Technical Publications

Direction **5215475-100**

Revision **2**

Reporting Tool

DICOM CONFORMANCE STATEMENT

REVISION HISTORY

Revision	Date	Reason for Change
A	Sep 25, 2007	Initial revision
1	Oct 19, 2007	After review
2	Mar 06, 2009	Added support for • Mammography CAD SR IOD • Key Object Selection Document IOD • DICOM Encapsulated PDF IOD Added changes after review.

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1. INTRODUCTION

1.1 OVERVIEW

Reporting Tool software can display DICOM reports with customizable layouts and export them in different formats to various targets. It handles DICOM Structured Reports (SR) and DICOM Encapsulated PDFs. The tool is designed to run on:

- Advantage Workstation 4.2P, 4.3, 4.4 and 4.5 (a Networked Medical Imaging Console).
- Signa HDXt and Discovery MR750 (MR Console).

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

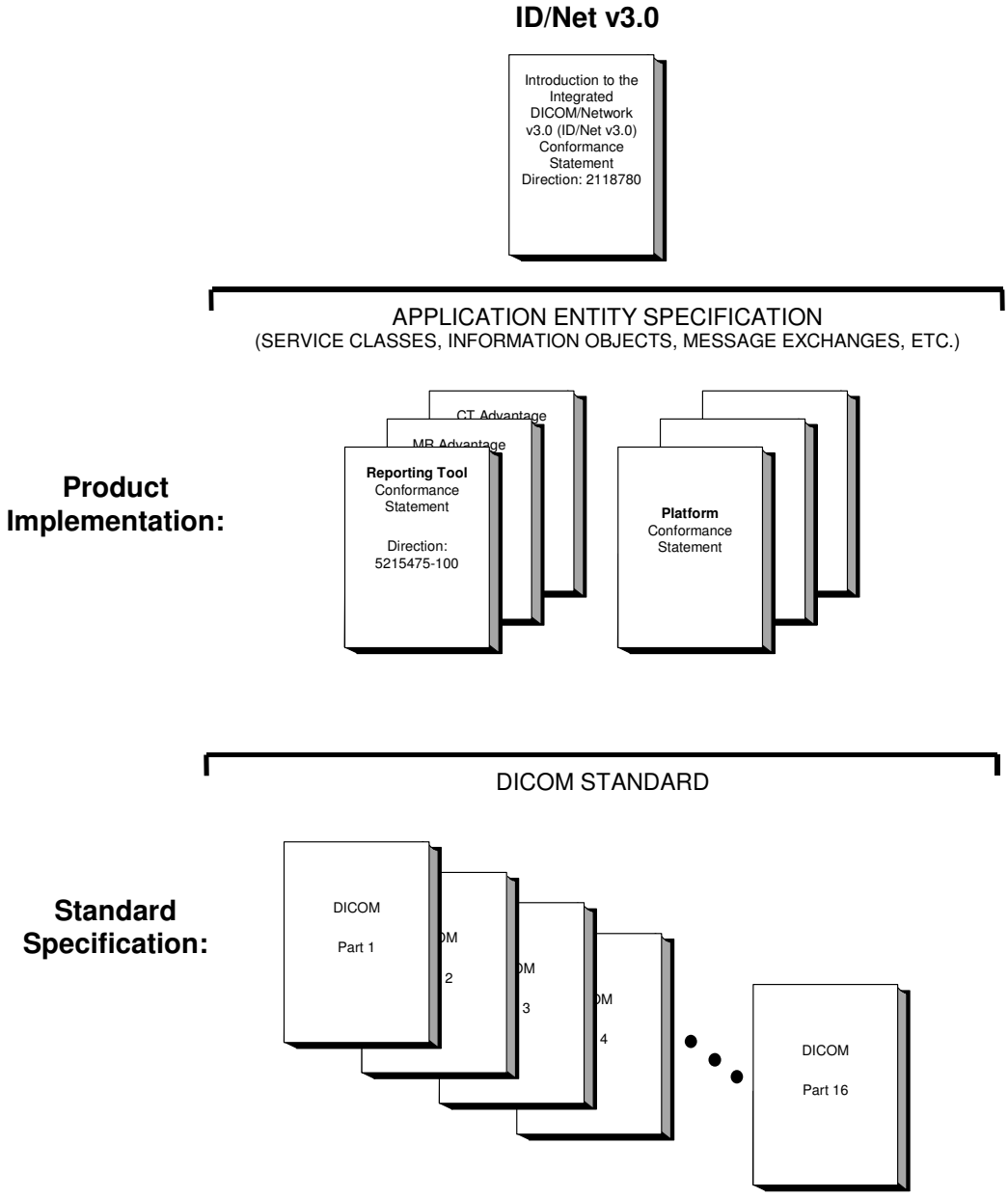
- **Section 3 (Media Storage Conformance Statement),** which specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Media Storage features.

- **Section 4 (Secondary Capture Information Object Implementation),** which specifies the GEMS equipment compliance to DICOM requirements for the implementation of a Secondary Capture Information Object.

