Information Object Implementation), which specifies the GE HealthCare 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 GE HealthCare equipment compliance to DICOM requirements for the implementation of an X-Ray Radiofluoroscopy (RF) Information Object.

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

Section 8 (Secondary Capture Information Object Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of a Secondary Capture (SC) Image Information Objects.

Section 9 (Multi-frame Grayscale Byte Secondary Capture Information Object Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of a Multi-frame Grayscale Byte SC (Multi-SC) Image Information Object.

Section 10 (X-Ray Radiation Dose Structured Report Information Object Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of a X-Ray Radiation Dose Structured Report (RDSR) Information Object.

Section 11 (Modality Worklist Query Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of the Modality Worklist (MWL) service.

Section 12 (Modality Performed Procedure Step Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of the Modality Perform Procedure Step (MPPS) service.

Section 13 (Storage Commitment Push Model Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of the Storage Commitment Push Model (Store Commit) SOP Class.

Section 14 (Basic Directory Information Object Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of a Basic Directory Information Object.

Section 15 (Print Management Implementation), which specifies the GE HealthCare equipment compliance to DICOM requirements for the implementation of the Basic Grayscale Print Meta (Print) SOP Classes.

Section 16 (Query Implementation), which specifies the GE HealthCare 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 GE HealthCare DICOM Conformance Statements is shown in Figure 1-1:

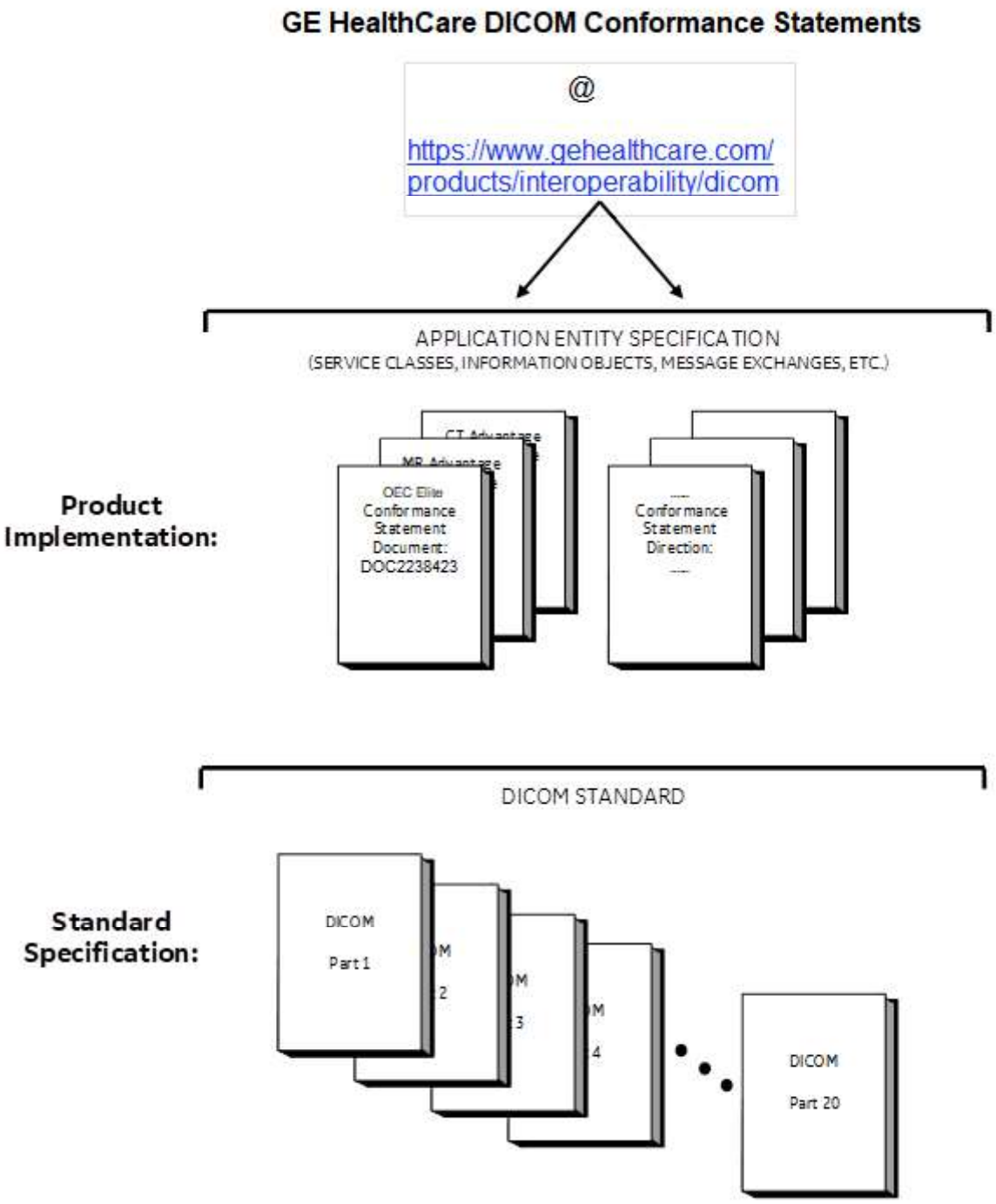

FIGURE 1-1 GE HEALTHCARE DICOM CONFORMANCE STATEMENT STRUCTURE

This document specifies the DICOM implementation. It is entitled:

OEC Elite 1.4
Conformance Statement for DICOM
DOC2238423

This document describes the DICOM Conformance Statement and Technical Specification required to interoperate with the GE HealthCare network interface.

The GE HealthCare 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 GE HealthCare implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GE HealthCare medical data exchanged using DICOM. The GE HealthCare Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GE HealthCare devices are capable of using different Information Object Definitions. For example, a GE HealthCare 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 GE HealthCare implementation. If the user encounters unspecified private data elements while parsing a GE HealthCare Data Set, the user is 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 GE HealthCare 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 HealthCare 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 HealthCare equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE HealthCare imaging equipment with non-GE HealthCare 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 HealthCare device and non-GE HealthCare devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non-GE HealthCare provider accepts full responsibility for all validation required for their connection with GE HealthCare devices. This includes the accuracy of the image data once it has crossed the interface between the GE HealthCare imaging equipment and the non-GE HealthCare 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 HealthCare imaging equipment are processed/displayed on a non-GE HealthCare device, as well as when images acquired on non-GE HealthCare equipment is processed/displayed on a GE HealthCare console or workstation.

- **Future Evolution** - GE HealthCare understands that the DICOM Standard will evolve to meet the user's growing requirements. GE HealthCare is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE HealthCare may follow the evolution of the Standard. The GE HealthCare 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 HealthCare 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 HealthCare provider, which connects with GE HealthCare 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 HealthCare Products are enhanced to support these changes.
- **Interaction** - It is the sole responsibility of the **non-GE HealthCare provider** to ensure that communication with the interfaced equipment does not cause degradation of GE HealthCare 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 definitions of these terms.

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

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

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

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

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

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

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

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
RWA	Real-World Activity
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
XRF	X-ray Radiofluoroscopy
UID	Unique Identifier
USB	Universal Serial Bus

NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the OEC Elite 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 OEC Elite 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 association to send each image and/or report.
- Sends DICOM images and RDSR to a DICOM Store SCP (PACS).
- Sends DICOM Storage Commitment to PACS.
- Querying and retrieving DICOM Modality Worklist from a Worklist SCP (RIS).
- Sends DICOM MPPS to 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 Elite is shown in Figure 2-1:

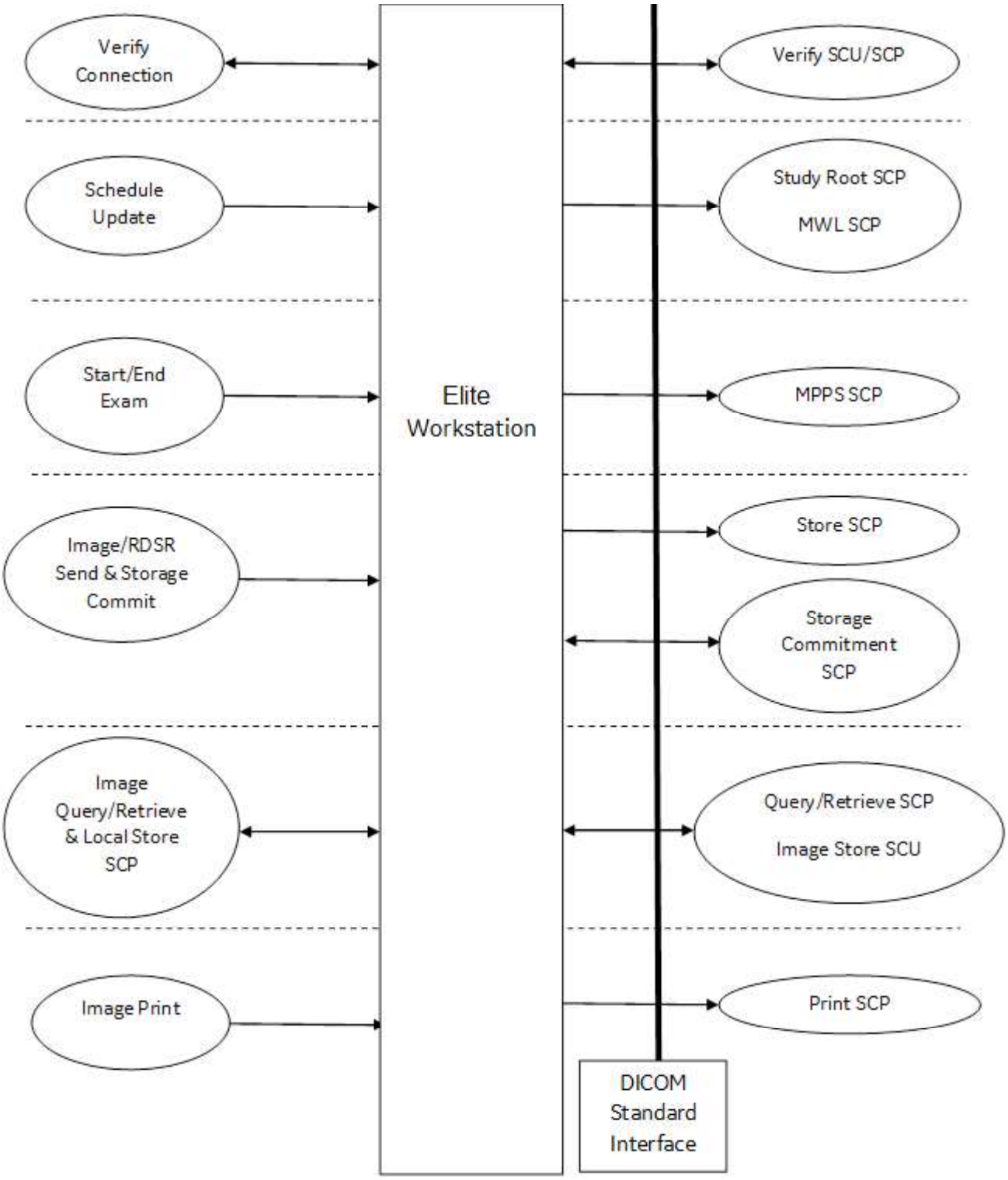

FIGURE 2-1 OEC ELITE NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM

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 Elite Workstation.

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

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

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

2.2.2 Functional Definition of AE's

Application Entity "Elite 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 MPPS messages to RIS.
- Initiates a DICOM association to send an image or RDSR.
- Transmits DICOM images and RDSR to the DICOM Storage SCP.
- Initiates a DICOM association for storage commitment of images and RDSR.
- Initiates a DICOM association to print images.
- Transmits images data, patient summary report, 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 Elite 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 Elite 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 Elite. 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 Elite Workstation if the user requests the system to create X-rays.
11. Images and RDSR can be sent to a properly formatted USB mass storage device. The OEC Elite 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 Elite Workstation Specification

The Elite Workstation Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU** and/or as an **SCP**. Anything that is marked “No” for SCU cannot be generated on the system.

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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	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
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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
RT Image 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 SOP Class	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 Elite Workstation is:

Maximum Length PDU	16384 (Not Configurable)

2.3.1.1.2 Number of Associations

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

The Elite 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 Elite 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 Elite Implementation UID	1.2.840.113619.6.329
OEC Elite Implementation Version Name	OEC v1.4

2.3.1.2 Association Initiation Policy

When the Elite 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 Elite 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/MPPS, Store/Store Commit, Print, or Query/Retrieve.

2.3.1.2.1.2 Proposed Presentation Context Table

TABLE 2-2 PRESENTATION CONTEXT – PROPOSED BY ELITE 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 Elite 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 Elite to be DICOM Query Type of 'Image' instead of 'Worklist'.

The Elite 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 ELITE WORKSTATION FOR ACTIVITY SCHEDULE UPDATE

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
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 Elite Workstation includes matching keys in the Modality Worklist queries as described in Section 11.

The Scheduled Exams screen will be populated with the results of the C-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 ELITE 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 User Log.
	A900	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the User Log.
	C000-CFFF	Error: Unable to process	Error displayed to the user and logged for viewing in the User Log.
	0122	Refused: SOP Class not supported	Error displayed to the user and logged for viewing in the User Log.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Cancel	FE00	Matching terminated due to Cancel request	Logged for viewing in the User Log.
Success	0000	Matching is complete - No final identifier is supplied.	Display the results 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.
	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 User 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 Elite Workstation includes matching keys in the queries as described in Section 16.

The Elite 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 ELITE 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 User Log.
	A900	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the User Log.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
	C000-CFFF	Error: Unable to process	Error displayed to the user and logged for viewing in the User Log.
	0122	Refused: SOP Class not supported	Error displayed to the user and logged for viewing in the User Log.
Cancel	FE00	Matching terminated due to Cancel request	Logged for viewing in the User Log.
Success	0000	Matching is complete - No final identifier is supplied.	Display the results 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.
	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 User 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 Elite Workstation will send an N-CREATE MPPS message at the start of an exam (first x-ray) and when the user appends a procedure step to the exam.

The Elite Workstation will send an N-SET MPPS message after 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 Elite Workstation includes attributes in the Modality Performed Procedure Step N-CREATE as described in Section 12.

The Elite Workstation uses many 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 ELITE WORKSTATION FOR MPPS N-CREATE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0210	Duplicate invocation	Error is logged in the User Log and entry is placed into transfer status screen.
	0111	Duplicate SOP Instance	Error is logged in the User Log and entry is placed into transfer status screen.
	0106	Invalid Attribute Value	Error is logged in the User Log and entry is placed into transfer status screen.
	0116	Attribute Value out of range	Error is logged in the User Log and entry is placed into transfer status screen.
	0117	Invalid SOP Instance	Error is logged in the User Log and entry is placed into transfer status screen.
	0120	Missing Attribute	Error is logged in the User Log and entry is placed into transfer status screen.
	0121	Missing Attribute Value	Error is logged in the User Log and entry is placed into transfer status screen.
	0212	Mistyped argument	Error is logged in the User Log and entry is placed into transfer status screen.
	0105	No such Attribute	Error is logged in the User Log and entry is placed into transfer status screen.

