Nucletron

Oncentra® External Beam v4.3
Oncentra® Brachy v4.3

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DICOM Conformance Statement

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1. Introduction

1.1 General

This document specifies the DICOM conformance of the Oncentra radiotherapy treatment planning system, previously named Oncentra Treatment Planning (OTP) and Oncentra MasterPlan.

The Connectivity Module (CM) in the Oncentra product is a multifunction application that includes the ability to store DICOM objects to other DICOM compliant applications and to Query/Retrieve other DICOM compliant applications. This DICOM functionality is described in Section 2, CM and File/Restore Network Conformance Statement.

The primary role of CM is as an interface between DICOM peers and the Oncentra database. CM will read DICOM data stored as Interchange Media objects (typically created by WinSCP32) and import valid data to the Oncentra proprietary database. It will also extract valid data and create DICOM Interchange Media objects for export via DICOM. This is described in Section 5, IOD Specific Implementation Details.

An associated DICOM Storage SCP application from ETIAM SA, WinSCP32, is included in the Oncentra distribution. The WinSCP32 application is covered by a separate DICOM Conformance Statement, included as Section 3, WinSCP32 SCP DICOM Conformance.

Oncentra also contains a File/Restore (FR) feature to send entire Patient Cases to a DICOM Archive for long-term storage, so that space-consuming objects that are no longer actively used can be removed from the Oncentra database. The Restore function can later be used to retrieve the filed data and restore the Patient Cases to a state where they can be used in a read-only mode in the Oncentra system.

FR runs as background process, and uses its own FR SCP to receive the data, to avoid mixing them with data received through WinSCP32. The DICOM Conformance of the FR SCP application (the receiving part) is described in Section 4, FR SCP DICOM Conformance, while the DICOM Conformance of the sending part used during the File operations is basically the same as for CM, and described together with the CM functionality.

Note:

Oncentra does in some cases use private attributes to store information relevant only for its own usage. These attributes are listed below, among the regular DICOM attributes. If DICOM data from Oncentra is modified by another application, these private attributes must be removed to ensure data consistency. Oncentra will not make use of any private data from other vendors. If Oncentra changes any DICOM data all foreign private tags will be removed.

Note:

The current version of Oncentra has a restriction with respect to selection of Archive for the File/Restore feature. Some archives have been known to corrupt DICOM objects when it comes to private sequences. Therefore Nucletron recommends that the selected Archive be configured to store its data in the format "Explicit Value Representation". Otherwise some of the type information that is used in the private sequences may be lost, prohibiting Oncentra to use the data.

1.2 Purpose

This DICOM Conformance Statement specifies the Oncentra compliance to the DICOM standard. It describes in detail the DICOM SOP Classes and roles that are supported by this product.

Note:

For better overview the attributes that are not used by Oncentra have been printed in grey instead of black.

1.3 Intended Audience

This document is intended for system developers, system integrators, and users or potential users of the Oncentra system (or their agents).

It is assumed that the reader of this document is familiar with the DICOM standard.

1.4 Important Notes

The document itself does not guarantee successful DICOM communication between Oncentra and non-Oncentra applications which claim conformance to DICOM. It is, however, the user's (or the user's agent) responsibility to address at least the following issues:

1.4.1 Interoperability

Integration in terms of interoperability of modalities claiming conformance to DICOM goes beyond the standard. Neither the DICOM standard itself nor the Conformance Statements of the concerned applications will guarantee interoperability, even if the DICOM communication may work.

Users or their agents are encouraged to examine carefully how information contained in the DICOM objects is interpreted by the communicating applications. The responsibility to analyze the application requirements and to design a solution that integrates such applications is the user's responsibility. The user is strongly advised to ensure that such integration analysis is correctly performed.

1.4.2 Validation

The DICOM applications referred to in this document have been carefully tested to assure compliance with DICOM and with the applications' DICOM Conformance Statement. However, connectivity and proper functionality with other vendors' products has to be verified prior to clinical use of the applications.

It is the responsibility of the user (or the user's agent) to verify DICOM connectivity within the environment in which the Oncentra applications shall be used. In this respect Nucletron will assist the user as far as possible.

1.4.3 Evolution of the DICOM Standard

It is expected that the DICOM standard will be further developed to meet future requirements. Nucletron is actively contributing to these developments. It is therefore natural that Nucletron will adapt or may discontinue its products due to changes in the DICOM standard.

The user is encouraged to make sure that any product from another vendor is also continuously adapted to revisions of DICOM. Ignoring this will increase the risk of losing connectivity and/or interoperability.

1.5 References

The Digital Imaging and Communications in Medicine (DICOM) Standard: NEMA PS 3.1-3.16 (2006). National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 1847, Rosslyn, Virginia 22209, USA.

1.6 Definitions

ACR American college of Radiology

AE DICOM Application Entity.

AM The Anatomy Modeling package; the part of the Oncentra software that handles all contouring and image registration.

ANSI	American National Standards Institute
Association	A (DICOM) association represents one entire communication session between two image devices. An association is initiated by a Service Class User application. The association may be terminated by either the Service Class User or the Service Class Provider application.
BM	The Beam Modeling activity; the part of the Oncentra software that handles external beam plan definition.
BP	The Brachy Planning activity; the part of the Oncentra software that handles the creation of a brachy treatment plan.
CM	The Connectivity Module; the part of the Oncentra software that handles all DICOM communication as well import and export of DICOM data to the Oncentra database.
DICOM	Digital Imaging and Communications in Medicine. A standard developed by the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA) for the electronic transfer of digital images and associated information.
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normalized
DRR	Digitally Reconstructed Radiograph
FR	File/Restore component of Oncentra, used for filing and restoring patient cases to a DICOM Archive
IOD	DICOM Information Object Definition.
NEMA	National Electrical Manufacturers Association
OTP	Oncentra Treatment Planning, technical abbreviation for Oncentra
PA	The Plan Analysis activity; a part of the Oncentra software that handles multi-plan comparison, dose display and Dose Volume Histograms.
PE	The Plan Evaluation activity; a part of the Oncentra software that handles dose display and Dose Volume Histograms.
PM	The Plan Manager activity; a part of the Oncentra software that allows you to create photon plans for external beam treatment.
PDU	Protocol Data Unit
SCP	Service Class Provider. A DICOM application performs the SCP role if it provides DICOM services (responds to requests) over the TCP/IP network.
SCU	Service Class User. A DICOM application performs the SCU role if it requests DICOM services over the TCP/IP network.
SOP	DICOM Service/Object Pair e.g. CT Image Storage.
TCP/IP	Transmission Control Protocol/Internet Protocol. The suite of commonly used network protocols adopted by DICOM as the basis for network communications.
UID	DICOM Unique Identifier.

2. CM and File/Restore Network Conformance Statement

2.1 Introduction

2.1.1 General

The Oncentra Connectivity Module (CM) performs multiple functions, including the use of DICOM associations to send valid objects to other DICOM compliant applications, and to Query/Retrieve other DICOM compliant applications. CM can be launched in three different modes depending on which treatment planning activity the operator has selected: Import, Export, or Utility mode.

The File/Restore feature, apart from the network receive part, is also covered by this section. File/Restore is launched from the Oncentra File Menu, and is used to File or Restore Patient Cases to or from a DICOM archive, with the intent to save space in the Oncentra database.

2.1.2 Purpose

This Conformance Statement specifies the Oncentra Connectivity Module's and the File/Restore utility's compliance to the DICOM standard. It describes in detail the DICOM SOP Classes and roles that are supported by this product.

2.2 Implementation Model

The CM application in export mode functions as a DICOM Storage SCU that will export valid DICOM objects to a remote DICOM Storage SCP, or print them on a DICOM Print SCP. The CM application in utility mode can Query/Retrieve a remote DICOM Query/Retrieve SCP.

CM in Export mode is commanded to perform the Storage function through a button named Export, and to perform the print function through a button named DICOM Print. CM in Utility mode is commanded to perform the Query/Retrieve functions through a menu item in the File menu.

CM in Import mode displays all available DICOM objects in a selectable Folder hierarchy. The user can then select individual or series of DICOM objects for import to the Oncentra database. Each imported DICOM series is attached to a selectable Oncentra Patient Case.

File/Restore is launched from the Oncentra File menu, and is used to File or Restore Patient Cases to a DICOM Archive that supports DICOM Store and Query/Retrieve as an SCP.

2.2.1 Application Data Flow Diagram

2.2.1.1 Connectivity Module

These Real-World Activities cause the CM application to initiate a DICOM association to a remote DICOM Application Entity:

The *Store to Remote AE* Real-World activity consists either of an operator selecting to export a patient case, thus launching CM in Export mode and generating a DICOM series or individual DICOM objects, selecting all or some of the generated objects and choosing the Export button; or, launching CM in Utility mode, selecting a DICOM series or individual DICOM objects and selecting "DICOM Store All" from the File menu. CM will then prompt for the Destination Peer and will initiate an association with the remote AE after selection.

The *Print to Remote AE* Real-World activity consists of an operator selecting to export a patient case, thus launching CM in Export mode and generating a DICOM series or individual DICOM objects, selecting all or some of the generated objects and choosing the DICOM Print button. CM will then prompt for the Destination Peer and initiate an association with the remote AE after selection.

The *Query Remote AE* Real-World Activity consists of an operator launching CM in utility mode, and then choosing the "DICOM Query & Retrieve" option from the File menu. After selecting a Query Peer and clicking the Update button CM will initiate an association with the remote AE. The Query result will then be displayed.

The *Retrieve from Remote AE* Real-World Activity is available once the *Query Remote AE* has been performed. The Destination Peer will be selected by the operator - the Destination peer may be any valid Storage SCU, including WinSCP32. The operator will then select a DICOM Series or individual DICOM objects for retrieval. CM will initiate an association with the remote AE after the Retrieve Series or Retrieve Images button is clicked.

2.2.1.2 File/Restore

These Real-World Activities cause the background FR application (running on the Oncentra application server) to initiate a DICOM association to a remote DICOM Application Entity:

The *F/R to Remote AE* Real-World Activity consists of either Filing or Restoring a Patient Case to a DICOM archive from the File/Restore Utility:

- The operator selects a patient case for Filing to a (selectable) DICOM Archive. This case is then placed in a queue for background processing. The FR process initiates an association with the remote AE, and stores all DICOM objects that belong to the case. If the filing is successful the case is compressed so that all the filed DICOM objects are deleted, and the case is marked as Filed. If the filing fails the operator is notified through a queue handler, and can choose to retry or abort the filing operation.
- The operator selects a filed patient case for Restore. The case is then placed in a queue for background processing. The FR process initiates an association with the relevant DICOM Archive, and requests a C-MOVE of the relevant DICOM objects to the FR SCP application. If all patient data is successfully transferred to the Oncentra system it is stored in the database, and the case is marked as Restored. A Restored case can be used in a read-only mode in Oncentra. If the restore fails the operator is notified through a queue handler, and can choose to retry or abort the restore operation.

The Application Data Flow Diagram, showing the CM and FR Application Entity relationships to Real World Activities, is shown in the figure below.

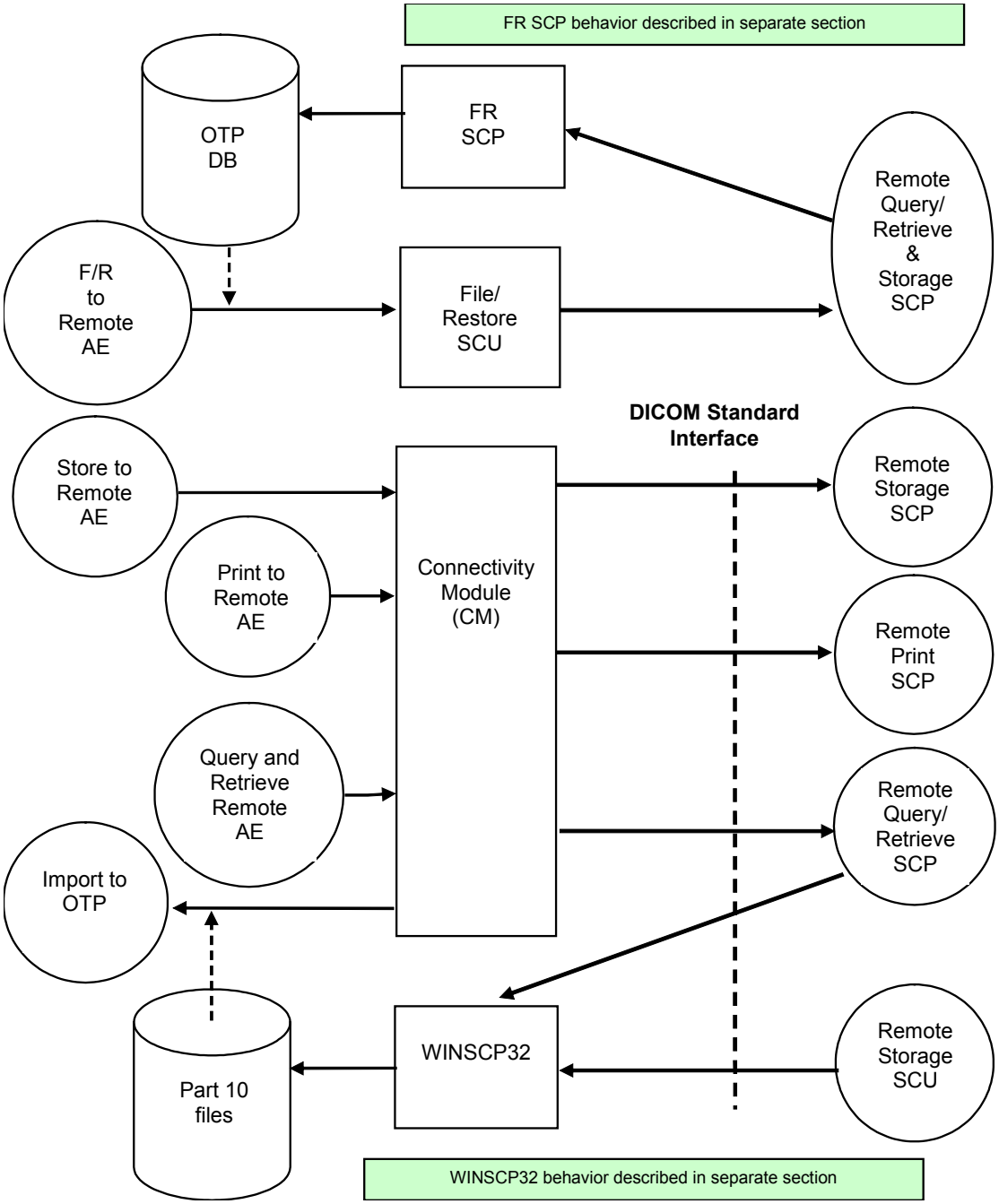

Figure 2-1 OTP Application Data Flow Diagram

2.2.2 Functional Definitions of Application Entities

2.2.2.1 Storage SCU Application Entity

The Storage SCU Application Entity supports the following functions:

- Initiates an association to a Remote AE to send DICOM objects. If the remote AE accepts the association (SOP class and presentation context), CM will send the selected object(s) by invoking C-STORE-RQ operation for each object on the same association.

2.2.2.2 Print SCU Application Entity

When an association has been successfully negotiated, CM has the following behavior:

- N-GET-RQ (PrinterSOPClass) is performed to get the printer characteristics.
- N-CREATE-RQ (BasicFilmSessionSOPClass) is sent to create a film session.
- N-SET-RQ (BasicFilmSessionSOPClass) are sent to set film session parameters (e.g., number of copies).

1) If the Collation checkbox is checked:

- for each film to be printed the following steps are performed:
  - N-CREATE-RQ (BasicFilmBoxSOPClass) is sent to create the FilmBox instance.
  - Several N-SET-RQ (BasicFilmBoxSOPClass) may be sent with the returned FilmBox instance to set some attributes (e.g.: Magnification Type) and to fill images box instances returned by the Print SCP. Those requests are made via a N-SET-RQ (BasicColorImageBoxSOPClass or BasicGrayscaleImageBoxSOPClass according to the association negotiation results)
- Finally an N-ACTION-RQ (BasicFilmSessionSOPClass) is sent to ask printing of its whole content.
- The association is closed by the SCU.

2) If the Collation checkbox is not checked:

- for each film to be printed the following steps are performed:
  - N-CREATE-RQ (BasicFilmBoxSOPClass) is sent to create the FilmBox instance.
  - Several N-SET-RQ (BasicFilmBoxSOPClass) may be sent with the returned FilmBox instance to set some attributes (e.g.: Magnification Type) and to fill images box instances returned by the Print SCP. Those requests are made via a N-SET-RQ (BasicColorImageBoxSOPClass or BasicGrayscaleImageBoxSOPClass according to the association negotiation results)
  - N-ACTION-RQ (BasicFilmBoxSOPClass) is sent to ask printing of the FilmBox instance content.
  - N-DELETE-RQ (BasicFilmBoxSOPClass) is sent to ask for the removal of the printed FilmBox instance in the FilmSession instance.
- The association is closed by the SCU.

2.2.2.3 Query/Retrieve Application Entity

The Query/Retrieve SCP Application Entity supports the following functions:

- Initiates an association to a Remote AE to Query for a list of DICOM objects (organized by study, series, objects). A Study-Root or Patient-Root (user selectable, default Study-Root) C-FIND-RQ request will be sent to the Remote AE once an association has been accepted. When a study is selected, CM will issue a series level C-FIND-RQ request for the series list for the selected study. When a series is selected, CM will issue a series level C-FIND-RQ request for the object list for the selected series.
- After a series or object(s) is selected and Retrieve Series or Retrieve Images is selected, CM sends a C-MOVE-RQ request to the Remote AE and the selected series or object(s) will be sent to the designated Destination Peer (Storage SCP) over a separate DICOM association

2.2.2.4 File/Restore Application Entity

The File/Restore Application Entity supports the following functions:

- When filing data FR initiates an association to a Remote AE to send DICOM objects. If the remote AE accepts the association (SOP class and presentation context), FR will send the selected object(s) by invoking C-STORE-RQ operation for each object on the same association.
- When restoring data FR sends a C-MOVE-RQ request to the Remote AE and the selected series or object(s) will be sent to the FR SCP over a separate DICOM association.

2.2.3 Sequencing of Real-World Activities

Real-World Activity *Store to DICOM peer* is independent of other DICOM operations.

Real-World Activity *Print to DICOM peer* is independent of other DICOM operations.

Real-World Activity *Query Remote DICOM peer* must be performed before *Retrieve from Remote DICOM peer* may be performed.

Real-World Activities *File/Restore to DICOM peer* is independent of other DICOM operations.

2.3 Application Entity Specifications

This section is valid for CM, as well as the File/Restore Storage SCU part.

2.3.1 Storage and SCU Application Entity Specification

The Storage SCU Application Entity and the File/Restore Storage SCU Application Entity provides Standard Conformance to the following DICOM Service Object Pair (SOP) Class as a **SCU**:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3
US Multiframe 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
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6
US 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
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XRay Angiographic BiPlane Image Storage	1.2.840.10008.5.1.4.1.1.12.3
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1

The CM software never acts in the role of SCP.

2.3.1.1 Association Establishment Policies

2.3.1.1.1 General

A single DICOM Application Context Name is defined for this version of the DICOM standard. This name is "1.2.840.10008.3.1.1.1".

The minimum PDU size is 4096 bytes and the maximum is 16384 bytes.

2.3.1.1.2 Number of Associations

CM and FR will attempt only one association at a time.

2.3.1.1.3 Asynchronous Nature

The Storage SCU Application Entity does not support asynchronous communication (multiple outstanding transactions over a single association). All operations are performed synchronously.

2.3.1.1.4 Implementation Identifying Information

The Implementation Class Unique Identifier (UID) for the Storage SCU Application Entity is

"1.2.250.1.59.3.0.3.5.3".

The Implementation Version Name is "ETIAM_DCMTK_353".

2.3.1.2 Association Initiation by Real-World Activity

The Storage SCU AE initiates an association for the transfer of one or more DICOM objects to a remote DICOM Storage SCP. The association is closed when the object(s) has been stored.

2.3.1.2.1 Real-World Activity: Store to Remote AE

The Storage SCU Application Entity initiates an association when one of the following Real-World activities occur:

After selecting a stored DICOM series or DICOM object(s), the operator selects Export in the CM Export mode or "DICOM Store All" from the File menu in the CM Utility mode.

Associated Real-World Activity

When the operator selects a DICOM Store operation, he must then select a destination DICOM peer on which the data is to be stored before the association is established.

The Storage SCU AE attempts to initiate a new association for each object to be transferred.

Proposed Presentation Contexts

The following table lists proposed presentation contexts.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See note	*See note*	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See note	*See note*	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See note	*See note*	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Note:

This applies to all supported Storage Abstract Syntax

SOP Specific Conformance for Storage SOP Classes

CM will establish a single association for a session. I.e.: If a number of DICOM objects are selected to be STORED on another DICOM peer, one association is established and then each selected object is sent via a sequence of C-STORE operations within that one association.

Upon receiving a C-STORE confirmation containing a Successful status, the next C-STORE operation will be performed if required. This will continue until all selected DICOM objects have been stored on the desired DICOM peer.

Upon receiving a C-STORE confirmation containing a warning or unsuccessful status, the association will be terminated and a warning message will be displayed. No other association will be initiated.

2.3.1.3 Association Acceptance Policy

The Storage SCU AE never accepts an association as it is acting as an SCU for storage and verification only.

2.3.2 Print SCU Application Entity Specification

The Print SCU Application Entity provides Standard Conformance to the following DICOM Service Object Pair (SOP) Class as a **SCU**:

2.3.2.1 Supported Meta SOP Classes for Basic Print SCU

Meta SOP Class Name	Meta SOP Class UID
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9
Basic Color Print Management	1.2.840.10008.5.1.1.18

2.3.2.2 Supported SOP Classes for Basic Grayscale Print SCU

SOP Class Name	SOP Class UID
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

2.3.2.3 Supported SOP Classes for Basic Color Printing SCU

SOP Class Name	SOP Class UID
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

The CM software never acts in the role of SCP.

2.3.2.4 Association Establishment Policies

2.3.2.4.1 General

A single DICOM Application Context Name is defined for this version of the DICOM standard. This name is "1.2.840.10008.3.1.1.1".

The minimum PDU size is 8192 bytes and the maximum is 65536 bytes.

2.3.2.4.2 Number of Associations

CM will attempt only one association at a time.

2.3.2.4.3 Asynchronous Nature

The Print SCU Application Entity does not support asynchronous communication (multiple outstanding transactions over a single association). All operations are performed synchronously.

2.3.2.4.4 Implementation Identifying Information

The Implementation Class Unique Identifier (UID) for the Storage SCU Application Entity is

“1.2.250.1.59.3.0.3.5.3”.

The Implementation Version Name is “ETIAM_DCMTK_353”.

2.3.2.5 Association Initiation by Real-World Activity

The Print SCU AE initiates a new association for each request at the film session level

2.3.2.5.1 Real-World Activity: Print to Remote AE

The Print SCU Application Entity initiates an association when the following Real-World activity occurs:

After selecting a stored DICOM series or DICOM object(s), the operator selects DICOM Print in the CM Export mode.

Associated Real-World Activity

When the operator selects a DICOM Print operation, he must then select a destination DICOM peer on which the data is to be stored before the association is established.

The Print SCU AE attempts to initiate a new association for each object to be transferred.

Proposed Presentation Contexts

The following table lists proposed presentation contexts.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None

SOP Specific Conformance for Print SOP Classes

CM will establish a single association for a session. If a number of DICOM objects are selected to be STORED on another DICOM peer, the user can select whether to collate the film printing or not. The exact behavior of the print SCU will depend on this, as described in section 2.2.2.2, Print SCU Application Entity.

2.3.2.6 Association Acceptance Policy

The Print SCU AE never accepts an association as it is acting as an SCU for printing and verification only.

2.3.3 Query/Retrieve SCU Application Entity Specification

The Query/Retrieve SCU Application Entity provides Standard Conformance to the following DICOM Service Object Pair (SOP) Class as a **SCU**:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.1.2

The CM software never acts in the role of a SCP.

2.3.3.1 Association Establishment Policies

2.3.3.1.1 General

A single DICOM Application Context Name is defined for this version of the DICOM standard. This name is "1.2.840.10008.3.1.1.1".

The minimum PDU size is 4096 bytes and the maximum is 16384 bytes.

2.3.3.1.2 Number of Associations

CM will attempt only one association at a time.

2.3.3.1.3 Asynchronous Nature

The Query/Retrieve SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association). All operations are performed synchronously.

2.3.3.1.4 Implementation Identifying Information

The Implementation Class Unique Identifier (UID) for the Query/Retrieve SCU Application Entity is “1.2.250.1.59.3.0.3.5.3”.

The Implementation Version Name is “ETIAM_DCMTK_353 ”.

2.3.3.2 Association Initiation by Real-World Activity

There are two Real-World activities that result in association establishment. Query/Retrieve SCU AE initiates an association for the appropriate Query/Retrieve Service Class that corresponds to the type of Query selected by the operator. When a DICOM series or DICOM objects are retrieved, a second association is established.

2.3.3.2.1 Real-World Activity: Query of Remote AE

The Query/Retrieve SCU AE initiates an association when the following Real-World activity occurs:

The operator selects “DICOM Query & Retrieve” from the File menu in the CM Utility mode.

Associated Real-World Activity

When the operator selects a DICOM Query/Retrieve operation, a DICOM Query and Retrieve form is displayed. The operator must then select the Query Peer and click on Update to establish the association and display the study list. Prior to clicking on Update he may optionally click on the Parameters button to select Patient or Study level filters to be applied to the displayed study list.

Proposed Presentation Contexts

The following table lists proposed presentation contexts.

Presentation Context Table					
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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Explicit VR Big Endian	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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

SOP Specific Conformance for Query/Retrieve SOP Classes - FIND

On initiating a Query operation, a Study Root C-FIND-RQ is performed at the Study, Series, and Image levels. The default request will ask for all studies in the remote database. Alternately, a Patient Root C-FIND-RQ may be selected and filters may be applied by entering the appropriate criteria in the Parameters form.

Attribute Name	Tag	Level	Note
PatientName	(0010,0010)	Patient/Study	At Study level only with Study Root model
PatientID	(0010,0020)	Patient/Study	At Study level only with Study Root model
PatientBirthDate	(0010,0030)	Patient/Study	At Study level only with Study Root model
PatientSex	(0010,0040)	Patient/Study	At Study level only with Study Root model
StudyInstanceUID	(0020,000D)	Study	
Study Date	(0008,0020)	Study	
ReferringPhysiciansName	(0008,0090)	Study	
StudyDescription	(0008,1030)	Study	
StudyID	(0020,0010)	Study	

Table 2-1 Requested Study Level Keys

Attribute Name	Tag	Level	Note
SeriesInstanceUID	(0020,000E)	Series	
Modality	(0008,0060)	Series	
SeriesNumber	(0020,0011)	Series	

Table 2-2 Requested Series Level Keys

Attribute Name	Tag	Level	Note
SOPInstanceUID	(0008,0018)	Image	

Table 2-3 Requested Image Level Keys

2.3.3.2.2 Real-World Activity: Retrieve from Remote AE

The Query/Retrieve SCU AE initiates an association when the following Real-World activity occurs:

The operator selects “Retrieve Series” or “Retrieve Images” from the “DICOM Query and Retrieve” user interface form. Alternatively when FR handles a Restore Patient Case request.

Associated Real-World Activity

The operator must select a DICOM Series or DICOM object(s) and a Destination Peer prior to requesting the retrieve operation. Alternatively the operator must request a Restore Patient Case.

Proposed Presentation Contexts

The following table lists proposed presentation contexts.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID list		
Study Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Explicit VR Big Endian	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	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.1.2	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Patient Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.1.2	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

SOP Specific Conformance for Query/Retrieve SOP Classes - MOVE

When the operator clicks on Retrieve Series or Retrieve Image, a C-MOVE-RQ request will be issued to the remote AE with the selected Destination peer (typically WINSCP32) identified as the Destination AE.

When the FR application handles a Restore Patient Case a C-MOVE-RQ request will be issued to the remote AE with FR SCP identified as the Destination AE.

2.3.3.3 Association Acceptance Policy

The Query/Retrieve SCU Application Entity never accepts an association.

2.4 Communication Profiles

2.4.1 Supported Communication Stacks

Oncentra Connectivity Module provides DICOM TCP/IP Network Communication Support as defined in PS 3.8.

2.4.1.1 OSI Stack

Not supported.

2.4.1.2 TCP/IP Stack

Oncentra Connectivity Module communicates over the TCP/IP protocol stack inherited from the host's operating system.