- **Section 5 (Structured Report Document Information Object Implementation),** which specifies the GEMS equipment compliance to DICOM requirements for the implementation of a Structured Report Document Information Object.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM v3.0 Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

Reporting Tool
Conformance Statement for DICOM
Direction: ***5215475-100***

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.
The GEMS 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 including Network Architecture and basic DICOM concepts, please refer to the Introduction.
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: +1.703.841.3285

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.
If readers are unfamiliar with DICOM terminology they should first refer to the document listed below, then read the DICOM Standard itself, prior to reading this DICOM Conformance Statement document.

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM v3.0. The GEMS Conformance Statements are available to the public.
The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS 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 GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements, which are sent by GEMS devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

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

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

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

1.6 REFERENCES

A list of references, which is applicable, to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.
The Secondary Capture image, Structured Report Document and Encapsulated PDF implementation refers to:

- DICOM PS3.3-2008: Information Object Definitions
- DICOM PS 3.16-2008: Content Mapping Resource

1.6.1 Platform Conformance Statements

- Advantage Workstation 4.5 - 5324648-100
- Advantage Workstation 4.4 - 5181424-100
- Advantage Workstation 4.3 - 5138820-100
- Advantage Workstation 4.2P - 2381100-100
- Signa HDxt - DOC0489666
- Discovery MR750 - DOC0464555

1.7 DEFINITIONS

A set of definitions which is applicable to all GEMS Conformance Statements is included in *the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.
A list of definitions can also be found in the references.

1.8 SYMBOLS AND ABBREVIATIONS

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.
A list of symbols and abbreviations can also be found in the references.

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the **Reporting Tool** compliance to DICOM requirements for **Networking** features.
Reporting Tool doesn't have own Networking features, these are provided by the underlying platform. For a complete description of the Networking features conformance refer to Platform Conformance Statements.

2.2 IMPLEMENTATION MODEL

Refer to DICOM Conformance statement of the underlying platform.

2.3 AE SPECIFICATIONS

Reporting Tool creates new SR instances when:

- an existing report is modified and saved
- a patient questionnaire is filled out and saved.

Reporting Tool creates Secondary Capture (SC) Image Storage instances from the pages of a PDF report generated from a SR.
Reporting Tool creates Encapsulated PDF Storage instances from the PDF rendering of a SR.
Reporting Tool can display and update Key Object Selections but it doesn't create one from scratch.

2.3.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Class(es):

TABLE 2.3-1
SOP Classes

SOP Class Name	SOP Class UID	Role
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.**11**	SCU / SCP
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.**22**	SCU / SCP
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.**33**	SCU / SCP
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.**50**	SCU / SCP
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.**59**	SCU / SCP
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.**7**	SCU
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.**104.1**	SCU / SCP

2.3.1.2 Association Policies

2.3.1.2.1 Implementation Identifying Information

TABLE 2.3-2
DICOM Implementation Class and Version

Implementation Class UID	**1.2.840.113619.6.238**
Implementation Version Name	RPT_<software version>

2.3.1.3 Association Initiation Policy

2.3.1.3.1 Presentation Context Table

These Transfer syntaxes are supported by the **Reporting Tool** application. For transfer syntaxes used for network transfer refer to Platform Conformance Statements.

TABLE 2.3-3
Presentation Contexts

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.**11**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.**22**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.**33**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.**50**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.**59**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.**7**	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.**104.1**	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

2.4 COMMUNICATION PROFILES

Refer to Platform Conformance Statements.

2.5 SUPPORT OF EXTENDED CHARACTER SETS

Reporting Tool supports the `ISO_IR 100` (Latin alphabet No. 1) character set.

2.6 CODES AND CONTROLLED TERMINOLOGY

2.6.1 Standard coding scheme designators

This implementation makes use of the following standard coding scheme designators:

- **DCM**: DICOM Controlled Terminology; DICOM PS 3.16-2008: Content Mapping Resource, Annex D
- **SRT**: SNOMED-RT (Referenced Terminology)
- **SNM3**: SNOMED Version 3 (used for backward compatibility)
- **UCUM**: Unified Code for Units of Measure

2.6.2 Private coding scheme designators

This implementation makes use of the following private coding scheme designators:

- **99GEMS**

2.7 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.
It is assumed that the 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 the product.
2. Firewall or router protections to ensure that the 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))

3. MEDIA STORAGE CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section of the DICOM conformance statement specifies the **Reporting Tool** compliance to DICOM requirements for **Media Interchange**. It details the DICOM Media Storage Application Profiles and roles, which are supported by this product.
Reporting Tool doesn't have own Media Interchange implementation it is provided by the underlying platform. For a complete description of the Media Interchange conformance refer to Platform Conformance Statements.

4. SECONDARY CAPTURE INFORMATION OBJECT IMPLEMENTATION

Reporting Tool creates Secondary Capture (SC) Image Storage instances from the pages of a PDF report generated from a SR.