	0107	Attribute list error	Error is logged in the User Log and entry is placed into transfer status screen.
	0118	No such SOP Class	Error is logged in the User Log and entry is placed into transfer status screen.
	0110	Processing Failure	Error is logged in the User Log and entry is placed into transfer status screen.
	0213	Resource Limitation	Error is logged in the User Log and entry is placed into transfer status screen.
	0211	Unrecognized Operation	Error is logged in the User Log and entry is placed into transfer status screen.
	0124	Refused: Not Authorized	Error is logged in the User Log and entry is placed into transfer status screen.
Success	0000	Successful operation	Success placed in the transfer status screen.
*	*	Any other status code.	Error is logged in the User Log and entry is placed into transfer status screen.

The OEC Elite 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 12.

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

TABLE 2-7 STATUS CODES RECEIVED BY ELITE 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 in the User Log and entry is placed into transfer status screen.
	0210	Duplicate invocation	Error is logged in the User Log and entry is placed into transfer status screen.
	0106	Invalid Attribute Value	Error is logged in the User Log and entry is placed into transfer status screen.
	0116	Attribute Value out of range	Error is logged in the User Log and entry is placed into transfer status screen.

	0212	Mistyped argument	Error is logged in the User Log and entry is placed into transfer status screen.
	0117	Invalid SOP Instance	Error is logged in the User Log and entry is placed into transfer status screen.
	0121	Missing Attribute Value	Error is logged in the User Log and entry is placed into transfer status screen.
	0105	No such Attribute	Error is logged in the User Log and entry is placed into transfer status screen.
	0107	Attribute list error	Error is logged in the User Log and entry is placed into transfer status screen.
	0118	No such SOP Class	Error is logged in the User Log and entry is placed into transfer status screen.
	0112	No such SOP Instance	Error is logged in the User Log and entry is placed into transfer status screen.
	0110	Processing Failure	Error is logged in the User Log and entry is placed into transfer status screen.
	0213	Resource Limitation	Error is logged in the User Log and entry is placed into transfer status screen.
	0211	Unrecognized operation	Error is logged in the User Log and entry is placed into transfer status screen.
	0124	Refused: Not authorized	Error is logged in the User Log and entry is placed into transfer status screen.
Success	0000	Successful operation	Success placed in the transfer status screen.
*	*	Any other status code.	Error is logged in the User Log and entry is placed into transfer status screen.

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 an End Exam or Complete Exam.

The Abstract syntax selected is based on the configuration of the Store SCP on the Elite Workstation or by the data item selected on the Images screen (Dose Summary, Patient Summary, or 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 Elite Workstation will negotiate the association as an SCU only. The Elite 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 ELITE 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
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
Multi-frame Grayscale Byte Secondary Capture 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	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 Elite Workstation includes optional data elements in the SOP Instances as described in Sections 5 through 10:

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

TABLE 2-9 STATUS CODES RECEIVED BY ELITE 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 User Log.
	A900-A9FF	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the User Log.
	C000-CFFF	Error: Cannot understand	Error displayed to the user and logged for viewing in the User Log.
	0122	Refused: SOP Class not supported	Error displayed to the user and logged for viewing in the User Log.
Warning	B000	Coercion of Data Elements	Logged for viewing in the User Log.
	B006	Elements Discarded	Logged for viewing in the User Log.
	B007	Data Set does not match SOP Class	Logged for viewing in the User Log.
Success	0000	Success	Logged for viewing in the User Log.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the User 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 Elite 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
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
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2

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 Elite 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 Elite 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 Elite 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 13.

Status codes that are more specifically processed when receiving **N-ACTION** responses from a **Storage Commit** SCP equipment are as follows:

TABLE 2-11 STATUS CODES RECEIVED BY ELITE 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 User Log.
	0210	Duplicate invocation	Error displayed to the user and logged for viewing in the User Log.
	0115	Invalid argument value	Error displayed to the user and logged for viewing in the User Log.
	0117	Invalid SOP Instance	Error displayed to the user and logged for viewing in the User Log.
	0212	Mistyped argument	Error displayed to the user and logged for viewing in the User Log.
	0123	No such Action	Error displayed to the user and logged for viewing in the User Log.
	0114	No such argument	Error displayed to the user and logged for viewing in the User Log.

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
	0118	No such SOP Class	Error displayed to the user and logged for viewing in the User Log.
	0112	No such SOP Instance	Error displayed to the user and logged for viewing in the User Log.
	0110	Processing Failure	Error displayed to the user and logged for viewing in the User Log.
	0213	Resource Limitation	Error displayed to the user and logged for viewing in the User Log.
	0211	Unrecognized operation	Error displayed to the user and logged for viewing in the User Log.
	0124	Refused: Not authorized	Error displayed to the user and logged for viewing in the User Log.
Success	0000	Successful operation	Logged for viewing in the User Log.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the User Log.

A Storage Commit N-EVENT-REPORT cannot 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. See section 2.3.1.3.3 for information on the Local Storage SCP.

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

The system is able to do Image Query/Retrieve from different Query/Retrieve servers (i.e. the user can select from a dropdown which server to use for Query/Retrieve).

2.3.1.2.5.2 Proposed Presentation Context Table

TABLE 2-12 PRESENTATION CONTEXT – PROPOSED BY ELITE 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	1.2.840.10008.5.1.4.1.2.1.1	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
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	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

2.3.1.2.5.2.1 SOP Specific DICOM Conformance Statement for the Patient Root Query/Retrieve Information Model - FIND and Study Root Query/Retrieve Information Model - FIND SOP Classes

The Elite Workstation includes matching keys in the queries as described in Section 16.

The Elite 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 Image Query 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 2-13 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR PATIENT ROOT & 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 User Log.
	A900	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the User Log.

	C000-CFFF	Error: Unable to process	Error displayed to the user and logged for viewing in the User Log.
	0122	Refused: SOP Class not supported	Error displayed to the user and logged for viewing in the User Log.
Cancel	FE00	Matching terminated due to Cancel request	Logged for viewing in the User Log.
Success	0000	Matching is complete - No final identifier is supplied.	Display the results 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.
	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 User Log.

2.3.1.2.5.2.2 SOP Specific DICOM Conformance Statement for the Patient Root Query/Retrieve Information Model - MOVE and Study Root Query/Retrieve Information Model - MOVE SOP Classes

The C-MOVE-RQ will use the AE Title of the Elite Workstation Application Entity as the Move Destination AE Title.

If the user selects the Cancel button on the Image Retrieve progress bar, the system will require confirmation of cancelation before sending a C-MOVE CANCEL; request will only be sent if the association is not yet complete.

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

TABLE 2-14 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR PATIENT ROOT & STUDY ROOT Q/R - MOVE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A701	Refused: Out of resources - Unable to calculate number of matches	Error displayed to the user and logged for viewing in the User Log.

	A702	Refused: Out of resources - Unable to perform sub-operations	Error displayed to the user and logged for viewing in the User Log.
	A801	Refused: Move Destination unknown	Error displayed to the user and logged for viewing in the User Log.
	A900	Error: Data Set does not match SOP Class	Error displayed to the user and logged for viewing in the User Log.
	C000-CFFF	Failed: Unable to process	Error displayed to the user and logged for viewing in the User Log.
	0122	Refused: SOP Class not supported	Error displayed to the user and logged for viewing in the User Log.
Cancel	FE00	Sub-operations terminated due to Cancel Indication	Logged for viewing in the User Log.
Warning	B000	Sub-operations Complete - One or more Failures	Logged for viewing in the User Log.
Success	0000	Sub-operations Complete - No Failures	Success placed in the transfer status screen.
Pending	FF00	Sub-operations are continuing	Show progress to user.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the User 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 2-15 PRESENTATION CONTEXT – PROPOSED BY ELITE 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 Elite Workstation uses the following DIMSE services of the supported SOP Classes:

TABLE 2-16 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
		N-ACTION	Not 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 DICOM 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 printout.
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 signaled to the user

The Elite Workstation includes data elements in the SOP Instances with associated value sets as described in Section 15.

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 2-17 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR BASIC FILM SESSION N-CREATE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0106	Invalid Attribute Value	Error displayed to the user and entry is placed into transfer status screen.
	0213	Resource Limitation	Error displayed to the user and entry is placed into transfer status screen.
Warning	B600	Memory allocation not supported	Entry placed in the transfer status screen.
Success	0000	Film session successfully created	Success placed in the transfer status screen.
*	*	Any other status code.	Error displayed to the user and entry is placed into transfer status screen.

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 2-18 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR BASIC FILM SESSION N-DELETE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	0119	Class-Instance conflict	No action is taken.
	0210	Duplicate invocation	No action is taken.
	0117	Invalid SOP Instance	No action is taken.
	0212	Mistyped argument	No action is taken.

	0118	No such SOP Class	No action is taken.
	0112	No such SOP Instance	No action is taken.
	0110	Processing Failure	No action is taken.
	0213	Resource Limitation	No action is taken.
	0211	Unrecognized operation	No action is taken.
	0124	Refused: Not authorized	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 2-19 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR BASIC FILM BOX N-CREATE

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	C616	Failed: 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 entry is placed into transfer status screen.
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.	Entry placed in the transfer status screen.
Success	0000	Film box successfully created	Logged for viewing in the User Log.
*	*	Any other status code.	Error displayed to the user and entry is placed into transfer status screen.

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

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

TABLE 2-20 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR BASIC FILM BOX N-ACTION

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	C602	Failed: Unable to create Print Job SOP Instance; print queue is full	Error displayed to the user and logged for viewing in the User Log.
	C603	Failed: Image size is larger than image box size	Error displayed to the user and logged for viewing in the User Log.
	C604	Image position collision: multiple images assigned to single image position	Error displayed to the user and logged for viewing in the User Log. Retired status code.
	C613	Failed: Combined Print Image size is larger than the Image Box size	Error displayed to the user and logged for viewing in the User Log.
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	Logged for viewing in the User Log.
	B604	Image size is larger than image box size, the image has been demagnified.	Logged for viewing in the User Log.
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Logged for viewing in the User Log.
	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.	Logged for viewing in the User Log.
Success	0000	Film accepted for printing; if supported, the Print Job SOP Instance is created	Logged for viewing in the User Log.
*	*	Any other status code.	Error displayed to the user and logged for viewing in the User Log.

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

The Elite 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 Elite 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.

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 are as follows:

TABLE 2-21 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR BASIC GRAYSCALE IMAGE BOX N-SET

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	C603	Failed: Image size is larger than image box size	Error displayed to the user and entry is placed into transfer status screen.
	C605	Failed: Insufficient memory in printer to store the image	Error displayed to the user and entry is placed into transfer status screen.
	C613	Failed: Combined Print Image size is larger than the Image Box size	Error displayed to the user and entry is placed into transfer status screen.
Warning	B604	Image size larger than image box size, the image has been demagnified.	Entry placed in the transfer status screen.
	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.	Entry placed in the transfer status screen.
	B609	Image size is larger than the Image Box size. The Image has been cropped to fit.	Entry placed in the transfer status screen.
	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.	Entry placed in the transfer status screen.
Success	0000	Image successfully stored in Image Box	Success placed in the transfer status screen.
*	*	Any other status code.	Error displayed to the user and entry is placed into transfer status screen.

2.3.1.2.6.2.1.4 Printer SOP Class

The Elite 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 15.5.1.

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 2-22 STATUS CODES RECEIVED BY ELITE 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 Elite 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 15.5.2.

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 2-23 STATUS CODES RECEIVED BY ELITE WORKSTATION FOR PRINTER SOP N-GET

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
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 Elite 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 Presentation LUT in the Basic Film Box N-CREATE.

2.3.1.3 Association Acceptance Policy

2.3.1.3.1 Real-World Activity: Verify Connection

2.3.1.3.1.1 Associated Real-World Activity

The Elite 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 2-24 PRESENTATION CONTEXT - ACCEPTED BY ELITE 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	SCP	None

2.3.1.3.1.3 Presentation Context Acceptance Criterion

The Elite 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 Elite 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

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 Elite Workstation will cause an association to be initiated from the Storage Commitment SCP for the N-EVENT-REPORT.

2.3.1.3.2.2 Accepted Presentation Context Table

TABLE 2-25 PRESENTATION CONTEXT - ACCEPTED BY ELITE WORKSTATION FOR ACTIVITY – 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	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

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

The Elite Workstation will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class.

Upon receiving a Storage Commitment N-EVENT-REPORT (Storage Commitment Result), the Elite Workstation will validate the Transaction UID against its list of outstanding Storage Commitment Request Transaction UIDs. If it matches an outstanding Request, the AE will mark all SOP Instances for which a success status is indicated with an Archived flag, shown on the image's thumbnail.

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

2.3.1.3.3.2 Accepted Presentation Context Table

TABLE 2-26 PRESENTATION CONTEXT - ACCEPTED BY ELITE 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	1.2.840.10008.5.1.4.1.1.1.1	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 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 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
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 Elite 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 Elite 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 2-27 STATUS CODES RETURNED BY ELITE 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 cannot be loaded as a DICOM dataset. Also when the Study and/or Series UIDs are not available.	None
Success	0000	Success	Returned when file is successfully stored on the system.	None

2.3.1.3.3.3 Presentation Context Acceptance Criterion

The Elite 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 Elite 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 MB/s, 100 Mb/s, and 1Gb/s auto-sensing Ethernet interface. The OEC Elite also supports wireless networking.

Note: For more information about the Physical Media available on the OEC Elite, 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 3.6.1.

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

Additional fields for Remote DICOM Store

- Modality to store (RF, XA, CR or SC. Default – RF)
- 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 HealthCare Field Engineer.

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

2.7 SUPPORT OF EXTENDED CHARACTER SETS

The OEC Elite 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.

2.8 CODES AND CONTROLLED TERMINOLOGY

2.8.1 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 10.7 where the VT is CODE. In these cases the standard or extended value for the code is defined.

2.8.2 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 10.7 for RDSR and 11.4 for MWL.

2.9 SECURITY PROFILE

2.9.1 External Network Requirements

The following describes non-DICOM network protocols used by the OEC Elite to set the current time for the implementation and to obtain the network address for the implementation. The OEC Elite system has a single network interface that may be configured for secure communication with transport layer security, or for non-secure communication.

TABLE 2-28 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 RFC2181	Yes

2.9.2 Secure Transport Connection Profiles

Note: This section pertains only to systems with the OEC Elite Secure option.

The OEC Elite 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 private 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 Elite.

TABLE 2-29 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 Elite compliance to DICOM requirements for **Media Interchange**. It details the DICOM Media Storage Application Profiles and roles that are supported by this product.

The Elite 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 interchange application model for the OEC Elite is shown in Figure 3-1:

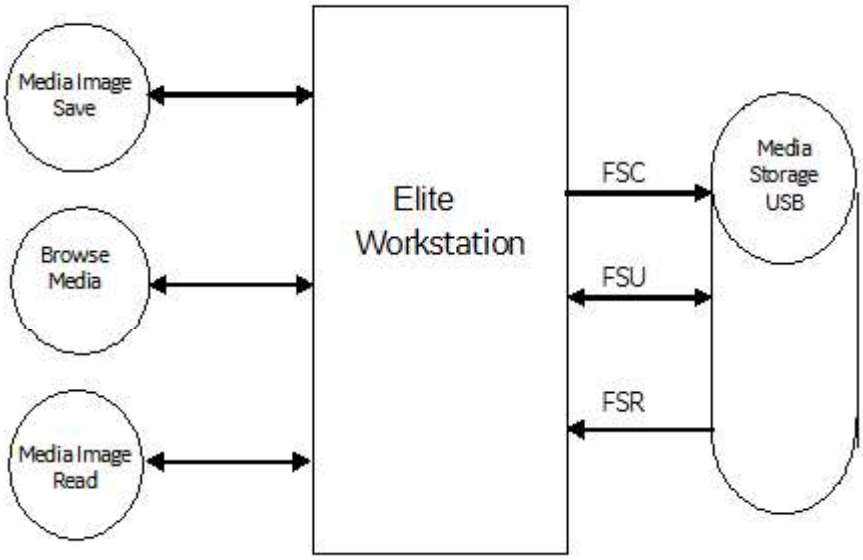

FIGURE 3-1 OEC ELITE MEDIA INTERCHANGE APPLICATION MODEL AND DATA FLOW DIAGRAM

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 Elite 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 Elite Workstation also allows OEC Compatible images to be written and read back.