2.4.1.2.1 API

Not applicable.

2.4.1.2.2 Physical Media Support

Oncentra Connectivity Module is indifferent to the physical medium over which TCP/IP executes.

2.4.1.3 Point-to-Point Stack

Not supported.

2.5 Extensions/Specializations/Privatizations

2.5.1 Standard Extended/Specialized/Private SOPs

None supported.

2.5.2 Private Transfer Syntaxes

None supported.

2.6 Configuration

2.6.1 Application Entity Title/Presentation Address Mapping

The Local Application Entity Titles are configurable.

2.6.2 Configurable Parameters CM

The following items are configurable for the CM AE:

- Local AE title (default OTP_SCU)

The following items are configurable for the WinSCP32 SCP:

- Local AE title (default OTP_INCOMING)
- Local Port Number (default 104)

The following items are configurable for remote DICOM AEs:

- Peer Symbolic Name: descriptor only
- Peer Hostname: remote peer IP address
- Peer Port Number: listening port number
- Called AE Title: AE title for remote peer

2.6.3 Configurable Parameters File/Restore

The following items are configurable for the FR AET

- Local AE title (Same for SCU and SCP)
- Local Port Number

The following items are configurable for the remote DICOM Archive:

- Archive Name: descriptor only
- Peer Hostname: remote peer IP address

- Peer Port Number: listening port number
- Called AE Title: AE title for remote peer
- Connection log level

2.7 Support of Extended Character Sets

ISO-IR 100 Latin alphabet No. 1, supplementary set

[Supports 8bit extended character set that includes European character sets.]

3. WinSCP32 SCP DICOM Conformance

This section is basically a copy of the DICOM Conformance statement for the WinSCP32 application as provided by ETIAM SA. It is valid for WinSCP32 version 2.6.

However, the text has been adapted to the configuration performed when distributed with Oncentra.

3.1 Introduction

This section describes WinSCP32 conformance to the DICOM 3.0 standard.

This conformance statement describes the conformance specifics of WinSCP32 software configurations supporting various Windows compatible devices.

It contains a short description of application involved and provides technical information about data exchange capabilities of the equipment. The main elements describing these capabilities are the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

It should be read in conjunction with the DICOM standard and its addenda.

This statement is conformant with the recommended format as described in PS 3.2 of the DICOM standard.

DICOM PRI acts as a SCP for the following Meta SOP Classes:

- Verification
- Storage

3.1.1 Acronyms and Abbreviations

Cf., section 1.6.

3.1.2 References

Cf., section 1.5.

3.1.3 Scope and Field of Application

This document specifies the compliance to the DICOM 3.0 standard.

It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

This Conformance Statement should be read in conjunction with the DICOM standard and its addenda.

3.1.4 Intended Audience

This Conformance Statement is intended for:

- potential users;
- system integrators of medical equipment;
- software designers implementing DICOM interfaces;

It is assumed that the reader is familiar with the DICOM standard.

3.2 Implementation Model

3.2.1 Application Data Flow Diagram

WinSCP32 is a Windows application for the transfer of DICOM images.

If started manually the WinSCP32 application will appear in the tray of the Windows task bar and run continuously until stopped.

Note:

In Oncentra the WinSCP32 application is launched as a background process at system startup. It shall therefore normally not be started manually by the user, and does not appear in the tray of the task bar.

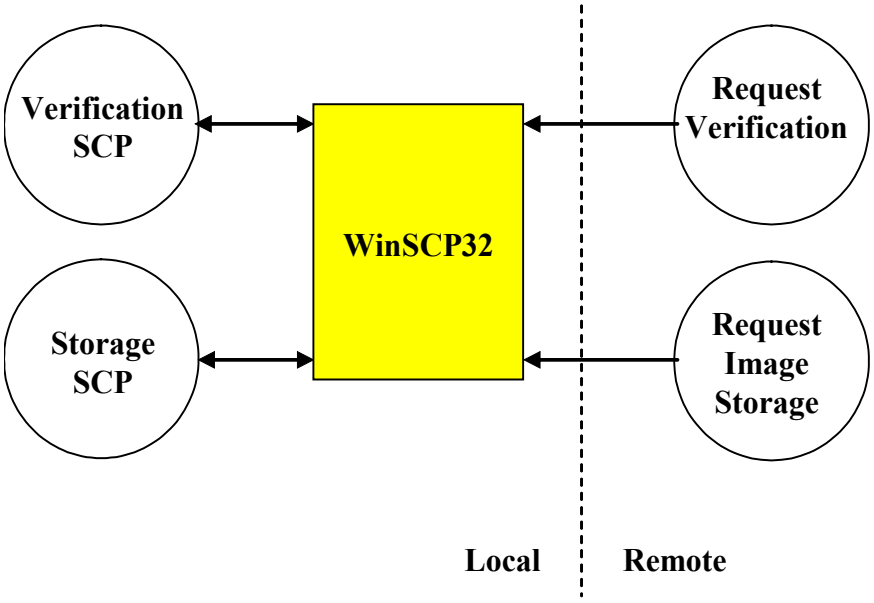

Figure 3-1 WinSCP32 Implementation Model

3.2.2 Functional Definitions of AE's

3.2.2.1 Verification Service as SCP

WinSCP32 waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, WinSCP32 expects it to be a DICOM application. WinSCP32 will accept associations with Presentation Contexts for SOP Classes of the Verification Service Class.

3.2.2.2 Image Storage Service as SCP

WinSCP32 waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, WinSCP32 expects it to be a DICOM application. WinSCP32 will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class. It will receive images on these Presentation Contexts and write them to files in the format compliant to Part 10 of the DICOM standard.

Image filenames are described below, as well as the image directory.

3.2.3 Sequencing of Real-World Activities

Not Applicable.

3.3 Application Entity Specifications

3.3.1 WinSCP32 AE - Specification

WinSCP32 provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP specified in the following tables:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

Table 3-1 Supported SOP Classes for Verification SCP

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital XRay Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital XRay Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography Xray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography Xray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral XRay Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral Xray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3
US Multiframe 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
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6
US 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
Multiframe Secondary Capture Single Bit Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Secondary Capture Byte Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multiframe Secondary Capture Word Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multiframe Secondary Capture True Color Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiologic Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2
XRay Angiographic BiPlane Image Storage (RET)	1.2.840.10008.5.1.4.1.1.12.3
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Stored Print Storage	1.2.840.10008.5.1.1.27
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
VL Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.77.1

SOP Class Name	SOP Class UID
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.99
Multiframe Secondary Capture Single Bit Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Secondary Capture Byte Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multiframe Secondary Capture Word Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multiframe Secondary Capture True Color Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1

Table 3-2 Supported SOP Classes for Storage SCP

3.3.1.1 Association Establishment Policies

3.3.1.1.1 General

Minimum PDU size accepted: 8192 bytes

Maximum PDU size accepted: 16384 bytes

3.3.1.1.2 Number of Associations

Up to 10 simultaneous associations are supported.

3.3.1.1.3 Asynchronous Nature

WinSCP32 does not support asynchronous operations.

3.3.1.1.4 Implementation Identifying Information

WinSCP32 will respond with the following implementation identifying parameters:

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Application Context Name	1.2.840.10008.3.1.1.1
Implementation Version Name	ETIAM_DCMTK_353

3.3.1.2 Association Initiation by Real-World Activity

3.3.1.2.1 Real World Activity: Verification SCP

Associated Real-World Activity

See section 3.2.

Proposed Presentation Contexts

WinSCP32 will propose the following different Presentation Contexts:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None

3.3.1.2.2 Real World Activity: Storage SCP

Associated Real-World Activity

See section 3.2.

Proposed Presentation Contexts

WinSCP32 will propose the following different Presentation Contexts:

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See note	*See note*	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See note	*See note*	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
See note	*See note*	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
See note	*See note*	DICOM - JPEG Baseline Encoding	1.2.840.10008.1.2.4.50	SCP	None
See note	*See note*	DICOM - JPEG Lossless Hierarchical First Order prediction	1.2.840.10008.1.2.4.70	SCP	None
See note	*See note*	DICOM - RLE Encoding	1.2.840.10008.1.2.5	SCP	None

Note:

This applies to all supported Storage Abstract Syntax. Encoded transfer syntaxes acceptance may be disabled in the user interface of WinSCP32 option dialog.

3.3.1.2.3 SOP Specific Conformance

SOP Specific Conformance to Verification SOP Class

WinSCP32 provides standard conformance to the DICOM Verification Service Class.

SOP Specific Conformance to Storage SOP Classes

WinSCP32 conforms to the SOP's of the Storage Service Class at Level 2 (Full). No elements are discarded or coerced by WinSCP32. In the event of a successful C-STORE operation, the image has successfully been written to disk as a standard file. As such, it may be accessed in the same manner as any other file. WinSCP32 will never delete a file that it has received; the duration of the storage of the image is determined by other users of the system.

The filename has the following syntax: MM-UID.dcm where

- MM is a two letter code for the modality (US, CT, ...)
- UID is the SOP Instance UID of the image

3.3.1.2.4 Presentation Context Acceptance Criterion

WinSCP32 will accept all contexts in the intersection of the proposed and acceptable Presentation Contexts. The acceptable Presentation Contexts, which WinSCP32 may accept, are specified in the table of par. 3.3.1.2.2

However, if encoded transfer syntax acceptance is disabled in the option dialog, no such transfer syntax will be accepted.

3.3.1.2.5 Transfer Syntax Selection Policies

WinSCP32 preferences, in decreasing order, if proposed by a Storage SCU, are the following:

JPEG Baseline Encoding (if this option is enabled)
JPEG Lossless Hierarchical First Order prediction (if this option is enabled)
RLE Encoding (if this option is enabled)
Explicit VR Little Endian
Implicit VR Little Endian
Explicit VR Big Endian

Any proposed Presentation Context which includes one of these transfer syntax will be accepted. Any proposed Presentation Context that does not include one of these transfer syntax will be rejected.

Files stored by WinSCP32 on disk use the Little Endian Explicit Transfer Syntax if the dataset is sent using a non-encoded Transfer Syntax. In other cases, the negotiated Transfer Syntax is used for disk storage.

3.4 Communication Profiles

3.4.1 Supported Communications Stacks

WinSCP32 provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

3.4.2 TCP/IP Stack

WinSCP32 inherits its TCP/IP stack from the Windows system upon which it executes.

3.4.3 Physical Media Support

WinSCP32 is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

3.5 Extensions/Specialization/Privatization

Not Applicable.

3.6 Configuration

WinSCP32 configuration is included in the application user interface through the Option dialog.

Note:

In Oncentra this is handled differently, cf., section 3.6.2.

3.6.1 AE Title/Presentation Address Mapping

Not Applicable.

3.6.2 Configurable Parameters

WinSCP32 configurable parameters may be defined in the Option Dialog Box of the user interface.

Note:

When used in conjunction with Oncentra the WinSCP32 application is launched in the background. These parameters shall then instead be specified in a configuration file. Cf., the Oncentra system administration documentation for details.

The following parameters may be defined, with defaults as set by Oncentra:

- TCP/IP port : default is 104
- AE Title : default is OTP_INCOMING
- Image Directory : the directory in which incoming objects are stored. Default is …OTP_DATA\DICOM\INCOMING.
- Accept Encoded Transfer Syntaxes or not. If this box is unchecked, none of the 3 encoded transfer syntaxes will be accepted. The image sender will have to send images uncompressed.

- Log events : Log all events or not (verbose) in the log window of the application.

3.7 Support of Extended Character Sets

WinSCP32 supports Extended Character Set “ISO_IR 100” Latin Alphabet N° 1, supplementary set.

4. FR SCP DICOM Conformance

4.1 Introduction

FR is an Oncentra application for filing and restoring data to a DICOM Archive on an Oncentra patient case level. FR SCP is an application only used for retrieval of filed DICOM data, when the case is being restored by FR.

DICOM data that are not retrieved from an Archive with the FR utility shall be sent to the WinSCP32 application instead.

Note:

The current version of Oncentra has a restriction with respect to selection of Archive for the File/Restore feature. Some archives have been known to corrupt DICOM objects when it comes to private sequences. Therefore Nucletron recommends that the selected Archive be configured to store its data in the format "Explicit Value Representation". Otherwise some of the type information that is used in the private sequences may be lost, prohibiting Oncentra to use the data.

4.1.1 Acronyms and Abbreviations

Cf., section 1.6.

4.1.2 References

Cf., section 1.5.

4.2 Implementation Model

4.2.1 Application Data Flow Diagram

FR acts as a SCP for the following Meta SOP Classes:

- Verification
- Storage

Cf. section 2.2.1 for an Application Flow Diagram describing the entire Oncentra system's DICOM interaction.

4.2.2 Functional Definitions of AE's

FR SCP component is waiting for DICOM association requests from the remote DICOM servers on a configured TCP/IP port when users have selected a case for restoring and the process of restoring has started (DICOM server was sent C-MOVE request).

When DICOM data is received it will be stored in the Oncentra database, and the status of the Oncentra patient case will be updated.

4.2.3 Sequencing of Real-World Activities

Not Applicable.

4.3 Application Entity Specifications

4.3.1 FR SCP AE - Specification

See section 2.3.1.

4.3.1.1 Association Establishment Policies

4.3.1.1.1 General

FR SCP Application Entity will attempt to establish an association whenever it is invoked with valid association requests. The DICOM association must contain valid Abstract and Transfer Syntax, and the contents of the image data set must contain information corresponding to its SOP class.

The default maximum PDU length for this AE is 16384 bytes.

4.3.1.1.2 Number of Associations

The maximum number of simultaneous associations accepted by Application Entity is configurable. In general there is no limit to the number of associations other than limits imposed by the operating system.

4.3.1.1.3 Asynchronous Nature

FR SCP allows only a single outstanding transaction on any association.

4.3.1.1.4 Called/Calling Application Entity Titles

The Called AET that FR SCP uses is configurable in FR Configuration.

4.3.1.1.5 Implementation Identifying Information

FR SCP will respond with the following implementation identifying parameters:

Name	SOP Class UID
Implementation Class UID	1.2.276.0.7230010.3.0.3.5.2
Application Context Name	1.2.840.10008.3.1.1.1
Implementation Version Name	OFFIS_DCMTK_352

4.3.1.2 Association Initiation by Real-World Activity

4.3.1.2.1 Real World Activity: Verification SCP

Associated Real-World Activity

FR SCP Application Entity responds to a DICOM Verification Service Class requests to provide an SCU with the ability to determine if Application Entity is receiving DICOM requests.

Proposed Presentation Contexts

FR SCP accepts any of the Presentation Contexts listed in the following table.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	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

4.3.1.2.2 Real World Activity : Storage SCP

Associated Real-World Activity

The associated Real-World activity is a received C-STORE-request. Received images are stored in the Oncentra database.

Proposed Presentation Contexts

FR SCP accepts any of the Presentation Contexts listed in the following table.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See note	*See note*	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

Note:

The Abstract Syntax corresponds to the Storage SOP Class UIDs supported by FR SCP

4.3.1.2.3 SOP Specific Conformance

SOP Specific Conformance to Verification SOP Class

FR SCP provides standard conformance to the DICOM Verification Service Class.

SOP Specific Conformance to Storage SOP Classes

FR SCP Application Entity conforms to the Full Storage Service Class at Level 2.

Any received data is locally stored into memory and processed by FR (stored into the Oncentra database if correct, or discarded if incorrect).

The AE returns the status Success upon successfully operation otherwise one of the following status codes is returned and the association aborted:

- Refused (A700): This error status indicates a lack of Resources (e.g. not enough memory space).
- Error (A900 or C000): An error occurred while processing the image, which makes it impossible to proceed. The image will not be stored and the association aborted.

4.3.1.3 Association Acceptance Policy

The FR SCP Application Entity attempts to accept a new association for the following service operations:

- DIMSE-C-ECHO
- DIMSE-C-STORE

4.4 Communication Profiles

4.4.1 Supported Communications Stacks

FR SCP provides DICOM v3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.4.2 TCP/IP Stack

FR SCP inherits its TCP/IP stack from the Windows system upon which it executes.

4.4.3 Physical Media Support

FR SCP is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

4.5 Extensions/Specialization/Privatization

Not Applicable.

4.6 Configuration

FR parameters are configurable from the Oncentra user interface through the FR Configuration dialogue.

4.6.1 AE Title/Presentation Address Mapping

Not Applicable.

4.6.2 Configurable Parameters

- TCP/IP port for incoming DICOM associations (be careful not setting this to the same number as any other locally running SCP might be using!).
- AE Title.

4.7 Support of Extended Character Sets

FR SCP supports Extended Character Set “ISO_IR 100” Latin Alphabet N° 1, supplementary set.

5. IOD Specific Implementation Details

5.1 General

5.1.1 Connectivity Module

For a more detailed description of the usage of the Oncentra Connectivity Module (CM), please see the Connectivity Module section of the current Oncentra User Manual.

CM acts as an interface to remote DICOM peers, as a Store SCU and as a Query/Retrieve SCU. Its primary function, however, is to import valid DICOM data to Oncentra and to create valid DICOM data for export from Oncentra. The import operation typically involves the selection of supported DICOM objects previously stored by the WinSCP32 application as Interchange Media (“part 10”) files. The export operation involves extraction of valid data from the Oncentra database and creation of DICOM Interchange Media (part 10) files for export via DICOM. This section describes the requirements, constraints, and other behavior of the import and export operations.

CM makes DICOM data available to the Oncentra application by performing import of the DICOM objects to the Oncentra database via the Import button in the CM Import mode.

CM creates DICOM objects for export when the user selects the Export activity for a patient case. This option creates DICOM Interchange Media (“part 10”) files from data in the proprietary Oncentra database. The DICOM objects may subsequently be sent to a remote DICOM peer by clicking the Export button in CM.

5.1.2 Patient Information

Some objects are normally not modified by Oncentra, for example CT and MR images. If such objects are exported from Oncentra, they will be exact duplicates of what was imported, except if the user have changed the Patient Information [Patient ID, Patient Name, Patient Sex, or Patient Date of Birth] when importing. Reason:

If the user specifies other Patient Information than what is present in a DICOM object being imported into Oncentra, CM will copy the DICOM data to a new object, which is stored in the Oncentra database with the following modifications:

- The Patient Information is changed to match the user-defined Oncentra Patient Information.
- A new SOP Instance UID is defined using the Oncentra UID preamble.

This functionality has some impact on the linking of related objects to each other using SOP Instance UIDs. This is further described in the detailed IOD specifications.

5.1.3 Date and Time Attributes

Objects created in Oncentra MasterPlan 1.4 versions (includes service packs) and earlier all have stored date and time attributes (all attributes of the type DA or TM) with local time including any daylight saving offset (thus local ‘clock’ time). The tag Timezone Offset From UTC (0008,0201), is not used in these objects.

Objects created in Oncentra MasterPlan 1.5 and later will also have the DA and TM values in local time but the Timezone Offset From UTC (0008,0201) will be specified for all objects.

Imported objects will be interpreted as using local time in DA and TM fields. If the Timezone Offset From UTC (0008,0201) is specified for an imported object this will be used to create a local time representation for display/copy via the UTC time.

Example: An object is created at 9:00 2006-02-18 (local time) with UTC offset +0800 (Beijing). It is exported and carried over a few time zones into a zone with UTC offset –05:00 (New York). The creation time displayed in New York will then be 20:00 2006-02-17.

The Patient module will NOT be interpreted in this way (i.e. the patients birth date or time will not be interpreted via UTC offset), it will always be interpreted as it is local date and time.

5.1.4 Detailed IOD Specifications

In the sections below the details for all DICOM object types supported by Oncentra are listed. This includes tables of all the individual attributes for each object, with information if Oncentra provides or uses those individual attributes.

Note:

Note that the text "Duplicated" or "Duplicated from SCP" for in the tables below indicates that Oncentra simply retains or copies the values that were imported via the SCP.

5.2 CT Image Information Object Implementation

Oncentra can import and export CT images. Oncentra can also create CT images by creating a virtual CT image series in AM, or by inserting an existing image into CT series using 'Register Image' function.

5.2.1 CT Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Duplicated SCP - Not used
Series	General Series	C.7.3.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	
	Image Pixel	C.7.6.3	M	
	Contrast/bolus	C.7.6.4	C Required if contrast media was used in this image	SCU - Duplicated SCP - Not used
	CT Image	C.8.2.1	M	
	Overlay Plane	C.9.2	U	SCU - Duplicated SCP - Not used
	VOI LUT	C.11.2	U	SCU - Duplicated SCP - Not used
	SOP Common	C.12.1	M	

5.2.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.

Attribute Name	Tag	Type	Notes
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Referenced Patient Sequence	(0008,1120)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Duplicated from SCP. SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Provided SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Provided SCP - Used
Study Time	(0008,0030)	2	SCU - Provided SCP - Not used.
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study ID	(0020,0010)	2	SCU - Duplicated from SCP. SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study Description	(0008,1030)	3	SCU - Duplicated from SCP. SCP – Used if provided
Physician(s) of Record	(0008,1048)	3	SCU - Duplicated from SCP. SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.4 General Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'CT' SCP - Used, supported: 'CT'
Series Instance UID	(0020,000E)	1	SCU - Provided SCP - Used to validate series contents.

Attribute Name	Tag	Type	Notes
Series Number	(0020,0011)	2	SCU - Duplicated from SCP. SCP - Used for display only.
Laterality	(0020,0060)	2C	SCU - Duplicated from SCP. SCP - Not used
Series Date	(0008,0021)	3	SCU - Duplicated from SCP. SCP - Not used
Series Time	(0008,0031)	3	SCU - Duplicated from SCP. SCP - Not used
Performing Physicians' Name	(0008,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Protocol Name	(0018,1030)	3	SCU - Duplicated from SCP. SCP - Not used
Series Description	(0008,103E)	3	SCU - Duplicated from SCP. SCP - Not used
Operators' Name	(0008,1070)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Body Part Examined	(0018,0015)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Position	(0018,5100)	2C	SCU - Duplicated from SCP. For images created in AM set to 'HFS' or copied from related images. SCP – Required for BM.
Smallest Pixel Value in Series	(0028,0108)	3	SCU - Provided. SCP - Not used
Largest Pixel Value in Series	(0028,0109)	3	SCU - Provided. SCP - Not used
Request Attributes Sequence	(0040,0275)	3	SCU - Duplicated from SCP. SCP - Not used
>Requested Procedure ID	(0040,1001)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step ID	(0040,0009)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step Description	(0040,0007)	3	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Action Item Code Sequence	(0040,0008)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step ID	(0040,0253)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Date	(0040,0244)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Time	(0040,0245)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Description	(0040,0254)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Action Item Sequence	(0040,0260)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Provided. SCP - Required, used to verify reference from RT Structure.

Attribute Name	Tag	Type	Notes
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from SCP. SCP - Not used

5.2.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - Duplicated from SCP. SCP - Used. [See Manufacturer SCU.]
Institution Name	(0008,0080)	3	SCU - Duplicated from SCP. SCP - Not used
Institution Address	(0008,0081)	3	SCU - Duplicated from SCP. SCP - Not used
Station Name	(0008,1010)	3	SCU - Duplicated from SCP. SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - Duplicated from SCP. SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Software Versions	(0018,1020)	3	SCU - Duplicated from SCP. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Duplicated from SCP. SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Duplicated from SCP. SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Duplicated from SCP; not used for images created by Oncentra. SCP - Used

5.2.7 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Duplicated from SCP. SCP - Not used
Patient Orientation	(0020,0020)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Date	(0008,0023)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Time	(0008,0033)	2C	SCU - Duplicated from SCP. SCP - Not used
Image Type	(0008,0008)	1	SCU - Duplicated from SCP. For images created in AM, set to "DERIVED\SECONDARY" ("\AXIAL" added for axial orientations). SCP - Used
Acquisition Number	(0020,0012)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Date	(0008,0022)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used

Attribute Name	Tag	Type	Notes
Acquisition Datetime	(0008,002A)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Duplicated from SCP. SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Duplicated from SCP. SCP - Not used
Image Comments	(0020,4000)	3	SCU - Duplicated from SCP. SCP - Not used
Quality Control Image	(0028,0300)	3	SCU - Duplicated from SCP. SCP - Not used
Burned In Annotation	(0028,0301)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression	(0028,2110)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression Ratio	(0028,2112)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.8 Image Plane Module

Attribute Name	Tag	Type	Notes
Pixel Spacing	(0028,0030)	1	SCU - Provided. SCP - Used
Image Orientation (Patient)	(0020,0037)	1	SCU - Provided. SCP - Used
Image Position (Patient)	(0020,0032)	1	SCU - Duplicated from SCP, provided on new. SCP - Used. Duplicate Image positions are not allowed by CM.
Slice Thickness	(0018,0050)	2	SCU - Duplicated from SCP; for images created in AM set to '0' SCP - Not used
Slice Location	(0020,1041)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.9 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used

Attribute Name	Tag	Type	Notes
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MOMOCHROME2') or copied from related images. SCP - Used, must be 'MONOCHROME2'
Rows	(0028,0010)	1	SCU - Provided SCP - Used
Columns	(0028,0011)	1	SCU - Provided SCP - Used
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Bits Stored	(0028,0101)	1	SCU - Duplicated from SCP; for images created in AM set to 12 or copied from related images. SCP - Used
High Bit	(0028,0102)	1	SCU - Duplicated from SCP; for images created in AM set to 11 or copied from related images. SCP - Used
Pixel Representation	(0028,0103)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Pixel Data	(7FE0,0010)	1	SCU - Provided. SCP - Used The Hounsfield values used in the internal algorithms of Oncentra will be limited to the range [-1000, 3095]. If Oncentra encounters values below -1000, these are replaced with -1000 and values above 3095 will be replaced with 3095.
Planar Configuration	(0028,0006)	1C	SCU - Duplicated from SCP. SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Duplicated from SCP. SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Duplicated from SCP. SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Duplicated from SCP. SCP - Not used

5.2.10 CT Image Module

Attribute Name	Tag	Type	Notes
Image Type	(0008,0008)	1	SCU - Duplicated from SCP. For images created in AM, see Image Type in section 5.2.7. SCP - Used

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; For images created in AM set to 1 or copied from related images. SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MONOCHROME2) or copied from related images. SCP - Used must be 'MONOCHROME2'
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Bits Stored	(0028,0101)	1	SCU - Duplicated from SCP; for images created in AM set to 12 or copied from related images SCP - Used
High Bit	(0028,0102)	1	SCU - Duplicated from SCP; for images created in AM set to 11 or copied. SCP - Used
Rescale Intercept	(0028,1052)	1	SCU - Duplicated from SCP; for images created in AM set to 0. SCP - Used
Rescale Slope	(0028,1053)	1	SCU - Duplicated from SCP; for images created in AM set to 1. SCP - Used
KVP	(0018,0060)	2	SCU - Duplicated from SCP. SCP - Not used
Acquisition Number	(0020,0012)	2	SCU - Duplicated from SCP. SCP - Not used
Scan Options	(0018,0022)	3	SCU - Duplicated from SCP. SCP - Not used
Data Collection Diameter	(0018,0090)	3	SCU - Duplicated from SCP. SCP - Not used
Reconstruction Diameter	(0018,1100)	3	SCU - Duplicated from SCP. SCP - Not used
Distance Source to Detector	(0018,1110)	3	SCU - Duplicated from SCP. SCP - Not used
Distance Source to Patient	(0018,1111)	3	SCU - Duplicated from SCP. SCP - Not used
Gantry/Detector Tilt	(0018,1120)	3	SCU - Duplicated from SCP. SCP - Not used
Table Height	(0018,1130)	3	SCU - Duplicated from SCP. SCP - Used
Rotation Direction	(0018,1140)	3	SCU - Duplicated from SCP. SCP - Not used
Exposure Time	(0018,1150)	3	SCU - Duplicated from SCP. SCP - Not used
X-ray Tube Current	(0018,1151)	3	SCU - Duplicated from SCP. SCP - Not used
Exposure	(0018,1152)	3	SCU - Duplicated from SCP. SCP - Not used
Exposure in μAs	(0018,1153)	3	SCU - Duplicated from SCP. SCP - Not used
Filter Type	(0018,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Generator Power	(0018,1170)	3	SCU - Duplicated from SCP. SCP - Not used
Focal Spot	(0018,1190)	3	SCU - Duplicated from SCP. SCP - Not used
Convolution Kernel	(0018,1210)	3	SCU - Duplicated from SCP. SCP - Not used

5.2.11 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.2' SCP - Used, supported value '1.2.840.10008.5.1.4.1.1.2'.
SOP Instance UID	(0008,0018)	1	SCU - Provided. Created by Oncentra if Patient Information changed by user. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Not used
Instance Creation Date	(0008,0012)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Duplicated from SCP. SCP - Not used

5.3 MR Image Information Object Implementation

Oncentra can import and export MR images. Oncentra can also create MR images in the AM module, by using the 'Register Image' functionality, which allows user to insert an image into existing MR series or create a new MR series.