4.1 IOD MODULE TABLE

The Secondary Capture Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes. Standard Extended and Private attributes are described in Section 4.3.

TABLE 4.1-1
SC IMAGE IOD MODULES

Information Entity	Module Name	Usage	Reference
Patient	Patient	Used	4.2.1
	Clinical Trial Subject	Not used	N/A
Study	General Study	Used	4.2.2
	Patient Study	Not used	N/A
	Clinical Trial Study	Not used	N/A
Series	General Series	Used	4.2.3
	Clinical Trial Series	Not used	N/A
Equipment	General Equipment	Used	4.2.4
	SC Equipment	Used	4.2.5
Image	General Image	Used	4.2.6
	Image Pixel	Used	4.2.7
	Device	Not used	N/A
	SC Image	Used	4.2.8
	Overlay Plane	Not used	N/A
	Modality LUT	Not used	N/A
	VOI LUT	Not used	N/A
	SOP Common	Used	4.2.9

4.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the SC Information Object.
The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. 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. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

4.2.1 Patient Module

TABLE 4.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Copied from source.
Patient ID	(0010,0020)	2	Copied from source.
Patient's Birth Date	(0010,0030)	2	Copied from source.
Patient's Sex	(0010,0040)	2	Copied from source. Enumerated Values: M = male F = female O = other

4.2.2 General Study Module

TABLE 4.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Copied from source.
Study Date	(0008,0020)	2	Copied from source.
Study Time	(0008,0030)	2	Copied from source.
Referring Physician's Name	(0008,0090)	2	Copied from source.
Study ID	(0020,0010)	2	Copied from source.
Accession Number	(0008,0050)	2	Copied from source.
Study Description	(0008,1030)	3	Copied from source.

4.2.3 General Series Module

TABLE 4.2-3
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Enumerated Value: OT = Other
Series Instance UID	(0020,000E)	1	Generated with format `1.2.840.113619.2.238.id` where `id` is a unique identifier of the instance with station information and timestamp.
Series Number	(0020,0011)	2	Copied from source.
Series Description	(0008,103E)	3	Copied from source.

4.2.4 General Equipment Module

TABLE 4.2-4
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	"GE MEDICAL SYSTEMS"
Institution Name	(0008,0080)	3	Copied from source.
Manufacturer's Model Name	(0008,1090)	3	"Reporting Tool"
Software Versions	(0018,1020)	3	Current software version.

4.2.5 SC Equipment Module

TABLE 4.2-5
SC EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Conversion Type	(0008,0064)	1	SYN = Synthetic Image
Modality	(0008,0060)	3	Copied from source. Enumerated Value: SR = SR Document
Secondary Capture Device Manufacturer	(0018,1016)	3	"GE MEDICAL SYSTEMS"

4.2.6 General Image Module

TABLE 4.2-6
GENERAL IMAGE MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	2	Generated.
Patient Orientation	(0020,0020)	2C	Empty.
Content Date	(0008,0023)	2C	Current date of creation.
Content Time	(0008,0033)	2C	Current time of creation.
Image Type	(0008,0008)	3	"DERIVED\SECONDARY"
Burned In Annotation	(0028,0301)	2	NO

4.2.7 Image Pixel Module

TABLE 4.2-7
IMAGE PIXEL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028,0002)	1	1 – for MONOCHROME2 3 – for RGB
Photometric Interpretation	(0028,0004)	1	MONOCHROME2 – when Samples per Pixel (0028,0002) has value 1 RGB – when Samples per Pixel (0028,0002) has value 3
Rows	(0028,0010)	1	Depends on PDF paper size and conversion resolution. E.g. with 72 dpi resolution: • 842 for A4 (210x297 mm) • 792 for Letter (8.5x11 in)

Columns	(0028,0011)	1	Depends on PDF paper size and conversion resolution. E.g. with 72 dpi resolution: • 595 for A4 (210x297 mm) • 612 for Letter (8.5x11 in)
Bits Allocated	(0028,0100)	1	8
Bits Stored	(0028,0101)	1	8
High Bit	(0028,0102)	1	7
Pixel Representation	(0028,0103)	1	000H
Pixel Data	(7FE0,0010)	1	Derived from BMP generated from a PDF page.
Planar Configuration	(0028,0006)	1C	0 if Samples per Pixel (0028,0002) has a value greater than 1. Not present otherwise.

4.2.8 SC Image Module

TABLE 4.2-8
SC IMAGE MODULE ATTRIBUTES

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

4.2.9 SOP Common Module

TABLE 4.2-9
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Enumerated Values: `1.2.840.10008.5.1.4.1.1.7`
SOP Instance UID	(0008,0018)	1	Generated with format `1.2.840.113619.2.238.id` where `id` is a unique identifier of the instance with station information and timestamp.
Specific Character Set	(0008,0005)	1C	Copied from source if it contains non-empty value.
Instance Number	(0020,0013)	3	Generated.

4.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

Not used.

4.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

Not used.