3.2.3 Sequencing of Real-World Activities

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

The Elite Workstation performs Media Image 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
Elite Workstation Implementation UID	1.2.840.113619.6.329
Implementation Version Name	OEC v1.4

3.3 AE SPECIFICATIONS

3.3.1 Elite Workstation AE Specification

The Elite Workstation Application Entity provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The supported Application Profiles and roles are listed in Table 3-1.

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	FSR	Interchange
	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 Elite Workstation Application Entity

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

Source Application Entity Title	Value configured by the user on the Local Server Definition screen for DICOM.
Elite Workstation Implementation UID	1.2.840.113619.6.329
Implementation Version Name	OEC v1.4

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

3.3.1.2 Real-World Activities for the Elite Workstation Application Entity

3.3.1.2.1 Real-World Activity: Media Image Save

The user loads/mounts a USB device into the Elite 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 the 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 Table 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
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 14.2.3.

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 Elite 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 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 X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
CT 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 Secondary Capture 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
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1

[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 14.2.3.

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 3-3. Exception: Raw Data Storage	See Table 3-3	RLE Lossless	1.2.840.10008.1.2.5	JPEG
		JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	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, First-Order Prediction(Process 14 [Selection Value 1]): Default Transfer Syntax for Lossless JPEG Image Compression	1.2.840.10008.1.2.70	JPEG

Common DICOMDIR Directory Records created by this AE will include key attributes as described in Section 14.2.3.

No additional DICOMDIR Keys are added to any record types.

3.4 AUGMENTED AND PRIVATE APPLICATION PROFILES

3.4.1 Augmented Application Profiles

The Elite 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 DE-IDENTIFICATION PROFILES

Table 3-5 lists all the supported de-identification profiles and options

TABLE 3-5. DE-IDENTIFICATION PROFILES

Profile	Option
Basic Application Level Confidentiality Profile	Basic Profile

3.5.1 Attribute Confidentiality Details

Table 3-6 provides the list of Attributes and the action when de-identifying instances. Supported Action Codes are defined in PS3.15 Section E.1

De-identification Action Codes are defined as the following:

- D: replace with a non-zero length value that may be a dummy value and consistent with the VR
- Z: replace with a zero length value, or a non-zero length value that may be a dummy value and consistent with the VR
- X: remove
- K: keep (unchanged for non-Sequence Attributes, cleaned for Sequences)
- C: clean, that is replace with values of similar meaning known not to contain identifying information and consistent with the VR
- U: replace with a non-zero length UID that is internally consistent within a set of Instances
- Z/D: Z unless D is required to maintain IOD conformance (Type 2 versus Type 1)
- X/Z: X unless Z is required to maintain IOD conformance (Type 3 versus Type 2)
- X/D: X unless D is required to maintain IOD conformance (Type 3 versus Type 1)
- X/Z/D: X unless Z or D is required to maintain IOD conformance (Type 3 versus Type 2 versus Type 1)
- X/Z/U*: X unless Z or replacement of contained instance UIDs (U) is required to maintain IOD conformance (Type 3 versus Type 2 versus Type 1 sequences containing UID references)

The system does not do referential replacement values for references such as SOP Instance UID; any sequence with referential replacement values is removed or set to empty. The system does not do any encryption of the Dataset. The system uses TLS security.

TABLE 3-6. DE-IDENTIFIED ELEMENTS AND ACTIONS

Attribute Name	Tag	Action	Encrypted	Comments
Accession Number	(0008,0050)	Z	N	Replaced with empty value.
Acquisition Date	(0008,0022)	X/Z	N	Removed.
Acquisition DateTime	(0008,002A)	X/Z/D	N	Removed.
Acquisition Time	(0008,0032)	X/Z	N	Removed.
Admitting Diagnoses Code Sequence	(0008,1084)	X	N	Removed.
Admitting Diagnoses Description	(0008,1080)	X	N	Removed.
Author Observer Sequence	(0040,A078)	X	N	Removed.
Comments on Radiation Dose	(0040,0310)	X	N	Removed.
Content Date	(0008,0023)	Z/D	N	Replaced with a dummy value “20000101”
Content Time	(0008,0033)	Z/D	N	Replaced with a dummy value “000000”
Contrast/Bolus Agent	(0018,0010)	Z/D	N	Replaced with an empty value.
Contrast/Bolus Start Time	(0018,1042)	X	N	Removed.
Custodial Organization Sequence	(0040,A07C)	X	N	Removed.
Date of Last Calibration	(0018,1200)	X	N	Removed.
Date of Secondary Capture	(0018,1012)	X	N	Removed.
Derivation Description	(0008,2111)	X	N	Removed.
Device Serial Number	(0018,1000)	X/Z/D	N	Removed for Image IOD. Replaced with dummy value “000000” for RDSR IOD.
Device UID	(0018,1002)	U	N	

Filler Order Number / Imaging Service Request	(0040,2017)	Z	N	Replaced with empty value.
Icon Image Sequence	(0088,0200)	X	N	Removed.
Instance Creation Date	(0008,0012)	X/D	N	Removed.
Instance Creation Time	(0008,0013)	X/Z/D	N	Removed.
Instance Creator UID	(0008,0014)	U	N	
Institution Name	(0008,0080)	X/Z/D	N	Removed.
Irradiation Event UID	(0008,3010)	U	N	
Issuer of Patient ID	(0010,0021)	X	N	Removed.
Media Storage SOP Instance UID	(0002,0003)	U	N	
Overlay Data	(60xx,3000)	X	N	Removed. Removes all overlay information on the image.
Patient's Age	(0010,1010)	X	N	Removed.
Patient's Birth Date	(0010,0030)	Z	N	Replaced with dummy value “20000101”
Patient's Name	(0010,0010)	Z	N	Replaced with dummy value “Unknown”
Patient's Sex	(0010,0040)	Z	N	Replaced with empty value.
Patient's Size	(0010,1020)	X	N	Removed.
Patient's Weight	(0010,1030)	X	N	Removed.
Patient Comments	(0010,4000)	X	N	Removed.
Patient ID	(0010,0020)	Z	N	Replaced with dummy value “Unknown ID”
Performed Procedure Step Description	(0040,0254)	X	N	Removed.
Performed Procedure Step ID	(0040,0253)	X	N	Removed.
Performed Procedure Step Start Date	(0040,0244)	X	N	Removed.

Performed Procedure Step Start Time	(0040,0245)	X	N	Removed.
Performing Physician's Name	(0008,1050)	X	N	Removed.
Placer Order Number / Imaging Service Request	(0040,2016)	Z	N	Replaced with empty value.
Protocol Name	(0018,1030)	X/D	N	Removed.
Reason for Requested Procedure Code Sequence	(0040,100A)	X	N	Removed.
Reason for the Requested Procedure	(0040,1002)	X	N	Removed.
Referenced Performed Procedure Step Sequence	(0008,1111)	X/Z/D	N	Removed from Image IOD. Replaced with an empty value for RDSR IOD
Referenced SOP Instance UID in File	(0004,1511)	U	N	
Referenced Study Sequence	(0008,1110)	X/Z	N	Removed for Image IOD. Replaced with an empty value for RDSR IOD.
Referring Physician's Name	(0008,0090)	Z	N	Replaced with empty value.
Request Attributes Sequence	(0040,0275)	X	N	Removed.
Requested Procedure Description	(0032,1060)	X/Z	N	Removed for Image IOD. Replaced with an empty value for RDSR IOD.
Requested Procedure ID	(0040,1001)	X	N	Removed.
Scheduled Procedure Step Description	(0040,0007)	X	N	Removed.
Scheduled Procedure Step ID	(0040,0009)	X	N	Removed.
Series Date	(0008,0021)	X/D	N	Removed.
Series Description	(0008,103E)	X	N	Removed.
Series Instance UID	(0020,000E)	U	N	

Series Time	(0008,0031)	X/D	N	Removed.
SOP Instance UID	(0008,0018)	U	N	
Source Application Entity Title	(0002,0016)	X	N	Removed.
Source Image Sequence	(0008,2112)	X/Z/U*	N	Removed.
Station Name	(0008,1010)	X/Z/D	N	Removed.
Study Date	(0008,0020)	Z	N	Replaced with dummy value “20000101”
Study Description	(0008,1030)	X	N	Removed.
Study ID	(0020,0010)	Z	N	Replaced with dummy value “00000000”
Study Instance UID	(0020,000D)	U	N	
Study Time	(0008,0030)	Z	N	Replaced with dummy value “000000”
Time of Last Calibration	(0018,1201	X	N	Removed.
Time of Secondary Capture	(0018,1014)	X	N	Removed.
Timezone Offset From UTC	(0008,0201)	X	N	Removed.

3.6 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.6.1 Standard Extended / Specialized / Private SOP Classes

3.6.1.1 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 4.2.7.

3.6.1.2 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 3-7 RAW DATA SOP PRIVATE CREATOR GROUPS

Element Name	Tag	VR	VM	Description
Private Creator	(1001,0010)	LO	1	OEC specific data
Private Creator	(1003,0010)	LO	1	OEC specific data
Private Creator	(1005,0010)	LO	1	OEC specific data
Private Creator	(1007,0010)	LO	1	OEC specific data
Private Creator	(1009,0010)	LO	1	OEC specific data
Private Creator	(100B,0010)	LO	1	OEC specific data
Private Creator	(100D,0010)	LO	0-1	OEC specific data
Private Creator	(100F,0010)	LO	1	OEC specific data
Private Creator	(1F01,0010)	LO	1	OEC specific data
Private Creator	(1101,0010)	LO	1	OEC specific data
Private Creator	(1103,0010)	LO	1	OEC specific data
Private Creator	(1105,0010)	LO	1	OEC specific data
Private Creator	(1109,0010)	LO	1	OEC specific data
Private Creator	(3033,0010)	LO	1	OEC specific data

3.7 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 – RF)
- Image Size (Half, Full. Default – Full)
- Remove Patient Information (Default – No)
- Merge into one Overlay (Default – Yes)

3.8 SUPPORT OF EXTENDED CHARACTER SETS

The Elite 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	Value set by MWL or entered by user. If nothing is entered, this value is generated by the system as an emergency exam name. The prefix of the name is configurable and has an incrementing number appended.
Patient ID	(0010,0020)	2	Value set by MWL or entered by user. If nothing is entered, this value is generated by the system as an emergency exam ID. The prefix of the ID is configurable and has an incrementing number appended.
Issuer of Patient ID	(0010,0021)	3	Value set by MWL. Else, value is set to empty. No user interface on this product.
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3	Value set by MWL. Else, not present. No user interface on this product.
Patient's Birth Date	(0010,0030)	2	Value set by MWL or entered by user. Format: YYYYMMDD.
Patient's Sex	(0010,0040)	2	Value set by MWL or entered by user.
Patient Comments	(0010,4000)	3	Value entered by user.

Attribute Name	Tag	Type	Attribute Description
Patient Identity Removed	(0012,0062)	3	Value set to “YES” if Media Image Save is performed with de-identification. Set to “NO” otherwise.
De-identification Method Code Sequence	(0012,0064)	1C	Value set to “Basic Application Confidentiality 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	Value set by MWL or generated by the system.
Study Date	(0008,0020)	2	Value set to date when the exam is started on the system. Format: YYYYMMDD
Study Time	(0008,0030)	2	Value set to time when the exam is started on the system. Format: HHMMSS
Referring Physician's Name	(0008,0090)	2	Value set by MWL or empty.
Study ID	(0020,0010)	2	Value set by MWL, entered by user, or generated by the system.
Accession Number	(0008,0050)	2	Value set by MWL or entered by user.
Study Description	(0008,1030)	3	Value set by MWL or entered by user.
Referenced Study Sequence	(0008,1110)	3	Value set by MWL, else not present. Used to allow for quick query/retrieval of referenced Studies.
>Include “SOP Instance Reference Macro”			
Procedure Code Sequence	(0008,1032)	3	Values set by MWL or values entered by user (Procedure Code, Designator, and Procedure Description). Only present if all three fields are populated.
>Include “Code Sequence Macro”			

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	Value set by MWL or empty.

Patient's Size	(0010,1020)	3	Value set by MWL or 0.00
Patient's Weight	(0010,1030)	3	Value set by MWL or 0.00

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	Value set to the configured Modality for the DICOM Store Server or Media Image Save. SC images have value set to "OT".
Series Instance UID	(0020,000E)	1	Value generated by the system.
Series Number	(0020,0011)	2	Value generated by the system.
Laterality	(0020,0060)	2C	Value set to "R" if R marker annotation is used. Value set to "L" if L marker annotation is used. All other cases, value is set to empty.
Series Date	(0008,0021)	3	For x-ray images, set to date procedure step was started. Each procedure step defines a new set of series. Format: YYYYMMDD.
Series Time	(0008,0031)	3	For x-ray images, set to time procedure step was started. Each procedure step defines a new set of series. Format: HHMMSS.
Performing Physician's Name	(0008,1050)	3	Value set by MWL or entered by user.
Protocol Name	(0018,1030)	3	Value set by MWL or entered by user.
Series Description	(0008,103E)	3	Value of the Protocol Description on the Additional Information screen. Value set by MWL, entered by user, or set to "Unknown Protocol" by the system.
Referenced Performed Procedure Step Sequence	(0008,1111)	3	Present, regardless of if MPPS is enabled for the exam or not.
>Include "SOP Instance Reference Macro"			Will be used in MPPS N-SET, if exam has MPPS transactions.
Patient Position	(0018,5100)	2C	Value derived from values set for the exam.

			Value is derived from “Patient Orientation”, “Orientation Modifier”, and “Patient/Table Relationship”.
Request Attributes Sequence	(0040,0275)	3	Sequence set with values from the MWL. Not present for manual exams. No user interface on this product.
>Requested Procedure ID	(0040,1001)	1C	Value set by MWL.
>Requested Procedure Description	(0032,1060)	3	Value set by MWL.
>Scheduled Procedure Step ID	(0040,0009)	1C	Value set by MWL.
>Scheduled Procedure Step Description	(0040,0007)	3	Value set by MWL.
>Scheduled Protocol Code Sequence	(0040,0008)	3	Value set by MWL.
>Include “Code Sequence Macro”			
Performed Procedure Step ID	(0040,0253)	3	Value set by MWL, entered by user, or generated by the system.
Performed Procedure Step Start Date	(0040,0244)	3	For x-ray images set to date the procedure step was started. For appended procedures, set to date procedure step was selected. Each procedure step defines a new set of series Format: YYYYMMDD.
Performed Procedure Step Start Time	(0040,0245)	3	For x-ray images set to time the procedure step was started. For appended procedures, set to time procedure step was selected. Each procedure step defines a new set of series Format: HHMMSS.
Performed Procedure Step Description	(0040,0254)	3	Value set by MWL or entered by user.