5.3.1 MR Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Duplicated from SCP. SCP - Not used
Series	General Series	C.7.3.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	
	Image Pixel	C.7.6.3	M	
	Contrast/bolus	C.7.6.4	C Required if contrast media was used in this image	SCU - Duplicated from SCP. SCP - Not used
	MR Image	C.8.3.1	M	
	Overlay Plane	C.9.2	U	SCU - Duplicated from SCP. SCP - Not used
	VOI LUT	C.11.2	U	SCU - Duplicated from SCP. SCP - Not used
	SOP Common	C.12.1	M	

5.3.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.

Attribute Name	Tag	Type	Notes
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Duplicated from SCP. SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Provided. SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Provided SCP - Not used
Study Time	(0008,0030)	2	SCU - Provided SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study ID	(0020,0010)	2	SCU - Duplicated from SCP. SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study Description	(0008,1030)	3	SCU - Duplicated from SCP. SCP – Used if provided
Physician(s) of Record	(0008,1048)	3	SCU - Duplicated from SCP. SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.4 General Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'MR' SCP - Used, supported: 'MR'
Series Instance UID	(0020,000E)	1	SCU - Provided. SCP - Used to validate series contents
Series Number	(0020,0011)	2	SCU - Duplicated from SCP. SCP - Used for display only.
Laterality	(0020,0060)	2C	SCU - Duplicated from SCP. SCP - Not used
Series Date	(0008,0021)	3	SCU - Duplicated from SCP. SCP - Not used
Series Time	(0008,0031)	3	SCU - Duplicated from SCP. SCP - Not used
Performing Physicians' Name	(0008,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Protocol Name	(0018,1030)	3	SCU - Duplicated from SCP. SCP - Not used
Series Description	(0008,103E)	3	SCU - Duplicated from SCP. SCP - Not used
Operators' Name	(0008,1070)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Body Part Examined	(0018,0015)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Position	(0018,5100)	2C	SCU - Duplicated from SCP. For images created in AM set to 'HFS' or copied from related images. SCP - Required for BM.
Smallest Pixel Value in Series	(0028,0108)	3	SCU - Provided. SCP - Not used
Largest Pixel Value in Series	(0028,0109)	3	SCU - Provided. SCP - Not used
Request Attributes Sequence	(0040,0275)	3	SCU - Duplicated from SCP. SCP - Not used
>Requested Procedure ID	(0040,1001)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step ID	(0040,0009)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step Description	(0040,0007)	3	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Action Item Code Sequence	(0040,0008)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step ID	(0040,0253)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Date	(0040,0244)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Time	(0040,0245)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Description	(0040,0254)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Action Item Sequence	(0040,0260)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Provided. SCP - Used to verify reference from RT Structure Set if RT Structure Set is imported.
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from SCP. SCP - Not used

5.3.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - Duplicated from SCP. SCP - Used. [See Manufacturer SCU.]
Institution Name	(0008,0080)	3	SCU - Duplicated from SCP. SCP - Not used
Institution Address	(0008,0081)	3	SCU - Duplicated from SCP. SCP - Not used
Station Name	(0008,1010)	3	SCU - Duplicated from SCP. SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Duplicated from SCP. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - Duplicated from SCP. SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Software Versions	(0018,1020)	3	SCU - Duplicated from SCP. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Duplicated from SCP. SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Duplicated from SCP. SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Duplicated from SCP; not used for images created by Oncentra. SCP - Used

5.3.7 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Duplicated from SCP. SCP - Not used.
Patient Orientation	(0020,0020)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Date	(0008,0023)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Time	(0008,0033)	2C	SCU - Duplicated from SCP. SCP - Not used
Image Type	(0008,0008)	1	SCU - Duplicated from SCP. For images created in AM, set to "DERIVED\SECONDARY\MPR" SCP - Used
Acquisition Number	(0020,0012)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Acquisition Date	(0008,0022)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used
Acquisition Datetime	(0008,002A)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Duplicated from SCP. SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Duplicated from SCP. SCP - Not used
Image Comments	(0020,4000)	3	SCU - Duplicated from SCP. SCP - Not used
Quality Control Image	(0028,0300)	3	SCU - Duplicated from SCP. SCP - Not used
Burned In Annotation	(0028,0301)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression	(0028,2110)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression Ratio	(0028,2112)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.8 Image Plane Module

Attribute Name	Tag	Type	Notes
Pixel Spacing	(0028,0030)	1	SCU - Provided. SCP - Used
Image Orientation (Patient)	(0020,0037)	1	SCU - Provided. SCP - Used
Image Position (Patient)	(0020,0032)	1	SCU - Duplicated from SCP, provided on new. SCP - Used. Duplicate Image positions are not allowed by CM.
Slice Thickness	(0018,0050)	2	SCU - Duplicated from SCP; for images created in AM set to '0' SCP - Not used
Slice Location	(0020,1041)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.9 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MOMOCHROME2') or copied from related images. SCP - Used, must be 'MONOCHROME2'
Rows	(0028,0010)	1	SCU - Provided SCP - Used
Columns	(0028,0011)	1	SCU - Provided SCP - Used
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Bits Stored	(0028,0101)	1	SCU - Duplicated from SCP; for images created in AM set to 12 or copied from related images. SCP - Used
High Bit	(0028,0102)	1	SCU - Duplicated from SCP; for images created in AM set to 11 or copied from related images. SCP - Used
Pixel Representation	(0028,0103)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Pixel Data	(7FE0,0010)	1	SCU - Provided. SCP - Used
Planar Configuration	(0028,0006)	1C	SCU - Duplicated from SCP. SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Duplicated from SCP. SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Duplicated from SCP. SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Duplicated from SCP. SCP - Not used

5.3.10 MR Image Module

Attribute Name	Tag	Type	Notes
Image Type	(0008,0008)	1	SCU - Duplicated from SCP. For images created in AM, set to "DERIVED\SECONDARY\MPR" SCP - Used

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MOMOCHROME2') or copied from related images. SCP - Used, must be 'MONOCHROME2'
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Scanning Sequence	(0018,0020)	1	SCU - Duplicated from SCP. SCP - Not used
Sequence Variant	(0018,0021)	1	SCU - Duplicated from SCP. SCP - Not used
Scan Options	(0018,0022)	2	SCU - Duplicated from SCP. SCP - Not used
MR Acquisition Type	(0018,0023)	2	SCU - Duplicated from SCP. SCP - Not used
Repetition Time	(0018,0080)	2C	SCU - Duplicated from SCP. SCP - Not used
Echo Time	(0018,0081)	2	SCU - Duplicated from SCP. SCP - Not used
Echo Train Length	(0018,0091)	2	SCU - Duplicated from SCP. SCP - Not used
Inversion Time	(0018,0082)	2C	SCU - Duplicated from SCP. SCP - Not used
Trigger Time	(0018,1060)	2C	SCU - Duplicated from SCP. SCP - Not used
Sequence Name	(0018,0024)	3	SCU - Duplicated from SCP. SCP - Not used
Angio Flag	(0018,0025)	3	SCU - Duplicated from SCP. SCP - Not used
Number of Averages	(0018,0083)	3	SCU - Duplicated from SCP. SCP - Not used
Imaging Frequency	(0018,0084)	3	SCU - Duplicated from SCP. SCP - Not used
Imaged Nucleus	(0018,0085)	3	SCU - Duplicated from SCP. SCP - Not used
Echo Number	(0018,0086)	3	SCU - Duplicated from SCP. SCP - Not used
Magnetic Field Strength	(0018,0087)	3	SCU - Duplicated from SCP. SCP - Not used
Spacing Between Slices	(0018,0088)	3	SCU - Duplicated from SCP. SCP - Not used
Number of Phase Encoding Steps	(0018,0089)	3	SCU - Duplicated from SCP. SCP - Not used
Percent Sampling	(0018,0093)	3	SCU - Duplicated from SCP. SCP - Not used
Percent Phase Field of View	(0018,0094)	3	SCU - Duplicated from SCP. SCP - Not used
Pixel Bandwidth	(0018,0095)	3	SCU - Duplicated from SCP. SCP - Not used
Nominal Interval	(0018,1062)	3	SCU - Duplicated from SCP. SCP - Not used
Beat Rejection Flag	(0018,1080)	3	SCU - Duplicated from SCP. SCP - Not used
Low R-R Value	(0018,1081)	3	SCU - Duplicated from SCP. SCP - Not used
High R-R Value	(0018,1082)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Intervals Acquired	(0018,1083)	3	SCU - Duplicated from SCP. SCP - Not used
Intervals Rejected	(0018,1084)	3	SCU - Duplicated from SCP. SCP - Not used
PVC Rejection	(0018,1085)	3	SCU - Duplicated from SCP. SCP - Not used
Skip Beats	(0018,1086)	3	SCU - Duplicated from SCP. SCP - Not used
Heart Rate	(0018,1088)	3	SCU - Duplicated from SCP. SCP - Not used
Cardiac Number of Images	(0018,1090)	3	SCU - Duplicated from SCP. SCP - Not used
Trigger Window	(0018,1094)	3	SCU - Duplicated from SCP. SCP - Not used
Reconstruction Diameter	(0018,1100)	3	SCU - Duplicated from SCP. SCP - Not used
Receiving Coil	(0018,1250)	3	SCU - Duplicated from SCP. SCP - Not used
Transmitting Coil	(0018,1251)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Matrix	(0018,1310)	3	SCU - Duplicated from SCP. SCP - Not used
Phase Encoding Direction	(0018,1312)	3	SCU - Duplicated from SCP. SCP - Not used
Flip Angle	(0018,1314)	3	SCU - Duplicated from SCP. SCP - Not used
SAR	(0018,1316)	3	SCU - Duplicated from SCP. SCP - Not used
Variable Flip Angle Flag	(0018,1315)	3	SCU - Duplicated from SCP. SCP - Not used
dB/dt	(0018,1318)	3	SCU - Duplicated from SCP. SCP - Not used
Temporal Position Identifier	(0020,0100)	3	SCU - Duplicated from SCP. SCP - Not used
Number of Temporal Positions	(0020,0105)	3	SCU - Duplicated from SCP. SCP - Not used
Temporal Resolution	(0020,0110)	3	SCU - Duplicated from SCP. SCP - Not used

5.3.11 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Duplicated from SCP. SCP - Used, supported value '1.2.840.10008.5.1.4.1.1.4'.
SOP Instance UID	(0008,0018)	1	SCU - Duplicated from SCP. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Not used
Instance Creation Date	(0008,0012)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Duplicated from SCP. SCP - Not used

5.4 PET Image Object Implementation

Oncentra can import and export PET images. AM can also create new PET images based on other imported images, using 'Register Image' functionality.

PET images are normally used as correlation images for image registration/fusion purposes in AM. For example: a CT or MR image series would be imported to an Oncentra case as the reference image series (via CM by importing the CT or MR image series first), then the PET image series would be imported to the same case. AM can then be used to perform image registration of the PET with the CT or MR image series.

5.4.1 PET Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Duplicated from SCP. SCP - Not used
Series	General Series	C.7.3.1	M	
	PET Series	C.8.9.1	M	SCU - Duplicated from SCP. SCP - Not used
	PET Isotope	C.8.9.2	M	SCU - Duplicated from SCP. SCP - Not used
	PET Multi-gated Acquisition	C.8.9.3	C - Required if Series Type (0054,1000) Value 1 is GATED.	SCU - Duplicated from SCP. SCP - Not used
	NM/PET Patient Orientation	C.8.4.6	M	SCU - Duplicated from SCP. SCP - Not used
Frame of Reference	Frame of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	SCU - Duplicated from SCP. SCP - Not used
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	
	Image Pixel	C.7.6.3	M	
	PET Image	C.8.9.4	M	
	Overlay Plane	C.9.2	U	SCU - SCP - Not used
	VOI LUT	C.11.2	U	SCU - SCP - Not used
	SOP Common	C.12.1	M	

5.4.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Patient's Birth Time	(0010,0032)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Duplicated from SCP. SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Duplicated from SCP. SCP - Used to validate study/series contents
Study Date	(0008,0020)	2	SCU - Duplicated from SCP. SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from SCP. SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study ID	(0020,0010)	2	SCU - Duplicated from SCP. SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from SCP. SCP – Used if provided
Study Description	(0008,1030)	3	SCU - Duplicated from SCP. SCP – Used if provided
Physician(s) of Record	(0008,1048)	3	SCU - Duplicated from SCP. SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.4 General Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - Provided. SCP - Used, supported: ‘PT’
Series Instance UID	(0020,000E)	1	SCU - Duplicated from SCP. SCP - Used to validate series contents
Series Number	(0020,0011)	2	SCU - Duplicated from SCP. SCP - Not used
Laterality	(0020,0060)	2C	SCU - Duplicated from SCP. SCP - Not used
Series Date	(0008,0021)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Series Time	(0008,0031)	3	SCU - Duplicated from SCP. SCP - Not used
Performing Physicians' Name	(0008,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Protocol Name	(0018,1030)	3	SCU - Duplicated from SCP. SCP - Not used
Series Description	(0008,103E)	3	SCU - Duplicated from SCP. SCP - Not used
Operators' Name	(0008,1070)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Body Part Examined	(0018,0015)	3	SCU - Duplicated from SCP. SCP - Not used
Patient Position	(0018,5100)	2C	SCU - Duplicated from SCP. For images created in AM set to 'HFS' or copied from related images. SCP - Not used.
Smallest Pixel Value in Series	(0028,0108)	3	SCU - Provided. SCP - Not used
Largest Pixel Value in Series	(0028,0109)	3	SCU - Provided. SCP - Not used
Request Attributes Sequence	(0040,0275)	3	SCU - Duplicated from SCP. SCP - Not used
>Requested Procedure ID	(0040,1001)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step ID	(0040,0009)	1C	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Procedure Step Description	(0040,0007)	3	SCU - Duplicated from SCP. SCP - Not used
>Scheduled Action Item Code Sequence	(0040,0008)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step ID	(0040,0253)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Date	(0040,0244)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Start Time	(0040,0245)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Procedure Step Description	(0040,0254)	3	SCU - Duplicated from SCP. SCP - Not used
Performed Action Item Sequence	(0040,0260)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.5 PET Series Module

Attribute Name	Tag	Type	Notes
Series Date	(0008,0021)	1	SCU - Duplicated from SCP. SCP - Not used
Series Time	(0008,0031)	1	SCU - Duplicated from SCP. SCP - Not used
Units	(0054,1001)	1	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Counts Source	(0054,1002)	1	SCU - Duplicated from SCP. SCP - Not used
Series Type	(0054,1000)	1	SCU - Duplicated from SCP. SCP - Not used
Reprojection Method	(0054,1004)	2C	SCU - Duplicated from SCP. SCP - Not used
Number of R-R Intervals	(0054,0061)	1C	SCU - Duplicated from SCP. SCP - Not used
Number of Time Slots	(0054,0071)	1C	SCU - Duplicated from SCP. SCP - Not used
Number of Time Slices	(0054,0101)	1C	SCU - Duplicated from SCP. SCP - Not used
Number of Slices	(0054,0081)	1	SCU - Duplicated from SCP. SCP - Not used
Corrected Image	(0028,0051)	2	SCU - Duplicated from SCP. SCP - Not used
Randoms Correction Method	(0054,1100)	3	SCU - Duplicated from SCP. SCP - Not used
Attenuation Correction Method	(0054,1101)	3	SCU - Duplicated from SCP. SCP - Not used
Scatter Correction Method	(0054,1105)	3	SCU - Duplicated from SCP. SCP - Not used
Decay Correction	(0054,1102)	1	SCU - Duplicated from SCP. SCP - Not used
Reconstruction Diameter	(0018,1100)	3	SCU - Duplicated from SCP. SCP - Not used
Convolution Kernel	(0018,1210)	3	SCU - Duplicated from SCP. SCP - Not used
Reconstruction Method	(0054,1103)	3	SCU - Duplicated from SCP. SCP - Not used
Detector Lines of Response Used	(0054,1104)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Start Condition	(0018,0073)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Start Condition Data	(0018,0074)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Termination Condition	(0018,0071)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Termination Condition Data	(0018,0075)	3	SCU - Duplicated from SCP. SCP - Not used
Field of View Shape	(0018,1147)	3	SCU - Duplicated from SCP. SCP - Not used
Field of View Dimensions	(0018,1149)	3	SCU - Duplicated from SCP. SCP - Not used
Gantry/Detector Tilt	(0018,1120)	3	SCU - Duplicated from SCP. SCP - Not used
Gantry/Detector Slew	(0018,1121)	3	SCU - Duplicated from SCP. SCP - Not used
Type of Detector Motion	(0054,0202)	3	SCU - Duplicated from SCP. SCP - Not used
Collimator Type	(0018,1181)	2	SCU - Duplicated from SCP. SCP - Not used
Collimator/Grid Name	(0018,1180)	3	SCU - Duplicated from SCP. SCP - Not used
Axial Acceptance	(0054,1200)	3	SCU - Duplicated from SCP. SCP - Not used
Axial Mash	(0054,1201)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Transverse Mash	(0054,1202)	3	SCU - Duplicated from SCP. SCP - Not used
Detector Element Size	(0054,1203)	3	SCU - Duplicated from SCP. SCP - Not used
Coincidence Window Width	(0054,1210)	3	SCU - Duplicated from SCP. SCP - Not used
Energy Window Range Sequence	(0054,0013)	3	SCU - Duplicated from SCP. SCP - Not used
>Energy Window Lower Limit	(0054,0014)	3	SCU - Duplicated from SCP. SCP - Not used
>Energy Window Upper Limit	(0054,0015)	3	SCU - Duplicated from SCP. SCP - Not used
Secondary Counts Type	(0054,1220)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.6 PET Isotope Module

Attribute Name	Tag	Type	Notes
Radiopharmaceutical Information Sequence	(0054,0016)	2	SCU - Duplicated from SCP. SCP - Not used
>Radionuclide Code Sequence	(0054,0300)	2	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Route	(0018,1070)	3	SCU - Duplicated from SCP. SCP - Not used
>Administration Route Code Sequence	(0054,0302)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Volume	(0018,1071)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Start Time	(0018,1072)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Stop Time	(0018,1073)	3	SCU - Duplicated from SCP. SCP - Not used
>Radionuclide Total Dose	(0018,1074)	3	SCU - Duplicated from SCP. SCP - Not used
>Radionuclide Half Life	(0018,1075)	3	SCU - Duplicated from SCP. SCP - Not used
>Radionuclide Positron Fraction	(0018,1076)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Specific Activity	(0018,1077)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical	(0018,0031)	3	SCU - Duplicated from SCP. SCP - Not used
>Radiopharmaceutical Code Sequence	(0054,0304)	3	SCU - Duplicated from SCP. SCP - Not used
Intervention Drug Information Sequence	(0018,0026)	3	SCU - Duplicated from SCP. SCP - Not used
>Intervention Drug Name	(0018,0034)	3	SCU - Duplicated from SCP. SCP - Not used
>Intervention Drug Code Sequence	(0018,0029)	3	SCU - Duplicated from SCP. SCP - Not used
>Intervention Drug Start Time	(0018,0035)	3	SCU - Duplicated from SCP. SCP - Not used
>Intervention Drug Stop Time	(0018,0027)	3	SCU - Duplicated from SCP. SCP - Not used
>Intervention Drug Dose	(0018,0028)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.7 PET Multi-gated Acquisition Module

Attribute Name	Tag	Type	Notes
Beat Rejection Flag	(0018,1080)	2	SCU - Duplicated from SCP. SCP - Not used
Trigger Source or Type	(0018,1061)	3	SCU - Duplicated from SCP. SCP - Not used
PVC Rejection	(0018,1085)	3	SCU - Duplicated from SCP. SCP - Not used
Skip Beats	(0018,1086)	3	SCU - Duplicated from SCP. SCP - Not used
Heart Rate	(0018,1088)	3	SCU - Duplicated from SCP. SCP - Not used
Framing Type	(0018,1064)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.8 NM/PET Patient Orientation

Attribute Name	Tag	Type	Notes
Patient Orientation Code Sequence	(0054,0410)	2	SCU - Duplicated from SCP. SCP - Not used
> Patient Orientation Modifier Code Sequence	(0054,0412)	2C	SCU - Duplicated from SCP. SCP - Not used
Patient Gantry Relationship Code Sequence	(0054,0414)	2	SCU - Duplicated from SCP. SCP - Not used

5.4.9 Frame of Reference

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from SCP. SCP - Used to verify reference from RT Structure Set if RT Structure Set is imported.
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from SCP. SCP - Not used

5.4.10 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - Duplicated from SCP. SCP - Not used
Institution Name	(0008,0080)	3	SCU - Duplicated from SCP. SCP - Not used
Institution Address	(0008,0081)	3	SCU - Duplicated from SCP. SCP - Not used
Station Name	(0008,1010)	3	SCU - Duplicated from SCP. SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Duplicated from SCP. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Device Serial Number	(0018,1000)	3	SCU - Duplicated from SCP. SCP - Not used
Software Versions	(0018,1020)	3	SCU - Duplicated from SCP. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Duplicated from SCP. SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Duplicated from SCP. SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Duplicated from SCP. SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Duplicated from SCP; not used for images created by Oncentra. SCP - Used

5.4.11 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Duplicated from SCP. SCP - Not used
Patient Orientation	(0020,0020)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Date	(0008,0023)	2C	SCU - Duplicated from SCP. SCP - Not used
Content Time	(0008,0033)	2C	SCU - Duplicated from SCP. SCP - Not used
Image Type	(0008,0008)	3	SCU - Duplicated from SCP. For images created in AM, set to "DERIVED\SECONDARY\MPR" SCP - Used
Acquisition Number	(0020,0012)	3	SCU - Duplicated from SCP. SCP - Not used
Acquisition Date	(0008,0022)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Duplicated from SCP; for images created in AM generated or copied from related images. SCP - Not used
Acquisition Datetime	(0008,002A)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Duplicated from SCP. SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Images in Acquisition	(0020,1002)	3	SCU - Duplicated from SCP. SCP - Not used
Image Comments	(0020,4000)	3	SCU - Duplicated from SCP. SCP - Not used
Quality Control Image	(0028,0300)	3	SCU - Duplicated from SCP. SCP - Not used
Burned In Annotation	(0028,0301)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression	(0028,2110)	3	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression Ratio	(0028,2112)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.12 Image Plane

Attribute Name	Tag	Type	Notes
Pixel Spacing	(0028,0030)	1	SCU - Provided SCP - Used
Image Orientation (Patient)	(0020,0037)	1	SCU - Duplicated from SCP, provided on new. SCP - Used
Image Position (Patient)	(0020,0032)	1	SCU - Provided SCP - Used. Duplicate Image positions are not allowed by CM.
Slice Thickness	(0018,0050)	2	SCU - Duplicated from SCP; for images created in AM set to '0' SCP - Not used
Slice Location	(0020,1041)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.13 Image Pixel

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MOMOCHROME2') or copied from related images. SCP - Used, must be 'MONOCHROME2'
Rows	(0028,0010)	1	SCU - Provided SCP - Used
Columns	(0028,0011)	1	SCU - Provided SCP - Used
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Bits Stored	(0028,0101)	1	SCU - Duplicated from SCP; for images created in AM set to 12 or copied from related images. SCP - Used
High Bit	(0028,0102)	1	SCU - Duplicated from SCP; for images created in AM set to 11 or copied from related images. SCP - Used
Pixel Representation	(0028,0103)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Pixel Data	(7FE0,0010)	1	SCU - Provided. SCP - Used

Attribute Name	Tag	Type	Notes
Planar Configuration	(0028,0006)	1C	SCU - Duplicated from SCP. SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Duplicated from SCP. SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Duplicated from SCP. SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Duplicated from SCP. SCP - Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Duplicated from SCP. SCP - Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Duplicated from SCP. SCP - Not used
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Duplicated from SCP. SCP - Not used

5.4.14 PET Image Module

Attribute Name	Tag	Type	Notes
Image Type	(0008,0008)	3	SCU - Duplicated from SCP. For images created in AM, set to "DERIVED\SECONDARY\MPR" SCP - Used
Samples per Pixel	(0028,0002)	1	SCU - Duplicated from SCP; for images created in AM set to 1 or copied from related images. SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Duplicated from SCP; for images created in AM set to ('MOMOCHROME2') or copied from related images. SCP - Used, must be 'MONOCHROME2'
Bits Allocated	(0028,0100)	1	SCU - Duplicated from SCP; for images created in AM set to 16 or copied from related images SCP - Used
Bits Stored	(0028,0101)	1	SCU - Duplicated from SCP; for images created in AM set to 12 or copied from related images. SCP - Used
High Bit	(0028,0102)	1	SCU - Duplicated from SCP; for images created in AM set to 11 or copied from related images. SCP - Used
Rescale Intercept	(0028,1052)	1	SCU - Duplicated from SCP SCP - Not used (Assumed to be 0 as specified by the DICOM standard.)
Rescale Slope	(0028,1053)	1	SCU - Duplicated from SCP. SCP - Not used. (Assumed to be 1)
Frame Reference Time	(0054,1300)	1	SCU - Duplicated from SCP. SCP - Not used
Trigger Time	(0018,1060)	1C	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
Frame Time	(0018,1063)	1C	SCU - Duplicated from SCP. SCP - Not used
Low R-R Value	(0018,1081)	1C	SCU - Duplicated from SCP. SCP - Not used
High R-R Value	(0018,1082)	1C	SCU - Duplicated from SCP. SCP - Not used
Lossy Image Compression	(0028,2110)	1C	SCU - Duplicated from SCP. SCP - Not used
Image Index	(0054,1330)	1	SCU - Duplicated from SCP. SCP - Not used
Acquisition Date	(0008,0032)	2	SCU - Duplicated from SCP. SCP - Not used
Acquisition Time	(0008,0032)	2	SCU - Duplicated from SCP. SCP - Not used
Actual Frame Duration	(0018,1242)	2	SCU - Duplicated from SCP. SCP - Not used
Nominal Interval	(0018,1062)	3	SCU - Duplicated from SCP. SCP - Not used
Intervals Acquired	(0018,1083)	3	SCU - Duplicated from SCP. SCP - Not used
Intervals Rejected	(0018,1084)	3	SCU - Duplicated from SCP. SCP - Not used
Primary (Prompts) Counts Accumulated	(0054,1310)	3	SCU - Duplicated from SCP. SCP - Not used
Secondary Counts Accumulated	(0054,1311)	3	SCU - Duplicated from SCP. SCP - Not used
Slice Sensitivity Factor	(0054,1320)	3	SCU - Duplicated from SCP. SCP - Not used
Decay Factor	(0054,1321)	1C	SCU - Duplicated from SCP. SCP - Not used
Dose Calibration Factor	(0054,1322)	3	SCU - Duplicated from SCP. SCP - Not used
Scatter Fraction Factor	(0054,1323)	3	SCU - Duplicated from SCP. SCP - Not used
Dead Time Factor	(0054,1324)	3	SCU - Duplicated from SCP. SCP - Not used
Referenced Overlay Sequence	(0008,1130)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Referenced Curve Sequence	(0008,1145)	3	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Duplicated from SCP. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Duplicated from SCP. SCP - Not used
Anatomic Region Sequence	(0008,2218)	3	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
>Anatomic Region Modifier Sequence	(0008,2220)	3	SCU - Duplicated from SCP. SCP - Not used
Primary Anatomic Structure Sequence	(0008,2228)	3	SCU - Duplicated from SCP. SCP - Not used
>Primary Anatomic Structure Modifier	(0008,2228)	3	SCU - Duplicated from SCP. SCP - Not used
>Primary Anatomic Structure Modifier Sequence	(0008,2230)	3	SCU - Duplicated from SCP. SCP - Not used

5.4.15 SOP Common

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Duplicated from SCP. SCP - Used, supported value '1.2.840.10008.5.1.4.1.1.128'.
SOP Instance UID	(0008,0018)	1	SCU - Duplicated from SCP. SCP - Not used
Specific Character Set	(0008,0005)	1C	SCU - Duplicated from SCP. SCP - Used
Instance Creation Date	(0008,0012)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Duplicated from SCP. SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Duplicated from SCP. SCP - Not used

5.5 Multi-frame True Color SC Image Object Implementation

Oncentra can export Multi-frame True Color SC images that are snapshots (of the screen) created inside Oncentra. Since Oncentra does not import this object (or rather do not support looking at it since imported), the note 'SCP – Not used' has been skipped below. Only the SCU part is noted.