5. BASIC TEXT, ENHANCED, COMPREHENSIVE, MAMMOGRAPHY CAD SR AND KEY OBJECT SELECTION DOCUMENT INFORMATION OBJECT IMPLEMENTATION

Reporting Tool creates new SR instances when:

- an existing report is modified and saved
- a patient questionnaire is filled out and saved.

5.1 IOD MODULE TABLE

Table 5.1-1 specifies the modules of **Basic Text, Enhanced, Comprehensive and Mammography CAD Structured Report** Information Object Definitions. SR specific modules are described in Section 5.2. Standard Extended and Private attributes are described in Section 5.3.
The contents of the SR Document Content are constrained by the supported template, as identified in Section 0. Standard Extended and Private templates are further described in Section 5.5.

TABLE 5.1-1
BASIC TEXT, ENHANCED, COMPREHENSIVE AND MAMMOGRAPHY CAD SR IOD MODULES

Information Entity	Module	Usage	Reference
Patient	Patient	Used	5.2.1
	Specimen Identification	Not used	N/A
	Clinical Trial Subject	Not used	N/A
Study	General Study	Used	5.2.2
	Patient Study	Used	5.2.3
	Clinical Trial Study	Not used	N/A
Series	SR Document Series	Used	5.2.4
	Clinical Trial Series	Not used	N/A
Equipment	General Equipment	Used	5.2.5
Document	SR Document General	Used	5.2.6
	SR Document Content	Used	5.2.7
	SOP Common	Used	5.2.8

Table 5.1-2 specifies the modules of **Key Object Selection Document** Information Object Definition.

TABLE 5.1-2
KEY OBJECT SELECTION IOD MODULES

Information Entity	Module	Usage	Reference
Patient	Patient	Used	5.2.1
	Specimen Identification	Not used	N/A
	Clinical Trial Subject	Not used	N/A
Study	General Study	Used	5.2.2
	Patient Study	Used	5.2.3
	Clinical Trial Study	Not used	N/A
Series	Key Object Document Series	Used	5.2.9
	Clinical Trial Series	Not used	N/A
Equipment	General Equipment	Used	5.2.5
Document	Key Object Document	Used	5.2.10
	SR Document Content	Used	5.2.7
	SOP Common	Used	5.2.8

5.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the entities, modules, and attributes contained within the SR Information Objects.
Displaying of data elements is configurable i.e. they can be rendered in the report or stay hidden. The "Displayed" column in the following tables describe the elements Reporting Tool can display.

5.2.1 Patient Module

TABLE 5.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Patient's Name	(0010,0010)	2	Copied from source.	Yes
Patient ID	(0010,0020)	2	Copied from source.	Yes
Patient's Birth Date	(0010,0030)	2	Copied from source.	Yes
Patient's Sex	(0010,0040)	2	Copied from source. Enumerated Values: M = male F = female O = other	Yes
Patient's Birth Time	(0010,0032)	3	Copied from source.	No
Ethnic Group	(0010,2160)	3	Copied from source or entered by the user.	Yes
Patient Comments	(0010,4000)	3	Copied from source.	No

5.2.2 General Study Module

TABLE 5.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Study Instance UID	(0020,000D)	1	Copied from source.	No
Study Date	(0008,0020)	2	Copied from source.	Yes
Study Time	(0008,0030)	2	Copied from source.	Yes
Referring Physician's Name	(0008,0090)	2	Copied from source or entered by the user.	Yes
Study ID	(0020,0010)	2	Copied from source.	Yes
Accession Number	(0008,0050)	2	Copied from source or entered by the user.	Yes
Study Description	(0008,1030)	3	Copied from source or empty.	No

5.2.3 Patient Study Module

TABLE 5.2-3
PATIENT STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Patient's Age	(0010,1010)	3	Copied from source or empty.	Yes
Patient's Size	(0010,1020)	3	Copied from source or entered by the user.	Yes
Patient's Weight	(0010,1030)	3	Copied from source or entered by the user.	Yes
Occupation	(0010,2180)	3	Copied from source or empty.	No
Additional Patient's History	(0010,21B0)	3	Copied from source or empty.	No

5.2.4 SR Document Series Module

TABLE 5.2-4
SR DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Modality	(0008,0060)	1	Copied from source. Enumerated Value: SR = SR Document	No
Series Instance UID	(0020,000E)	1	Copied from source or generated if the SR is created from scratch with format `1.2.840.113619.2.238.id` where `id` is a unique identifier of the instance with station information and timestamp.	No
Series Number	(0020,0011)	1	Copied from source or set to "1" if the SR is created from scratch.	No
Series Description	(0008,103E)	3	Copied from source.	No
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Copied from source or empty if the SR is created from scratch.	No