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	Value supplied by system, non-editable.
Institution Name	(0008,0080)	3	Value set to the Hospital Name entered by the user.
Station Name	(0008,1010)	3	Value set to system configuration for Station Name.
Manufacturer's Model Name	(0008,1090)	3	Value supplied by system, non-editable.
Device Serial Number	(0018,1000)	3	Value supplied by system, non-editable.

Software Versions	(0018,1020)	3	Value supplied by system, non-editable.
Date of Last Calibration	(0018,1200)	3	Value set to Dose Accuracy Calibration date of the system. Format: YYYYMMDD.
Time of Last Calibration	(0018,1201)	3	Value set to Dose Accuracy Calibration time of the system. Format: HHMMSS.

4.2.5 Acquisition Entity Modules

4.2.5.1 General Acquisition Module

TABLE 4-6 GENERAL ACQUISITION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Acquisition Number	(0020,0012)	3	Value set to image's irradiation event number.
Acquisition Date	(0008,0022)	3	Value set to date of the image's irradiation event. Format: YYYYMMDD.
Acquisition Time	(0008,0032)	3	Value set to time of the image's irradiation event. Format: HHMMSS.
Acquisition DateTime	(0008,002A)	3	Value set to date/time of image's irradiation event. Format: YYYYMMDDHHMMSS.
Irradiation Event UID	(0008,3010)	3	Value generated by the system. Unique identification of image's irradiation event.

4.2.6 Image Entity Modules

4.2.6.1 General Image Module

TABLE 4-7 GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	2	Value set to instance number of the image.
Patient Orientation	(0020,0020)	2C	Value set to empty.
Content Date	(0008,0023)	2C	Value set to date the image was saved. Format: YYYYMMDD.
Content Time	(0008,0033)	2C	Value set to time the image was saved. Format: HHMMSS.

Attribute Name	Tag	Type	Attribute Description
Image Type	(0008,0008)	3	See 4.2.6.1.1
Burned In Annotation	(0028,0301)	3	Value set to "NO"
Icon Image Sequence	(0088,0200)	3	See 4.2.6.1.2
>Include *"Image Pixel Macro"*			See 4.2.6.1.2
Presentation LUT Shape	(2050,0020)	3	Value set to "IDENTITY" (output is in P-Values).

4.2.6.1.1 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 always be set to "SINGLE PLANE"

4.2.6.1.2 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 Pixel Data (7FE0,0010) is set to the pixel data of the image.

4.2.6.2 General Reference Module

TABLE 4-8 GENERAL REFERENCE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Derivation Description	(0008,2111)	3	See 4.2.6.2.1
Source Image Sequence	(0008,2112)	3	See 4.2.6.2.1
>Include "Image SOP Instance Reference Macro"			

4.2.6.2.1 Derivation Description and Source Image Sequence

The value for the Derivation Description 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.”

4.2.6.3 Image Pixel Module

TABLE 4-9 IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	Value is set to “1”
Photometric Interpretation	(0028,0004)	1	Value is set to “MONOCHROME2”.
Rows	(0028,0010)	1	Value is set to 1280 for Full Size x-ray images. Value is set to 640 for Half Size x-ray images.
Columns	(0028,0011)	1	Value is set to 1280 for Full Size x-ray images. Value is set to 640 for Half Size x-ray images.
Bits Allocated	(0028,0100)	1	For XA, RF, CR modality, value is set to 16 For OT modality, value is set to 8. Includes SC and Multi-SC.
Bits Stored	(0028,0101)	1	For XA, RF, CR modality, value is set to 10. For OT modality, value is set to 8. Includes SC and Multi-SC.
High Bit	(0028,0102)	1	Value is one less than Bits Stored (0028,0101).
Pixel Representation	(0028,0103)	1	Value set to “”0000H” (unsigned integer).
Planar Configuration	(0028,0006)	1C	Value set to “0”.
Pixel Data	(7FE0,0010)	1C	Value set to pixel data of the image.

4.2.6.4 Contrast/Bolus Module

TABLE 4-10 CONTRAST/BOLUS MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Contrast/Bolus Agent	(0018,0010)	2	Value set to empty.
Contrast/Bolus Start Time	(0018,1042)	3	Present only for multi-frame images. For images that have an injector signal (e.g. Subtract imaging), value is set to time of contrast injection. Else, value is set to empty.

4.2.6.5 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 4-11 OVERLAY PLANE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Overlay Rows	(60xx,0010)	1	Value set to 1280 for Full Size images. Value set to 640 for Half Size images.
Overlay Columns	(60xx,0011)	1	Value set to 1280 for Full Size images. Value set to 640 for Half Size images.
Overlay Type	(60xx,0040)	1	Value set to “G" (Graphics).
Overlay Origin	(60xx,0050)	1	Value set to 1\1.
Overlay Bits Allocated	(60xx,0100)	1	Value set to “1”.
Overlay Bit Position	(60xx,0102)	1	Value set to “0”.
Overlay Data	(60xx,3000)	1	Value set to the graphic data with monochrome values.
Overlay Label	(60xx,1500)	3	See 4.2.6.5.1.

4.2.6.5.1 Overlay Label

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

- Demographic Information Overlay – no annotations are present
- Demographic-Image Information Overlay – merged overlays
- Image Annotation Overlay – second overlay when image is annotated

4.2.6.6 VOI LUT module

TABLE 4-12 VOI LUT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Window Center	(0028,1050)	1C	Set to value taken from image histogram or default. For 10-bit images, default value is 511. For 8-bit images, default value is 127.
Window Width	(0028,1051)	1C	Set to value taken from image histogram or default. For 10-bit images, default value is 1023. For 8-bit images, default value is 255.

4.2.6.7 SOP Common Module

TABLE 4-13 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	Value generated by the system.

Specific Character Set	(0008,0005)	1C	Value set to “ISO_IR 100” (Latin Alphabet No. 1).
Instance Creation Date	(0008,0012)	3	Value set to date of image was saved. Format: YYYYMMDD.
Instance Creation Time	(0008,0013)	3	Value set to time of image was saved. Format: HHMMSS.
Instance Creator UID	(0008,0014)	3	Value generated by system.
Instance Number	(0020,0013)	3	Value set to image number.

4.2.7 Standard Extended Attributes

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

TABLE 4-14 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
Equipment	N/A	N/A	N/A
Acquisition	N/A	N/A	N/A
Image	Comments on Radiation Dose	(0040,0310)	Value set to “Low Dose On” or “Low Dose Off” dependent on Low Dose setting.
	Entrance Dose	(0040,0302)	Value set to CAK value in dGy at system reference point (integer, can be rounded to zero).
	Entrance Dose in mGy	(0040,8302)	Value set to CAK value in mGy at system reference point (decimal string, not rounded).

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 ELITE MAPPING OF DICOM ENTITIES

The OEC Elite 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 ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
Acquisition	Image
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.	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

Entity Name	Module Name	Usage	Reference
Equipment	General Equipment	Used	4.2.4.1
Acquisition	General Acquisition	Used	4.2.5.1
Image	General Image	Used	4.2.6.1
	General Reference	Used for derived images.	4.2.6.2
	Image Pixel	Used	4.2.6.3
	Contrast/Bolus	Used. Required if contrast media was used.	4.2.6.4
	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. Required if image may be subtracted.	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.	4.2.6.5
	Multi-frame Overlay	Not Used	N/A
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.6.6
	SOP Common	Used	4.2.6.7
	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	Value set to “0” (Looping).
Frame Time	(0018,1063)	1C	Value set to frame time millisecond value (2 decimal places). Calculated by dividing 1000 by the cine acquisition rate.
Recommended Display Frame Rate	(0008,2144)	3	Value set to cine acquisition rate.
Cine Rate	(0018,0040)	3	Value set to cine acquisition rate.
Effective Duration	(0018,0072)	3	Value set to total number frames divided by acquisition rate.
Actual Frame Duration	(0018,1242)	3	For pulsed x-rays, value set to cine pulse width. For continuous x-rays, value set to Frame Time.

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	Value set to number of frames acquired. For trimmed cine, value set to the number of frames between cues.
Frame Increment Pointer	(0028,0009)	1	Value 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	Value set to the 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	Value set to “NONE” ((No Subtraction) No mask subtraction operation is specified).
Recommended Viewing Mode	(0028,1090)	2	Value set to “NAT” (Native viewing of image as encoded).

5.4.1.5 X-Ray Image Module

TABLE 5-7 X-RAY IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Frame Increment Pointer	(0028,0009)	1C	Value set to “00181063H” (Frame Time (0018,1063)).
Lossy Image Compression	(0028,2110)	1C	Value set to “00” (Image has NOT been subjected to lossy compression.)
Image Type	(0008,0008)	1	See 4.2.6.1.1
Pixel Intensity Relationship	(0028,1040)	1	Value set to “DISP” (Ready to be displayed)
Samples per Pixel	(0028,0002)	1	Value set to “1”.
Photometric Interpretation	(0028,0004)	1	Value set to “MONOCHROME2”.
Bits Allocated	(0028,0100)	1	Value set to “16”.
Bits Stored	(0028,0101)	1	Value set to “10”.
High Bit	(0028,0102)	1	Value set to “9”.
Pixel Representation	(0028,0103)	1	Value set to “0000H” (Unsigned Integer).

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	Value set to average voltage of x-ray exposure.
Radiation Setting	(0018,1155)	1	For Digital Spot and Digital Cine modes, value set to “GR” For all other imaging modes, value set to “SC”
X-Ray Tube Current	(0018,1151)	2C	Value set to average value in milliamps of this irradiation event, reported as ceiling of decimal number of the current (integer).
Exposure Time	(0018,1150)	2C	Value set to time of this irradiation event, reported as ceiling of milliseconds.. For pulsed mode irradiation events, only pulsed irradiations are counted.

Attribute Name	Tag	Type	Attribute Description
			For single continuous mode, scout irradiation is not counted in this value.
Exposure	(0018,1152)	2C	Value set to exposure of this irradiation event, reported as ceiling of milliamp-seconds. For pulsed mode irradiation events, only pulsed irradiations are counted. For single continuous mode, scout irradiation is not counted in this value.
Exposure in µAs	(0018,1153)	3	Value set to exposure of this irradiation event, reported as ceiling of microamp-seconds. For pulsed mode irradiation events, only pulsed irradiations are counted. For single continuous mode, scout irradiation is not counted in this value.
Grid	(0018,1166)	3	Value set to “IN” if the grid is present during the irradiation event. Else, value is set to “NONE”.
Average Pulse Width	(0018,1154)	3	Present only when using pulsed mode. Value set to commanded value, in milliseconds, for pulsed mode irradiation event.
Radiation Mode	(0018,115A)	3	For continuous mode, value set to “CONTINUOUS”. For pulsed mode, value set to “PULSED”.
Intensifier Size	(0018,1162)	3	Value set to the diameter of X-Ray intensifier, in mm. Present for Image intensifier systems. Not present for FPD systems.
Imager Pixel Spacing	(0018,1164)	3	Value set to the detector pixel spacing, in mm. Pixel Spacing = Row Spacing \ Column Spacing. Current detectors have Imager Pixel values of: 21 cm FPD 0.135 mm – All magnifications 31 cm FPD 0.198 mm – All magnifications 9 inch II • Norm – 0.3 mm • Mag1 – 0.23 mm • Mag2 – 0.15 mm 12 inch II • Norm – 0.23 mm • Mag1 – 0.15 mm • Mag2 – 0.11 mm

Attribute Name	Tag	Type	Attribute Description
			Magnification refers to the Field of View (FOV). For the II systems, physical distance at the front plane of the Image Receptor housing does change when the FOV is changed. The value of this attribute shall never be adjusted to account for correction for the effect of geometric magnification or calibration against an object of known size; Pixel Spacing (0028,0030) is specified for that purpose.
Pixel Spacing	(0028,0030)	1C	Value is only present if the user has added measurements annotations to the image and calibrated that measurement. Value is derived from measurement annotation calibration values.
Image and Fluoroscopy Area Dose Product	(0018,115E)	3	Value set to X-ray dose in dGycm^2. For derived images, this is set to 0 or will be empty.

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	Value set to 1000 (mm, nominal).
Positioner Motion	(0018,1500)	2C	For non-MD systems, value is always set to “STATIC” For MD systems, value is set to "DYNAMIC" when the gantry moves during the cine. Else, value is set to “STATIC”.
Positioner Primary Angle	(0018,1510)	2	For non-MD systems, value is always set to empty. For MD systems, value is calculated by the system.
Positioner Secondary Angle	(0018,1511)	2	For non-MD systems, value is always set to empty. For MD systems, value is calculated by the system.
Positioner Primary Angle Increment	(0018,1520)	2C	Only present for DYNAMIC cines (on MD systems). Value is calculated by the system.
Positioner Secondary Angle Increment	(0018,1521)	2C	Only present for DYNAMIC cines (on MD systems). Value is calculated by the 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	Value set to "SCINTILLATOR" (Phosphor used).
Imager Pixel Spacing	(0018,1164)	1	Value set to the detector pixel spacing, in mm. Pixel Spacing = Row Spacing \ Column Spacing. Current detectors have Imager Pixel values of: 21 cm FPD 0.135 mm – All magnifications 31 cm FPD 0.198 mm – All magnifications 9 inch II • Norm – 0.3 mm • Mag1 – 0.23 mm • Mag2 – 0.15 mm 12 inch II • Norm – 0.23 mm • Mag1 – 0.15 mm • Mag2 – 0.11 mm Magnification refers to the Field of View (FOV). For the II systems, physical distance at the front plane of the Image Receptor housing does change when the FOV is changed. The value of this attribute shall never be adjusted to account for correction for the effect of geometric magnification or calibration against an object of known size; Pixel Spacing (0028,0030) is specified for that purpose.
Pixel Spacing	(0028,0030)	1C	Value is only present if the user has added measurements annotations to the image and calibrated that measurement. Value is derived from measurement annotation calibration values.

5.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the XA SOP Instance.

5.5.1 Standard Attributes

See Section 4.2.7 for Standard Attributes supported in the XA SOP Instance.

5.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology, but no extension is made for the XA 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 Radiofluoroscopic 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 ELITE MAPPING OF DICOM ENTITIES

The OEC Elite 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 ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
Acquisition	Image
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.	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

Entity Name	Module Name	Usage	Reference
Acquisition	General Acquisition	Used	4.2.5.1
Image	General Image	Used	4.2.6.1
	General Reference	Used for derived images.	4.2.6.2
	Image Pixel	Used	4.2.6.3
	Contrast/Bolus	Used. Required if contrast media was used.	4.2.6.4
	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. Required if image may be subtracted.	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
	XRF Positioner	Used	6.4.1.1
	X-Ray Tomography 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.	4.2.6.5
	Multi-Frame Overlay	Not Used	N/A
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.6.6
	SOP Common	Used	4.2.6.7
	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	Value set to 1000 (mm, nominal).

6.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the XRF SOP Instance.

6.5.1 Standard Attributes

See Section 4.2.7 for Standard Attributes supported in the XRF SOP Instance.

6.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

This product supports standard coded terminology, but no extension is made for the XRF 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 ELITE MAPPING OF DICOM ENTITIES

The OEC Elite 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 ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
Acquisition	Image
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.	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
Acquisition	General Acquisition	Used	4.2.5.1

Entity Name	Module Name	Usage	Reference
Image	General Image	Used	4.2.6.1
	General Reference	Used for derived images.	4.2.6.2
	Image Pixel	Used	4.2.6.3
	Contrast/Bolus	Used. Required if contrast media was used.	4.2.6.4
	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.	4.2.6.5
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.6.6
	SOP Common	Used	4.2.6.7
	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	Value set to empty.
View Position	(0018,5101)	2	Value set to empty.