5.5.1 Multi-frame True Color SC Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	SCU - Provided
	Clinical Trial Subject	C.7.1.3	U	SCU - Not supported
Study	General Study	C.7.2.1	M	SCU - Provided
	Patient Study	C.7.2.2	U	SCU - Not supported
	Clinical Trial Study	C.7.2.3	U	SCU - Not supported
Series	General Series	C.7.3.1	M	SCU - Provided
	Clinical Trial Series	C.7.3.2	U	SCU - Not supported
Equipment	General Equipment	C.7.5.1	M	SCU - Provided
	SC Equipment	C.8.6.1	M	SCU - Provided
Image	General Image	C.7.6.1	M	SCU - Provided
	Image Pixel	C.7.6.3	M	SCU - Provided
	Cine	C.7.6.5	C– Required if Frame Increment Pointer (0028,0009) is Frame Time (0018,1063) or Frame Time Vector(0018,1065)	SCU - Provided
	Multi-frame	C.7.6.6	M	SCU - Provided
	Frame Pointers	C.7.6.9	U	SCU - Not supported

IE	Module	Reference	DICOM Usage	Notes
	SC Image	C.8.6.2	U	SCU - Not supported
	SC Multi-frame Image	C.8.6.3	M	SCU - Provided
	SC Multi-frame Vector	C.8.6.4	C – Required if Number of Frames is greater than 1	SCU - Not supported
	SOP Common	C.12.1	M	SCU - Provided

5.5.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database.
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database.
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database.
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided
Patient's Birth Time	(0010,0032)	3	SCU - Not provided
Other Patient Ids	(0010,1000)	3	SCU - Not provided
Other Patient Names	(0010,1001)	3	SCU - Not provided
Ethnic Group	(0010,2160)	3	SCU - Not provided
Patient Comments	(0010,4000)	3	SCU - Not provided

5.5.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Duplicated from Reference Image Series
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series
Study ID	(0020,0010)	2	SCU - Duplicated from Reference Image Series
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series
Physician(s) of Record	(0008,1048)	3	SCU - Not provided
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not provided
Referenced Study Sequence	(0008,1110)	3	SCU - Not provided
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided

5.5.4 General Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - Provided 'OT'.
Series Instance UID	(0020,000E)	1	SCU - Provided
Series Number	(0020,0011)	2	SCU - Not supported
Laterality	(0020,0060)	2C	SCU - Not supported
Series Date	(0008,0021)	3	SCU - Provided
Series Time	(0008,0031)	3	SCU - Not supported
Performing Physicians' Name	(0008,1050)	3	SCU - Provided
Protocol Name	(0018,1030)	3	SCU - Not supported
Series Description	(0008,103E)	3	SCU - Not supported
Operators' Name	(0008,1070)	3	SCU - Not supported
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not supported
Body Part Examined	(0018,0015)	3	SCU - Not supported
Patient Position	(0018,5100)	2C	SCU - Not supported
Smallest Pixel Value in Series	(0028,0108)	3	SCU - Not supported
Largest Pixel Value in Series	(0028,0109)	3	SCU - Not supported
Request Attributes Sequence	(0040,0275)	3	SCU - Not supported
>Requested Procedure ID	(0040,1001)	1C	SCU - Not supported
>Scheduled Procedure Step ID	(0040,0009)	1C	SCU - Not supported
>Scheduled Procedure Step Description	(0040,0007)	3	SCU - Not supported
>Scheduled Action Item Code Sequence	(0040,0008)	3	SCU - Not supported
Performed Procedure Step ID	(0040,0253)	3	SCU - Not supported
Performed Procedure Step Start Date	(0040,0244)	3	SCU - Not supported
Performed Procedure Step Start Time	(0040,0245)	3	SCU - Not supported
Performed Procedure Step Description	(0040,0254)	3	SCU - Not supported
Performed Action Item Sequence	(0040,0260)	3	SCU - Not supported

5.5.5 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - Provided 'NUCLETRON'
Institution Name	(0008,0080)	3	SCU - Not supported
Institution Address	(0008,0081)	3	SCU - Not supported
Station Name	(0008,1010)	3	SCU - Not supported
Institutional Department Name	(0008,1040)	3	SCU - Not supported

Attribute Name	Tag	Type	Notes
Manufacturer's Model Name	(0008,1090)	3	SCU - Provided 'MASTERPLAN_SNAPSHOT'
Device Serial Number	(0018,1000)	3	SCU - Not supported
Software Versions	(0018,1020)	3	SCU - Not supported
Spatial Resolution	(0018,1050)	3	SCU - Not supported
Date of Last Calibration	(0018,1200)	3	SCU - Not supported
Time of Last Calibration	(0018,1201)	3	SCU - Not supported
Pixel Padding Value	(0028,0120)	3	SCU - Not supported

5.5.6 SC Equipment Module

Attribute Name	Tag	Type	Notes
Conversion Type	(0008,0064)	1	SCU - Provided 'PRT'
Modality	(0008,0060)	3	SCU - Provided 'OT'
Secondary Capture Device ID	(0018,1010)	3	SCU - Not supported
Secondary Capture Device Manufacturer	(0018,1016)	3	SCU - Not supported
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	SCU - Not supported
Secondary Capture Device Software Version	(0018,1019)	3	SCU - Not supported
Video Image Format Acquired	(0018,1022)	3	SCU - Not supported
Digital Image Format Acquired	(0018,1023)	3	SCU - Not supported

5.5.7 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Provided
Patient Orientation	(0020,0020)	2C	SCU - Not supported
Content Date	(0008,0023)	2C	SCU - Not supported
Content Time	(0008,0033)	2C	SCU - Not supported
Image Type	(0008,0008)	1	SCU - Provided 'DERIVED\SECONDARY'
Acquisition Number	(0020,0012)	3	SCU - Not supported
Acquisition Date	(0008,0022)	3	SCU - Provided
Acquisition Time	(0008,0032)	3	SCU - Provided
Acquisition Datetime	(0008,002A)	3	SCU - Not supported
Referenced Image Sequence	(0008,1140)	3	SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not supported
>Referenced Frame Number	(0008,1160)	3	SCU - Not supported
Derivation Description	(0008,2111)	3	SCU - Not supported

Attribute Name	Tag	Type	Notes
Source Image Sequence	(0008,2112)	3	SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not supported
>Referenced Frame Number	(0008,1160)	3	SCU - Not supported
Images in Acquisition	(0020,1002)	3	SCU - Not supported
Image Comments	(0020,4000)	3	SCU - Provided
Quality Control Image	(0028,0300)	3	SCU - Not supported
Burned In Annotation	(0028,0301)	3	SCU - Provided
Lossy Image Compression	(0028,2110)	3	SCU - Provided
Lossy Image Compression Ratio	(0028,2112)	3	SCU - Not supported

5.5.8 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Provided '3'
Photometric Interpretation	(0028,0004)	1	SCU - Provided 'RGB'
Rows	(0028,0010)	1	SCU - Provided
Columns	(0028,0011)	1	SCU - Provided
Bits Allocated	(0028,0100)	1	SCU - Provided
Bits Stored	(0028,0101)	1	SCU - Provided
High Bit	(0028,0102)	1	SCU - Provided
Pixel Representation	(0028,0103)	1	SCU - Provided
Pixel Data	(7FE0,0010)	1	SCU - Provided.
Planar Configuration	(0028,0006)	1C	SCU - Provided.
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Not supported
Smallest Image Pixel Value	(0028,0106)	3	SCU - Not supported
Largest Image Pixel Value	(0028,0107)	3	SCU - Not supported
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Not supported
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Not supported
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Not supported
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Not supported
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Not supported
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Not supported

5.5.9 Cine Module

Attribute Name	Tag	Type	Notes
Preferred Playback Sequencing	(0018,1244)	3	SCU - Not supported
Frame Time	(0018,1063)	1C	SCU - Provided
Frame Time Vector	(0018,1065)	1C	SCU - Not supported
Start Trim	(0008,2142)	3	SCU - Not supported
Stop Trim	(0008,2143)	3	SCU - Not supported
Recommended Display Frame Rate	(0008,2144)	3	SCU - Not supported
Cine Rate	(0018,0040)	3	SCU - Not supported
Frame Delay	(0018,1066)	3	SCU - Not supported
Image Trigger Delay	(0018,1067)	3	SCU - Not supported
Effective Duration	(0018,0072)	3	SCU - Not supported
Actual Frame Duration	(0018,1242)	3	SCU - Not supported
Multiplexed Audio Channels Description Code Sequence	(003A,0300)	2C	SCU - Not supported
>Channel Identification Code	(003A,0301)	1	SCU - Not supported
>Channel Mode	(003A,0302)	1	SCU - Not supported
>Channel Source Sequence	(003A,0208)	1	SCU - Not supported

5.5.10 Multi-Frame Module

Attribute Name	Tag	Type	Notes
Number of Frames	(0028,0008)	1	SCU - Provided
Frame Increment Pointer	(0028,0009)	1	SCU - Provided

5.5.11 SC Multi-Frame Image Module

Attribute Name	Tag	Type	Notes
Burned In Annotation	(0028,0301)	1	SCU - Provided
Presentation LUT Shape	(2050,0020)	1C	SCU - Not supported
Illumination	(2010,015E)	3	SCU - Not supported
Reflected Ambient Light	(2010,0160)	3	SCU - Not supported
Rescale Intercept	(0028,1052)	1C	SCU - Not supported
Rescale Slope	(0028,1053)	1C	SCU - Not supported
Rescale Type	(0028,1054)	1C	SCU - Not supported
Frame Increment Pointer	(0028,0009)	1C	SCU - Provided ‘0x0018 0x1063’
Nominal Scanned Pixel Spacing	(0018,2010)	1C	SCU - Provided
Pixel Spacing	(0028,0030)	1C	SCU - Not supported
Pixel Spacing Calibration Type	(0028,0402)	3	SCU - Not supported
Pixel Spacing Calibration Description	(0029,0404)	1C	SCU - Not supported

Attribute Name	Tag	Type	Notes
Digitizing Device Transport Direction	(0018,2020)	3	SCU - Not supported
Rotation of Scanned Film	(0018,2030)	3	SCU - Not supported
Private attributes	(0029,00xx)	3	Private creator group "NUCLETRON"
Patient Fall ID	(0029,xx00)	3	SCU - Provided For internal OIM interpretation
Form Type	(0029,xx01)	3	SCU - Provided Type of form to which snapshot shall be attached Defined terms: RTP2 - Radiation Treatment Plan RAH2 - Radiation Treatment History DOC - Documents
Form Index	(0029,xx02)	3	SCU – Provided Index of form to which snapshot shall be attached "Plan label" if Form Type is RTP2 else: -1 - attach to last form. 1 - attach to first form.
Snap Shot Beam Number	(0029,xx03)	3	SCU - Provided Empty if snap shot not on specific beam
Snap Shot Status	(0029,xx04)	3	SCU - Provided
End private attributes			

5.5.12 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Provided '1.2.840.10008.5.1.4.1.1.7.4'
SOP Instance UID	(0008,0018)	1	SCU - Provided
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100'
Instance Creation Date	(0008,0012)	3	SCU - Provided
Instance Creation Time	(0008,0013)	3	SCU - Provided
Instance Creator UID	(0008,0014)	3	SCU - Not supported

5.6 Other Supported Image Modalities

Oncentra also supports a set of other image modalities. These other image modalities are handled in the same way as MR images.

Geometrical information is used if provided (for example, pixel sizes). The projective image modalities are only supported in brachy planning.

These other image modalities are currently supported:

- OT
- US (see note)
- DX
- PX
- IO
- XA
- CR
- MG

Note:

Oncentra can import and export series of US images. Oncentra supports an additional Image Plane module to be able to import a series of axial orthogonal US images with the defined image position and orientation.

5.7 RT Structure Set Information Object Implementation

Oncentra can import and export RT Structures. Oncentra can also create RT Structures.

RT Structure Sets can reference one or many image series. Consequently, if Patient Information is changed upon import of an RT Structure Set CM will check the Oncentra audit trail to determine if the images referenced in the RT Structure Set also had their Patient Information changed. If so these images will have new SOP Instance UIDs, and the stored RT Structure Set will be modified to reference these new image UIDs.

When SCU is referenced for the RT Structure Set below, it is referring to a Structure Set that is created by AM. I.e., it reflects the Oncentra format of a RT Structure Set created by Oncentra.

A structure set that is to be used in external treatment planning (in any of the activities Beam Modeling, Dose Calculation and Plan Evaluation) must have contours of type EXTERNAL for all slices in the reference image series (the series used as dose plan basis).

5.7.1 RT Structure Set IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Not supported SCP - Not used
Series	RT Series	C.8.8.1	M	
Equipment	General Equipment	C.7.5.1	M	
Structure Set	Structure Set	C.8.8.5	M	
	ROI Contour	C.8.8.6	M	
	RT ROI Observations	C.8.8.8	M	
	Approval	C.8.8.16	U	SCU - Supported SCP - Used
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

5.7.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Not provided SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Not provided SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Not provided SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Not provided SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Not provided SCP - Not used

5.7.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Provided. SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study ID	(0020,0010)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series SCP - Not used
Physician(s) of Record	(0008,1048)	3	SCU - Not provided SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not provided SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided SCP - Not used

5.7.4 RT Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'RTSTRUCT' SCP - Used, supported: 'RTSTRUCT'
Series Instance UID	(0020,000E)	1	SCU - Created by Oncentra. SCP - Required
Series Number	(0020,0011)	2	SCU - '1' SCP - Not used
Series Description	(0008,103E)	3	SCU – Provided, always "Nucletron Oncentra Anatomy Modeling Structure Set" SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

5.7.5 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - 'Nucletron' SCP - Used. [See Manufacturer SCU.]
Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
Station Name	(0008,1010)	3	SCU - Windows computer name SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - 'ONCENTRA' SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - 'OTP V#'. # is replaced with the version number of Oncentra, including build number, which may change if an Oncentra service pack is applied. Example 'OTP V1.3.0.30'. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Not provided SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Not provided SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Not provided SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Not provided SCP - Not used

5.7.6 Structure Set Module

Attribute Name	Tag	Type	Notes
Structure Set Label	(3006,0002)	1	SCU - Filled from Case label SCP - Required

Attribute Name	Tag	Type	Notes
Structure Set Name	(3006,0004)	3	SCU - Duplicated from SCP. (Not provided for Structure Set created by Oncentra.) SCP - Not used
Structure Set Description	(3006,0006)	3	SCU - Not provided SCP - Not used
Instance Number	(0020,0013)	3	SCU - Not provided SCP - Not used
Structure Set Date	(3006,0008)	2	SCU - Date of creation (I.E.: when saved in Oncentra). SCP - Not used
Structure Set Time	(3006,0009)	2	SCU - Time of creation (I.E.: when saved in Oncentra). SCP - Not used
Private attributes	(3007,00xx)	3	Private creator group "NUCLETRON"
Patient Structure Set Grid Definition PointPatient	(3007,xx59)	3	The definition point of the patient structure set grid in Oncentra. SCU - Provided if (3007,xx71) Patient Structure Set Grid Definition Point Mode is set to '1' (Manual) SCP - Used if provided
Patient Structure Set Grid Spacing	(3007,xx60)	3	The grid spacing of the patient structure set grid in Oncentra: X, Y, Z values. SCU - Provided if (3007,xx70) Patient Structure Set Grid Spacing Mode is set to '1' (Manual) SCP - Used if provided
Patient Structure Set Grid Spacing Mode	(3007,xx70)	3	The grid spacing generation method for the patient structure set grid. 1 = Manual 2 = Auto SCU - Provided SCP - Used if provided, otherwise auto spacing will be used
Patient Structure Set Grid Definition Point Mode	(3007,xx71)	3	The definition point generation method for the patient structure set grid 1 = Manual 2 = Auto SCU - Provided SCP - Used if provided, otherwise 'auto' will be used
End private attributes			
Referenced Frame of Reference Sequence	(3006,0010)	3	SCU - Provided SCP - Required
>Frame of Reference UID	(0020,0052)	1C	SCU - Provided SCP - Required
Private attributes	(3005,00xx)	3	Private creator group "MDS NORDION OTP ANATOMY MODELLING"
>IMean and IWindow	(3005,xx2A)	3	Mean and Window attribute
End private attributes			
>Frame of Reference Relationship Sequence	(3006,00C0)	3	SCU - Provided SCP - Used
>>Related Frame of Reference UID	(3006,00C2)	1C	SCU - Provided SCP - Required if Frame of Reference Relationship Sequence (3006,00C0) is provided.
>>Frame of Reference Transformation Type	(3006,00C4)	1C	SCU - Provided SCP - Required if Frame of Reference Relationship Sequence (3006,00C0) is provided. Supported value "HOMOGENEOUS'

Attribute Name	Tag	Type	Notes
>>Frame of Reference Transformation Matrix	(3006,00C6)	1C	SCU - Provided SCP - Required if Frame of Reference Relationship Sequence (3006,00C0) is provided.
>>Frame of Reference Transformation Comment	(3006,00C8)	3	SCU - Provided SCP - Not used
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION OTP ANATOMY MODELLING”
>>Registration Type	(3005,xx20)	3	Valid AM Registration Types: "AM_LANDMARK_IMAGE_REGISTRATION" "AM_SURFACE_IMAGE_REGISTRATION" "AM_IDENTITY_IMAGE_REGISTRATION" "AM_MUTUAL_INFO_IMAGE_REGISTRATION" "AM_MANUAL_IMAGE_REGISTRATION"
If sRegistrationType is:			**AM_LANDMARK_IMAGE_REGISTRATION**
>>Number of Point Pairs	(3005,xx22)	1C	Number of point pairs per landmark registration
>>AM Registration Point Pair sequence	(3005,xx24) or (3005,xx44)	1C	If lNumPointPairs > 0. *Tag id xx24 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
>>>AM Registration Point Pair	(3005,xx26) or (3005,xx46)	1C	Define a Point Pair: X1\ Y1\ Z1\ X2\ Y2\ Z2\ dWeight *Tag id xx26 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
>>>AM Landmark Registration Name	(3005,xx28) or (3005,xx48)	1C	String defining the registration name. *Tag id xx28 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
If sRegistrationType is:			**AM_SURFACE_REGISTRATION**
>>LNumSurfacePts	(3005,xx24) or (3005,xx54)	1C	Number of surface Points. *Tag id xx24 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
>>LNumIterationPts	(3005,xx26) or (3005,xx56)	1C	Number of iteration Points. *Tag id xx26 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
>>AM Surface Point Pair	(3005,xx28) or (3005,xx58)	1C	lROI1Index\lROI2Index\ X1\Y1\Z1\X2\Y2\Z2 *Tag id xx28 is obsolete and only present for objects created prior to OTP 1.3 SP2.*
End private attributes			
>RT Referenced Study Sequence	(3006,0012)	3	SCU - Provided SCP – Used if provided
>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Provided SCP - Not used
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Required
>>RT Referenced Series Sequence	(3006,0014)	1C	SCU - Provided SCP - Required
>>>Series Instance UID	(0020,000E)	1C	SCU - Provided SCP - Required
>>>Contour Image Sequence	(3006,0016)	1C	SCU - Provided SCP - Not used
>>>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Provided SCP - Not used
>>>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Not used
>>>>Referenced Frame Number	(0008,1160)	3	SCU - Not provided SCP - Not used
Structure Set ROI Sequence	(3006,0020)	3	SCU - Provided SCP - Required

Attribute Name	Tag	Type	Notes
>ROI Number	(3006,0022)	1C	SCU - Provided SCP - Required
>Referenced Frame of Reference UID	(3006,0024)	1C	SCU - Provided SCP - Required
>ROI Name	(3006,0026)	2C	SCU - Provided SCP - Used if available - otherwise left blank on import. If several ROIs have the same name only the first will be loaded by AM. Any ROI named “DUMMY_STRUCTURE” will not be loaded by AM.
>ROI Description	(3006,0028)	3	SCU - Not provided SCP - Not used
>ROI Volume	(3006,002C)	3	SCU - Duplicated from SCP. SCP - Not used
>ROI Generation Algorithm	(3006,0036)	2C	SCU - Provided SCP – Not Used
>ROI Generation Description	(3006,0038)	3	SCU – Provided SCP – Used if provided When a ROI is a generated point set, one of these values is provided: POINT_SET_Applicator POINT_SET_Patient POINT_SET_Axis POINT_SET_Basal_Linear POINT_SET_Basal_Triangular POINT_SET_Basal_Square POINT_SET_Catheter POINT_SET_Lowest_dose_distance POINT_SET_Target POINT_SET_User_defined POINT_SET_Undefined Any other value will be interpreted as ‘undefined’. When a ROI is made with Model Based Segmentation the value will be MBSGENERATED.
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION OTP ANATOMY MODELLING”
>AM Roi Private Attribute Sequence	(3005,xx00)	3	Sequence for ROI attributes that do not exist in the standard. This is to allow attribute persistence in AM.
>>bIsCompletedFlag	(3005,xx02)	1C	ROI completed (drawing done) or not
>>lVisualizationType	(3005,xx04)	1C	Type of 3D visualization, e.g. solid, transparent, wire etc.
>>lOpacity	(3005,xx06)	1C	The opacity, 0 to 100%, of a transparent 3D visualization
>>lClosureType	(3005,xx08)	1C	The type rendering at the top and/or bottom of an ROI, closed or open. 0 = Closed 1 = Top open 2 = Bottom open 3 = Both ends open
>>bHelperVisible	(3005,xx0A)	1C	Help contours visible in 3D view or not
>>bSlicedVisible	(3005,xx0C)	1C	2D Contours visible in 3D view or not
>>bVisible	(3005,xx0E)	1C	ROI visible in views or not
>>Grid Spacing	(3005,xx10)	3	The grid spacing of the triangulation basis SCU - Provided if (3005,xx13) Grid Spacing Mode is set to ‘1’ (Manual) SCP - Used if provided
>>lTriangulationAlgorithm	(3005,xx12)	1C	The algorithm for triangulation used for the ROI

Attribute Name	Tag	Type	Notes
Grid Spacing Mode	(3005,xx13)	1C	The grid spacing generation method. 1 = Manual 2 = Auto SCU - Provided SCP - Used if provided, otherwise auto spacing will be used
Align To Structure Set Grid	(3005,xx15)	1C	Indicates if ROI grid shall be aligned to the structure set grid Provided values TRUE or FALSE. SCU - Provided SCP - Used if provided, if not specified then FALSE is used
End private attributes			
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION OTP ANATOMY MODELLING”
AM Next ROI Number	(3005,xx2C)	3	SCU - Provided as next unique ROI Number to be used for the next ROI created by AM. ROI Numbers are never reused in an Oncentra RT Structure. SCP - Used if Oncentra is the creator of the RT Structure Set.
Treatment Planning Refererence Point Info Sequence	(3005,xx59)	3	SCU - Provided if TPRP is defined in AM. SCP - Used if defined by Oncentra
>Treatment Planning Reference Point ROI Number (TPRP)	(3005,xx2E)	1C	SCU - Provided if TPRP is defined in AM. SCP - Used if defined by Oncentra. Must be present if sequence (3005,xx59) is present
>Treatment Planning Reference Point (i.e.: TPRP) Frame Of Reference UID	(3005,xx30)	1C	SCU - Provided if TPRP is defined in AM. SCP - Used if defined by Oncentra. Must be present if sequence (3005,xx59) is present
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group “NUCLETRON”
Referenced Catheter	(3007,xx17)	3	Catheter used for generating point set. The value -1000 is used to mean all catheters. SCU - Provided SCP - Used if provided
Referenced Catheter Dwell Position	(3007,xx18)	3	Dwell position used for generating point set. The value -1000 means all dwell points. The value -1001 means all active dwell points. SCU - Provided SCP - Used if provided
Reconstructed Point Set Min Distance	(3007,xx24)	3	SCU - Provided SCP - Used if provided
Used For Normalization	(3007,xx25)	3	SCU – Provided if this is a point set ROI (brachy) and in use for optimization SCP – Used if provided
Used For Optimization	(3007,xx26)	3	SCU – Provided if this is a point set ROI (brachy) and in use for optimization SCP – Used if provided
Point Set Generation Reference	(3007,xx30)	3	Referenced ROI number provided if the ROI is a generated point set. SCU - Provided SCP - Used if provided
Point Set Generation Distance	(3007,xx32)	3	Distance from referenced ROI to generated point(s) SCU - Provided SCP - Used if provided

Attribute Name	Tag	Type	Notes
Referenced Catheter Set	(3007,xx33)	3	Vector of values indicating which catheters where used for generating point set. SCU - Provided SCP - Used if provided
Point Set Generation Direction	(3007,xx34)	3	Direction vector used in point set generation SCU - Provided SCP - Used if provided
Point Set Generation Rule Sequence	(3007,xx35)	3	Brachy point set generation rule sequence SCU - Provided SCP - Used if provided
>Referenced ROI Number	(300B,1000)	3	Referenced ROI number, provided if the point set is made from a ROI in the structure set referenced by the plan. SCU - Provided SCP - Used if provided
>Point Set Generation Reference	(3007,xx30)	3	Referenced ROI number, provided if the point set is made from a ROI in the embedded structure set. SCU - Provided SCP - Used if provided
>Referenced Frame of Reference UID	(3006,0024)	3	The frame of reference for this rule SCU - Provided SCP - Used if provided
>Point Set Generation Distance	(3007,xx32)	3	Distance from referenced ROI to generated point(s) SCU - Provided SCP - Used if provided
>Point Set Generation Direction	(3007,xx34)	3	Direction vector used in point set generation SCU - Provided SCP - Used if provided
>Point Set Generation Rule Type	(3007,xx36)	3	Brachy point set generation rule type SCU - Provided SCP - Used if provided
>Point Set Generation Rule Name	(3007,xx37)	3	Brachy point set generation rule name SCU - Provided SCP - Used if provided
>Point Set Generation Rule Number	(3007,xx38)	3	Brachy point set generation rule number SCU - Provided SCP - Used if provided
>Point Set Generation Rule Number Of Points	(3007,xx39)	3	Brachy point set generation rule number of points SCU - Provided SCP - Used if provided
>Point Set Generation Rule Referenced Catheter Dwell position Pairs	(3007,xx40)	3	Brachy point set generation rule, vector of referenced catheter dwell position pairs used for the point generation SCU - Provided SCP - Used if provided
>Point Set Valid	(3007,xx42)	3	Brachy point set generation rule, indicates if the generated point set is valid (then == “TRUE”) SCU - Provided SCP - Used if provided, if missing point set is regarded invalid.
> Generation Algorithm	(3006,0036)	3	Brachy point set generation rule, indicates if the generated point set is automatically generated (then == “AUTOMATIC”) SCU - Provided SCP - Used if provided, if missing point set is regarded MANUAL.
> Point Set Generation Rule Clip Outside Implant	(3007,xx46)	3	Brachy point set generation rule, indicates if the generated point set is clipped (not generated) outside implant (then == “TRUE”) SCU - Provided SCP - Used if provided, if missing no clipping is assumed
> Point Set Generation Rule Manually Modified	(3007,xx47)	3	Brachy point set generation rule, indicates if the rule has been modified since last point set generation (then == “TRUE”) SCU - Provided SCP - Used if provided, if missing no clipping is assumed

Attribute Name	Tag	Type	Notes
Private attributes	(300B,00xx)	3	Private creator group "NUCLETRON"
Referenced RT Plan ROI Number	(300B,xx00)	3	Referenced ROI number provided if the ROI is a generated point set and the ROI is part of the RT Plan embedded structure set. SCU – Provided SCP – Used if provided
End private attributes			
End private attributes			

5.7.7 ROI Contour Module

Attribute Name	Tag	Type	Notes
ROI Contour Sequence	(3006,0039)	1	SCU – Provided SCP – Used
>Referenced ROI Number	(3006,0084)	1	SCU – Provided SCP – Used
>ROI Display Color	(3006,002A)	3	SCU – Provided SCP – Used for display purposes if provided.
Private attributes	(0021,00xx)	3	Private creator group "NUCLETRON"
>Reference Image Series UID	(0021,xx00)	3	SCU – Provided, Series UID of the image series the ROI is defined in. SCP – Used if provided and no contours are defined for the ROI.
End private attributes			
>Contour Sequence	(3006,0040)	3	SCU – Provided SCP – Required
>>Contour Number	(3006,0048)	3	SCU – Provided SCP – Not used
>>Attached Contours	(3006,0049)	3	SCU – Not provided SCP – Not used
>>Contour Image Sequence	(3006,0016)	3	SCU – Provided SCP – Required
>>>Referenced SOP Class UID	(0008,1150)	1C	SCU – Provided SCP – Required
>>>Referenced SOP Instance UID	(0008,1155)	1C	SCU – Provided SCP – Required
>>>Referenced Frame Number	(0008,1160)	1C	SCU – Provided SCP – Not used
>>Contour Geometric Type	(3006,0042)	1C	SCU – Provided. SCP – Required.
>>Contour Slab Thickness	(3006,0044)	3	SCU – Not provided SCP – Not used
>>Contour Offset Vector	(3006,0045)	3	SCU – Not provided SCP – Not used
>>Number of Contour Points	(3006,0046)	1C	SCU – Provided SCP – Required
>>Contour Data	(3006,0050)	1C	SCU – Provided SCP – Required.
Private attributes	(3007,00xx)	3	Private creator group "NUCLETRON"
>> Normalization Point Weight	(3007,xx15)	3	SCU – Provided, weight for normalization, when normalizing on multiple points SCP – Used if provided
>> Point Name	(3007,xx16)	3	SCU – Provided, Name of point SCP – Used if provided
>> Referenced Catheter	(3007,xx17)	3	SCU – Provided, when point was created with reference (based on) catheter, this is the index of the catheter the point belongs to. SCP – Used if provided