5.2.5 General Equipment Module

TABLE 5.2-5
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Manufacturer	(0008,0070)	2	Copied from source or "`GE MEDICAL SYSTEMS`" if the SR is created from scratch.	No
Institution Name	(0008,0080)	3	Copied from source or empty.	No
Institution Address	(0008,0081)	3	Copied from source or empty.	No
Station Name	(0008,1010)	3	Copied from source or empty.	No
Institutional Department Name	(0008,1040)	3	Copied from source or empty.	No
Manufacturer's Model Name	(0008,1090)	3	Copied from source or "`Reporting Tool`".	No
Device Serial Number	(0018,1000)	3	Copied from source or empty.	No

5.2.6 SR Document General Module

TABLE 5.2-6
SR DOCUMENT GENERAL MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Instance Number	(0020,0013)	1	Copied from source or set to “1” if the SR is created from scratch.	No
Completion Flag	(0040,A491)	1	Copied from source or selected by the user. Enumerated Values: PARTIAL = Partial content. COMPLETE = Complete content.	Yes
Completion Flag Description	(0040,A492)	3	Copied from source or empty.	No
Verification Flag	(0040,A493)	1	Copied from source or selected by the user. Enumerated Values: UNVERIFIED = Not attested to. VERIFIED = Attested to by a Verifying Observer Name (0040,A075) who is accountable for its content.	Yes
Content Date	(0008,0023)	1	Current date of creation.	Yes
Content Time	(0008,0033)	1	Current time of creation.	Yes
Verifying Observer Sequence	(0040,A073)	1C		Yes
>Verifying Observer Name	(0040,A075)	1	Copied from source or entered by the user.	Yes
>Verifying Observer Identification Code Sequence	(0040,A088)	2	Empty.	No
>Verifying Organization	(0040,A027)	1	Copied from source or entered by the user.	Yes
>Verification DateTime	(0040,A030)	1	Current date and time of verification.	Yes
Predecessor Documents Sequence	(0040,A360)	1C	Reference to source SR when an existing report is amended. Not present if the SR is created from scratch.	Yes
>Study Instance UID	(0020,000D)	1	The Study Instance UID of the source SR.	No
>Referenced Series Sequence	(0008,1115)	1		No
>>Series Instance UID	(0020,000E)	1	The Series Instance UID of the source SR.	No
>>Retrieve AE Title	(0008,0054)	3	Empty.	No
>>Storage Media File-Set ID	(0088,0130)	3	Empty.	No
>>Storage Media File-Set UID	(0088,0140)	3	Empty.	No
>>Referenced SOP Sequence	(0008,1199)	1		No
>>>Referenced SOP Class UID	(0008,1150)	1	The SOP Class UID of the source SR.	No
>>>Referenced SOP Instance UID	(0008,1155)	1	The SOP Instance UID of the source SR	No
Identical Documents Sequence	(0040,A525)	1C	Not present.	No
Referenced Request Sequence	(0040,A370)	1C	Not present.	No
Performed Procedure Code Sequence	(0040,A372)	2	Copied from source or empty if the SR is created from scratch.	No

Current Requested Procedure Evidence Sequence	(0040,A375)	1C	Copied from source or not present if the SR is created from scratch.	No
Pertinent Other Evidence Sequence	(0040,A385)	1C	Copied from source or not present if the SR is created from scratch.	No

5.2.7 SR Document Content Module

TABLE 5.2-7
SR DOCUMENT CONTENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Include 'Document Content Macro' Table 5.2-8 with a Value Type (0040,A040) of CONTAINER.				
Include 'Document Relationship Macro' Table 5.2-9.				

TABLE 5.2-8
DOCUMENT CONTENT MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Value Type	(0040,A040)	1	Copied from source or CONTAINER for the root content item if the SR is created from scratch. Defined Terms: TEXT NUM CODE DATETIME DATE TIME UIDREF PNAME COMPOSITE IMAGE WAVEFORM SCOORD TCOORD CONTAINER	No
Concept Name Code Sequence	(0040,A043)	1C	Conveys Document Title. Copied from source or set to the triplet below for patient questionnaires created from scratch.	Yes
> Code Value	(0008,0100)	1C	Copied from source or "PQ-100" for patient questionnaires created from scratch.	No
> Coding Scheme Designator	(0008,0102)	1C	Copied from source or "99GEMS" for patient questionnaires created from scratch.	No
> Code Meaning	(0008,0104)	1C	Copied from source or "Questionnaire" for patient questionnaires created from scratch.	Yes
Include 'Container Macro' Table 5.2-10 if and only if Value Type (0040,A040) is CONTAINER.				