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	Value set to “MONOCHROME2”.
KVP	(0018,0060)	3	Value set to average voltage of x-ray exposure.
Distance Source to Detector	(0018,1110)	3	Value set to 1000 (mm, nominal).
Exposure Time	(0018,1150)	3	Value set to time reported as ceiling of milliseconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. For single continuous mode, scout irradiation is not counted in this value.
X-Ray Tube Current	(0018,1151)	3	Value set to average value in milliamps of this irradiation event, reported as ceiling of decimal number of the current (integer).
Exposure	(0018,1152)	3	Value set to exposure reported as ceiling of milliamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. For single continuous mode, scout irradiation is not counted in this value.
Exposure in μAs	(0018,1153)	3	Value set to exposure reported as ceiling of microamp-seconds of this irradiation event. For pulsed mode irradiation events, only pulsed irradiations are counted. For single continuous mode, scout irradiation is not counted in this value.
Imager Pixel Spacing	(0018,1164)	3	Value set to the detector pixel spacing, in mm. Pixel Spacing = Row Spacing \ Column Spacing. Current detectors have Imager Pixel values of: 21 cm FPD 0.135 mm – All magnifications 31 cm FPD 0.198 mm – All magnifications 9 inch II • Norm – 0.3 mm • Mag1 – 0.23 mm • Mag2 – 0.15 mm 12 inch II • Norm – 0.23 mm • Mag1 – 0.15 mm

Attribute Name	Tag	Type	Use
			• Mag2 – 0.11 mm Magnification refers to the Field of View (FOV). For the II systems, physical distance at the front plane of the Image Receptor housing does change when the FOV is changed. The value of this attribute shall never be adjusted to account for correction for the effect of geometric magnification or calibration against an object of known size; Pixel Spacing (0028,0030) is specified for that purpose.
Pixel Spacing	(0028,0030)	1C	Value is only present if the user has added measurements annotations to the image and calibrated that measurement. Value is derived from measurement annotation calibration values.
Anatomic Region Sequence	(0008,2218)	3	Value set by user input (See 7.5.1.1). Default value is “Entire Body”.
>Include “Code Sequence Macro”			See 7.5.1.1

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 4.2.7 for Standard Attributes supported in the CR SOP Instance. The CR SOP Instance additionally supports tags (0018,1155) and (0018,115E).

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
Entire body	38266002	SCT
Abdomen	818981001	SCT
Ankle joint	70258002	SCT
Bile duct	28273000	SCT
Bladder	89837001	SCT

Code Meaning	Code Value	Coding Scheme Designator
Calcaneus	80144004	SCT
Cervical spine	122494005	SCT
Chest	816094009	SCT
Clavicle	51299004	SCT
Coccyx	64688005	SCT
Elbow joint	16953009	SCT
Esophagus	32849002	SCT
Facial bones	91397008	SCT
Femur	71341001	SCT
Finger	7569003	SCT
Foot	56459004	SCT
Forearm	14975008	SCT
Gallbladder	28231008	SCT
Hand	85562004	SCT
Heart	80891009	SCT
Hip Joint	24136001	SCT
Humerus	85050009	SCT
Knee	72696002	SCT
Lower leg	30021000	SCT
Lumbar spine	122496007	SCT
Mandible	91609006	SCT
Maxilla	70925003	SCT
Nasal bone	74386004	SCT
Orbital structure	363654007	SCT
Pancreatic duct and bile duct systems	110621006	SCT
Paranasal sinus	2095001	SCT
Patella	64234005	SCT
Pelvis	816092008	SCT
Rib	113197003	SCT
Sacroiliac joint	39723000	SCT
Sacrum	54735007	SCT
Scapula	79601000	SCT
Shoulder	16982005	SCT
Skull	89546000	SCT
Sternum	56873002	SCT
Stomach	69695003	SCT
Temporomandibular joint	53620006	SCT
Thoracic spine	122495006	SCT
Thumb	76505004	SCT

Code Meaning	Code Value	Coding Scheme Designator
Toe	29707007	SCT
Upper urinary tract	431491007	SCT
Ureter	87953007	SCT
Urethra	13648007	SCT
Uterus and fallopian tubes	110639002	SCT
Wrist joint	74670003	SCT

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.

SECONDARY CAPTURE INFORMATION OBJECT IMPLEMENTATION

8.1 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.

8.2 OEC ELITE MAPPING OF DICOM ENTITIES

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

TABLE 8-1 SC MAPPING OF DICOM ENTITIES TO OEC ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
Acquisition	Image
Image	Image

8.3 IOD MODULE TABLE

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

TABLE 8-2 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.	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	8.4.1.1
Acquisition	General Acquisition	Used	4.2.5.1
Image	General Image	Used	4.2.6.1
	General Reference	Used for derived images.	4.2.6.2

Entity Name	Module Name	Usage	Reference
	Image Pixel	Used	4.2.6.3
	Device	Not Used	N/A
	Specimen	Not Used	N/A
	SC Image	Used	8.4.2.1
	Overlay Plane	Used when overlays are configured to be stored via DICOM Store or Media Image Save.	4.2.6.5
	Modality LUT	Not Used	N/A
	VOI LUT	Used to provide the Window Width and Center.	4.2.6.6
	ICC Profile	Not Used	N/A
	SOP Common	Used	4.2.6.7
	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 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.

8.4.1 Equipment Entity Modules

8.4.1.1 SC Equipment Module

TABLE 8-3 SC EQUIPMENT MODULE ATTRIBUTES

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

8.4.2 Image Entity Modules

8.4.2.1 SC Image Module

TABLE 8-4 SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Date of Secondary Capture	(0018,1012)	3	Value set to date of image creation. Format: YYYYMMDD.
Time of Secondary Capture	(0018,1014)	3	Value set to time of image creation. Format: HHMMSS.
Pixel Spacing	(0028,0030)	1C	Value is only present if the user has added measurements annotations to the image and calibrated that measurement. Value is derived from measurement annotation calibration values.

8.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the SC SOP Instance.

8.5.1 Standard Attributes

The SC SOP Instance supports tags (0040,0302) and (0040,8302). See Section 4.2.7 for more information about these Standard Attributes.

8.6 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

9.1 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.

9.2 OEC ELITE MAPPING OF DICOM ENTITIES

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

TABLE 9-1 MULTI-SC MAPPING OF DICOM ENTITIES TO OEC ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
Acquisition	Image
Image	Image

9.3 IOD MODULE TABLE

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

TABLE 9-2 MULTI-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	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	8.4.1.1

Entity Name	Module Name	Usage	Reference
Frame of Reference	Frame of Reference	Not Used	N/A
	Synchronization	Not Used	N/A
Acquisition	General Acquisition	Used	4.2.5.1
Image	General Image	Used	4.2.6.1
	General Reference	Used if not all cine frames are stored	4.2.6.2
	Image Pixel	Used	4.2.6.3
	Cine	Used	5.4.1.1
	Multi-frame	Used	5.4.1.2
	Frame Pointers	Not Used	N/A
	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	8.4.2.1
	SC Multi-frame Image	Used	9.4.1
	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.	4.2.6.6
	SOP Common	Used	4.2.6.7
	Common Instance Reference	Not Used	N/A
	Frame Extraction	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 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.

9.4.1 SC Multi-frame Image Module

TABLE 9-3 MULTI-SC IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Burned In Annotation	(0028,0301)	1	Value set to “NO”
Presentation LUT Shape	(2050,0020)	1C	Value set to “IDENTITY” (Output is in P-Values).
Rescale Intercept	(0028,1052)	1C	Value set to 0.
Rescale Slope	(0028,1053)	1C	Value set to 1.
Rescale Type	(0028,1054)	1C	Value set to “US” (Unspecified).
Frame Increment Pointer	(0028,0009)	1C	Value set to Frame Time (0018,1063).
Pixel Spacing	(0028,0030)	1C	Value is only present if the user has added measurements annotations to the image and calibrated that measurement. Value is derived from measurement annotation calibration values.

9.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the SC SOP Instance.

9.5.1 Standard Attributes

The SC SOP Instance supports the tags (0040,0302) and (0040,8302) (see Section 4.2.7 for more information about these Standard Attributes), as well as the tags in section 5.4.1.4.

9.6 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

10.1 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.

10.2 OEC ELITE MAPPING OF DICOM ENTITIES

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

TABLE 10-1 RDSR MAPPING OF DICOM ENTITIES TO OEC ELITE ENTITIES

DICOM IE	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Series
Equipment	Exam
SR Document	Document

10.3 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 10.7.

TABLE 10-2 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	10.4.1.1
	Patient Study	Used for MWL data	10.4.1.2
	Clinical Trial Study	Not Used	N/A
Series	SR Document Series	Used	10.4.2.1
	Clinical Trial Series	Not Used	N/A

Frame Of Reference	Synchronization	Not Used	N/A
Equipment	General Equipment	Used	4.2.4.1
	Enhanced General Equipment	Used	10.4.3.1
SR Document	SR Document General	Used	10.4.4.1
	SR Document Content	Used	10.4.4.2
	SOP Common	Used	10.4.4.3

10.4 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.

10.4.1 Study Entity Modules

10.4.1.1 General Study Module

TABLE 10-3 GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Value set by MWL or generated by the system.
Study Date	(0008,0020)	2	Value set to the date when the exam is started on the system. Format: YYYYMMDD.
Study Time	(0008,0030)	2	Value set to the time when the exam is started on the system. Format: HHMMSS.
Referring Physician's Name	(0008,0090)	2	Value set by MWL or empty.
Study ID	(0020,0010)	2	Value set by MWL, entered by user, or generated by the system.
Accession Number	(0008,0050)	2	Value set by MWL or entered by user.
Issuer of Accession Number Sequence	(0008,0051)	3	Value set by MWL, else not present.
>Include "HL7v2 Hierarchic Designator Macro"			
Study Description	(0008,1030)	3	Value set to Procedure Description on the Patient Information screen. Value set by MWL or entered by user.

Procedure Code Sequence	(0008,1032)	3	Values set by MWL or entered by user (Procedure Code, Designator, Procedure Description).
>Include "Code Sequence Macro"			

10.4.1.2 Patient Study Module

TABLE 10-4 PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Admitting Diagnoses Description	(0008,1080)	3	Value set by MWL or empty.
Admitting Diagnoses Code Sequence	(0008,1084)	3	Value set by MWL or empty.
>Include "Code Sequence Macro"			
Patient's Age	(0010,1010)	3	Value set by MWL or empty.
Patient's Size	(0010,1020)	3	Value set by MWL., else not present.
Patient's Weight	(0010,1030)	3	Value set by MWL., else not present.

10.4.2 Series Entity Modules

10.4.2.1 SR Document Series Module

TABLE 10-5 SR DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Modality	(0008,0060)	1	Value set to "SR" (SR Document)
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 set to the procedure step start date. Each procedure step defines a new series. Format: YYYYMMDD.
Series Time	(0008,0031)	3	Value set to the procedure step start time. Each procedure step defines a new series. Format: HHMMSS.
Series Description	(0008,103E)	3	Value of the Protocol Description on the Additional Information screen. Value set by MWL, entered by user, or set to "Unknown Protocol" by the system.
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Value generated by the system.
>Include "SOP Instance Reference Macro"			Will be used in MPPS N-SET, if exam has MPPS transactions.

10.4.3 Equipment Entity Modules

10.4.3.1 Enhanced General Equipment Module

TABLE 10-6 ENHANCED GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Manufacturer	(0008,0070)	1	Value supplied by system, non-editable.
Manufacturer's Model Name	(0008,1090)	1	Value supplied by system, non-editable.
Device Serial Number	(0018,1000)	1	Value supplied by system, non-editable.
Software Versions	(0018,1020)	1	Value supplied by system, non-editable.

10.4.4 Document Entity Modules

10.4.4.1 SR Document General Module

TABLE 10-7 SR DOCUMENT GENERAL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Instance Number	(0020,0013)	1	Value generated by the system.
Preliminary Flag	(0040,A496)	3	Value set to “FINAL” (This report is the definitive means of communicating the results of a procedure.)
Completion Flag	(0040,A491)	1	Value set to COMPLETE (Complete content).
Verification Flag	(0040,A493)	1	Value set to UNVERIFIED (Not attested to).
Content Date	(0008,0023)	1	Value set to the date the exam is ended. Format: YYYYMMDD.
Content Time	(0008,0033)	1	Value set to the time the exam is ended. Format: HHMMSS.
Verifying Observer Sequence	(0040,A073)	1C	Not present per conditional.
Author Observer Sequence	(0040,A078)	3	
>Include “Identified Person or Device Macro”			Values set to Identified Device Macro values.
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	Set to an empty sequence.
Predecessor Documents Sequence	(0040,A360)	1C	Not present per conditional.
Identical Documents Sequence	(0040,A525)	1C	Not present per conditional.
Referenced Request Sequence	(0040,A370)	1C	
>Study Instance UID	(0020,000D)	1	Value set by MWL or generated by the system.

Attribute Name	Tag	Type	Use
>Referenced Study Sequence	(0008,1110)	2	Contains the Referenced Study Sequence received from MWL. Else is empty.
>>Include "SOP Instance Reference Macro"			
>Accession Number	(0008,0050)	2	Value set by MWL or entered by user.
>Placer Order Number / Imaging Service Request	(0040,2016)	2	Value set by MWL or empty.
>Filler Order Number / Imaging Service Request	(0040,2017)	2	Value set by MWL or empty.
>Requested Procedure ID	(0040,1001)	2	Value set by MWL or value in "Study ID" field.
>Requested Procedure Description	(0032,1060)	2	Value set by MWL or value in "Procedure Description" field.
>Requested Procedure Code Sequence	(0032,1064)	2	Value set by MWL or empty.
>>Include "Code Sequence Macro"			
>Reason for the Requested Procedure	(0040,1002)	3	Value set by MWL or empty.
>Reason for Requested Procedure Code Sequence	(0040,100A)	3	Value set by MWL or empty.
>>Include "Code Sequence Macro"			
Performed Procedure Code Sequence	(0040,A372)	2	Values set by the MWL or entered by user (Procedure Code, Designator, Procedure Description).
>Include "Code Sequence Macro"			
Current Requested Procedure Evidence Sequence	(0040,A375)	1C	Contains the SOP instances of all images stored to PACS. If no images are stored, not present.
>Include "Hierarchical SOP Instance Reference Macro"			
Pertinent Other Evidence Sequence	(0040,A385)	1C	Not present per conditional.
Referenced Instance Sequence	(0008,114A)	1C	Not present per conditional.

10.4.4.2 SR Document Content Module

TABLE 10-8 SR DOCUMENT CONTENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Value Type	(0040,A040)	1	Value set to "CONTAINER"
Concept Name Code Sequence	(0040,A043)	1C	
>Code Value	(0008,0100)	1C	Value set to 113701.
>Coding Scheme Designator	(0008,0102)	1C	Value set to DCM.
>Code Meaning	(0008,0104)	1	Value set to X-Ray Radiation Dose Report.
Continuity of Content	(0040,A050)	1	Value set to "SEPARATE"
Content Template Sequence	(0040,A504)	1C	

>Mapping Resource	(0008,0105)	1	Value set to "DCMR" (DICOM Content Mapping Resource).
>Template Identifier	(0040,DB00)	1	Value set to 10001.
Observation DateTime	(0040,A032)	1C	Not present.
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 per conditional.
>Insert SR Document Content Module			Recursive inclusion to create document content tree. See 10.4.4.2.1.1 for supported templates.