Attribute Name	Tag	Type	Notes
>> Referenced Catheter Dwell Position	(3007,xx18)	3	SCU – Provided, when previous (3007,xx17) is used, this indicated the dwell position index of the position this point is based on. SCP – Used if provided
>>Optimization Point Weight	(3007,xx22)	3	SCU – Provided, weight in optimization, when optimizing on multiple points SCP – Used if provided
>>Optimization Relative Dose	(3007,xx23)	3	SCU – Provided SCP – Used if provided
>>Used For Normalization	(3007,xx25)	3	SCU – Provided if in use for optimization SCP – Used if provided
>>Used For Optimization	(3007,xx26)	3	SCU – Provided if in use for optimization SCP – Used if provided
>> Point Set Generation Rule Reference Sequence	(3007,xx41)	3	SCU – Provided if this is a point set contour generated by a point set generation rule. If a point is generated as result of many rules these sequence can have more than one item. SCP – Used if provided
>>> Referenced Catheter	(3007,xx17)	3	SCU – Provided, when sequence is provided, this is the index of the catheter the point belongs to. SCP – Used if provided
>>> Referenced Catheter Dwell Position	(3007,xx18)	3	SCU – Provided, when sequence is provided, this indicated the dwell position index of the position this point is based on. SCP – Used if provided
>>> Point Set Generation Rule Number	(3007,xx38)	3	SCU – Provided, when sequence is provided, this is the point set rule number from the sequence Point Set Generation Rule Sequence (3007, xx35) this point is based on. SCP – Used if provided
>> Point 2D Sequence	(3007,xx38)	3	SCU – Sequence of information for 2D points placed on images. The sequence can contain one or many items. SCP – Used if provided
>>> Referenced SOP Instance UID	(0008,1155)	1C	SCU – Image on which the points are located. Must be present if sequence is present. SCP – Used if provided
>>> Point 2D Data	(3007,xx45)	1C	SCU – Array of X,Y pairs of point coordinates in pixels. Must be present if sequence is present. SCP – Used if provided
>>> Point 2D Marker Positions	(3007,xx49)	3	SCU – Indexes of active 2D marker points. SCP – Used if provided
>> Point 2D Shifts	(3007,xx44)	3	SCU – Description of shifts (reconstruction errors). SCP – Used if provided
>> Marker Positions	(3007,xx48)	3	SCU – Indexes of active marker points. SCP – Used if provided
>> Reconstruction Segment Error Sequence	(3007,xx4A)	3	SCU – Sequence of items describing the reconstruction errors for each marker position. SCP – Used if provided
>>> Marker Position	(3007,xx4B)	3	SCU – Marker position. SCP – Used if provided
>>> Point Offset From Tip	(3007,xx4C)	3	SCU – Point Offset From Tip. SCP – Used if provided
>>> Point Relative Shift	(3007,xx4D)	3	SCU – Point Relative Shift. SCP – Used if provided
>>> Segment Length	(3007,xx4E)	3	SCU – Segment length. SCP – Used if provided
>>> Segment Error	(3007,xx4F)	3	SCU – Segment relative error. SCP – Used if provided
>>> Segment Valid	(3007,xx50)	3	SCU – Validity of the error info. TRUE if valid else missing or something else. SCP – Used if provided

Attribute Name	Tag	Type	Notes
>> 2D Catheter Reconstruction Catheter Shift	(3007,xx51)	3	SCU – Point reconstruction shift in segment errors are relative to this catheter shift SCP – Used if provided
>> 2D Catheter Reconstruction Total Length Error	(3007,xx52)	3	SCU – Error in total reconstructed length SCP – Used if provided
>> 2D Catheter Reconstruction Total Length Valid	(3007,xx53)	3	SCU – Total length validity. SCP – Used if provided
>> 2D Catheter Reconstruction Valid	(3007,xx54)	3	Only valid in describing points reconstruction mode. SCU – Overall reconstruction validity. SCP – Used if provided, else assumed to be FALSE.
>> 2D Catheter Tracking Reconstruction State	(3007, xx55)	3	Only valid in reconstruction mode catheter tracking). SCU – TRUE if reconstruction is initiated. SCP – Used if provided, else assumed to be FALSE.
End private attributes			

5.7.8 RT ROI Observations Module

Attribute Name	Tag	Type	Notes
RT ROI Observations Sequence	(3006,0080)	1	SCU - Provided SCP - Used
>Observation Number	(3006,0082)	1	SCU - Provided SCP - Used
>Referenced ROI Number	(3006,0084)	1	SCU - Provided SCP - Used
>ROI Observation Label	(3006,0085)	3	SCU - Not provided SCP - Not used
>ROI Observation Description	(3006,0088)	3	SCU - Not provided SCP - Not used
>RT Related ROI Sequence	(3006,0030)	3	SCU - Not provided SCP - Not used
>>Referenced ROI Number	(3006,0084)	1C	SCU - Not provided SCP - Not used
>>RT ROI Relationship	(3006,0033)	3	SCU - Not provided SCP - Not used
>RT ROI Identification Code Sequence	(3006,0086)	3	SCU - Not provided SCP - Not used
>>Code Value	(0008,0100)	1C	SCU - Not provided SCP - Not used
>>Coding Scheme Designator	(0008,0102)	1C	SCU - Not provided SCP - Not used
>>Code Meaning	(0008,0104)	3	SCU - Not provided SCP - Not used
>Related RT ROI Observations Sequence	(3006,00A0)	3	SCU - Not provided SCP - Not used
>>Observation Number	(3006,0082)	1C	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>RT ROI Interpreted Type	(3006,00A4)	2	SCU - Provided. SCP - Used if provided. Defined terms used: EXTERNAL PTV CTV GTV TREATED_VOLUME IRRAD_VOLUME BOLUS AVOIDANCE ORGAN MARKER REGISTRATION ISOCENTER CONTRAST_AGENT CAVITY BRACHY_CHANNEL BRACHY_ACCESSORY BRACHY_SRC_APP BRACHY_CHNL_SHLD CONTROL Private extensions used for brachy point set: AXIS BASAL LOWESTDOSEDISTANCE USERDEFINED PATIENT CATHETER
>ROI Interpreter	(3006,00A6)	2	SCU - Zero length SCP - Not used
>Material ID	(300A,00E1)	3	SCU - Not provided SCP - Not used
>ROI Physical Properties Sequence	(3006,00B0)	3	SCU - Provided SCP - Used if provided.
>>ROI Physical Property	(3006,00B2)	1C	SCU - Provided. SCP - Used if provided. The following properties are recognized: REL_MASS_DENSITY (only supplied if set in UI or in ROI catalog) REL_ELEC_DENSITY (not used) EFFECTIVE_Z (only supplied if in ROI catalog) EFF_Z_PER_A (only supplied if in ROI catalog) NORM_WEIGHT (private extension)
>>ROI Physical Property Value	(3006,00B4)	1C	SCU - Provided SCP – Used if provided If the value is <= 0.0 the physical property is silently ignored.

5.7.9 Approval Module

Attribute Name	Tag	Type	Notes
Approval Status	(300E,0002)	1	SCU - Provided. SCP - Used
Review Date	(300E,0004)	2C	SCU - Provided. SCP - Used

Attribute Name	Tag	Type	Notes
Review Time	(300E,0005)	2C	SCU - Provided. SCP - Used
Reviewer Name	(300E,0008)	2C	SCU - Provided. SCP - Used

5.7.10 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.3' SCP - Used, supported value '1.2.840.10008.5.1.4.1.1.481.3'
SOP Instance UID	(0008,0018)	1	SCU - Provided. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Not used
Instance Creation Date	(0008,0012)	3	SCU - Provided SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Provided SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not provided SCP - Not used

5.8 RT Plan Information Object Implementation

Oncentra can import and export RT Plan objects. Oncentra can also create RT Plan objects.

RT Plans can reference an RT Structure Set, which in turn can reference one or many image series. Consequently, if the user changes the Patient Information for an RT Plan on import, CM will check the Oncentra audit trail to determine if the images referenced in the related RT Structure Set also had their Patient Information changed on import. If so, the RT Structure Set will also have a new SOP Instance UID and as a result the RT Plan is modified to reference the new RT Structure Set UID.

Note:

- *When an imported RT Plan object is to be read for the first time by either BM, DC, PE or PA, the RT Plan will be modified as a result of the fact that an internal RT Dose object is created for the RT Plan as a preparation for Oncentra dose calculation. (This internal RT Dose object can be viewed by using CM export but is not meant to be exported together with the RT Plan). Also BM will create Oncentra DRRs for each beam in the RT Plan.*
- *When an imported RT Plan is to be read by either BM or PE, a validation is performed to make sure that the treatment unit referenced for each beam exists, matches in nominal beam energy and is the correct radiation type. If this match is not found, the user is given the option to map the DICOM treatment unit to an existing Oncentra treatment unit. It is the user's responsibility to ensure that this mapping is correct. [The reason that this mapping is required is because the DICOM Treatment Machine Name in the imported RT Plan may differ from Oncentra.]*
- *When an imported RT Plan is to be read by either BM or PE, a validation is performed on all beams to make sure that the beam settings pass BM/PE beam validation rules (i.e., the DICOM multi-leaf specifications of the beam must match the Oncentra treatment unit multi-leaf specifications for the beam, the beam's referenced wedge must exist for the Oncentra treatment unit for the beam, etc.). If the beam validation fails, the user is informed that the beam in question will be rejected from the plan (the plan would then contain only beams that have passed the beam validation). The user would then be expected to enter the rejected beam manually. Any change to the original plan causes a new RT Plan object to be created with a new instance UID. Any beam changes will invalidate all RT Dose objects associated with the Plan, if the plan is saved to the Oncentra database.*

- *When an RT Plan series is selected in CM, CM will find all objects related to this RT Plan and allow them to be selected for import to the Oncentra database. The objects in this list can be the RT Plan, referenced RT Structure Set, Images referenced by the RT Structure Set, RT Images that reference the RT Plan, and RT Dose objects referenced by the RT Plan.*

When SCU is referenced for the RT Plan below, it is referring to an RT Plan that is created by Oncentra. I.e., it reflects the Oncentra format of an RT Plan created by Oncentra. When SCP is referenced for the RT Plan below, it is referring to an RT Plan that is imported by Oncentra via CM. A RT Plan can only be either an external beam plan or a brachy plan but not both at the same time.

5.8.1 RT Plan IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Not Supported SCP - Not used
Series	RT Series	C.8.8.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	U	SCU - Supported SCP - Used
Equipment	General Equipment	C.7.5.1	M	
Plan	RT General Plan	C.8.8.9	M	
	RT Prescription	C.8.8.10	U	SCU - Supported SCP - Used
	RT Tolerance Tables	C.8.8.11	U	SCU - Not supported SCP - Not used
	RT Patient Setup	C.8.8.12	U	SCU - Supported SCP - Not used
	RT Fraction Scheme	C.8.8.13	U	SCU - Supported SCP - Used
	RT Beams	C.8.8.14	C - Required if RT Fraction Scheme Module exists and Number of Beams (300A,0080) is greater than zero for one or more fraction groups	SCU - Supported SCP - Used
	RT Brachy Application Setups	C.8.8.15	C - Required if RT Fraction Scheme Module exists and Number of Brachy Application Setups (300A,00A0) is greater than zero for one or more fraction groups	SCU - Supported SCP - Used
	Approval	C.8.8.16	U	SCU - Supported SCP - Used
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

5.8.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used

Attribute Name	Tag	Type	Notes
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Not provided SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Not provided SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Not provided SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Not provided SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Not provided SCP - Not used

5.8.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Duplicated from Reference Image Series SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study ID	(0020,0010)	2	SCU - Zero length. SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series SCP - Not used
Physician(s) of Record	(0008,1048)	3	SCU - Not provided SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not provided SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Required
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Required
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided SCP - Not used

5.8.4 RT Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'RTPLAN' SCP - Used, supported: 'RTPLAN'
Series Instance UID	(0020,000E)	1	SCU - Provided. SCP - Used

Attribute Name	Tag	Type	Notes
Series Number	(0020,0011)	2	SCU - '1' SCP - Not used
Series Description	(0008,103E)	3	SCU – Provided, The plan note is provided, SCP – Used, copied into plan note unless there is a RT Plan Description.
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

5.8.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from Reference Image Series. SCP – Used if present
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Private attributes	(0021,00xx)	3	Private creator group "NUCLETRON"
Reference Image Series UID	(0021,xx00)	3	SCU – Provided, Series UID of image series the plan is based on. Only valid if RT Plan Geometry (300A,000C) is PATIENT. SCP – Used if provided
End private attributes			

5.8.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - 'Nucletron' SCP - Not used
Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
Station Name	(0008,1010)	3	SCU - Windows computer name SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - 'ONCENTRA' SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - 'OTP V#'. # is here replaced with the version number of Oncentra, including build number, which may change if an Oncentra service pack is applied. Example 'OTP V1.3.0.30'. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Not provided SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Not provided SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Not provided SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Not provided SCP - Not used

5.8.7 RT General Plan Module

Attribute Name	Tag	Type	Notes
RT Plan Label	(300A,0002)	1	SCU - Provided SCP - Used
RT Plan Name	(300A,0003)	3	SCU - Provided (always same as RT Plan Label) SCP - Not used
RT Plan Description	(300A,0004)	3	SCU - Provided SCP - Used
Operators' Name	(0008,1070)	2	SCU - Oncentra Portal logon username SCP - Not used
RT Plan Date	(300A,0006)	2	SCU - Date of creation (I.E.: when saved in Oncentra). SCP - Not used
RT Plan Time	(300A,0007)	2	SCU - Time of creation (I.E.: when saved in Oncentra). SCP - Not used
Treatment Protocols	(300A,0009)	3	SCU - Not provided SCP - Not used
Plan Intent	(300A,000A)	3	SCU – Provided, if set SCP – Used if provided
Treatment Sites	(300A,000B)	3	SCU - Not provided SCP - Not used
RT Plan Geometry	(300A,000C)	1	SCU - Provided SCP – Checked but ignored internally. Supported values: PATIENT TREATMENT_DEVICE
Referenced Structure Set Sequence	(300C,0060)	1C	SCU - Provided SCP - Required if RT Plan Geometry (300A,000C) is 'PATIENT'.
>Referenced SOP Class UID	(0008,1150)	1C	SCU - '1.2.840.10008.5.1.4.1.1.481.3' SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Required
Referenced Dose Sequence	(300C,0080)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Referenced RT Plan Sequence	(300C,0002)	3	SCU – Provided if this plan has been assigned a pre-treated plan in the external beam optimizer. SCP – Only used if a pre-treated plan is also imported and matched.
>Referenced SOP Class UID	(0008,1150)	1C	SCU – Provided SCP – Used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP – Used
>RT Plan Relationship	(300A,0055)	1C	SCU – Provided Only PRIOR is provided. SCP – Used if PRIOR else not used (and then the whole sequence data set item is discarded)
Private attributes	(3005,00xx)	3	Private creator group "MDS NORDION CALCULATION"

Attribute Name	Tag	Type	Notes
RT Plan Optimization Status	(3005,xx08)	3	Optimization status for RT Plan. Supported terms: NONE: not optimized OPTIMIZER_OPT : external beam optimizer optimized BRACHY_NOT_OPT: plan to be optimized by brachy module BRACHY_OPT: plan optimized by brachy module For more details on the optimization see private tag Optimization Parameter Value. These terms are not used in plans created after Oncentra MasterPlan 3.2 but can be present in older plans if the legacy DCM optimization has been used. TO_BE_OPTIMIZED OPTIMIZED
RT Plan Calculation Status	(3005,xx0A)	3	Calculation status for RT Plan. Supported terms: NONE TO_BE_CALCULATED CALCULATED SCU - Not provided for objects created in Oncentra 4.1 or later. SCP - Ignored
Next Beam Number	(3005,xx25)	3	SCU - Provided if RT Plan created by Oncentra as Next Unique Beam Number for next beam Not provided for objects created in Oncentra MasterPlan 1.4 or later SCP - Used if RT Plan Created by Oncentra
ROI Optimization info sequence	(3005,xx40)	3	SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra
>Referenced ROI Number	(3006,0084)	1C	SCU - Provided if RT Plan created by Oncentra and the referenced ROI is in the structures set referenced by the plan. SCP - Used if RT Plan Created by Oncentra
>Private attributes	(300B,00xx)	1C	Private creator group “NUCLETRON” SCU - Provided if the referenced ROI is in the RT plan embedded structure set.
>HIPO optimalization data	(300B,xx33)	3	SCU - SCU - Provided if the plan is optimized with HIPO. SCP - Used if provided
>Referenced RT Plan ROI Number	(300B,xx00)	1C	SCU - SCU - Provided if the referenced ROI is in the RT plan embedded structure set. SCP - Used if provided
> End private attributes			
> ROI Optimisation Type	(3005,xx41)		SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra Supported terms: TARGET ORGAN_AT_RISK
> Relative Standard Deviation	(3005,xx42)	1C	SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra
Optimization Parameter Sequence	(3005,xx0D)	3	SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra

Attribute Name	Tag	Type	Notes
>Optimization Parameter Type	(3005,xx0E)	1C	At least one item must be present if sequence is present. SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra Supported terms: ACCURATEDOSEALG ACCURATEDOSE_FLAG ACCURATEDOSE_EVERY_IT_FLAG ACCURATEDOSE_EVERY_IT_VALUE ACCURATEDOSE_AFTER_IT_FLAG ACCURATEDOSE_AFTER_IT_VALUE FLUENCE_MATRIX_STEPSIZE TARGET_MARGIN DOSEGRIDRESOLUTION_Z TUMOUR_OVERLAP_FLAG TUMOUR_OVERLAP_VALUE STOPCRIT_OPTTOL STOPCRIT_MAXNUM_IT SEGMENT_MU_FORMAT SEGMENTATION_TYPE BRACHY_OPTIMIZATION_TYPE DWELL_TIME_GRADIENT DOSE_GRID_SIZE_X DOSE_GRID_SIZE_Y DOSE_GRID_SIZE_Z DOSE_GRID_RESOLUTION_X DOSE_GRID_RESOLUTION_Y DOSE_GRID_RESOLUTION_Z DOSE_GRID_CORNER_X DOSE_GRID_CORNER_Y DOSE_GRID_CORNER_Z

Attribute Name	Tag	Type	Notes
> Optimization Parameter Value	(3005,xx10)	1C	Must be present if 'Optimization Parameter Type' is present. SCU - Provided if RT Plan created by Oncentra SCP - Used if RT Plan Created by Oncentra Interpretation depends on the value of 'Optimization Parameter Type'. Value constants for 'FLAG' values TRUE = 1.0 any other value will mean FALSE Enumeration for ACCURATEDOSEALG PENCIL_BEAM = 1.0 COLLAPSED_CONE = 2.0 Enumeration for SEGMENT_MU_FORMAT FLOAT = 1.0 INTEGER = 2.0 ONE_DECIMAL = 3.0 Enumeration for BEAM_OPT_TYPE BEAM_NOT_USED = 0.0 INTENSITY_MODULATION = 1.0 BEAM_WEIGHT = 2.0 SEGMENT_WEIGHT = 3.0 not yet implemented DIRECT_STEP_AND_SHOOT = 4.0 BEAM_LOCKED = 5.0 not yet implemented BEAM_NOT_OPTIMIZED = 6.0 Enumeration for BEAM_ANGLE_OPT_TYPE BEAM_ANGLE_NOT_USED = 0.0 GANTRY = 1.0 COLLIMATOR = 2.0 GANTRY_AND_COLLIMATOR = 3.0 Enumeration for BRACHY_OPTIMIZATION_TYPE NO_OPTIMIZATION = 0.0 GEOMETRICAL_ON_DISTANCE = 1.0 GEOMETRICAL_ON_VOLUME = 2.0 GRAPHICAL = 3.0 DOSE_POINTS_ON_DISTANCE = 4.0 DOSE_POINTS_ON_VOLUME = 5.0 MANUAL_DWELL_WEIGHTS = 6.0 MANUAL_DWELL_TIMES = 7.0 IPSA = 8.0
Library Plan Info	(3005,xx44)	3	Informational string about label and date of the library plan.
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group "MDS NORDION OTP EM"
dAbsDoseGyAt100Percent	(3007,xx00)	3	Brachy planning uses this to save the Dose normalization value selected by the user. It represents the Absolute Dose in Grays at the 100% isodose line selected by the user.
Dose Display Mode	(3007,xx02)	3	PE uses this to save the Dose Display Mode selected by the user. Allowed values: "ABSOLUTE" or "RELATIVE" Not used for brachy plans but always set to ABSOLUTE.
EM Isoline Sequence	(3007,xx04)	3	Used to save the Isolines selected by the user. i.e.: Dose value and the RGB color triplet.
> Relative	(3007,xx05)	3	Used to say whether Dose Value shall be interpreted as Gy or relative (%). "TRUE" means relative, "FALSE" means Gy.
> Dose Value	(3007,xx06)	1C	Dose in Gray or some relative value. Always relative values for brachy plans.

Attribute Name	Tag	Type	Notes
> RGB triplet color representation for Dose	(3007,xx08)	1C	Values: [0..255]/[0..255]/[0..255]
> Line type	(3007,xx1A)	3	Isoline line type: kLINE_TYPE_SOLID = 0 kLINE_TYPE_DASH = 1, kLINE_TYPE_DOT = 2, kLINE_TYPE_DASH_DOT = 3, kLINE_TYPE_DASH_DOT_DOT = 4
> Line width	(3007,xx1B)	3	Isoline width, -1 means default width
> Visibility	(3007,xx1C)	3	Visibility of isoline, true visible, false hidden
Normalization XYZ point	(3007, xx0A)	3	Point used for normalization
Normalization ROI Info Sequence	(3007, xx0B)	3	Sequence describing a (ROI) normalization
> Referenced ROI Number	(3007, xx0C)	3	Identifier of ROI normalized to. Can be missing which means that the normalization values are 'global'. When provided means reference to the structure set referenced by the plan
>Private attributes	(300B,10xx)	3	Value: "NUCLETRON".
>Referenced RT Plan ROI Number	(300B,xx00)	3	Used instead of (3007, xx0C) when the referenced ROI number is a ROI in the embedded structure set.
>End private attributes			
>Min Max Average	(3007, xx0D)	1C	How the normalization was made to that ROI (Min dose max dose or average dose) Must be present if (3007, xx0C) Referenced ROI Number is present. Only provided in first item in dataset.
>Normalization Distance	(3007, xx15)	3	Distance to normalization point set, only valid if Normalization Type (3007, xx14) is NORMALIZED_TO_A_MINIMAL_PERIPHERAL_DOSE Only provided in first item in dataset.
>Normalization Factor	(3007, xx16)	3	Normalization factor used in Brachy normalization Only provided in first item in dataset.
>Normalization FFactor	(3007, xx18)	3	Normalization F-factor used in Brachy normalization Only provided in first item in dataset.
Prescribed Percentage Level	(3007, xx0E)	3	Dose prescription in percent
Normalized	(3007, xx0F)	3	Normalization status 1 mean normalized 0 means not normalized (normalization data is not valid)
Beam Weight Point	(3007, xx10)	3	A beam weight point
Beam Weight Point On	(3007, xx11)	3	Whether the beam weight point is used or not
Dose Per Fx Display	(3007, xx12)	3	Whether dose is displayed per fraction or total
Weight To Meterset Scale Factor	(3007, xx13)	3	Scale factor for scaling between meterset values and Oncentra internal beam weight factors.
Normalization Type	(3007, xx14)	3	Type of normalization: Defined terms: NORMALIZED_TO_A_POINT NORMALIZED_TO_AN_ROI NORMALIZED_TO_A_5_MM_BOX NORMALIZED_TO_A_MINIMAL_PERIPHERAL_DOSE NORMALIZED_TO_A_DVH NORMALIZED_AUTO NORMALIZED_ON_POINTS NORMALIZED_MANUAL
Prescription Time	(3007,xx19)	3	Planned Treatment Time (UTC)
End private attributes			
Private attributes	(3009,10xx)	3	Value: "NUCLETRON".

Attribute Name	Tag	Type	Notes
Natural Dvh Parameter Low Dose	(3009,xx20)	3	Brachy DVH generation parameter
Natural Dvh Parameter High Dose	(3009,xx21)	1C	Brachy DVH generation parameter Must be present if (3007,xx20) is.
Natural Dvh Parameter Number Of Points	(3009,xx22)	1C	Brachy DVH generation parameter Must be present if (3007,xx20) is.
Natural Dvh Parameter Number Of Bins	(3009,xx23)	1C	Brachy DVH generation parameter Must be present if (3007,xx20) is.
Natural Dvh Implant Margin	(3009,xx24)	3	Brachy DVH generation parameter
Non Natural Dvh Parameter Low Dose	(3009,xx25)	3	Brachy DVH generation parameter
Non Natural Dvh Parameter High Dose	(3009,xx26)	1C	Brachy DVH generation parameter Must be present if (3007,xx25) is.
Non Natural Dvh Parameter Number Of Points	(3009,xx27)	1C	Brachy DVH generation parameter Must be present if (3007,xx25) is.
Non Natural Dvh Parameter Number Of Bins	(3009,xx28)	1C	Brachy DVH generation parameter Must be present if (3007,xx25) is.
Non Natural Dvh Implant Margin	(3009,xx29)	3	Brachy DVH generation parameter
Auto Dwell Time Gradient	(3009,xx30)	3	Brachy indication whether dwell time gradient were automatically calculated (then == “T”), or set manually (then not provided or set to “F”)
FilmSetupChangedDuringReconstruction	(3009,xx4A	3	Brachy indication whether film setup was changed during catheter reconstruction (then == “T”), or not (then not provided or set to “F”)
End private attributes			
Private attributes	(3009,10xx)	1C	Value: “NUCLETRON”. Used when plan is a ‘Case Manifest container’ This is not a real RT Plan object.
Case Manifest Sequence	(3009,xx00)	3	Private Sequence in a special ‘Case’ RT Plan for defining all DICOM objects related to a MasterPlan Case. The ‘Case’ RT Plan is a DICOM conformant RT Plan. It does not contain any treatment information. I.e.: no Beam sequence, etc. This tag also indicates that this object is a case manifest RT Plan object.
> Reference Image Series Sequence	(3009,xx01)	3	The Reference Image Series in a case is used for Treatment Planning. For generality, is defined as image series sequence that is currently limited to one reference series per case.
>> SOP Class UID	(0008,0016)	1C	Class UID of reference Image Series. Required if Reference Image Series Sequence is sent.
>> Modality	(0008,0060)	1C	Modality of Reference Image Series. Required if Reference Image Series Sequence is sent.
>>Referenced Image Sequence	(0008,1140)	1C	Reference series image list. Required if Reference Image Series Sequence is sent.
>>> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP List. Required if Referenced Image Sequence is sent.
>>> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP. Required if Referenced Image Sequence is sent.
>> Study Instance UID	(0020,000D)	1C	Required if Reference Image Series Sequence is sent.
>> Series Instance UID	(0020,000E)	1C	Required if Reference Image Series Sequence is sent.
> Correlation Image Series Sequence	(3009,xx02)	3	The Correlation Image Series Sequence. If sent, contains 1 or more Image Series that are correlated via image registration with the with the reference image series.
>> SOP Class UID	(0008,0016)	1C	Class UID of Correlation Image Series. Required if Correlation Image Series Sequence is sent.
>> Modality	(0008,0060)	1C	Modality of Correlation Image Series. Required if Correlation Image Series Sequence is sent.