TABLE 5.2-9

DOCUMENT RELATIONSHIP MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Observation DateTime	(0040,A032)	1C	Copied from source or current date and time.	No
Content Sequence	(0040,A730)	1C	SR content, the sequence of top-level content items.	Yes
> Relationship Type	(0040,A010)	1	Copied from source. Defined Terms: CONTAINS HAS PROPERTIES HAS OBS CONTEXT HAS ACQ CONTEXT INFERRED FROM SELECTED FROM HAS CONCEPT MOD	No
> Referenced Content Item Identifier	(0040,DB73)	1C	Not used. Note: Comprehensive SRs are displayed and editable but the references between the content items are not handled.	No

TABLE 5.2-10
CONTAINER MACRO ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Continuity of Content	(0040,A050)	1	Copied from source or "SEPARATE" if the SR is created from scratch. Enumerated Values: SEPARATE CONTINUOUS	No
Content Template Sequence	(0040,A504)	1C	Copied from source or filled in for Questionnaire.	No
>Mapping Resource	(0008,0105)	1	"GE HEALTHCARE" for Questionnaire.	No
>Template Identifier	(0040,DB00)	1	"PQ_100" for Questionnaire.	No

5.2.7.1 SR Document Content Descriptions

5.2.7.1.1 Value Type rendering and editing

Table 5.2-11 describes how the different content item types are rendered in a generic format and which one is editable. The generic layout is an indented display of the nested content items' recursive traversal.
Each content item's **Code Meaning** (0008,0104) in the corresponding Concept Name Code Sequence (0040,A043) is displayed together with the actual value itself.
Reference Value Types are not editable, which means that it's not possible to add, update or remove reference to an IMAGE, WAVEFORM, COMPOSITE or UIDREF content item.

TABLE 5.2-11
RENDERING AND EDITING BY VALUE TYPES

Value Type (0040,A040)	Rendering	Editable
TEXT	**Text Value** (0040,A160)	Yes
NUM	**Numeric Value** (0040,A30A) and **Code Value** (0008,0100) from Measurement Units Code Sequence (0040,08EA)	No
CODE	**Code Meaning** (0008,0104) of Concept Code Sequence (0040,A168)	No
DATETIME	**Date Time** (0040,A120) in YYYY-MM-DD, hh:mm:ss format	Yes
DATE	**Date** (0040,A121) in YYYY-MM-DD format	Yes
TIME	**Time** (0040,A122) in hh:mm:ss format	Yes
UIDREF	**UID** (0040,A124)	No
PNAME	**Person Name** (0040,A123) in name_prefix given_name_complex middle_name family_name_complex name_suffix format	No
COMPOSITE	**Referenced SOP Instance UID** (0008,1155)	No
IMAGE	JPEG image of the DICOM object identified by Referenced SOP Instance UID (0008,1155). GSPS is not supported.	No
WAVEFORM	**Referenced SOP Instance UID** (0008,1155)	No
SCOORD	Not rendered	N/A
TCOORD	Not rendered	N/A
CONTAINER	Recursive rendering of child content items	N/A

5.2.7.1.2 Content Template

The product supports the following root Templates.

TABLE 5.2-12
ROOT TEMPLATES

SOP Class	Template ID	Template Name	Use
Basic Text SR	Any		Display / Update
Enhanced SR	Any		Display / Update
Comprehensive SR	Any		Display / Update
Mammography CAD SR	TID 4000	Mammography CAD Document Root	Display / Update
Key Object Selection Document	TID 2010	Key Object Selection	Display / Update

5.2.8 SOP Common Module

TABLE 5.2-13

SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Enumerated Values: 1.2.840.10008.5.1.4.1.1.88.11 1.2.840.10008.5.1.4.1.1.88.22 1.2.840.10008.5.1.4.1.1.88.33 1.2.840.10008.5.1.4.1.1.88.50 1.2.840.10008.5.1.4.1.1.88.59
SOP Instance UID	(0008,0018)	1	Generated with format 1.2.840.113619.2.238.id where id is a unique identifier of the instance with station information and timestamp.
Specific Character Set	(0008,0005)	1C	Copied from source or "ISO_IR 100".
Instance Creation Date	(0008,0012)	3	Current date of creation.
Instance Creation Time	(0008,0013)	3	Current time of creation.
Instance Creator UID	(0008,0014)	3	Empty.

5.2.9 Key Object Document Series Module

TABLE 5.2-14
KEY OBJECT DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Modality	(0008,0060)	1	Copied from source. Enumerated Value: KO = Key Object Selection	No
Series Instance UID	(0020,000E)	1	Copied from source.	No
Series Number	(0020,0011)	1	Copied from source.	No
Series Description	(0008,103E)	3	Copied from source.	No
Referenced Performed Procedure Step Sequence	(0008,1111)	2	Copied from source.	No

5.2.10 Key Object Document Module

TABLE 5.2-15
KEY OBJECT DOCUMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description	Displayed
Instance Number	(0020,0013)	1	Copied from source.	No
Content Date	(0008,0023)	1	Current date of creation.	Yes
Content Time	(0008,0033)	1	Current time of creation.	Yes
Referenced Request Sequence	(0040,A370)	1C	Copied from source.	No
Current Requested Procedure Evidence Sequence	(0040,A375)	1	Copied from source.	No
Identical Documents Sequence	(0040,A525)	1C	Not present.	No

5.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

The Product supports the Standard and Private Attributes defined in the following sections in Standard Extended SR SOP Instances as Type 3 data elements.