10.4.4.2.1 SR Document Content Descriptions

10.4.4.2.1.1 Content Template

This product supports the following root Template for SR SOP Instances created by this product. Refer to section 10.7 for a detailed description of the supported templates.

TABLE 10-9 SR ROOT TEMPLATES

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

10.4.4.3 SOP Common Module

TABLE 10-10 SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Value set to 1.2.840.10008.5.1.4.1.1.88.67.
SOP Instance UID	(0008,0018)	1	Value generated by the system.
Specific Character Set	(0008,0005)	1C	Value set to “ISO_IR 100” (Latin Alphabet No. 1).
Instance Creation Date	(0008,0012)	3	Value set to the date the report was created. Format: YYYYMMDD.
Instance Creation Time	(0008,0013)	3	Value set to the time the report was created. Format: HHMMSS.
Instance Creator UID	(0008,0014)	3	Value generated by the system.
Timezone Offset From UTC	(0008,0201)	3	Value set to the timezone set for the system.
Instance Number	(0020,0013)	3	Value set to instance number.

10.5 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

No Private Attributes are supported in the XRF SOP Instance.

10.5.1 Standard Attributes

This product supports the following attributes in the SR SOP Instance as Type 3 data elements.

TABLE 10-11 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	Performed Procedure Step ID	(0040,0253)	Value set by MWL, entered by user, or generated by the system.
	Performed Procedure Step Start Date	(0040,0244)	Value set to date of start of procedure step. Format: YYYYMMDD.
	Performed Procedure Step Start Time	(0040,0245)	Value set to time of start of procedure step. Format: HHMMSS.
	Performed Procedure Step Description	(0040,0254)	Value set by MWL or entered by user.
	Performed Protocol Code Sequence	(0040,0260)	Value set to Protocol information.
Equipment	N/A	N/A	N/A
SR Document	N/A	NA	N/A

10.6 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

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

10.6.1 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.**

10.6.1.1 Context ID 4031/4009 Common Anatomic Regions

See Table 7-5.

10.6.1.2 Context ID 3629 Procedure Intent

TABLE 10-12 CID 3629

Code Meaning	Code Value	Coding Scheme Designator
Diagnostic Intent	261004008	SCT
Therapeutic Intent	262202000	SCT
Combined Diagnostic and Therapeutic Procedure	1279505009	SCT
Quality Control Intent	113680	DCM
Staging intent	373825000	SCT
Guidance Intent	363675004	SCT
Palliative Intent	363676003	SCT
Screening Intent	360156006	SCT
Forensic Intent	447295008	SCT
Adjunct intent	421974008	SCT
Adjuvant intent	373846009	SCT
Curative intent	373808002	SCT
Neo-adjuvant intent	373847000	SCT
Supportive intent	399707004	SCT
Preventive intent	129428001	SCT
Prophylactic intent	360271000	SCT

10.7 STANDARD, STANDARD EXTENDED AND PRIVATE TEMPLATES

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

10.7.1 Standard Templates

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

10.7.1.1 Template ID 10001 X-Ray Radiation Dose

TABLE 10-13 TID 10001

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		CONTAINER	EV (113701, DCM, "X-Ray Radiation Dose Report")	1	M		Root node

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, "Procedure reported")	1	M		DT (113704, DCM, "Projection X-Ray")
>>	HAS CONCEPT MOD	CODE	EV (363703001, SCT, "Has Intent")	1	M		DCID 3629 “Procedure Intent” See 10.6.1.2, value is user selectable from Additional Information screen.
>		INCLUDE	DTID 1002 “Observer Context”	1	M		See 10.7.1.2
>	HAS OBS CONTEXT	CODE	EV (113705, DCM, "Scope of Accumulation")	1	M		DCID 10000 “Scope of Accumulation” Value set to (113016, DCM, “ Performed Procedure Step”)
>>	HAS PROPERTIES	UIDREF	DCID 10001 “UID Type” (121126, DCM, “Performed Procedure Step SOP Instance UID”)	1	M		Value generated by the system.
>	CONTAINS	CODE	EV (113945, DCM, "X-Ray Detector Data Available")	1	U		DCID 230 “Yes-No” Value set to (373066001, SCT, “Yes”)
>	CONTAINS	CODE	EV (113943, DCM, "X-Ray Source Data Available")	1	U		DCID 230 “Yes-No” Value set to (373066001, SCT, “Yes”)
>	CONTAINS	CODE	EV (113944, DCM, "X-Ray Mechanical Data Available")	1	U		DCID 230 “Yes-No” Value set to (373066001, SCT, “Yes”)
>	CONTAINS	INCLUDE	DTID 10002 “Accumulated X-Ray Dose”	1	MC	IFF Single Plane system	$Plane = EV (113622, DCM, "Single Plane"). See section 10.7.1.3.
>	CONTAINS	INCLUDE	DTID 10003 “Irradiation Event X-Ray Data”	1-n	MC	Condition met	All Irradiation events from the exam are recorded. See section 10.7.1.4.
>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		Value set to Comment from Patient Information screen.

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
>	CONTAINS	CODE	EV (113854, DCM, "Source of Dose Information")	1	M		DCID 10020 “Source of Projection X-Ray Dose Information” Value set to (113940, DCM, "System Calculated")

10.7.1.2 Template ID 1002 Observer Context

Only one observer context instance is contained in the report.

TABLE 10-14 TID 1002

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
	HAS OBS CONTEXT	CODE	EV (121005, DCM, "Observer Type")	1	M	IF Observer type is device	Value set to (121007, DCM, "Device")
	HAS OBS CONTEXT	UIDREF	EV (121012, DCM, "Device Observer UID")	1	M		Value set to UID of the Device
	HAS OBS CONTEXT	TEXT	EV (121013, DCM, "Device Observer Name")	1	U		Value set to Station Name entered by user
	HAS OBS CONTEXT	TEXT	EV (121014, DCM, "Device Observer Manufacturer")	1	U		Value set to “GE Healthcare Surgery”
	HAS OBS CONTEXT	TEXT	EV (121015, DCM, "Device Observer Model Name")	1	U		Value set to Model Name of the system
	HAS OBS CONTEXT	TEXT	EV (121016, DCM, "Device Observer Serial Number")	1	U		Value set to Serial Number of the system
	HAS OBS CONTEXT	TEXT	EV (121017, DCM, "Device Observer Physical Location During Observation")	1	U		Value set to Station Name entered by user

10.7.1.3 Template ID 10002 Accumulated X-Ray Dose

TABLE 10-15 TID 10002

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/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		Value set to (113622, DCM, "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		DCID 10010 “Dose Measurement Device” Value set to (15869005, SCT, "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.	Units – 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.	
>	CONTAINS	INCLUDE	DTID 10004 “Accumulated Fluoroscopy and Acquisition Projection X-Ray Dose”	1	MC	Projection X-RAY and Row 4 is absent	See section 10.7.1.3.1.

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
>	CONTAINS	INCLUDE	DTID 10007 “Accumulated Total Projection Radiography Dose”	1	MC	Projection X-RAY and Row 4 is absent	See section 10.7.1.3.2.
>	CONTAINS	INCLUDE	DTID 1021 “Device Participant”	1	MC	Required if the irradiating device is not the recording device and the dose was accumulated on a single device.	Present. See section 10.7.1.3.3

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

TABLE 10-16 TID 10004

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		NUM	EV (113726, DCM, "Fluoro Dose Area Product Total")	1	MC	Fluoroscopy provided by system	Units - Gy.m2
		NUM	EV (113728, DCM, "Fluoro Dose (RP) Total")	1	MC	Fluoroscopy provided by system	Units - Gy
		NUM	EV (113730, DCM, "Total Fluoro Time")	1	MC	Fluoroscopy provided by system	Units - s (seconds)
		NUM	EV (113727, DCM, "Acquisition Dose Area Product Total")	1	MC	Digital Spot and Digital Cine	Units - Gy.m2
		NUM	EV (113729, DCM, "Acquisition Dose (RP) Total")	1	MC	Digital Spot and Digital Cine	Units - Gy
		NUM	EV (113855, DCM, "Total Acquisition Time")	1	MC	Digital Spot and Digital Cine	Units - s (seconds)

10.7.1.3.2 Template ID 10007 Accumulated Total Projection Radiography Dose

TABLE 10-17 TID 10007

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint

		NUM	EV (113722, DCM, "Dose Area Product Total")	1	M		Units - Gy.m2
		NUM	EV (113725, DCM, "Dose (RP) Total")	1	MC	Row 18 is not MPPS Content	Units - Gy
		NUM	EV (113731, DCM, "Total Number of Radiographic Frames")	1	U		Units – no units.

10.7.1.3.3 Template ID 1021 Device Participant

TABLE 10-18 TID 1021

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		CODE	EV (113876, DCM, "Device Role in Procedure")	1	M		Value set to (113859, DCM, "Irradiating Device")
>	HAS PROPERTIES	TEXT	EV (113877, DCM, "Device Name")	1	U		Value set to system's AE Title
>	HAS PROPERTIES	TEXT	EV (113878, DCM, "Device Manufacturer")	1	M		Value set to "GE Healthcare Surgery"
>	HAS PROPERTIES	TEXT	EV (113879, DCM, "Device Model Name")	1	M		Value set to Model Name of the system
>	HAS PROPERTIES	TEXT	EV (113880, DCM, "Device Serial Number")	1	M		Value set to Device Serial Number of the system
>	HAS PROPERTIES	UIDREF	EV (121012, DCM, "Device Observer UID")	1	M		Value set to UID of the Device

10.7.1.4Template ID 10003 Irradiation Event X-Ray Data

TABLE 10-19 TID 10003

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/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		Value set to (113622, DCM, "Single Plane")

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
>	CONTAINS	UIDREF	EV (113769, DCM, "Irradiation Event UID")	1	M		Value generated by the system
>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		Value set to DateTime of the irradiation event
>	CONTAINS	CODE	EV (113721, DCM, "Irradiation Event Type")	1	M		Value set to (44491008, SCT, “Fluoroscopy”)
>	CONTAINS	TEXT	EV (125203, DCM, "Acquisition Protocol")	1	U		Value set to Protocol Description on the Additional Information screen.
>	CONTAINS	CODE	EV (113745, DCM, "Patient Table Relationship")	1	U		The value set for the from the user interface conforming to DCID 21 "Patient Equipment Relationship"
>	CONTAINS	CODE	EV (113743, DCM, "Patient Orientation")	1	U		The value set for the from the user interface conforming to DCID 19 "Patient Orientation"
>>	HAS CONCEPT MOD	CODE	EV (113744, DCM, "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, DCM, "Target Region")	1	M		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	IMAGE	EV (113795, DCM, "Acquired Image")	1-n	MC	IFF image is stored to PACS	
>	CONTAINS	INCLUDE	DTID 10003B “Irradiation Event X-Ray Source Data”	1	MC	Row 9 ("X-Ray Source Data Available") set to Yes	See 10.7.1.4.1

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
>	CONTAINS	INCLUDE	DTID 10003C “Irradiation Event X-Ray Mechanical Data”	1	MC	Row 10 ("X-Ray Mechanical Data Available") set to Yes	See 10.7.1.4.2

10.7.1.4.1 Template ID 10003B Irradiation Event X-Ray Source Data

TABLE 10-20 TID 10003B

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		NUM	EV (113738, DCM, "Dose (RP)")	1	MC	Projection X-ray and Row 18 ("Source of Dose Information") not MPPS Content	Units - Gy
		CODE	EV (113780, DCM, "Reference Point Definition")	1	MC	IF Row 1 ("Dose (RP)") is present	DCID 10025 “Radiation Dose Reference Points” Value set to (113861, DCM, “30cm in Front of Image Input Surface”)
		CODE	EV (113732, DCM, "Fluoro Mode")	1	UC	Fluoroscopy	DCID 10004 “Fluoro Modes” Value set to Continuous or Pulsed, depending on mode used
		NUM	EV (113791, DCM, "Pulse Rate")	1	MC	IFF Mode = Pulsed	Units – pulse/s
		NUM	EV (113768, DCM, "Number of Pulses")	1	MC	IFF Mode = Pulsed	No units
		NUM	EV (113793, DCM, "Pulse Width")	1	U	IFF Mode = Pulsed	Units – ms (milliseconds)
		NUM	EV (113742, DCM, "Irradiation Duration")	1	U		Units – s (seconds)
		NUM	EV (113733, DCM, "KVP")	1	M		Units – kV

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		NUM	EV (113734, DCM, "X-Ray Tube Current")	1	MC	IF Exposure is not present (may be present otherwise)	Units - mA
		NUM	EV (113767, DCM, "Average X-Ray Tube Current")	1	U		Units – mA
		NUM	EV (113824, DCM, "Exposure Time")	1	MC	IF Exposure is not present (may be present otherwise)	Units – ms (milliseconds)
		NUM	EV (113736, DCM, "Exposure")	1	MC	IF X-Ray Tube Current or Exposure Time is not present (may be present otherwise)	Units – uA.s
		NUM	EV (113766, DCM, "Focal Spot Size")	1	U		Units – mm
		CODE	EV (111632, DCM, "Anode Target Material")	1	U		DCID 10016 “Anode Target Material” Value set to (26194003, SCT, “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” Value set to (113650, DCM, “Strip filter”)
>	CONTAINS	CODE	EV (113757, DCM, "X-Ray Filter Material")	1	U		DCID 10006 “X-Ray Filter Materials” Value set to (12503006 , SCT, “Aluminum”)
>	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

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		NUM	EV (113790, DCM, "Collimated Field Area")	1	U		Units – m2
		CODE	EV (111635, DCM, "X-Ray Grid")	1	U		DCID 10017 “X-Ray Grid” Value set to Fixed Grid or No Grid, depending on if grid is inserted.

10.7.1.4.2 Template ID 10003C Irradiation Event X-Ray Mechanical Data

TABLE 10-21 TID 10003C

NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value/Value Set Constraint
		NUM	EV (112011, DCM, "Positioner Primary Angle")	1	UC		Units – deg Set to “Value Unknown” for non-MD systems.
		NUM	EV (112012, DCM, "Positioner Secondary Angle")	1	UC		Units – deg Set to “Value Unknown” for non-MD systems.
		NUM	EV (113739, DCM, "Positioner Primary End Angle")	1	UC		Units – deg Set to “Value Unknown” for non-MD systems.
		NUM	EV (113740, DCM, "Positioner Secondary End Angle")	1	UC		Units – deg Set to “Value Unknown” for non-MD systems.
		NUM	DCID 10008 “Dose Related Distance Measurements” (113737, DCM, “Distance Source to Reference Point”)	1-n	U		Units – mm Value set to 700
		NUM	DCID 10008 “Dose Related Distance Measurements” (113750, DCM, “Distance Source to Detector”)	1-n	U		Units – mm Value set to 1000

10.7.2 Standard Extended Templates

This product does not support extensions to the standard templates for SOP Instances created by this product.

MODALITY WORKLIST QUERY IMPLEMENTATION

11.1 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.