Attribute Name	Tag	Type	Notes
>>Correlation Image Sequence	(0008,1140)	1C	Correlation series image list. Required if Correlation Image Series Sequence is sent.
>>> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP List. Required if Correlation Image Series Sequence is sent.
>>> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP. Required if Correlation Image Series Sequence is sent.
>> Study Instance UID	(0020,000D)	1C	Required if Correlation Image Series Sequence is sent.
>> Series Instance UID	(0020,000E)	1C	Required if Correlation Image Series Sequence is sent.
> RT Structure Set Sequence	(3009,xx03)	3	The RT Structure Set Series Sequence. For generality, is defined as RT Structure Set sequence that is currently limited to one RT Structure Set per case.
>> SOP Class UID	(0008,0016)	1C	For RTSTRUCT: [1.2.840.10008.5.1.4.1.1.481.3]. Required if RT Structure Set Sequence is sent.
>> SOP Instance UID	(0008,0018)	1C	Uniquely identifies the SOP instance. Required if RT Structure Set Sequence is sent.
>> Modality	(0008,0060)	1C	Modality = RTSTRUCT. Required if RT Structure Set Sequence is sent.
>> Study Instance UID	(0020,000D)	1C	Required if RT Structure Set Sequence is sent.
>> Series Instance UID	(0020,000E)	1C	Required if RT Structure Set Sequence is sent.
>> Structure Set Label	(3006,0002)	1C	Required RT Structure Set Sequence is sent.
>> Private Creator 10xx	(3009,10xx)	1C	Value: “NUCLETRON”. Required if RT Structure Set Series Sequence is sent.
>> Approved	(3009,xx06)	1C	Object Approved State. I.e.: TRUE or FALSE. Required if RT Structure Set Sequence is sent.
> Referenced RT Plan Sequence	(300C,0002)	3	If sent, defines 1 or more RT Plans related to the case.
>> RT Plan Label	(300A,0002)	1C	Required if Referenced RT Plan Sequence is sent.
>> SOP Class UID	(0008,0016)	1C	For RT Plan: [1.2.840.10008.5.1.4.1.1.481.5]. Required if Referenced RT Plan Sequence is sent.
>> SOP Instance UID	(0008,0018)	1C	Instance UID for RT Plan object. Required if Referenced RT Plan Sequence is sent.
>> Modality	(0008,0060)	1C	Modality = RTPLAN. Required if Referenced RT Plan Sequence is sent.
>> Study Instance UID	(0020,000D)	1C	Required if Referenced RT Plan Sequence is sent.
>> Series Instance UID	(0020,000E)	1C	Required if Referenced RT Plan Sequence is sent.
>> Private Creator 10xx	(3009,10xx)	1C	Value: “NUCLETRON”. Required if Referenced RT Plan Sequence is sent
>> Approved	(3009,xx06)	1C	Object Approved State. I.e.: TRUE or FALSE. Required if Referenced RT Plan Sequence is sent.
>> Referenced RT Dose Series Sequence	(3009,xx04)	3	If sent, defines 1 or more RT Dose Series related to the RT Plan. Designed to support BEAM Dose, PLAN Dose, Fraction DOSE, BRACHY Dose, etc., for a single plan in future Oncentra versions.
>>> SOP Class UID	(0008,0016)	1C	For RT Dose: [1.2.840.10008.5.1.4.1.1.481.2]. Required if Referenced RT Dose Sequence is sent.
>>>Modality	(0008,0060)	1C	Modality = RTDOSE. Required if Referenced RT Dose Sequence is sent.
>>> Study Instance UID	(0020,000D)	1C	Required if Referenced RT Dose Sequence is sent.
>>> Series Instance UID	(0020,000E)	1C	Required if Referenced RT Dose Sequence is sent
>>> Dose Summation Type	(3004,000A)	1C	Type = BEAM or PLAN for MasterPlan V3.0. Required if Referenced RT Dose Sequence is sent
>>> Private Creator 10xx	(3009,10xx)	1C	Value: “NUCLETRON”. Required if Referenced RT Dose Sequence is sent
>>>Referenced Dose Sequence	(300C,0080)	1C	Referenced Dose list. Required if Referenced RT Dose Sequence is sent.

Attribute Name	Tag	Type	Notes
>>>> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP List. Required if Referenced RT Dose Sequence is sent
>>>> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP. Required if Referenced RT Dose Sequence is sent
>> Referenced RT Image Series Sequence	(3009,xx05)	3	If sent, defines 1 or more RT Image Series related to the RT Plan or to the Case.
>>> SOP Class UID	(0008,0016)	1C	For RT Image: [1.2.840.10008.5.1.4.1.1.481.1]. Required if Referenced RT Image Sequence is sent.
>>>Modality	(0008,0060)	1C	Modality = RTIMAGE. Required if Referenced RT Image Sequence is sent.
>>> Study Instance UID	(0020,000D)	1C	Required if Referenced RT Image Sequence is sent.
>>> Series Instance UID	(0020,000E)	1C	Required if Referenced RT Image Sequence is sent
>>> Private Creator 10xx	(3009,10xx)	1C	Value: “NUCLETRON”. Required if Referenced RT Image Sequence is sent
>>> Referenced Reference Image Sequence	(300C,0042)	1C	RT Image series image list. Required if Referenced Image Sequence is sent
>>>> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP List. Required if Referenced Reference Image Sequence is sent
>>>> Referenced SOP Instance UID	(0008,1155)	1C	Uniquely identifies the referenced SOP Required if Referenced Reference RT Image Sequence is sent
End private attributes			
Private attributes	(300F,10xx)	1C	Value: “NUCLETRON”. Used when plan is containing an embedded structure set. This is only used for brachy plans.
Embedded Structure Set Sequence	(300F,xx00)	3	SCU - Provided SCP - Used if provided The embedded structure set sequence contains all sorts of contours that are specific for a brachy plan. Typically these are channel structures, and various point sets used for normalization and optimization within brachy. These structures are typically not directly associated to the patient anatomy. For the contents of this sequence, see the Structure set Module, ROI Contour Module and RT ROI Observations Module.
End private attributes			
Private attributes	(300B,0010)	1C	Value: “NUCLETRON”. Used when plan is containing a Flexitron Plan Code. This is only used for brachy plans.
Flexitron Plan Code	(300B,1029)	3	SCU - Provided SCP - Used if provided The Flexitron Plan Code is calculated based on the Patient ID and the date and time of the plan approval. This is only used for Flexitron Treatment Machines. This code is printed on the Treatment Printout and also stored in the Plan. The plan is only accepted when the code printed matches the code in the plan.
End private attributes			

5.8.8 RT Prescription Module

Attribute Name	Tag	Type	Notes
Prescription Description	(300A,000E)	3	SCU - Not Provided SCP - Not used
Dose Reference Sequence	(300A,0010)	3	SCU - Provided [If plan has been optimized at any stage] (Can be removed by CM export filter) SCP - Used if provided

Attribute Name	Tag	Type	Notes
>Dose Reference Number	(300A,0012)	1C	SCU - Provided SCP – Not used
>Dose Reference UID	(300A,0013)	3	SCU - Provided SCP - Not used
>Dose Reference Structure Type	(300A,0014)	1C	SCU – Provided SITE (Can be removed by CM export filter) VOLUME VOLUME_EMB (Nucletron specific) COORDINATES When COORDINATES this represents a calculated brachy dose point. SCP - Used if provided, unless COORDINATES which causes the whole Dose Reference Item to be ignored.
>Dose Reference Description	(300A,0016)	3	SCU - Provided SCP – Used if provided Used to describe the type of constraint/objective used for optimization. One of the following values: UNIFORM_DOSE MIN_DOSE MAX_DOSE MIN_DVH MAX_DVH UNIFORMITY_CONSTRAINT MIN_DOSE_CONSTRAINT MAX_DOSE_CONSTRAINT MIN_DVH_CONSTRAINT MAX_DVH_CONSTRAINT MAX_DOSE_SURFACE MIN_DOSE_SURFACE MAX_AVERAGE_DOSE MIN_AVERAGE_DOSE SURR_DOSE_FALLOFF If (300A,0014) is SITE this is the prescription site label. If it is a brachy dose reference this can also be a dose point label.
>Referenced ROI Number	(3006,0084)	1C	SCU – Provided when standard requires. SCP - Used if provided
>Dose Reference Point Coordinates	(300A,0018)	1C	SCU – Provided when standard requires. SCP - Not used
>Nominal Prior Dose	(300A,001A)	3	SCU - Not provided SCP - Not used
>Dose Reference Type	(300A,0020)	1C	SCU - Provided One of the following values: TARGET ORGAN_AT_RISK UNSPECIFIED (Nucletron specific) When Dose Reference Structure Type (300A, 0014) is COORDINATES, this always has the value of UNSPECIFIED. SCP - Used if provided.
>Constraint Weight	(300A,0021)	3	SCU - Provided SCP - Used if provided
>Delivery Warning Dose	(300A,0022)	3	SCU - Not provided SCP - Not used
>Delivery Maximum Dose	(300A,0023)	3	SCU - Not provided SCP - Not used
>Target Minimum Dose	(300A,0025)	3	SCU - Provided SCP - Used If provided

Attribute Name	Tag	Type	Notes
>Target Prescription Dose	(300A,0026)	3	SCU - Provided when Dose Reference Type (300A,0020) is TARGET or UNDEFINED. SCP - Used If provided
>Target Maximum Dose	(300A,0027)	3	SCU - Provided SCP - Used If provided
>Target Underdose Volume Fraction	(300A,0028)	3	SCU - Provided SCP - Used If provided
>Organ at Risk Full-volume Dose	(300A,002A)	3	SCU - Provided SCP - Used If provided
>Organ at Risk Limit Dose	(300A,002B)	3	SCU - Provided SCP - Used If provided
>Organ at Risk Maximum Dose	(300A,002C)	3	SCU - Provided SCP - Used If provided
>Organ at Risk Overdose Volume Fraction	(300A,002D)	3	SCU - Provided SCP - Used If provided
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION CALCULATION”
>Relative Standard Deviation	(3005,xx42)	3	Private information used by the optimizer. SCU - Provided SCP - Used If provided
>Library Plan ROI Info	(3005,xx43)	3	Private information used for library plan handling. SCU - Provided SCP - Used If provided
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group “NUCLETRON”
Margin Catheter	(3007,xx27)	3	Private information used by brachy optimization SCU - Provided SCP - Used If provided
Margin Dose Control	(3007,xx28)	3	Private information used by brachy optimization SCU - Provided SCP - Used If provided
Organ At Risk Minimum Dose	(3007,xx29)	3	Private information used by brachy optimization SCU - Provided SCP - Used If provided
Internal Dose Reference Type	(3007,xx31)	3	Private information used by brachy optimization SCU - Provided SCP - Used If provided, will override Dose Reference Type (300A,0020).
High Dose Level	(3007,xx63)	3	Private information used by external beam optimization SCU - Provided SCP - Used If provided
Low Dose Level	(3007,xx64)	3	Private information used by external beam optimization SCU - Provided SCP - Used If provided
Vicinity Exponent	(3007,xx65)	3	Private information used by external beam optimization SCU - Provided SCP - Used If provided
Low Dose Distance	(3007,xx66)	3	Private information used by external beam optimization SCU - Provided SCP - Used If provided
End private attributes			
Private attributes	(300B,00xx)	3	Private creator group “NUCLETRON”
Referenced RT Plan ROI Number	(300B,xx00)	3	Private information used by brachy optimization Only supplied if Dose Reference Structure Type (300A, 0014) is one of the Nucletron specific terms. SCU - Provided SCP - Used If provided

Attribute Name	Tag	Type	Notes
End private attributes			

5.8.9 RT Tolerance Tables Module

Attribute Name	Tag	Type	Notes
Tolerance Table Sequence	(300A,0040)	3	Provided if added in CM SCP - Not used
>Tolerance Table Number	(300A,0042)	1	Provided if added in CM SCP - Not used
>Tolerance Table Label	(300A,0043)	3	Provided if added in CM SCP - Not used
>Gantry Angle Tolerance	(300A,0044)	3	SCU - Not provided SCP - Not used
>Gantry Pitch Angle Tolerance	(300A,014E)	3	SCU - Not provided SCP - Not used
>Beam Limiting Device Angle Tolerance	(300A,0046)	3	SCU - Not provided SCP - Not used
>Beam Limiting Device Tolerance Sequence	(300A,0048)	3	SCU - Not provided SCP - Not used
>>RT Beam Limiting Device Type	(300A,00B8)	1	SCU - Not provided SCP - Not used
>>Beam Limiting Device Position Tolerance	(300A,004A)	1	SCU - Not provided SCP - Not used
>Patient Support Angle Tolerance	(300A,004C)	3	SCU - Not provided SCP - Not used
>Table Top Eccentric Angle Tolerance	(300A,004E)	3	SCU - Not provided SCP - Not used
>Table Top Pitch Angle Tolerance	(300A,004F)	3	SCU - Not provided SCP - Not used
>Table Top Roll Angle Tolerance	(300A,0050)	3	SCU - Not provided SCP - Not used
>Table Top Vertical Position Tolerance	(300A,0051)	3	SCU - Not provided SCP - Not used
>Table Top Longitudinal Position Tolerance	(300A,0052)	3	SCU - Not provided SCP - Not used
>Table Top Lateral Position Tolerance	(300A,0053)	3	SCU - Not provided SCP - Not used

5.8.10 RT Patient Setup Module

Attribute Name	Tag	Type	Notes
Patient Setup Sequence	(300A,0180)	1	SCU - Provided SCP - Used
>Patient Setup Number	(300A,0182)	1	SCU - Provided SCP - Used
>Patient Position	(0018,5100)	1C	SCU - Provided SCP - Used. Supported terms: HFS, HFP, FFS, FFP, must be same in all items in the Sequence.
>Patient Additional Position	(300A,0184)	1C	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>Fixation Device Sequence	(300A,0190)	3	SCU - Not provided SCP - Not used
>>Fixation Device Type	(300A,0192)	1C	SCU - Not provided SCP - Not used
>>Fixation Device Label	(300A,0194)	2C	SCU - Not provided SCP - Not used
>>Fixation Device Description	(300A,0196)	3	SCU - Not provided SCP - Not used
>>Fixation Device Position	(300A,0198)	3	SCU - Not provided SCP - Not used
>Shielding Device Sequence	(300A,01A0)	3	SCU - Not provided SCP - Not used
>>Shielding Device Type	(300A,01A2)	1C	SCU - Not provided SCP - Not used
>>Shielding Device Label	(300A,01A4)	2C	SCU - Not provided SCP - Not used
>>Shielding Device Description	(300A,01A6)	3	SCU - Not provided SCP - Not used
>>Shielding Device Position	(300A,01A8)	3	SCU - Not provided SCP - Not used
>Setup Technique	(300A,01B0)	3	SCU - Provided, always ISOCENTRIC SCP - Not used
>Setup Technique Description	(300A,01B2)	3	SCU - Not provided SCP - Not used
>Setup Device Sequence	(300A,01B4)	3	SCU - Not provided SCP - Not used
>>Setup Device Type	(300A,01B6)	1C	SCU - Not provided SCP - Not used
>>Setup Device Label	(300A,01B8)	2C	SCU - Not provided SCP - Not used
>>Setup Device Description	(300A,01BA)	3	SCU - Not provided SCP - Not used
>>Setup Device Parameter	(300A,01BC)	2C	SCU - Not provided SCP - Not used
>>Setup Reference Description	(300A,01D0)	3	SCU - Not provided SCP - Not used
>Table Top Vertical Setup Displacement	(300A,01D2)	3	SCU - Provided if TPRP present SCP - Not used
>Table Top Longitudinal Setup Displacement	(300A,01D4)	3	SCU - Provided if TPRP present SCP - Not used
>Table Top Lateral Setup Displacement	(300A,01D6)	3	SCU - Provided if TPRP present SCP - Not used

5.8.11 RT Fraction Scheme Module

Attribute Name	Tag	Type	Notes
Fraction Group Sequence	(300A,0070)	1	SCU - Provided SCP - Used
>Fraction Group Number	(300A,0071)	1	SCU - Provided SCP - Used
>Referenced Patient Setup Number	(300C,006A)	3	SCU - Not provided SCP - Not used
>Referenced Dose Sequence	(300C,0080)	3	SCU - Not provided SCP - Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
>Referenced Dose Reference Sequence	(300C,0050)	3	SCU - Not provided SCP - Not used
>>Referenced Dose Reference Number	(300C,0051)	1C	SCU - Not provided SCP - Not used
>>Constraint Weight	(300A,0021)	3	SCU - Not provided SCP - Not used
>>Delivery Warning Dose	(300A,0022)	3	SCU - Not provided SCP - Not used
>>Delivery Maximum Dose	(300A,0023)	3	SCU - Not provided SCP - Not used
>>Target Minimum Dose	(300A,0025)	3	SCU - Not provided SCP - Not used
>>Target Prescription Dose	(300A,0026)	3	SCU - Not provided SCP - Not used
>>Target Maximum Dose	(300A,0027)	3	SCU - Not provided SCP - Not used
>>Target Underdose Volume Fraction	(300A,0028)	3	SCU - Not provided SCP - Not used
>>Organ at Risk Full-volume Dose	(300A,002A)	3	SCU - Not provided SCP - Not used
>>Organ at Risk Limit Dose	(300A,002B)	3	SCU - Not provided SCP - Not used
>>Organ at Risk Maximum Dose	(300A,002C)	3	SCU - Not provided SCP - Not used
>>Organ at Risk Overdose Volume Fraction	(300A,002D)	3	SCU - Not provided SCP - Not used
>Number of Fractions Planned	(300A,0078)	2	SCU - Provided SCP - Used if provided.
>Number of Fractions Per Day	(300A,0079)	3	SCU - Not provided SCP - Not used
>Repeat Fraction Cycle Length	(300A,007A)	3	SCU - Not provided SCP - Not used
>Fraction Pattern	(300A,007B)	3	SCU - Not provided SCP - Not used
>Number of Beams	(300A,0080)	1	SCU – Provided if it is an external beam plan SCP - Not used
>Referenced Beam Sequence	(300C,0004)	1C	SCU - Provided if it is an external beam plan SCP - Not used
>>Referenced Beam Number	(300C,0006)	1C	SCU - Provided if it is an external beam plan SCP - Not used A beam number must only be referenced once in the fraction group sequence.
>>Beam Dose Specification Point	(300A,0082)	3	SCU - Provided if it is an external beam plan and set by operator. SCP - Used if provided
>>Beam Dose	(300A,0084)	3	SCU - Provided if it is an external beam plan and beam Dose specification point is set and there is dose. SCP - Used if provided
>>Beam Meterset	(300A,0086)	3	SCU - Provided if it is an external beam plan and set by operator. SCP - Used if provided.
>Number of Brachy Application Setups	(300A,00A0)	1	SCU – Provided if it is a brachy plan, always 1 SCP - Not used
>Referenced Brachy Application Setup Sequence	(300C,000A)	1C	SCU - Provided SCP - Not used
>>Referenced Brachy Application Setup Number	(300C,000C)	1C	SCU - Provided if it is a brachy plan SCP - Not used

Attribute Name	Tag	Type	Notes
>>Brachy Application Setup Dose Specification Point	(300A,00A2)	3	SCU - Not provided SCP - Not used
>>Brachy Application Setup Dose	(300A,00A4)	3	SCU - Not provided SCP - Not used

5.8.12 RT Beams Module

Attribute Name	Tag	Type	Notes
Beam Sequence	(300A,00B0)	1	SCU - Provided SCP - Used
>Beam Number	(300A,00C0)	1	SCU - Provided SCP - Used
>Beam Name	(300A,00C2)	3	SCU - Provided SCP - Used if provided.
>Beam Description	(300A,00C3)	3	SCU - Provided (Beam Number + 'blank' + Beam Name) SCP - Not used.
>Beam Type	(300A,00C4)	1	SCU - Provided. SCP - Used (Dynamic beam type supported for Gantry ARCs only. All other dynamic rotations are not supported, Dynamic IMRT is not supported.)
>Radiation Type	(300A,00C6)	2	SCU - Provided SCP - Used if provided Supported terms 'PHOTON' or 'ELECTRON'
> Primary Fluence Mode Sequence	(3002,0050)	3	SCU – Provided if treatment unit is in Flattening Filter Free mode. SCP – Used if provided
>> Fluence Mode	(3002,0051)	1	SCU – Provided if treatment unit is in Flattening Filter Free mode – NON_STANDARD SCP – Used if value is NON_STANDARD
>> Fluence Mode ID	(3002,0052)	1C	SCU – Provided if Fluence mode has value NON_STANDARD SCP – Used if value is FFF Provided as 'FFF' if treatment unit is in Flattening Filter Free mode.
>Treatment Machine Name	(300A,00B2)	2	SCU - Provided SCP – Required, must match treatment unit specification in Oncentra if plan shall be opened in certain modules.
>Manufacturer	(0008,0070)	3	SCU - Not provided SCP - Not used
>Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
>Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
>Institutional Department Name	(0008,1040)	3	SCU - Not provided SCP - Not used
>Manufacturer's Model Name	(0008,1090)	3	SCU - Not provided SCP - Not used
>Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
>Primary Dosimeter Unit	(300A,00B3)	3	SCU - Provided SCP - Required if Beam Meterset (300A,0086) provided
>Referenced Tolerance Table Number	(300C,00A0)	3	SCU - Provided if added in CM.. SCP - Not used
>Source-Axis Distance	(300A,00B4)	3	SCU - Provided SCP - If provided, must match Oncentra Treatment Unit specifications if plan shall be opened in certain modules.

Attribute Name	Tag	Type	Notes
>Beam Limiting Device Sequence	(300A,00B6)	1	SCU - Provided SCP - Used
>>RT Beam Limiting Device Type	(300A,00B8)	1	SCU - Provided SCP - Used
>>Source to Beam Limiting Device Distance	(300A,00BA)	3	SCU - Not provided SCP - Not used
>>Number of Leaf/Jaw Pairs	(300A,00BC)	1	SCU - Provided SCP - Used
>>Leaf Position Boundaries	(300A,00BE)	2C	SCU - Provided SCP - Required, must match Oncentra Treatment Unit specifications if plan shall be opened in certain modules.
>Referenced Patient Setup Number	(300C,006A)	3	SCU - Provided SCP - Used
>Referenced Reference Image Sequence	(300C,0042)	3	SCU - Not provided SCP - Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
>>Reference Image Number	(300A,00C8)	1C	SCU - Not Provided SCP - Not used
>>Start Cumulative Meterset Weight	(300C,0008)	3	SCU - Not Provided SCP - Not used
>>End Cumulative Meterset Weight	(300C,0009)	3	SCU - Not Provided SCP - Not used
>Planned Verification Image Sequence	(300A,00CA)	3	SCU - Not provided SCP - Not used
>>Start Cumulative Meterset Weight	(300C,0008)	3	SCU - Not provided SCP - Not used
>>Meterset Exposure	(3002,0032)	3	SCU - Not provided SCP - Not used
>>End Cumulative Meterset Weight	(300C,0009)	3	SCU - Not provided SCP - Not used
>>RT Image Plane	(3002, 000C)	3	SCU - Not provided SCP - Not used
>>X-Ray Image Receptor Angle	(3002,000E)	3	SCU - Not provided SCP - Not used
>>RT Image Orientation	(3002,0010)	3	SCU - Not provided SCP - Not used
>>RT Image Position	(3002,0012)	3	SCU - Not provided SCP - Not used
>>RT Image SID	(3002,0026)	3	SCU - Not provided SCP - Not used
>>Imaging Device-Specific Acquisition Parameters	(300A,00CC)	3	SCU - Not provided SCP - Not used
>>Referenced Reference Image Number	(300C,0007)	3	SCU - Not provided SCP - Not used
>Treatment Delivery Type	(300A,00CE)	3	SCU - 'TREATMENT'. SCP - Checked, if other than TREATMENT, user will be notified that a change will cause delivery type to become TREATMENT.
>Referenced Dose Sequence	(300C,0080)	3	SCU - Not provided SCP - Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Provided SCP - Used if Oncentra created RT Dose is provided.
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Used if Oncentra created RT Dose is provided.

Attribute Name	Tag	Type	Notes
>Number of Wedges	(300A,00D0)	1	SCU - Provided as 0 or 1 SCP - Used, supported: 0 or 1
>Wedge Sequence	(300A,00D1)	1C	SCU - Provided SCP - Required
Private attributes	(3005,00xx)	3	Private creator group "MDS NORDION CALCULATION"
>> TMS Wedge Fraction	(3005,xx22)	3	SCU - Provided if dose has been calculated and the private tag Effective Wedge Angle (3005, xx24) has been provided. SCP - Not used
>> Effective Wedge Angle	(3005,xx24)	3	SCU - Provided SCP - Used
> TMS Beam Weight	(3005,xx20)	3	SCU - Not provided SCP - Not used
End private attributes			
>>Wedge Number	(300A,00D2)	1C	SCU - Provided SCP - Required
>>Wedge Type	(300A,00D3)	2C	SCU - Provided SCP - Used Supported values: STANDARD DYNAMIC MOTORIZED
>>Wedge ID	(300A,00D4)	3	SCU - Provided SCP - Required, must match a valid wedge for the Oncentra Treatment Unit specified for this beam.
>>Wedge Angle	(300A,00D5)	2C	SCU - Provided SCP - Required If this value is zero for a STANDARD wedge, Oncentra will try to find the angle from the treatment unit database based on the Wedge ID.
>>Wedge Factor	(300A,00D6)	2C	SCU - Zero length SCP - Not used
>>Wedge Orientation	(300A,00D8)	2C	SCU - Provided SCP - Required, must match the wedge orientation specified in the Oncentra Treatment Unit database for the selected wedge.
>>Source to Wedge Tray Distance	(300A,00DA)	3	SCU – Provided, value from treatment unit database. SCP - Not used
>Number of Compensators	(300A,00E0)	1	SCU - '0' or '1' SCP – Used if provided This attribute is always '0'/ignored for non-PROTON beams.
>Total Compensator Tray Factor	(300A,00E2)	3	SCU - Not Provided SCP - Not used
>Compensator Sequence	(300A,00E3)	1C	SCU – Optionally provided for PROTON beams SCP – Used if provided for PROTON beam Only one item in this sequence is supported.
>>Compensator Number	(300A,00E4)	1C	SCU – Provided, always '1' SCP - Not used
>>Material ID	(300A,00E1)	2C	SCU - Provided SCP - Required
>>Compensator ID	(300A,00E5)	3	SCU - Provided SCP - Required
>>Source to Compensator Tray Distance	(300A,00E6)	2C	SCU - Provided SCP - Required
>> Compensator Divergence	(300A,02E0)	3	SCU - Provided SCP – Used if provided
>> Compensator Mounting Position	(300A,02E1)	3	SCU - Provided SCP – Used if provided
>>Compensator Rows	(300A,00E7)	1C	SCU - Provided SCP - Required

Attribute Name	Tag	Type	Notes
>>Compensator Columns	(300A,00E8)	1C	SCU - Provided SCP - Required
>>Compensator Pixel Spacing	(300A,00E9)	1C	SCU - Provided SCP - Required
>>Compensator Position	(300A,00EA)	1C	SCU - Provided SCP - Required
>>Compensator Transmission Data	(300A,00EB)	1C	SCU - Not provided SCP - Not used
>>Compensator Thickness Data	(300A,00EC)	1C	SCU - Provided SCP - Required
>Number of Boli	(300A,00ED)	1	SCU - Provided SCP - Required
>Referenced Bolus Sequence	(300C,00B0)	1C	SCU - Provided if Number of Boli (300A, 00ED) is greater than 0. SCP - Required if Number of Boli (300A, 00ED) is greater than 0.
>>Referenced ROI Number	(3006,0084)	1C	SCU - Provided. SCP - Required if Number of Boli (300A, 00ED) is greater than 0.
>>Bolus ID	(300A,00DC)	3	SCU - Provided. ROI name from structure set is used. (Can be removed by CM export filter) SCP – Not used
>> Bolus Description	(300A,00DD)	3	SCU - Not provided SCP - Not used
>Number of Blocks	(300A,00F0)	1	SCU - Provided SCP - Required
>Total Block Tray Factor	(300A,00F2)	3	SCU - Provided SCP - Used if available. To Map an Oncentra tray to a DICOM tray
>Block Sequence	(300A,00F4)	1C	SCU - Provided if Number of Blocks (300A, 00F0) is > 0. SCP - Required if Number of Blocks (300A, 00F0) is > 0.
>>Block Tray ID	(300A,00F5)	3	SCU - Provided SCP - Used if provided for automatic block tray matching.
>>Source to Block Tray Distance	(300A,00F6)	2C	SCU - Provided SCP - Required by dose calculation and must be the same value for all blocks in the current Beam
>>Block Type	(300A,00F8)	1C	SCU - Provided SCP - Maximum 8 shielding blocks and one aperture allowed - any beam with one or more invalid blocks would be rejected.
>>Block Divergence	(300A,00FA)	2C	SCU - 'PRESENT' SCP - Not used, all blocks and apertures are assumed to be divergent.
>>Block Mounting Position	(300A,00FB)	3	SCU – 'SOURCE_SIDE' SCP - Not used, all blocks and apertures are assumed to be mounted 'SOURCE_SIDE'
>>Block Number	(300A,00FC)	1C	SCU - Provided SCP - Required if Number of Blocks (300A,00F0) is > 0.
>>Block Name	(300A,00FE)	3	SCU - 'Block #' where '#' is the Block Number (300A,00FC). SCP - Used for display during tray selection if provided.
>>Material ID	(300A,00E1)	2C	SCU - Provided unless Block Transmission (300A,0102) is provided. SCP - Used. However, see comment for Block Transmission (300A,0102)
>>Block Thickness	(300A,0100)	2C	SCU - Provided if Material ID (300A,00E1) is provided. SCP - Required if Material ID (300A,00E1) is provided.