5.3.1 Private Group GEMS_0039

TABLE 5.3-1
PRIVATE GROUP GEMS_0039

Attribute Name	Tag	VR	VM	Attribute Description and Use
Private Creator Identification	(0039,0010)	LO	1	"REPORT_FROM_APP"
Application specific data	(0039,1095)	LO	1	VV#<application_version>#<application_name>

Reporting Tool is expecting only (0039,1095).
This data is used to render the report in application specific format, which is different from the generic format described in 5.2.7.1.1.

5.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

5.4.1 Private Context Groups

5.4.1.1 CID PQ-010 Lung Analysis Questions

Context ID PQ-010

Lung Analysis Questions

Type: Extensible **Version: 20070925**

Coding Scheme Designator (0008,0102)	Coding Scheme Version (0008,0103)	Code Value (0008,0100)	Code Meaning (0008,0104)
99GEMS		PQ-1000	Reason for exam
99GEMS		PQ-1010	Pre-exam comments
99GEMS		PQ-1020	Currently smoking cigarettes
99GEMS		PQ-1030	If not currently smoking, when did patient quit?
99GEMS		PQ-1040	Age when first started smoking cigarettes
99GEMS		PQ-1050	How many times has patient tried to quit smoking?
99GEMS		PQ-1060	How many pack(s) a day has the patient smoked?
99GEMS		PQ-1070	For how many years has the patient smoked?
99GEMS		PQ-1080	Number of cigarette pack years
99GEMS		PQ-1090	Select other tobacco products used
99GEMS		PQ-1100	Has patient ever used smokeless tobacco products?
99GEMS		PQ-1105	If so, for how many years?
99GEMS		PQ-1110	Has patient been exposed to significant second-hand smoke in his/her home?
99GEMS		PQ-1120	Has patient been exposed to significant second-hand smoke in his/her workplace?
99GEMS		PQ-1130	Has patient been exposed to significant second-hand smoke in social settings?
99GEMS		PQ-1140	Do/did patient's parents smoke?
99GEMS		PQ-1150	Does patient's spouse smoke?
99GEMS		PQ-1160	Has patient ever worked with asbestos?
99GEMS		PQ-1170	Has patient ever worked in a shipyard or with pipe insulation?
99GEMS		PQ-1180	Has patient ever worked with heavy metals such as lead, arsenic, or mercury?
99GEMS		PQ-1190	Has patient ever worked in a mine?
99GEMS		PQ-1200	Has patient had significant exposure to radon gas?

Coding Scheme Designator (0008,0102)	Coding Scheme Version (0008,0103)	Code Value (0008,0100)	Code Meaning (0008,0104)
99GEMS		PQ-1210	Does the patient have a past history of cancer?
99GEMS		PQ-1220	Respiratory symptoms
99GEMS		PQ-1230	Has the patient ever been told that he/she had an abnormal chest x-ray?
99GEMS		PQ-1240	If so, what was the diagnosis?
99GEMS		PQ-1250	Has patient ever had a positive skin test for tuberculosis?
99GEMS		PQ-1260	Does patient have a history of asthma?
99GEMS		PQ-1270	Does the patient have a history of chronic or frequent bronchitis?
99GEMS		PQ-1280	Does the patient have a chronic smoker's cough?
99GEMS		PQ-1290	Has the patient had a fungal infection of the lungs?
99GEMS		PQ-1300	Has the patient ever been diagnosed with emphysema?
99GEMS		PQ-1310	Family history of lung cancer
99GEMS		PQ-1320	Please check any conditions for which the patient has seen a health care provider or taken medication in the past five years
99GEMS		PQ-1330	Current living location
SRT		J-00000	Occupation

5.4.1.2 CID PQ-020 Oncology Questions

Context ID PQ-020

Oncology Questions

Type: Extensible **Version: 20070925**

Coding Scheme Designator (0008,0102)	Coding Scheme Version (0008,0103)	Code Value (0008,0100)	Code Meaning (0008,0104)
99GEMS		PQ-2000	Cancer diagnosis
99GEMS		PQ-2010	AJCC/UICC Staging
SRT		G-F150	T category
SRT		R-40030	N category
SRT		R-40031	M category
99GEMS		PQ-2020	Stage grouping
99GEMS		PQ-2030	Medical and surgical history
99GEMS		PQ-2040	Current medical and surgical history
99GEMS		PQ-2050	Allergies
99GEMS		PQ-2060	Dermatologic status
99GEMS		PQ-2070	Laboratory data history
99GEMS		PQ-2080	Treatment history

5.5 STANDARD EXTENDED AND PRIVATE TEMPLATES

5.5.1 Private Templates

5.5.1.1 TID PQ_100 Questionnaire Document Root Template

This template forms the top of a content tree for questionnaire reports generated by Reporting Tool.

TID PQ_100
QUESTIONNAIRE DOCUMENT ROOT

	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (PQ-100, 99GEMS, "Questionnaire")	1	M		
2	>	CONTAINS	INCLUDE	**DTID (PQ_200)** Patient Questions	1	M		

5.5.1.2 TID PQ_200 Patient Questions Template

This template describes the list of questions in the questionnaire.