11.2 OEC ELITE MAPPING OF DICOM ENTITIES

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

TABLE 11-1 MWL MAPPING OF DICOM ENTITIES TO OEC ELITE ENTITIES

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

11.3 IOD MODULE TABLE

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

TABLE 11-2 MWL IOD MODULES

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	11.4.1.1
	Scheduled Procedure Step	11.4.1.2
Requested Procedure	Requested Procedure	11.4.2.1
Imaging Service Request	Imaging Service Request	11.4.3.1
Visit	Visit Identification	Not used.
	Visit Status	Not used.
	Visit Relationship	Not used.
	Visit Admission	11.4.4.1
Patient	Patient Relationship	Not used.
	Patient Identification	11.4.5.1
	Patient Demographic	11.4.5.2
	Patient Medical	11.4.5.3

11.4 WORKLIST QUERY MODULE DEFINITIONS

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

11.4.1 Common Scheduled Procedure Step Entity Modules

11.4.1.1 SOP Common Module

These attributes are not part of the Worklist Information Model but are included in the C-FIND request identifier.

TABLE 11-3 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.

11.4.1.1.1 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.

11.4.1.2 Scheduled Procedure Step Module

Unless specified otherwise, all attributes listed are requested with an empty value.

TABLE 11-4 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	

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
>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. This value is displayed on the Scheduled Exams 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. This value is displayed on the Scheduled Exams screen.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1 *	No / No	Value is always sent as empty. This value is displayed on the Scheduled Exams screen.
>Modality	(0008,0060)	R	1 *	No / Yes	Matching is supported and can be set to XA, RF, SC, CR or All (which is empty in the request). This value is displayed on the Scheduled Exams screen.
>Scheduled Performing Physician's Name	(0040,0006)	R	2 *	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 may be truncated and will be shown with an ellipsis (…) to show the truncation. The value is displayed in full on the Patient Information screen. Mapped to “Performing Physician’s Name” (0008,1050) in Image Instance and MPPS. Not mapped to RDSR instance.
>Scheduled Procedure Step Description	(0040,0007)	O	1C *	Yes / Yes	Displayed on Additional information screen. Mapped to “Performed Procedure Step Description” in RDSR Instance.
>Scheduled Station Name	(0040,0010)	O	2	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. Not displayed.

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
>Scheduled Protocol Code Sequence	(0040,0008)	O	1C	Yes / Yes	Mapped to (0040,0260) in RDSR Instance. Present in Image Instance as (0040,0008).
>>Code Value	(0008,0100)	O	1C *	Yes / Yes	Displayed on Additional information screen.
>>Coding Scheme Designator	(0008,0102)	O	1C *	Yes / Yes	Displayed on Additional information screen.
>>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	No truncation of this value occurs in the transfer of this value to the Instance. Displayed on Patient Information screen.

Note: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.1.2.1 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 Elite Workstation AE has the same AE Title for all DICOM services.

11.4.2 Common Requested Procedure Entity Modules

Unless specified otherwise, all attributes listed are requested with an empty value.

11.4.2.1 Requested Procedure Module

TABLE 11-5 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 to the Instance or on the Scheduled Exams screen. The value is displayed in full on the Patient Information screen.
Requested Procedure Description	(0032,1060)	O	1C *	Yes / Yes	No truncation of this value occurs in the transfer of this value to the Instance. Displayed on the Additional Information screen.
Requested Procedure Code Sequence	(0032,1064)	O	1C	Yes / Yes	Mapped to "Procedure Code Sequence" in Image Instance. Present in RDSR Instance as (0032,1064).
>Code Value	(0008,0100)	O	1C *	Yes / Yes	Displayed on Patient Information screen.
>Coding Scheme Designator	(0008,0102)	O	1C *	Yes / Yes	Displayed on Patient Information screen.
>Code Meaning	(0008,0104)	O	3 *	Yes / Yes	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 may be truncated and will be shown with an ellipsis (…) to show the truncation. The value is displayed in full on the Patient Information screen.
Study Instance UID	(0020,000D)	O	1 *	Yes / Yes	Displayed on Additional Information screen.
Referenced Study Sequence	(0008,1110)	O	2	Yes / Yes	Used to support Query Retrieve.
>Referenced SOP Class UID	(0008,1150)	O	1	Yes / Yes	See section 2.3.1 for the list of SOP Class UIDs supported by the Elite Workstation. Not displayed.
>Referenced SOP Instance UID	(0008,1155)	O	1	Yes / Yes	Not displayed.
Reason for the Requested Procedure	(0040,1002)	O	3	Yes / No	Only mapped to RDSR Instance. Not displayed.

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Reason for Requested Procedure Code Sequence	(0040,100A)	O	3	Yes / No	Only mapped to RDSR Instance. Not displayed.

Note: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.2.1.1 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.

11.4.3 Common Imaging Service Request Entity Modules

Unless specified otherwise, all attributes listed are requested with an empty value.

11.4.3.1Imaging Service Request Module

TABLE 11-6 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 to the Instance or in the display on the Scheduled Exam screen. The value is displayed in full on the Patient Information screen.
Issuer of Accession Number Sequence	(0008,0051)	O	3	Yes / Yes	Only mapped to RDSR Instance. Not displayed.

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Referring Physician's Name	(0008,0090)	O	2 *	Yes / Maybe	No truncation of this value occurs in the transfer of this value to the Instance. Displayed on Patient Information screen. This value will also be used as Physician Name if the "Scheduled Performing Physician's Name" attribute is empty. Mapped to MPPS if "Scheduled Performing Physician's Name" is empty.
Placer Order Number / Imaging Service Request	(0040,2016)	O	3	Yes / Yes	Only mapped to RDSR Instance. Not displayed.
Filler Order Number / Imaging Service Request	(0040,2017)	O	3	Yes / Yes	Only mapped to RDSR Instance. Not displayed.

Note: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.4 Common Visit Entity Modules

Unless specified otherwise, all attributes listed are requested with an empty value.

11.4.4.1Visit Admission

TABLE 11-7 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	Only mapped to RDSR Instance. Not displayed.
Admitting Diagnoses Code Sequence	(0008,1084)	O	3	Yes / No	Only mapped to RDSR Instance. Not displayed.
>Include "Code Sequence Macro"					

Note: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.5 Common Patient Entity Modules

Unless specified otherwise, all attributes listed are requested with an empty value.

11.4.5.1 Patient Identification

TABLE 11-8 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 may be truncated and will be shown with an ellipsis (…) 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. 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 may be truncated and will be shown with an ellipsis (…) to show the truncation. The value is displayed in full on the Patient Information 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: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.5.2 Patient Demographic

TABLE 11-9 MWL PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance / MPPS	Note
Patient's Birth Date	(0010,0030)	O	2 *	Yes / Yes	No truncation of this value occurs in the transfer of this value to the Instance. 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. 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: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

11.4.5.3 Patient Medical

TABLE 11-10 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.
Allergies	(0010,2110)	O	2	No / No	Not displayed.

Note: * in the *Expected Return Key Type* column indicates that this information is displayed on screen, if available.

MODALITY PERFORMED PROCEDURE STEP IMPLEMENTATION

12.1 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.

12.2 RELATIONSHIP BETWEEN SCHEDULED AND PERFORMED PROCEDURE STEPS

The OEC Elite 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).

12.3 IOD MODULE TABLE

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

TABLE 12-1 MPPS IOD MODULES

Module Name	Reference
SOP Common	12.4.1
Performed Procedure Step Relationship	12.4.2
Performed Procedure Step Information	12.4.3
Image Acquisition Results	12.4.4
Billing and Material Management Code	12.4.5

12.4 MODALITY PERFORMED PROCEDURE STEP MODULE DEFINITIONS

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

12.4.1 SOP Common Module

TABLE 12-2 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.

12.4.2 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 12-3 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 Attribute Sequence	(0040,0270)	1, Sequence containing 11 mostly empty items.	1, Sequence containing 12 items populated with data from the MWL.
>Study Instance UID	(0020,000D)	1, Generated by the system	1, Value from MWL
>Referenced Study Sequence	(0008,1110)	2, Empty sequence	2, Values from MWL
>>Referenced SOP Class UID	(0008,1150)	1, Not sent	1, Value from MWL
>>Referenced SOP Instance UID	(0008,1155)	1, Not sent	1, Value from MWL
>Accession Number	(0008,0050)	2, Entered by user	2, Value from MWL
>Issuer of Accession Number Sequence	(0008,0051)	3, Not sent	3, Values from MWL. Sent only if present in MWL
>>Local Namespace Entity ID	(0040,0031)	1C, Not sent	1C, Value from MWL
>>Universal Entity ID	(0040,0032)	1C, Not sent	1C, Value from MWL
>>Universal Entity ID Type	(0040,0033)	1C, Not sent	1C, Value from MWL
>Placer Order Number/Imaging Service Request	(0040,2016)	3, Empty	3, Value from MWL
>Order Placer Identifier Sequence	(0040,0026)	3, Not sent	3, Not sent
>Filler Order Number/Imaging Service Request	(0040,2017)	3, Empty	3, Value from MWL
>Order Filler Identifier Sequence	(0040,0027)	3, Not sent	3, Not sent
>Requested Procedure ID	(0040,1001)	2, Empty	2, Value from MWL
>Requested Procedure Code Sequence	(0032,1064)	3, Empty sequence	3, Values from MWL

Attribute Name	Tag	Type for SCU: N-CREATE	
		Acquisition without MWL Entry	Acquisition with MWL Entry
>>Code Value	(0008,0100)	1C, Not sent	1C, Value from MWL
>>Coding Scheme Designator	(0008,0102)	1C, Not sent	1C, Value from MWL
>>Coding Scheme Version	(0008,0103)	1C, Not sent	1C, Value from MWL, else not sent.
>>Code Meaning	(0008,0104)	1, Not sent	1, Value from MWL
>Requested Procedure Description	(0032,1060)	2, Empty	2, Value from MWL
>Scheduled Procedure Step ID	(0040,0009)	2, Empty	2, Value from MWL
>Scheduled Procedure Step Description	(0040,0007)	2, Empty	2, Value from MWL
>Scheduled Protocol Code Sequence	(0040,0008)	2, Empty sequence	2, Values from MWL
>>Code Value	(0008,0100)	1C, Not sent	1C, Value from MWL
>>Coding Scheme Designator	(0008,0102)	1C, Not sent	1C, Value from MWL
>>Coding Scheme Version	(0008,0103)	1C, Not sent	1C, Value from MWL, else not sent.
>>Code Meaning	(0008,0104)	1, Not sent	1, Value from MWL
Patient's Name	(0010,0010)	2, Entered by user	2, Value from MWL
Patient ID	(0010,0020)	2, Entered by user	2, Value from MWL
Issuer of Patient ID	(0010,0021)	3, Empty	3, Value from MWL
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	3, Not sent	3, Values from MWL. Sent only if present in MWL
>Universal Entity ID	(0040,0032)	3, Not sent	3, Value from MWL
>Universal Entity ID Type	(0040,0033)	1C, Not sent	1C, Value from MWL
Other Patient IDs Sequence	(0010,1002)	3, Not sent	3, Not sent
Patient's Birth Date	(0010,0030)	2, Entered by user	2, Value from MWL
Patient's Sex	(0010,0040)	2, Entered by user	2, Value 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 Sequence	(0038,0014)	3, Not sent	3, Not sent
Service Episode ID	(0038,0060)	3, Not sent	3, Not sent
Issuer of Service Episode ID Sequence	(0038,0064)	3, Not sent	3, Not sent
Service Episode Description	(0038,0062)	3, Not sent	3, Not sent

12.4.3 Performed Procedure Step Information Module

TABLE 12-4 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	-	Value set to Procedure Step ID on the Additional Information screen. Value set by MWL, entered by user, or set to "PPS Step ID" by the system.
Performed Station AE Title	(0040,0241)	1	-	Value set to system configuration for AE Title.
Performed Station Name	(0040,0242)	2	-	Value set to system configuration for Station Name.
Performed Location	(0040,0243)	2	-	Value set to empty.
Performed Procedure Step Start Date	(0040,0244)	1	-	Value set to date when procedure step started. For first procedure step, this is the first x-ray of the exam. Format: YYYYMMDD.
Performed Procedure Step Start Time	(0040,0245)	1	-	Value set to time when procedure step started. For first procedure step, this is the first x-ray of the exam. Format: HHMMSS.
Performed Procedure Step Status	(0040,0252)	1	3	N-CREATE: Value set to "IN PROGRESS" (Started but not complete) N-SET: Value set to "COMPLETED" (Successfully completed) for completed exams. Value set to "DISCONTINUED" (Canceled or unsuccessfully terminated) for abandoned exams.
Performed Procedure Step Description	(0040,0254)	2	3	Value set to Procedure Step Description on the Additional Information screen. Value set by MWL or entered by user.
Performed Procedure Type Description	(0040,0255)	2	3	Value set to Procedure Description on the Patient Information screen. Value set by MWL or entered by user.
Procedure Code Sequence	(0008,1032)	2	3	For MWL, set to values sent from MWL if they weren't modified by the user prior to the start of the procedure step. For manual data entry, set to values entered by user on the Patient Information screen. All three values (Code, Designator, Description) must be present. For appended steps: sequence will be empty.
>Code Value	(0008,0100)	1C	3	Value set by MWL or entered by user.
>Coding Scheme Designator	(0008,0102)	1C	1C	Value set by MWL or entered by user.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
>Coding Scheme Version	(0008,0103)	1C	1C	Value set by MWL, else not sent.
>Code Meaning	(0008,0104)	3	3	Value set by MWL or entered by user.
Reason For Performed Procedure Code Sequence	(0040,1012)	3	3	Not sent.
Performed Procedure Step End Date	(0040,0250)	2	3	N-CREATE: Value set to empty. N-SET: Value set to date when the user 'ends' the exam from the user interface. Format: YYYYMMDD.
Performed Procedure Step End Time	(0040,0251)	2	3	N-CREATE: Value set to empty. N-SET: Value set to time when the user 'ends' the exam from the user interface. Format: HHMMSS
Comments on the Performed Procedure Step	(0040,0280)	3	3	Not sent.
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	3	3	N-CREATE: Set to an empty sequence. N-SET: Only present when user 'abandons' an exam. Contains the sequence values the user selected from the user interface when 'abandoning' an exam.
>Code Value	(0008,0100)	1C	3	N-CREATE: Not sent N-SET: Value selected from user interface
>Coding Scheme Designator	(0008,0102)	1C	1C	N-CREATE: Not sent N-SET: Value selected from user interface
>Coding Scheme Version	(0008,0103)	1C	1C	Not sent.
>Code Meaning	(0008,0104)	1	1	N-CREATE: Not sent N-SET: Value selected from user interface

12.4.4 Image Acquisition Results Module

TABLE 12-5 MPPS IMAGE ACQUISITION RESULTS MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Modality	(0008,0060)	1	-	Value set to either: modality sent in the MWL or default configured DICOM Store server's modality (manual exams). Else set to "RF".