Attribute Name	Tag	Type	Notes
>>Block Transmission	(300A,0102)	2C	SCU - Provided unless Material ID (300A,00E1) is provided. SCP - Used. To perform dose calculation, transmission values for all shielding and aperture blocks are required, either through direct specification or by determination through Material ID and Block Thickness values. However, if no values are provided in imported DICOM objects they can be specified in the Beam Modeling activity. Dose calculation also has some restrictions with respect to transmission values for shielding blocks, cf. the Oncentra user documentation for further details.
>>Block Number of Points	(300A,0104)	2C	SCU - Provided SCP - Required if Number of Blocks (300A,00F0) is > 0; a minimum of 3 points is required.
>>Block Data	(300A,0106)	2C	SCU - Provided SCP - Required if Number of Blocks (300A,00F0) is > 0.
>Applicator Sequence	(300A,0107)	3	SCU - Provided SCP - Required by dose calculation if Radiation Type is ELECTRON. Only a single item shall be permitted in this sequence.
>>Applicator ID	(300A,0108)	1C	SCU - Provided SCP - Required
>>Applicator Type	(300A,0109)	1C	SCU - Provided SCP - Required. Supported values by dose calculation: ELECTRON_SQUARE and ELECTRON_RECT.
>>Applicator Description	(300A,010A)	3	SCU - Not provided SCP - Not used
>Final Cumulative Meterset Weight	(300A,010E)	1C	SCU - Provided SCP - Required
>Number of Control Points	(300A,0110)	1	SCU - Provided SCP - Used
>Control Point Sequence	(300A,0111)	1	SCU - Provided SCP - Used
>>Control Point Index	(300A,0112)	1C	SCU - Provided SCP - Required
>>Cumulative Meterset Weight	(300A,0134)	2C	SCU - Provided SCP - Required
>>Referenced Dose Reference Sequence	(300C,0050)	3	SCU - Provided (can be removed by CM export filter) SCP - Not used
>>>Referenced Dose Reference Number	(300C,0051)	1C	SCU - Provided (points to the SITE dose reference) SCP - Not used
>>>Cumulative Dose Reference Coefficient	(300A,010C)	2C	SCU - Provided SCP - Not used
>>Nominal Beam Energy	(300A,0114)	3	SCU - Provided SCP - Required for first control point. Must match Oncentra Treatment Unit specifications. If provided in consecutive control points the values must be the same for all control points for the current beam.
>>Dose Rate Set	(300A,0115)	3	SCU – Provided For a VMAT plan the value may vary. When the plan is a non-VMAT plan, this will be a constant value as defined in the treatment unit database. (Can be removed by CM export filter) SCP - Not used unless VMAT plan.
>>Wedge Position Sequence	(300A,0116)	3	SCU - Provided SCP - Used if provided
>>>Referenced Wedge Number	(300C,00C0)	1C	SCU - Provided SCP - Required
>>>Wedge Position	(300A,0118)	1C	SCU - Provided SCP - Required

Attribute Name	Tag	Type	Notes
>>Beam Limiting Device Position Sequence	(300A,011A)	1C	SCU - Provided SCP - Required
>>>RT Beam Limiting Device Type	(300A,00B8)	1C	SCU - Provided SCP - Required
>>>Leaf/Jaw Positions	(300A,011C)	1C	SCU - Provided SCP - Required
>>Gantry Angle	(300A,011E)	1C	SCU - Provided SCP - Required
>>Gantry Rotation Direction	(300A,011F)	1C	SCU - Provided for ARC beams SCP - Required for ARC beams
>>Gantry Pitch Angle	(300A,014A)	1C	SCU – Provided, always 0. SCP – If provided must be 0 (else a warning is issued and value is ignored).
>>Beam Limiting Device Angle	(300A,0120)	1C	SCU - Provided SCP - Required
>>Beam Limiting Device Rotation Direction	(300A,0121)	1C	SCU - 'NONE' SCP - Supported value 'NONE'.
>>Patient Support Angle	(300A,0122)	1C	SCU - Provided SCP - Required
>>Patient Support Rotation Direction	(300A,0123)	1C	SCU - 'NONE' SCP - Supported value 'NONE'.
>>Table Top Eccentric Axis Distance	(300A,0124)	3	SCU - Not Provided SCP - Not used
>>Table Top Eccentric Angle	(300A,0125)	1C	SCU - '0.0' SCP - Required by dose calculation to be exactly zero.
>>Table Top Eccentric Rotation Direction	(300A,0126)	1C	SCU - 'NONE' SCP - Required by dose calculation to be set to 'NONE'.
>>Table Top Vertical Position	(300A,0128)	2C	SCU - Not Provided (empty string for first control point) SCP - Not used
>>Table Top Longitudinal Position	(300A,0129)	2C	SCU - Not Provided (empty string for first control point) SCP - Not used
>>Table Top Lateral Position	(300A,012A)	2C	SCU - Not Provided (empty string for first control point) SCP - Not used
>>Isocenter Position	(300A,012C)	2C	SCU - Provided SCP - Required
>>Surface Entry Point	(300A,012E)	3	SCU - Not provided SCP - Not used
>>Source to Surface Distance	(300A,0130)	3	SCU - Provided (Can be removed by CM Export filter) Note: In the case of a tangential field or other when the beam central axis does not intersect with the surface ROI (External or Bolus), this value will be set to the Source Axis Distance. SCP - Not used
Private attributes	(3005,00xx)	3	Private creator group "MDS NORDION CALCULATION"
>Optimization Constraint Sequence	(3005,xx0C)	3	Sequence containing constraints and restrictions imposed on the RT Plan during optimization. One or more items may be contained in the sequence.

Attribute Name	Tag	Type	Notes
>>Optimization Constraint Type	(3005,xx0E)	1C	Type of constraint to be imposed in optimization of RT Plan. Required if Optimization Constraint Sequence (3005,xx0C) is sent. Supported terms: LEAF_JAW_FIXED MIN_METERSET MAX_SEGMENTS MAX_INTENSITIES MIN_FIELDSIZE MIN_LEAVES TOL_EQ_LEAF TOL_EQ_AREA USE_DEF_FLDSIZE
>>Optimization Constraint Value	(3005,xx10)	1C	Value of associated constraint type. Required if Optimization Constraint Sequence (3005,xx0C) is sent.
End private attributes			
Private attributes	(300B,00xx)	3	Private creator group "NUCLETRON"
>Private Wedge Information	(300B,xx03)	3	Wedge information kept only for internal use in Oncentra when the DICOM wedge is not present due to a beam with a motorized wedge present but no weight assigned to the wedged segment.
>Discarded Segment	(300B,xx04)	3	Indicates which control points need to be recreated for internal use (with zero meterset weight).
>Treatment Machine Label	(300B,xx0A)	3	Oncentra internal treatment machine label, not to be used by other systems. User standard tag (300A,00B2) instead.
End private attributes			
Private attributes	(300B,00xx)	3	Private creator group "NUCLETRON"
> Referenced Conformance ROI	(300B,xx17)	3	ROI number of ROI to which the beam is set to automatically conform to in Plan Manager
> ROI Conformance Method	(300B,xx18)	3	How conformance is done (application defined by Plan Manager)
> ROI Conformance Parameters	(300B,xx19)	3	ROI conformance parameters (application defined by Plan Manager)
> ROI Conformance State	(300B,xx20)	3	ROI conformance state, defined values: -1 Invalid (ROI changed but beam not updated) 0 Off (conformance is not in use) 1 Valid (conformance is up to date)
> Referenced Isocenter Placement ROI	(300B,xx21)	3	ROI number of ROI to which the beam is set to automatically put its isocenter to in Plan Manager
> Isocenter Placement State	(300B,xx22)	3	ROI conformance state, defined values: -1 Invalid (ROI changed but beam not updated) 0 Off (auto placement is not in use) 1 Valid (placement is up to date)
> Rectangular Field Mode	(300B,xx28)	3	Rectangular field mode state (used in Plan Manager (PM) only) 0 or missing is interpreted as not rectangular field mode 1 is interpreted as rectangular field mode. Rectangular field mode will cause PM to automatically move beam limiting devices so that the field is keeps a rectangular shape.
End private attributes			

5.8.13 RT Brachy Application Setups Module

Attribute Name	Tag	Type	Notes
Brachy Treatment Technique	(300A,0200)	1	SCU - Provided SCP - Used

Attribute Name	Tag	Type	Notes
Brachy Treatment Type	(300A,0202)	1	SCU - Provided SCP – Used Defined terms used: HDR PDR UNDEFINED
Treatment Machine Sequence	(300A,0206)	1	SCU - Provided SCP - Used if provided.
>Treatment Machine Name	(300A,00B2)	2	SCU - Provided SCP – Required in certain modules, must match definition of brachy treatment unit in Oncentra.
>Manufacturer	(0008,0070)	3	SCU - Not provided SCP - Not used
>Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
>Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
>Institutional Department Name	(0008,1040)	3	SCU - Not provided SCP - Not used
>Manufacturer's Model Name	(0008,1090)	3	SCU - Provided SCP – Required in certain modules, must match definition of brachy treatment unit in Oncentra.
>Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
>Treatment Machine Zip	(300B,xx05)	3	Key to the treatment machine record in the treatment machine database.
>End private attributes			
Source Sequence	(300A,0210)	1	SCU - Provided SCP - Used
>Source Number	(300A,0212)	1	SCU - Provided SCP - Used
>Source Type	(300A,0214)	1	SCU - Provided SCP - Used
>Source Manufacturer	(300A,0216)	3	SCU - Not provided SCP - Not used
>Active Source Diameter	(300A,0218)	3	SCU - Not provided SCP - Not used
>Active Source Length	(300A,021A)	3	SCU - Not provided SCP - Not used
>Material ID	(300A,00E1)	3	SCU - Not provided SCP - Not used
>Source Encapsulation Nominal Thickness	(300A,0222)	3	SCU - Not provided SCP - Not used
>Source Encapsulation Nominal Transmission	(300A,0224)	3	SCU - Not provided SCP - Not used
>Source Isotope Name	(300A,0226)	1	SCU - Provided SCP - Used
>Source Isotope Half Life	(300A,0228)	1	SCU - Provided SCP - Used
>Source Strength Units	(300A,0229)	1C	SCU - Provided SCP - Used
>Reference Air Kerma Rate	(300A,022A)	1	SCU - Provided SCP - Used
>Source Strength	(300A,022B)	1C	SCU - Provided SCP - Used

Attribute Name	Tag	Type	Notes
>Source Strength Reference Date	(300A,022C)	1	SCU - Provided SCP - Used
>Source Strength Rate Reference Time	(300A,022E)	1	SCU - Provided SCP - Used
>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
>Source Zip	(300B,xx06)	3	Key to the source record in the treatment machine database.
>Calibration Zip	(300B,xx07)	3	Key to the source calibration record in the treatment machine database.
>Source Calibration Time	(300B,xx08)	3	Source calibration time (UTC).
>Source Identification Number	(300B, xx0C)	3	Identification of the source as provided by the afterloader manufacturer
>Applicator Model BLOB	(300B,xx0D)	3	Binary Large Object of Applicator model used in the plan
>End private attributes			
Application Setup Sequence	(300A,0230)	1	SCU - Provided SCP - Used
>Application Setup Type	(300A,0232)	1	SCU - Provided SCP – Used Defined terms used: FLETCHER_SUIT DELCLOS BLOEDORN JOSLIN_FLYNN CHANDIGARH MANCHESTER HENSCHKE NASOPHARYNGEAL OESOPHAGEAL ENDOBRONCHIAL SYED_NEBLETT ENDORECTAL PERINEAL And the following which are not listed in the standard: MAMMOSITE UNDEFINED VAGINAL CERVICAL UTERINE BREAST MULTICATHETER_BREAST_APPLICATOR HEAD_AND_NECK SKIN_AND_SURFACE PANCREAS_AND_BILE_DUCT GYNECOLOGY UROLOGY EXTREMITIES STOMACH INTESTINES ORBITA SINGLE_CATHETER MULTI_CATHETER
>Application Setup Number	(300A,0234)	1	SCU - Provided SCP - Used
>Application Setup Name	(300A,0236)	3	SCU - Provided SCP - Used
>Application Setup Manufacturer	(300A,0238)	3	SCU - Not provided SCP - Not used
>Template Number	(300A,0240)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>Template Type	(300A,0242)	3	SCU - Not provided SCP - Not used
>Template Name	(300A,0244)	3	SCU - Not provided SCP - Not used
>Referenced Reference Image Sequence	(300C,0042)	3	SCU - Not provided SCP - Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>>Referenced SOP Class Instance	(0008,1155)	1C	SCU - Not provided SCP - Not used
>Total Reference Air Kerma	(300A,0250)	1	SCU - Provided SCP - Used
>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
>Reconstruction Starts At Tip	(300B,xx02)	3	Indicates reconstruction direction in Brachy GUI. SCU – Provided only if reconstruction start at catheter tip for all catheters in the Application Setup. Then has value ‘TRUE’ SCP – Used if provided and set to TRUE (else ignored and value FALSE is assumed)
> Reconstruction Mode	(300B,xx09)	3	SCU - Provided SCP – Used Type of catheter reconstruction. Value is interpreted like this: Undefined = 0, Catheter Describing Points = 1, Tracked From Tip End = 2, Tracked Between Ends = 3, CT Reconstruction = 4 (this is the default interpretation if value is not present)
> Assembly Name	(300B,xx0F)	3	User defined name for the used assembly. SCU - Provided SCP – Used
> PartSet Name	(300B,xx10)	3	SCU - Provided SCP – Used
> Assembly Details	(300B,xx11)	3	SCU - Provided SCP – Used
> Assembly Creation Date	(300B,xx12)	3	SCU - Provided SCP – Used
> Intrauterine Protrusion	(300B,xx30)	3	SCU – Provided SCP – Used For Fletcher CT/MT and Utrecht Interstitial applicators
> Configuration Table Name	(300B,xx31)	3	SCU – Provided SCP – Used For Fletcher CT/MT and Utrecht Interstitial applicators
>End private attributes			
>Brachy Accessory Device Sequence	(300A,0260)	3	SCU - Not provided SCP - Not used
>>Brachy Accessory Device Number	(300A,0262)	2C	SCU - Not provided SCP - Not used
>>Brachy Accessory Device ID	(300A,0263)	2C	SCU - Not provided SCP - Not used
>>Brachy Accessory Device Type	(300A,0264)	1C	SCU - Not provided SCP - Not used
>>Brachy Accessory Device Name	(300A,0266)	3	SCU - Not provided SCP - Not used
>>Material ID	(300A,00E1)	3	SCU - Not provided SCP - Not used
>> Brachy Accessory Device Nominal Thickness	(300A,026A)	3	SCU - Not provided SCP - Not used
>> Brachy Accessory Device Nominal Transmission	(300A,026C)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>>Referenced ROI Number	(3006,0084)	2C	Used if the ROI referenced is in the structure set referenced by the RT Plan else empty. SCU - Not provided SCP - Not used
>>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
Referenced RT Plan ROI Number	(300B,xx00)	3	Used if the ROI referenced is in the RT Plan embedded structure set. SCU - Not provided SCP - Not used
>>End private attributes			
>Channel Sequence	(300A,0280)	1	SCU - Provided SCP - Used
>>Channel Number	(300A,0282)	1	SCU - Provided SCP - Used
>>Channel Length	(300A,0284)	2	SCU - Provided SCP - Used
>>Channel Total Time	(300A,0286)	1	SCU - Provided SCP - Used
>>Source Movement Type	(300A,0288)	1	SCU - Provided SCP - Used
>>Number of Pulses	(300A,028A)	1C	SCU - Provided SCP - Used
>>Pulse Repetition Interval	(300A,028C)	1C	SCU - Provided SCP - Used
>>Source Applicator Number	(300A,0290)	3	SCU - Not provided SCP - Not used
>>Source Applicator ID	(300A,0291)	2C	SCU - Provided, Oncentra channel number mapping SCP - Used
>>Source Applicator Type	(300A,0292)	1C	SCU - Provided SCP - Used
>>Source Applicator Name	(300A,0294)	3	SCU - Not provided SCP - Not used
>>Source Applicator Length	(300A,0296)	1C	SCU - Provided SCP - Used
>>Source Applicator Manufacturer	(300A,0298)	3	SCU - Not provided SCP - Not used
>>Material ID	(300A,00E1)	3	SCU - Not provided SCP - Not used
>> Source Applicator Wall Nominal Thickness	(300A,029C)	3	SCU - Not provided SCP - Not used
>> Source Applicator Wall Nominal Transmission	(300A,029E)	3	SCU - Not provided SCP - Not used
>>Source Applicator Step Size	(300A,02A0)	1C	SCU - Provided SCP - Used
>>Referenced ROI Number	(3006,0084)	2C	Used if the ROI referenced is in the structure set referenced by the RT Plan else empty. SCU - Provided SCP - Used
>>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
>>Referenced RT Plan ROI Number	(300B,xx00)	3	Used if the ROI referenced is in the RT Plan embedded structure set. SCU - Provided SCP – Used if provided

Attribute Name	Tag	Type	Notes
>>Has Measured Source Path	(300B,xx26)	3	Indicates whether a measured source path is used to determine source positions in the channel. Defined values: TRUE FALSE TRUE means a measured source path is used to determine the source positions in the channel. FALSE means center path is used to determine the source positions in the channel. If attribute (300B,xx26) is not present, FALSE is assumed. SCU - Provided SCP – Used if provided
>>End private attributes			
>>Transfer Tube Number	(300A,02A2)	2	SCU – Provided, identical to Source Applicator ID SCP - Used
>>Transfer Tube Length	(300A,02A4)	2C	SCU – Provided for Flexitron plans otherwise not provided SCP - Used
>>Channel Shield Sequence	(300A,02B0)	3	SCU - Provided SCP - Used
>>>Channel Shield Number	(300A,02B2)	1C	SCU - Provided SCP - Used
>>>Channel Shield ID	(300A,02B3)	2C	SCU - Provided SCP - Used
>>>Channel Shield Name	(300A,02B4)	3	SCU - Provided SCP - Used
>>>Material ID	(300A,00E1)	3	SCU - Provided SCP - Used
>>>Channel Shield Nominal Thickness	(300A,02B8)	3	SCU - Provided SCP - Used
>>>Channel Shield Nominal Transmission	(300A,02BA)	3	SCU - Provided SCP - Used
>>>Channel Shield Start Angle	(300B,0015)	3	SCU - Provided SCP – Used
>>>Channel Shield Stop Angle	(300B,0016)	3	SCU - Provided SCP – Used
>>>Channel Shield Active	(300B,0014)	3	SCU - Provided SCP – Used
>>>Referenced ROI Number	(3006,0084)	2C	Used if the ROI referenced is in the structure set referenced by the RT Plan else empty. SCU - Not provided SCP - Not used
>>>Private attributes	(300B,10xx)	3	Private creator group “NUCLETRON”
>>>Referenced RT Plan ROI Number	(300B,xx00)	3	Uses if the ROI referenced is in the RT Plan embedded structure set. SCU - Not provided SCP - Not used
> Reconstruction Method	(300B,xx0E)	3	SCU - Provided SCP – Used Method used to reconstruct the catheter. Value is interpreted like this: Undefined = 0, Manual Reconstruction = 1 (this is the default interpretation if value is not present), Model Based Reconstruction = 2, Reconstruction by Model Bending = 3
> Model Catheter ID	(300B,xx13)	3	Unique identifier for the model catheter. SCU - Provided SCP – Used

Attribute Name	Tag	Type	Notes
> Rotation Angle	(300B,xx32)	3	SCU – Provided SCP – Used For Fletcher CT/MT and Utrecht Interstitial applicators
> Catheter Lock	(300B,xx34)	3	SCU – Provided SCP – Used For HIPO optimized plan
>>>End private attributes			
>>Referenced Source Number	(300C,000E)	1	SCU - Provided SCP - Used
>>Number of Control Points	(300A,0110)	1	SCU - Provided SCP - Used
>>Final Cumulative Time Weight	(300A,02C8)	1C	SCU - Provided SCP - Used
>>Brachy Control Point Sequence	(300A,02D0)	1	SCU - Provided SCP - Used
>>>Control Point Index	(300A,0112)	1	SCU - Provided SCP - Used
>>>Cumulative Time Weight	(300A,02D6)	2	SCU - Provided SCP - Used
>>>Control Point Relative Position	(300A,02D2)	1	SCU - Provided SCP - Used
>>>Control Point 3D Position	(300A,02D4)	3	SCU - Provided SCP - Used
>>>Brachy Referenced Dose Reference Sequence	(300C,0055)	3	SCU - Not provided SCP - Not used
>>>>Referenced Dose Reference Number	(300C,0051)	1C	SCU - Not provided SCP - Not used
>>>>Cumulative Dose Reference Coefficient	(300A,010C)	1C	SCU - Not provided SCP - Not used

5.8.14 Approval Module

Attribute Name	Tag	Type	Notes
Approval Status	(300E,0002)	1	SCU - Provided. SCP - Used
Review Date	(300E,0004)	2C	SCU - Provided. SCP - Used
Review Time	(300E,0005)	2C	SCU - Provided. SCP - Used
Reviewer Name	(300E,0008)	2C	SCU - Provided. SCP - Used

5.8.15 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.5' SCP - Used, supported value '1.2.840.10008.5.1.4.1.1.481.5'
SOP Instance UID	(0008,0018)	1	SCU - Provided. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Not used
Instance Creation Date	(0008,0012)	3	SCU - Provided SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Provided SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not Provided SCP - Not used

5.9 RT Image Information Object Implementation

Oncentra can import and export RT Image objects. Oncentra can also create RT Image objects.

RT Images can reference an RT Plan. Consequently, if the user changes the Patient Information for an RT Image on import, CM will check the Oncentra audit trail to determine if the related RT Plan had its Patient Information changed on import. If so, the RT Plan will also have a new SOP Instance UID and as a result the RT Image is modified to reference the new RT Plan's UID.

BM will create 2 DRR images for each external beam in the RT Plan. These DRR images are stored as RT Images. One image is the DRR without beam outline drawn into the DRR and the other image is the DRR with the beam outline drawn on top of the DRR. The user can then export either one or both of these DRRs for each beam.

Note:

In Oncentra RT Image objects the beam settings are not provided by (e.g.) the beam limiting device sequence, instead detailed beam settings must be extracted from the corresponding RT Plan object.

When SCU is referenced for the RT Image below, it is referring to an RT Image that is created by Oncentra. I.e., it reflects the Oncentra format of an RT Image created by Oncentra. When SCP is referenced for the RT Image below, it is referring to an RT Image that is imported by Oncentra via CM.

5.9.1 RT Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Not supported SCP - Not used
Series	RT Series	C.8.8.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	U	SCU - Not Supported SCP - Not used
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Pixel	C.7.6.3	M	
	Contrast/bolus	C.7.6.4	C-Required if contrast media was used in this image.	SCU - Not supported SCP - Not used
	Cine	C.7.6.5	C - Required if multi-frame image is a cine image.	SCU - Not supported SCP - Not used
	Multi-Frame	C.7.6.6	C - Required if pixel data is multi-frame data.	SCU - Not supported SCP - Not used
	RT Image	C.8.8.2	M	

IE	Module	Reference	DICOM Usage	Notes
	Modality LUT	C.11.1	U	SCU - Not supported SCP - Not used
	VOI LUT	C.11.2	U	SCU - Supported SCP - Used
	Approval	C.8.8.16	U	SCU - Not supported SCP - Not used
	Curve	C.10.2	U	SCU - Not supported SCP - Not used
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

5.9.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Not provided SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Not provided SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Not provided SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Not provided SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Not provided SCP - Not used

5.9.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Duplicated from Reference Image Series SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study ID	(0020,0010)	2	SCU - Duplicated from Reference Image Series SCP - Not used

Attribute Name	Tag	Type	Notes
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series SCP - Not used
Physician(s) of Record	(0008,1048)	3	SCU - Not Provided SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not Provided SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not Provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not Provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not Provided SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not Provided SCP - Not used

5.9.4 RT Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'RTIMAGE' SCP - Supported value 'RTIMAGE'
Series Instance UID	(0020,000E)	1	SCU - Created by Oncentra. SCP - Used
Series Number	(0020,0011)	2	SCU - '1' SCP - Required
Series Description	(0008,103E)	3	SCU - Not provided SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

5.9.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from Reference Image Series. SCP – Used if present
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from Reference Image Series SCP - Not used

5.9.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - 'Nucletron' SCP - Used
Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
Station Name	(0008,1010)	3	SCU - Windows computer name SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - 'ONCENTRA' SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - 'OTP V#'. # is here replaced with the version number of Oncentra, including build number, which may change if an Oncentra service pack is applied. Example 'OTP V1.3.0.30'. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Not provided SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Not provided SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Not provided SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Not provided SCP - Not used

5.9.7 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Provided SCP - Used
Patient Orientation	(0020,0020)	2C	SCU - Zero Length SCP - Not used
Image Date	(0008,0023)	2C	SCU - Not Provided SCP - Not used
Image Time	(0008,0033)	2C	SCU - Not Provided SCP - Not used
Image Type	(0008,0008)	3	SCU - 'DERIVED\SECONDARY\DRR' or 'DERIVED\SECONDARY\FLUENCE' SCP - Used
Acquisition Number	(0020,0012)	3	SCU - Not provided SCP - Not used
Acquisition Date	(0008,0022)	3	SCU - Not provided SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Not provided SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Not provided SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
Image Comments	(0020,4000)	3	SCU - Not provided SCP - Not used

5.9.8 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - '1' SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - 'MONOCHROME2'. SCP - Used
Rows	(0028,0010)	1	SCU - Provided SCP - Used
Columns	(0028,0011)	1	SCU - Provided SCP - Used
Bits Allocated	(0028,0100)	1	SCU - '16' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '12' SCP - Used
High Bit	(0028,0102)	1	SCU - '11' SCP - Used
Pixel Representation	(0028,0103)	1	SCU - '0' (unsigned integer). SCP - Used
Pixel Data	(7FE0,0010)	1	SCU - Provided SCP - Used
Planar Configuration	(0028,0006)	1C	SCU - Not provided SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Not provided SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Not provided SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Not provided SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Not provided SCP - Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Not provided SCP - Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Not provided SCP - Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Not provided SCP - Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Not provided SCP - Not used
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Not provided SCP - Not used

5.9.9 RT Image Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - '1' SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - 'MONOCHROME2'. SCP - Used