TID PQ_200
PATIENT QUESTIONS

	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (PQ-0110, 99GEMS, "Patient Questions")	1	M		
2	>	CONTAINS	INCLUDE	**DTID (PQ_300)** Patient Question Answer	1-n	M		

5.5.1.3 TID PQ_300 Patient Question Answer Template

This template describes one question with its corresponding answer.

TID PQ_300
PATIENT QUESTION ANSWER

	NL	Relation with Parent	Value Type	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		CONTAINS	CODE	EV (PQ-0120, 99GEMS, "Question")	1-n	MC	XOR row 4	DCID(PQ-010) DCID(PQ-020)
2	>	HAS CONCEPT MOD	TEXT	EV (121051,DCM,"Equivalent Meaning of Value")	1	M		
3	>	HAS PROPERTIES	TEXT	EV (PQ-0130, 99GEMS, "Answer")	1	U		
4		CONTAINS	TEXT	EV (PQ-0120, 99GEMS, "Question")	1-n	MC	XOR row 1	
5	>	HAS PROPERTIES	TEXT	EV (PQ-0130, 99GEMS, "Answer")	1	U		

6. ENCAPSULATED PDF INFORMATION OBJECT IMPLEMENTATION

Reporting Tool creates Encapsulated PDF Storage instances from the PDF rendering of a SR (source).

6.1 IOD MODULE TABLE

Table 6.1-1 specifies the modules of **Encapsulated PDF** Information Object Definition.

TABLE 6.1-1
ENCAPSULATED PDF IOD MODULES

Information Entity	Module	Usage	Reference
Patient	Patient	Used	6.2.1
	Specimen Identification	Not used	N/A
	Clinical Trial Subject	Not used	N/A
Study	General Study	Used	6.2.2
	Patient Study	Not used	N/A
	Clinical Trial Study	Not used	N/A
Series	Encapsulated Document Series	Used	6.2.3
	Clinical Trial Series	Not used	N/A
Equipment	General Equipment	Used	6.2.4
	SC Equipment	Used	6.2.5
Encapsulated Document	Encapsulated Document	Used	6.2.6
	SOP Common	Used	6.2.7

6.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the entities, modules, and attributes contained within the Encapsulated PDF Information Object.

6.2.1 Patient Module

TABLE 6.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	Copied from source.
Patient ID	(0010,0020)	2	Copied from source.
Patient's Birth Date	(0010,0030)	2	Copied from source.
Patient's Sex	(0010,0040)	2	Copied from source. Enumerated Values: M = male F = female O = other

6.2.2 General Study Module

TABLE 6.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Copied from source.
Study Date	(0008,0020)	2	Copied from source.
Study Time	(0008,0030)	2	Copied from source.
Referring Physician's Name	(0008,0090)	2	Copied from source.
Study ID	(0020,0010)	2	Copied from source.
Accession Number	(0008,0050)	2	Copied from source.

6.2.3 Encapsulated Document Series Module

TABLE 6.2-3
ENCAPSULATED DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Enumerated Value: OT = Other
Series Instance UID	(0020,000E)	1	Generated with format `1.2.840.113619.2.238.id` where `id` is a unique identifier of the instance with station information and timestamp.
Series Number	(0020,0011)	1	Copied from source.

6.2.4 General Equipment Module

TABLE 6.2-4
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	"GE MEDICAL SYSTEMS"

6.2.5 SC Equipment Module

TABLE 6.2-5
SC EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Conversion Type	(0008,0064)	1	WSD = Workstation

6.2.6 Encapsulated Document Module

TABLE 6.2-6
ENCAPSULATED DOCUMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	1	Generated.
Content Date	(0008,0023)	2	Copied from source.
Content Time	(0008,0033)	2	Copied from source.
Acquisition DateTime	(0008,002A)	2	Copied from source.
Burned In Annotation	(0028,0301)	1	Copied from source if it is Encapsulated PDF. If the source is SR and the PDF rendering contains sufficient burned in annotation to identify the patient and date the data was acquired then YES, otherwise NO.
Source Instance Sequence	(0042,0013)	1C	Copied from source or filled with SOP Instance Reference from the source.
Document Title	(0042,0010)	2	Copied from source or filled with Code Meaning from source Concept Name Code Sequence.
Concept Name Code Sequence	(0040,A043)	2	Copied from source.
MIME Type of Encapsulated Document	(0042,0012)	1	"application/pdf"
Encapsulated Document	(0042,0011)	1	Byte stream of PDF rendering of source.

6.2.7 SOP Common Module

TABLE 6.2-7
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Enumerated Values: 1.2.840.10008.5.1.4.1.1.104.1
SOP Instance UID	(0008,0018)	1	Generated with format 1.2.840.113619.2.238.id where id is a unique identifier of the instance with station information and timestamp.
Specific Character Set	(0008,0005)	1C	Copied from source or "ISO_IR 100".