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Study ID	(0020,0010)	2	-	Value set to Study ID on the Patient Information screen. Value set by MWL, entered by user, or generated by the system.
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)	1C	3	Not sent.
>Coding Scheme Designator	(0008,0102)	1C	1C	Not sent.
>Coding Scheme Version	(0008,0103)	1C	1C	Not sent.
>Code Meaning	(0008,0104)	3	3	Not sent.
Performed Series Sequence	(0040,0340)	2	3	Sent as an empty sequence for N-CREATE in all cases. Sent with values from MWL or entered by user for N-SET.
>Performing Physician's Name	(0008,1050)	2	2	N-CREATE: Not sent. N-SET: Value set to Physician's Name on Patient Information screen.
>Protocol Name	(0018,1030)	1	1	N-CREATE: Not sent. N-SET: Value set to Protocol Description on the Additional Information screen.
>Operators' Name	(0008,1070)	2	2	N-CREATE: Not sent. N-SET: Value set to empty.
>Series Instance UID	(0020,000E)	1	1	N-CREATE: Not sent. N-SET: Value created by the system for this series, which contains the images for this procedure setup.
>Series Description	(0008,103E)	2	2	N-CREATE: Not sent. N-SET: Value set to Protocol Description on the Additional Information screen.
>Retrieve AE Title	(0008,0054)	2	2	N-CREATE: Not sent. N-SET: Value set to the default configured DICOM Store server's AE Title.
> Archive Requested	(0040,A494)	3	3	Not sent.
>Referenced Image Sequence	(0008,1140)	2	2	N-CREATE: Not sent. N-SET: Contain the list of all images saved to the exam prior to exam completion.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
>>Referenced SOP Class UID	(0008,1150)	1	1	N-CREATE: Not sent. N-SET: Value set to the SOP Class UID of the default configured DICOM Store server.
>>Referenced SOP Instance UID	(0008,1155)	1	1	N-CREATE: Not sent. N-SET: Value set to the SOP Instance UID used for storage.
>>Container Identifier	(0040,0512)	3	3	Not sent.
>>Specimen Description Sequence	(0040,0560)	3	3	Not sent.
>>>Specimen Identifier	(0040,0551)	1	1	Not sent.
>>>Specimen UID	(0040,0554)	1	1	Not sent.
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2	2	N-CREATE: Not sent. N-SET: Contains the RDSR stored to PACS prior to exam completion for this procedure step.
>>Referenced SOP Class UID	(0008,1150)	1	1	N-CREATE: Not sent. N-SET: Set to the RDSR SOP Class UID.
>>Referenced SOP Instance UID	(0008,1155)	1	1	N-CREATE: Not sent. N-SET: Set to the RDSR Instance UID used for storage for this procedure step.

12.4.5 Billing and Material Management Code Module

TABLE 12-6 MPPS BILLING AND MATERIAL MANAGEMENT CODE 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.
>Include "Code Sequence Macro"		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.
>>Include "Code Sequence Macro"		3	3	Not sent.

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
>Quantity Sequence	(0040,0293)	3	3	Not sent.
>>Quantity	(0040,0294)	3	3	Not sent.
>>Measuring Units Sequence	(0040,0295)	3	3	Not sent.
>>>*Include "Code Sequence Macro"*		3	3	Not sent.

STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION

13.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION

Refer to DICOM PS3.3 for descriptions of the 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.

13.1.1 Storage Commitment Module for N-ACTION

TABLE 13-1 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 SOP Class of the stored object.	
>Referenced SOP Instance UID	(0008,1155)	Set to the SOP Instance UID of the stored DICOM object.	
>Storage Media File-Set ID	(0088,0130)	Not used	Not used
>Storage Media File-Set UID	(0088,0140)	Not used	Not used

13.1.2 Storage Commitment Module for N-EVENT-REPORT

TABLE 13-2 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	
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 13.1.2.1 for the list of processed values.	

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

When receiving a N-Event-Report request with an 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 13-3 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

14.1 IOD MODULE TABLE

Table 14-1 identifies the defined modules within the entities which comprise the Basic Directory IOD. Modules are identified by Module Name.

TABLE 14-1 BASIC DIRECTORY IOD MODULES

Entity Name	Module Name	Reference
File Set Identification	File-set Identification	14.2.1
Directory Information	Directory Information	14.2.2

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

14.2 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.

14.2.1 File-Set Identification Module

TABLE 14-2 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”.
File-set Descriptor File ID	(0004,1141)	3	Not used
Specific Character Set of File-set Descriptor File	(0004,1142)	1C	Not used

14.2.2 Directory Information Module

TABLE 14-3 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

Attribute Name	Tag	Type	Attribute Description
File-set Consistency Flag	(0004,1212)	1	FSC/FSU: Value set to “0000H” (no known inconsistencies)
Directory Record Sequence	(0004,1220)	2	Is created by FSC
>Offset of the Next Directory Record	(0004,1400)	1	Is set
>Record In-use Flag	(0004,1410)	1	FSC/FSU: Value set to “FFFFH” (record is in use) FSR: Value set to “0000H” (imply skipping this record)
>Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1	Is set
>Directory Record Type	(0004,1430)	1	The values supported by FSC and FSU 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
>Include Record Selection Keys			See 14.2.3.

14.2.3 Definition of Specific Directory Records

14.2.3.1 Patient Directory Record Definition

TABLE 14-4 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	Value set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.
Patient ID	(0010,0020)	1	Value 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	Value set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.
Patient's Sex	(0010,0040)	3	Value set by the FSC/FSU as defined in 4.2.1.1. FSR support reads the value as stored.

14.2.3.2 Study Directory Record Definition

TABLE 14-5 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	Value set by the FSC/FSU as defined in 4.2.2.1. FSR support reads the value as stored.
Study Time	(0008,0030)	1	Value set by the FSC/FSU as defined in 4.2.2.1. FSR support reads the value as stored.
Study Description	(0008,1030)	2	Value set by the FSC/FSU as defined in 4.2.2.1. FSR support reads the value as stored.
Study Instance UID	(0020,000D)	1C	Value set by the FSC/FSU as defined in 4.2.2.1. FSR support reads the value as stored.
Study ID	(0020,0010)	1	Value set by the FSC/FSU as defined in 4.2.2.1.
Accession Number	(0008,0050)	2	Value set by the FSC/FSU as defined in 4.2.2.1. FSR support reads the value as stored.

14.2.3.3 Series Directory Record Definition

TABLE 14-6 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	Value set by the FSC/FSU as defined in 4.2.3.1. FSR support reads the value as stored.
Series Instance UID	(0020,000E)	1	Value set by the FSC/FSU as defined in 4.2.3.1.
Series Number	(0020,0011)	1	Value set by the FSC/FSU as defined in 4.2.3.1.
Icon Image Sequence	(0088,0200)	3	Not used
Performing Physician's Name	(0008,1050)	3	Value set by the FSC/FSU as defined in 4.2.3.1.

14.2.3.4 Image Directory Record Definition

TABLE 14-7 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	Value set by the FSC/FSU as defined in 4.2.6.1.
Icon Image Sequence	(0088,0200)	3	See 14.2.3.4.1.
>Include "Image Pixel Macro"			See 14.2.3.4.1.
Image Type	(0008,0008)	3	Value set by the FSC/FSU as defined in 4.2.6.1.
Number of Frames	(0028,0008)	3	Value set by the FSC/FSU as defined in 5.4.1.2, if the image is multi-frame.

14.2.3.4.1 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.

14.2.3.4.2 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. This is defined in section 14.3.

14.2.3.5 SR Document Directory Record Definition

TABLE 14-8 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	Value set by the FSC/FSU as defined in section 10.4.4.1.
Completion Flag	(0040,A491)	1	Value set by the FSC/FSU as defined in section 10.4.4.1.
Verification Flag	(0040,A493)	1	Value set by the FSC/FSU as defined in section 10.4.4.1.
Content Date	(0008,0023)	1	Value set by the FSC/FSU as defined in section 10.4.4.1.
Content Time	(0008,0033)	1	Value set by the FSC/FSU as defined in section 10.4.4.1.
Verification DateTime	(0040,A030)	1C	Not used.
Concept Name Code Sequence	(0040,A043)	1	This information is found in section 10.4.4.2, which defines the content of the report.
>Include "Code Sequence Macro"			
Content Sequence	(0040,A730)	1C	This information is found in section 10.4.4.2, which defines the content of the report.
>Relationship Type	(0040,A010)	1	This information is found in section 10.4.4.2, which defines the content of the report.
>The SR content starts 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 10.7.1.1

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.

14.3 PRIVATE DATA DICTIONARY

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

TABLE 14-9 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

15.1 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.

15.2 BASIC FILM SESSION SOP CLASS

15.2.1 Basic Film Session N-CREATE Attributes

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

TABLE 15-1 BASIC FILM SESSION N-CREATE ATTRIBUTES

Attribute name	Tag	Use
Specific Character Set	(0008,0005)	Not used
Number of Copies	(2000,0010)	User configurable
Print Priority	(2000,0020)	User configurable. Possible Enumerated Values: HIGH or MED or LOW or empty
Medium Type	(2000,0030)	User configurable. Possible Defined Terms: PAPER or CLEAR FILM or BLUE FILM or empty
Film Destination	(2000,0040)	User configurable. Possible Defined Terms: MAGAZINE or PROCESSOR or empty
Film Session Label	(2000,0050)	Not used
Memory Allocation	(2000,0060)	Not used
Owner ID	(2100,0160)	Not used

15.2.2 Basic Film Session N-DELETE

This is sent after the Presentation LUT N-DELETE.

15.3 BASIC FILM BOX SOP CLASS

15.3.1 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 15-2 BASIC FILM BOX N-CREATE ATTRIBUTES

Attribute Name	Tag	Use
Image Display Format	(2010,0010)	Enumerated Values sent and range: STANDARD\C,R The values 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)	Received in N-CREATE-RSP Basic Film Session SOP Class from SCP. Sent to SCP in N-CREATE-RQ Basic Film Box SOP Class..
Referenced Image Box Sequence	(2010,0510)	Received in the N-CREATE-RSP Basic Film Session SOP Class from SCP. Not sent by SCU.
>Referenced SOP Class UID	(0008,1150)	Received in the N-CREATE-RSP Basic Film Session SOP Class from SCP. Not sent by SCU. Set to 1.2.840.10008.5.1.1.4
>Referenced SOP Instance UID	(0008,1155)	Received in the N-CREATE-RSP Basic Film Session SOP Class from SCP. 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)	User configurable. Possible Enumerated Values: PORTRAIT or LANDSCAPE
Film Size ID	(2010,0050)	User configurable. Possible Defined Terms:

Attribute Name	Tag	Use
		8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX30CM
Magnification Type	(2010,0060)	Not used
Max Density	(2010,0130)	User configurable. Range of 0-400. Default value is 300.
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)	Set to 1.2.840.10008.5.1.1.23
>Referenced SOP Instance UID	(0008,1155)	Received in N-CREATE-RSP Presentation LUT SOP Class from SCP. 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)	User configurable. Possible Defined Terms sent: BLACK or WHITE or empty
Empty Image Density	(2010,0110)	User configurable. Possible Defined Terms sent: BLACK or WHITE or empty
Min Density	(2010,0120)	User configurable. Range of 0-400. Default value is 0.
Trim	(2010,0140)	Not used
Illumination	(2010,015E)	User configurable. Range of 0-4000. Default value is 2000.
Reflected Ambient Light	(2010,0160)	User configurable. Range of 0-400. Default value is 10.
Requested Resolution ID	(2020,0050)	Not used
ICC Profile	(0028,2000)	Not used

15.3.2 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 15-3 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

15.4 BASIC GRAYSCALE IMAGE BOX SOP CLASS

15.4.1 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 15-4 BASIC GRAYSCALE IMAGE BOX N-SET ATTRIBUTES

Attribute Name	Tag	Use
Image Box 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)	Used
>Samples Per Pixel	(0028,0002)	Value set to “1”
>Photometric Interpretation	(0028,0004)	Value set to “MONOCHROME2”
>Rows	(0028,0010)	Value set to 1280
>Columns	(0028,0011)	Value set to 1280
>Pixel Aspect Ratio	(0028,0034)	Not used. Condition not met
>Bits Allocated	(0028,0100)	Dependent on the setting for Bit Depth set by the user. Value set to “8” for 8 bits depth Value set to “16” for 12 bits depth
>Bits Stored	(0028,0101)	Dependent on the setting for Bit Depth set by the user. Value set to “8” for 8 bits depth Value set to “12” for 12 bits depth
>High Bit	(0028,0102)	Dependent on the setting for Bit Depth set by the user. Value set to “7” for 8 bits depth Value set to “11” for 12 bits depth
>Pixel Representation	(0028,0103)	Value set to “0” (unsigned integer)
>Pixel Data	(7FE0,0010)	Used
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

15.5 PRINTER SOP CLASS

15.5.1 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 15-5 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.

15.5.2 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 the system behavior when receiving the N-GET response from the Printer SCP.

TABLE 15-6 PRINTER N-GET ATTRIBUTES

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

15.6 PRESENTATION LUT SOP CLASS

15.6.1 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 15-7 PRESENTATION LUT N-CREATE ATTRIBUTES

Attribute Name	Tag	Use
Presentation LUT Sequence	(2050,0010)	Not used
>LUT Descriptor	(0028,3002)	Not used
>LUT Explanation	(0028,3003)	Not used
>LUT Data	(0028,3006)	Not used
Presentation LUT Shape	(2050,0020)	Value set to "IDENTITY" (input to the Presentation LUT is in P-Values)

QUERY IMPLEMENTATION

16.1 OEC ELITE MAPPING OF DICOM ENTITIES

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

TABLE 16-1 MAPPING OF DICOM ENTITIES TO OEC ELITE ENTITIES

DICOM	OEC Elite Entity
Patient	Patient
Study	Exam
Series	Exam
Image	Image

16.2 INFORMATION MODEL KEYS

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

16.2.1 Common Query Keys

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

TABLE 16-2 Q/R PATIENT LEVEL COMMON RETRIEVE ATTRIBUTES

Attribute Name	Tag	Type	SCU Use
Specific Character Set	(0008,0005)	-	See 16.2.1.1.1.
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

16.2.1.1Q/R Common Attribute Descriptions

16.2.1.1.1 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.

16.2.2 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 16-3 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.
Patient's Birth Date	(0010,0030)	O	Always set to empty.
Patient's Sex	(0010,0040)	O	Always set to empty.

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

16.2.3 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 16-4 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 empty.
Accession Number	(0008,0050)	R*	Always set to empty.
Study ID	(0020,0010)	R*	Always set to empty.
Study Instance UID	(0020,000D)	U	Set to empty unless the MWL Studies button is used from a Referenced Study in the MWL exam.
Modalities in Study	(0008,0061)	O	Always set to empty.

Study Description	(0008,1030)	O*	Always set to empty.
Number of Study Related Instances	(0020,1208)	O	Always set to empty.

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

16.2.4 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 16-5 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 empty.
Accession Number	(0008,0050)	R*	Always set to empty.
Patient's Name	(0010,0010)	R*	Wildcard matching is requested automatically.
Patient ID	(0010,0020)	R*	Single value matching is supported.
Study ID	(0020,0010)	R*	Always set to empty.
Study Instance UID	(0020,000D)	U	Set to empty unless the MWL Studies button is used from a Referenced Study in the MWL exam.
Modalities in Study	(0008,0061)	O	Always set to empty.
Study Description	(0008,1030)	O*	Always set to empty.
Patient's Birth Date	(0010,0030)	O	Always set to empty.
Patient's Sex	(0010,0040)	O	Always set to empty.
Number of Study Related Instances	(0020,1208)	O	Always set to empty.

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

16.2.5 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 16-6 SERIES LEVEL ATTRIBUTES FOR Q/R INFORMATION MODEL

Attribute Name	Tag	Type	SCU Use
Modality	(0008,0060)	R*	Always set to empty.
Series Number	(0020,0011)	R	Always set to empty.
Series Instance UID	(0020,000E)	U	Always set to empty.
Number of Series Related Instances	(0020,1209)	O*	Always set to empty. Number may be used to display the instance count to the user in the progress bar.
Performing Physician's Name	(0008,1050)	O	Always set to empty.

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

16.2.6 Image Level

The Elite 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.

16.3 PRIVATE DATA ATTRIBUTES

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