Attribute Name	Tag	Type	Notes
Bits Allocated	(0028,0100)	1	SCU - '16' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '12' SCP - Used
High Bit	(0028,0102)	1	SCU - '11' SCP - Used
Pixel Representation	(0028,0103)	1	SCU - '0' (unsigned integer). SCP - Used
RT Image Label	(3002,0002)	1	SCU - Beam label from Oncentra plan SCP - Not used
RT Image Name	(3002,0003)	3	SCU - Provided as concatenation of Plan Label and Beam Label from Oncentra, i.e. 'ppp:bbb'. SCP - Not used
RT Image Description	(3002,0004)	3	SCU – Provided as the Plan Label from Oncentra SCP - Not used
Operators' Name	(0008,1070)	2	SCU - Oncentra logon username SCP - Not used
Image Type	(0008,0008)	1	SCU – one of: 'DERIVED\SECONDARY\DRR' 'DERIVED\SECONDARY\FLUENCE' SCP - Required
Conversion Type	(0008,0064)	2	SCU - 'WSD' SCP - Not used
Reported Values Origin	(3002,000A)	2C	SCU - Not provided SCP - Not used
RT Image Plane	(3002, 000C)	1	SCU - 'NORMAL' SCP - Not used
X-Ray Image Receptor Translation	(3002,000D)	3	SCU - Provided SCP - Not used
X-Ray Image Receptor Angle	(3002,000E)	2	SCU - Provided SCP - Not used
RT Image Orientation	(3002,0010)	2C	SCU - Not provided SCP - Not used
Image Plane Pixel Spacing	(3002,0011)	2	SCU - Provided SCP - Used
RT Image Position	(3002,0012)	2	SCU - Provided SCP - Used
Radiation Machine Name	(3002,0020)	2	SCU - Provided SCP - Not used
Primary Dosimeter Unit	(300A,00B3)	2	SCU - Provided SCP - Not used
Radiation Machine SAD	(3002,0022)	2	SCU - Provided SCP - Used
Radiation Machine SSD	(3002,0024)	3	SCU - Not provided SCP - Used
RT Image SID	(3002,0026)	2	SCU - Provided as projection distance SCP - Used
Source to Reference Object Distance	(3002,0028)	3	SCU - Not provided SCP - Not used
Referenced RT Plan Sequence	(300C,0002)	3	SCU - Provided SCP - Used by CM to link RT Image to RT Plan.
>Referenced SOP Class UID	(0008,1150)	1C	SCU - '1.2.840.10008.5.1.4.1.1.481.5' SCP - Used by CM to link RT Image to RT Plan
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Used by CM to link RT Image to RT Plan
Referenced Beam Number	(300C,0006)	3	SCU - Provided SCP - Used
Referenced Fraction Group Number	(300C,0022)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
Fraction Number	(3002,0029)	3	SCU - Not provided SCP - Not used
Start Cumulative Meterset Weight	(300C,0008)	3	SCU - Not provided SCP - Not used
End Cumulative Meterset Weight	(300C,0009)	3	SCU - Not provided SCP - Not used
Exposure Sequence	(3002,0030)	3	SCU - Provided Can be removed by export filter in CM. SCP - Not used
>Referenced Frame Number	(0008,1160)	1C	SCU - Not provided SCP - Not used
>KVP	(0018,0060)	2C	SCU - Not provided SCP - Not used
>X-Ray Tube Current	(0018,1151)	2C	SCU - Not provided SCP - Not used
>Exposure Time	(0018,1150)	2C	SCU - Not provided SCP - Not used
>Meterset Exposure	(3002,0032)	2C	SCU - Not provided SCP - Not used
>Beam Limiting Device Sequence	(300A,00B6)	3	SCU - Provided SCP - Not used
>>RT Beam Limiting Device Type	(300A,00B8)	1C	SCU - Provided SCP - Not used
>>Source to Beam Limiting Device Distance	(300A,00BA)	3	SCU - Not provided SCP - Not used
>>Number of Leaf/Jaw Pairs	(300A,00BC)	1C	SCU - Provided SCP - Not used
>>Leaf Position Boundaries	(300A,00BE)	2C	SCU - Provided SCP - Not used
>>Leaf/Jaw Positions	(300A,011C)	1C	SCU - Provided SCP - Not used
>Applicator Sequence	(300A,0107)	3	SCU - Provided SCP - Not used
>>Applicator ID	(300A,0108)	1C	SCU - Provided SCP - Not used
>>Applicator Type	(300A,0109)	1C	SCU - Provided SCP - Not used
>>Applicator Description	(300A,010A)	3	SCU - Provided SCP - Not used
>Number of Blocks	(300A,00F0)	1C	SCU - Provided SCP - Not used
>Block Sequence	(300A,00F4)	2C	SCU - Provided SCP - Not used
>>Block Tray ID	(300A,00F5)	3	SCU - Provided SCP - Not used
>>Source to Block Tray Distance	(300A,00F6)	2C	SCU - Provided SCP - Not used
>>Block Type	(300A,00F8)	1C	SCU - Provided SCP - Not used
>>Block Divergence	(300A,00FA)	2C	SCU - Provided SCP - Not used
>>Block Number	(300A,00FC)	1C	SCU - Provided SCP - Not used
>>Block Name	(300A,00FE)	3	SCU - Provided SCP - Not used
>>Material ID	(300A,00E1)	2C	SCU - Provided SCP - Not used

Attribute Name	Tag	Type	Notes
>>Block Thickness	(300A,0100)	3	SCU - Provided SCP - Not used
>>Block Number of Points	(300A,0104)	2C	SCU - Provided SCP - Not used
>>Block Data	(300A,0106)	2C	SCU - Provided SCP - Not used
Gantry Angle	(300A,011E)	3	SCU - Provided SCP - Not used
Gantry Pitch Angle	(300A,014A)	3	SCU – Provided, always 0 (Can be removed by CM Export filter) SCP - Not used
Beam Limiting Device Angle	(300A,0120)	3	SCU - Provided SCP - Not used
Patient Support Angle	(300A,0122)	3	SCU - Provided SCP - Not used
Table Top Eccentric Axis Distance	(300A,0124)	3	SCU - Not provided SCP - Not used
Table Top Eccentric Angle	(300A,0125)	3	SCU - Provided SCP - Not used
Iso Center Position	(300A,012C)	3	SCU – Provided for external beam RT image (from RT plan) SCP - Not used
Patient Position	(0018,5100)	2C	SCU – Provided for external beam RT image (from RT plan) SCP - Not used
Table Top Vertical Position	(300A,0128)	3	SCU - Provided SCP - Not used
Table Top Longitudinal Position	(300A,0129)	3	SCU - Provided SCP - Not used
Table Top Lateral Position	(300A,012A)	3	SCU - Provided SCP - Not used
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION OTP DRR”
BM DRR Mean & Window	(3005,xx00)	3	Mean and Window setting for display of an OTP DRR image. SCU - Not provided for OTP V1.3. The normal Window Center (0028,1050) and Window Width (0028,1051) are now used to define the DRR mean and window. DICOM Print servers use the Window Center and Widow Width information in order to correctly print the image as defined by the Oncentra user. SCP - Used if provided by OTP prior to OTP V1.3 .
BM DRR Image Quality Attributes	(3005,xx02)	3	LNumObliqueImages\lBoneContrastEnhFactor\ lCtNumForBone\bOverlaid\bHighRes bOverlaid : 0 - not overlaid non zero - overlaid image with beam outline burnt in bHighres: 0 - low Res 256x256 non zero - high Res 512x512 *Note: BM creates overlaid and non-overlaid DRRs for each beam.*
Magnification	(3005,xx03)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Dlg Focus Isocenter Distance	(3005,xx04)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU – Provided SCP - Used

Attribute Name	Tag	Type	Notes
Beam Direction	(3005,xx05)	3	Used for the film registration functionality to store data entered by operator or derived by other method. Defined terms: AP - anterior-posterior PA - posterior-anterior RL - right-left LR - left-right SCU - Provided SCP - Used
Dlg Gantry Angle	(3005,xx06)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
L-Arm Angle	(3005,xx07)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
C-Arm Angle	(3005,xx08)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Dlg Isocenter Film Distance	(3005,xx09)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Reconstruction Angle	(3005,xx0A)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Flip Horizontal	(3005,xx0B)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Flip Vertical	(3005,xx0C)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Reconstruction Method	(3005,xx0D)	3	Defined term. One of: ORTHOGONAL SEMIORTHOGONAL VARIABLEANGLE ISOCENTRIC IBU Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Dimension Cross Wire	(3005,xx0E)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Distance Top Cross To Side Cross Axis	(3005,xx0F)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Distance Bottom Cross To Side Cross Axis	(3005,xx10)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used

Attribute Name	Tag	Type	Notes
Distance Left Side Cross To Top Bottom Cross Axis	(3005,xx11)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Distance Right Side Cross To Top Bottom Cross Axis	(3005,xx12)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Large Cross Point 1	(3005,xx13)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Large Cross Point 2	(3005,xx14)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Small Cross Point 1	(3005,xx15)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Small Cross Point 2	(3005,xx16)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Cross Translation	(3005,xx17)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
Cross Angle	(3005,xx18)	3	Used for the film registration functionality to store data entered by operator or derived by other method. SCU - Provided SCP - Used
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group “NUCLETRON”
DRR Generation Method	(3007,xx19)	3	Used to describe how the DRR was generated. SCU - Provided SCP - Used
DRR Generation MinThreshold	(3007,xx20)	3	DRR generation parameter. SCU - Provided SCP - Used
DRR Generation MaxThreshold	(3007,xx21)	3	DRR generation parameter. SCU - Provided SCP - Used
DRR Generation Field DRR	(3007,xx56)	3	DRR generation parameter. A value describing how the RT Image is generated in Oncentra. Is this a "Field DRR" ('zoomed' to the field shape)? 1 if this is the case. SCU - Provided SCP - Used
DRR Generation CT Range Shift	(3007,xx57)	3	DRR generation parameter. A value describing how the RT Image is generated in Oncentra. Is Range Shift used for generation? 1 if this is the case. SCU - Provided SCP - Used
DRR Generation Inverted	(3007,xx58)	3	DRR generation parameter. A value describing how the RT Image is generated in Oncentra. Is this an inverted DRR? 1 if this is the case. SCU - Provided SCP - Used

Attribute Name	Tag	Type	Notes
DRR Generation Segment Union	(3007,xx61)	3	A value describing how the RT Image is generated in Oncentra. Is this a union of the segments? 1 if this is the case. The value is only of interest if there are overlays burned into the image, see (3005,xx02) SCU - Provided SCP - Used
DRR Generation Field Margin	(3007,xx62)	3	A value describing how the RT Image is generated in Oncentra. This is the extra margin added around the enclosing rectangle of the beam. The value is only of interest if this is a Field DRR (3007,xx56). SCU - Provided SCP - Used
End private attributes			
Private attributes	(300B,00xx)	3	Private creator group "NUCLETRON"
Pixel Data UID	(300B,xx0B)	3	UID that is associated with the Pixel Data (so it is not changed even if other data in this DICOM object instance is changed) SCU - Provided SCP - Used
End private attributes			
Private attributes	(3003,00xx)		Private creator group "PRIVATE_CODE_STRING_3003" These tags are read from a DICOM object exported from the Nucletron IBU.
CArmAngle	(3003,xx10)	3	SCP - Used
LArmAngle	(3003,xx20)	3	SCP - Used
FlipHorizontal	(3003,xx30)	3	SCP - Used
FlipVertical	(3003,xx31)	3	SCP - Used
End private attributes			

5.9.10 VOI LUT Module

Attribute Name	Tag	Type	Notes
VOI LUT Sequence	(0028,3010)	3	SCU - Not provided SCP - Not used
>LUT Descriptor	(0028,3002)	1C	SCU - Not provided SCP - Not used
>LUT Explanation	(0028,3003)	3	SCU - Not provided SCP - Not used
>LUT Data	(0028,3006)	1C	SCU - Not provided SCP - Not used
Window Center	(0028,1050)	3	SCU - Provided SCP - Used
Window Width	(0028,1051)	1C	SCU - Provided SCP - Used

5.9.11 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.1' SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Used

Attribute Name	Tag	Type	Notes
Instance Creation Date	(0008,0012)	3	SCU - Provided SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Provided SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not provided SCP - Not used

5.10 RT Dose Information Object Implementation (SCU)

Oncentra can import and export RT Dose objects.

All RT Dose objects created by Oncentra are encoded as BEAM dose and multi-frame. This means that you have one RT Dose object for each beam, and one frame in each RT Dose object for each transverse reference image.

RT Dose objects are imported to Oncentra by using CM to first select the RT Plan that references the RT Dose objects, and then selecting the RT Dose objects. If an RT Plan is imported with modified Patient information any related RT Dose objects will not be linked to the modified RT Plan. This is an Oncentra limitation for safety reasons.

When SCU is referenced for the RT Dose below, it is referring to an RT Dose that is created by Oncentra. I.e., it reflects the Oncentra format of an RT Dose created by Oncentra. When SCP is referenced for the RT Dose below, it is referring to an RT Dose that is imported by Oncentra via CM.

5.10.1 RT Dose IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Not supported SCP - Not used
Series	RT Series	C.8.8.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Dose	General Image	C.7.6.1	C-Required if dose data contains grid-based doses.	
	Image Plane	C.7.6.2	C-Required if dose data contains grid-based doses.	
	Image Pixel	C.7.6.3	C-Required if dose data contains grid-based doses.	
	Multi-Frame	C.7.6.6	C - Required if dose data contains grid-based doses and pixel data is multi-frame data.	SCU - Supported (Oncentra produces multi-frame beam dose) SCP - Used (for Oncentra multi-frame beam dose)
	Overlay Plane	C.9.2	U	SCU - Not supported SCP - Not used
	Multi-Frame Overlay	C.9.3	U	SCU - Not supported SCP - Not used
	Modality LUT	C.11.1	U	SCU - Not supported SCP - Not used
	RT Dose	C.8.8.3	M	
	RT DVH	C.8.8.4	U	SCU - Not supported SCP - Not used

IE	Module	Reference	DICOM Usage	Notes
	Structure Set	C.8.8.5	C-Required if dose data contains dose points or isodose curves.	Isodose curves not supported
	ROI Contour	C.8.8.6	C-Required if dose data contains dose points or isodose curves.	Isodose curves not supported
	RT Dose ROI	C.8.8.7	C-Required if dose data contains dose points or isodose curves.	Isodose curves not supported
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

5.10.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Not provided SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Not provided SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Not provided SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Not provided SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Not provided SCP - Not used

5.10.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Duplicated from Reference Image Series SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study ID	(0020,0010)	2	SCU - Zero length. SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series SCP - Not used

Attribute Name	Tag	Type	Notes
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series SCP - Not used
Physician(s) of Record	(0008,1048)	3	SCU - Not provided SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not provided SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided SCP - Not used

5.10.4 RT Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'RTDOSE SCP - Supported value 'RTDOSE'
Series Instance UID	(0020,000E)	1	SCU - Created by Oncentra. SCP - Used
Series Number	(0020,0011)	2	SCU - '1' SCP - Required
Series Description	(0008,103E)	3	SCU - Provided SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

5.10.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from Reference Image Series. SCP - Required
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from Reference Image Series. SCP - Not used

5.10.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - 'Nucletron' SCP - Used
Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
Station Name	(0008,1010)	3	SCU - Windows logon username. SCP - Not used

Attribute Name	Tag	Type	Notes
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - 'ONCENTRA' SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - 'OTP V#'. # is here replaced with the version number of Oncentra, including build number, which may change if an Oncentra service pack is applied. Example 'OTP V1.3.0.30'. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Not provided SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Not provided SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Not provided SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Not provided SCP - Not used

5.10.7 General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Zero length (I RT Dose matrices are better identified by their 3D image position, as Oncentra only provides multi-frame doses.) SCP - Used
Patient Orientation	(0020,0020)	2C	SCU - Zero length SCP - Not used
Content Date	(0008,0023)	2C	SCU - Provided SCP - Not used
Content Time	(0008,0033)	2C	SCU - Provided SCP - Not used
Image Type	(0008,0008)	3	SCU - 'ORIGINAL\PRIMARY\DOSE'. SCP - Used
Acquisition Number	(0020,0012)	3	SCU - '1' SCP - Not used
Acquisition Date	(0008,0022)	3	SCU - Not provided SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Not provided SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Not provided SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Not provided SCP - Not used
Image Comments	(0020,4000)	3	SCU - Not provided SCP - Not used

5.10.8 Image Plane Module

Attribute Name	Tag	Type	Notes
Pixel Spacing	(0028,0030)	1	SCU - Provided SCP - Required
Image Orientation (Patient)	(0020,0037)	1	SCU - Provided SCP - Required
Image Position (Patient)	(0020,0032)	1	SCU - Provided SCP - Required
Slice Thickness	(0018,0050)	2	SCU - '0' SCP - Not used
Slice Location	(0020,1041)	3	SCU - Not provided SCP - Not used

5.10.9 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - '1' SCP - Required
Photometric Interpretation	(0028,0004)	1	SCU - 'MONOCHROME2'. SCP - Required
Rows	(0028,0010)	1	SCU - Provided SCP - Required
Columns	(0028,0011)	1	SCU - Provided SCP - Required
Bits Allocated	(0028,0100)	1	SCU - '16' SCP - Required
Bits Stored	(0028,0101)	1	SCU - '16' SCP - Required
High Bit	(0028,0102)	1	SCU - '15' SCP - Required
Pixel Representation	(0028,0103)	1	SCU - '0' (unsigned integer). SCP - Required
Pixel Data	(7FE0,0010)	1	SCU - Provided SCP - Required
Planar Configuration	(0028,0006)	1C	SCU - Not provided SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Not provided SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Not provided SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Not provided SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Not provided SCP - Not used
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C	SCU - Not provided SCP - Not used
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C	SCU - Not provided SCP - Not used
Red Palette Color Lookup Table Data	(0028,1201)	1C	SCU - Not provided SCP - Not used
Green Palette Color Lookup Table Data	(0028,1202)	1C	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
Blue Palette Color Lookup Table Data	(0028,1203)	1C	SCU - Not provided SCP - Not used

5.10.10 Multi-Frame Module

Attribute Name	Tag	Type	Notes
Number of Frames	(0028,0008)	1	SCU - Provided SCP - Used
Frame Increment Pointer	(0028,0009)	1	SCU - Provided SCP - Used

5.10.11 RT Dose Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - '1' SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - 'MONOCHROME2'. SCP - Used
Bits Allocated	(0028,0100)	1	SCU - '16' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '16' SCP - Used
High Bit	(0028,0102)	1C	SCU - '15' SCP - Required
Pixel Representation	(0028,0103)	1C	SCU - '0' (unsigned integer). SCP - Required
Dose Units	(3004,0002)	1	SCU - 'GY' SCP - Used
Dose Type	(3004,0004)	1	SCU - 'PHYSICAL' SCP - Used
Dose Comment	(3004,0006)	3	SCU - Not provided SCP - Not used
Normalization Point	(3004,0008)	3	SCU - Not provided SCP - Not used
Dose Summation Type	(3004,000A)	1	SCU - 'BEAM', 'PLAN' or 'CONTROL_POINT' SCP - Used
Referenced RT Plan Sequence	(300C,0002)	1C	SCU - Provided SCP - Required
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Provided SCP - Required
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Required
>Referenced Fraction Group Sequence	(300C,0020)	1C	SCU - Provided SCP - Required
>>Referenced Fraction Group Number	(300C,0022)	1C	SCU - Provided SCP - Required
>>Referenced Beam Sequence	(300C,0004)	1C	SCU - Provided SCP - Required
>>>Referenced Beam Number	(300C,0006)	1C	SCU - Provided SCP - Required
>>>Referenced Control Point Sequence	(300C,00F2)	1C	SCU – Provided when CONTROL_POINT dose SCP - Required

Attribute Name	Tag	Type	Notes
>>>>Referenced Start Control Point Index	(300C,00F4)	1	SCU – Provided when CONTROL_POINT dose SCP - Required
>>>>Referenced Stop Control Point Index	(300C,00F6)	1	SCU – Provided when CONTROL_POINT dose SCP - Required
>>Referenced Brachy Application Setup Sequence	(300C,000A)	1C	SCU - Not provided SCP - Not used
>>>Referenced Brachy Application Setup Number	(300C,000C)	1C	SCU - Not provided SCP - Not used
Grid Frame Offset Vector	(3004,000C)	1C	SCU – Provided From Oncentra MasterPlan 3.0 and later the format is according to variant a), relative offsets, as described in the DICOM 2006 standard. Objects created with versions prior to Oncentra MasterPlan 3.0 will use variant b), absolute positions, as described in the DICOM 2006 standard. (This was the 2004 standard.) SCP - Required
Dose Grid Scaling	(3004,000E)	1	SCU - Provided SCP - Used
Tissue Heterogeneity Correction	(3004,0014)	3	SPU - Provided SCP – Used The defined term IMAGE is always interpreted as ROI_OVERRIDE
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION CALCULATION”
Density Basis in Dose Calculation	(3005,xx00)	3	Basis for generating density matrix in dose calculation. Supported terms: ROI_AND_CT WATER_EQUIVALENT Not used in objects created by Oncentra MasterPlan 1.5 or later. Replaced by standard attribute Tissue Heterogeneity Correction (3004,0014).
Dose Calculation Algorithm Sequence	(3005,xx04)	3	Sequence for specification of dose calculation algorithm for different modalities, and their respective properties. One or more items may be included in the sequence.
>Radiation Type	(300A,00C6)	1C	Radiation Type associated with specified dose calculation algorithm. Required if Dose Calculation Algorithm Sequence (3005,xx04) is sent. Supported terms: PHOTON ELECTRON
>Dose Calculation Algorithm Name	(3005,xx06)	1C	Specification of dose calculation algorithm for associated radiation type. Required if Dose Calculation Algorithm Sequence (3005,xx04) is sent. Supported terms: PENCIL_BEAM COLLAPSED_CONE MONTE_CARLO FB_PB FB_CC
>Algorithm Specific Parameter Sequence	(3005,xx17)	3	Sequence containing algorithm specific parameters associated with specified radiation type and algorithm. One or more items may be included in the sequence.
>>Algorithm Specific Parameter Type	(3005,xx18)	1C	Name of algorithm specific parameter. Required if Algorithm Specific Parameter Sequence (3005,xx17) is sent. Supported terms: NO_HISTORIES CALCULATION_HW

Attribute Name	Tag	Type	Notes
>>Algorithm Specific Parameter Value	(3005,xx19)	1C	Value of the specified parameter. Required if Algorithm Specific Parameter Sequence (3005,xx17) is sent. When Algorithm Specific Parameter Type is NO_HISTORIES: An Integer in the range 1000-1 000 000 coded as a string When Algorithm Specific Parameter Type is CALCULATION_HW: "GPU" or "CPU"
>QA Parameters Sequence	(3005,xx30)	3	Sequence containing control information for QA information output generated by the dose calculation function. Only one item is allowed in this sequence. Other items will be ignored.
>>Request QA output	(3005,xx31	1C	Indicates whether QA output is requested or not. Required if sequence is sent. Supported terms: TRUE FALSE
>>Line dose input file name	(3005,xx32)	1C	Name of file for line dose output controlling information. Shall be a file name, max 255 characters long. Required if sequence is sent.
>>Line dose output file name	(3005,xx33)	1C	Name of file for line dose output result. Shall be a file name, max 255 characters long. Required if sequence is sent.
External Axial Extension	(3005,xx16)	3	Extension in axial direction of the patient external contour
Gy Per Meterset	(3005,xx23)	3	Gy per meterset (monitor unit or minute) for this dose object.
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group "MDS NORDION DCMRTDOSEINPUT" The presence of this tag designates an RTDOSE object as being the DcmRtdoseInput object for an associated RTPLAN. Used for internal Oncentra purposes (dose calculation requests). No other attributes are included in this Private Creator group.
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group "NUCLETRON"
Matrix Dimensions	(3007,xx69)	3	Only used in DcmRtdoseInput to hold number of rows and number of columns. The ordinary Rows and Columns values are 1 for these objects.
End private attributes			

5.10.12 Structure Set Module

Attribute Name	Tag	Type	Notes
Structure Set Label	(3006,0002)	1	SCU – 'PlanDosePoints' SCP - Required
Structure Set Name	(3006,0004)	3	SCU - 'PlanDosePoints' SCP - Not used
Structure Set Description	(3006,0006)	3	SCU - Not provided SCP - Not used
Instance Number	(0020,0013)	3	SCU - Not provided SCP - Not used
Structure Set Date	(3006,0008)	2	SCU – Date of creation (i.e.: when saved in Oncentra). SCP – Not used
Structure Set Time	(3006,0009)	2	SCU – Time of creation (i.e.: when saved in Oncentra). SCP – Not used

Attribute Name	Tag	Type	Notes
Referenced Frame of Reference Sequence	(3006,0010)	3	SCU – Not provided SCP – Not used
>Frame of Reference UID	(0020,0052)	1C	SCU – Not provided SCP – Not used
>Frame of Reference Relationship Sequence	(3006,00C0)	3	SCU – Not provided SCP – Not used
>>Related Frame of Reference UID	(3006,00C2)	1C	SCU – Not provided SCP – Not used
>>Frame of Reference Transformation Type	(3006,00C4)	1C	SCU – Not provided SCP – Not used
>>Frame of Reference Transformation Matrix	(3006,00C6)	1C	SCU – Not provided SCP – Not used
>>Frame of Reference Transformation Comment	(3006,00C8)	3	SCU – Not provided SCP – Not used
>RT Referenced Study Sequence	(3006,0012)	3	SCU – Not provided SCP – Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU – Not provided SCP – Not used
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU – Not provided SCP – Not used
>>RT Referenced Series Sequence	(3006,0014)	1C	SCU – Not provided SCP – Not used
>>>Series Instance UID	(0020,000E)	1C	SCU – Not provided SCP – Not used
>>>Contour Image Sequence	(3006,0016)	1C	SCU – Not provided SCP – Not used
>>>>Referenced SOP Class UID	(0008,1150)	1C	SCU – Not provided SCP – Not used
>>>>Referenced SOP Instance UID	(0008,1155)	1C	SCU – Not provided SCP – Not used
>>>>Referenced Frame Number	(0008,1160)	3	SCU – Not provided SCP – Not used
Structure Set ROI Sequence	(3006,0020)	3	SCU – Provided SCP – Required
>ROI Number	(3006,0022)	1C	SCU – Provided SCP – Required
>Referenced Frame of Reference UID	(3006,0024)	1C	SCU – Provided SCP – Required
>ROI Name	(3006,0026)	2C	SCU – Provided if available SCP – Used if available
>ROI Description	(3006,0028)	3	SCU – Not provided SCP – Not used
>ROI Volume	(3006,002C)	3	SCU – Duplicated from SCP. SCP – Not used
>ROI Generation Algorithm	(3006,0036)	2C	SCU – Provided SCP – Used if provided Enumerated value MASTERPLANISO used to mark point as an ISO center point.

Attribute Name	Tag	Type	Notes
>ROI Generation Description	(3006,0038)	3	SCU – Provided SCP – Used if provided Has a special meaning when the ROI is a generated point set. One of these values is provided: POINT_SET_Applicator POINT_SET_Patient POINT_SET_Axis POINT_SET_Basal_Linear POINT_SET_Basal_Triangular POINT_SET_Basal_Square POINT_SET_Catheter POINT_SET_Lowest_dose_distance POINT_SET_Target POINT_SET_User_defined POINT_SET_Undefined Any other value is interpreted as 'undefined'.

5.10.13 ROI Contour Module

Attribute Name	Tag	Type	Notes
ROI Contour Sequence	(3006,0039)	1	SCU – Provided SCP – Used
>Referenced ROI Number	(3006,0084)	1	SCU – Provided SCP – Used
>ROI Display Color	(3006,002A)	3	SCU – Provided SCP – Not used
>Contour Sequence	(3006,0040)	3	SCU – Provided SCP – Required
>>Contour Number	(3006,0048)	3	SCU – Not provided SCP – Not used
>>Attached Contours	(3006,0049)	3	SCU – Not provided SCP – Not used
>>Contour Image Sequence	(3006,0016)	3	SCU - Not provided SCP - Not used
>>>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>>>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
>>>Referenced Frame Number	(0008,1160)	1C	SCU - Not provided SCP - Not used
>>Contour Geometric Type	(3006,0042)	1C	SCU - Provided. SCP - Required. Valid value: POINT
>>Contour Slab Thickness	(3006,0044)	3	SCU - Not provided SCP - Not used
>>Contour Offset Vector	(3006,0045)	3	SCU - Not provided SCP - Not used
>>Number of Contour Points	(3006,0046)	1C	SCU - Provided SCP - Required
>>Contour Data	(3006,0050)	1C	SCU - Provided SCP - Required.

5.10.14 RT Dose ROI Module

Attribute Name	Tag	Type	Notes
RT Dose ROI Sequence	(3004,0010)	1	SCU - Provided SCP - Required
>Referenced ROI Number	(3006,0084)	1	SCU - Provided SCP - Required
>Dose Units	(3004,0002)	1	SCU - Provided SCP - Required
>Dose Value	(3004,0012)	1	SCU - Provided SCP - Required
Private attributes	(3005,00xx)	3	Private creator group “MDS NORDION CALCULATION”
>Gy Per Meterset	(3005,xx23)	3	Gy per meterset for this particular dose point.
>Dose Component Sequence	(3005,xx26)	3	Introduces sequence of items specifying dose components associated with the (point) ROI. One or more items may be included in this sequence.
>>Dose Component Type	(3005,xx27)	1C	Dose component type. Defined terms: OPEN_FRACTION = relative dose fraction from open beam segment for motorized wedge beam For a CONTROL_POINT dose object this value is the same as the Dose Value (3004, 0012). WEDGE_FRACTION = relative dose fraction from wedged beam segment for motorized wedge beam For a CONTROL_POINT dose object this value is the same as the Dose Value (3004, 0012). SSD = Source to surface distance in mm. DEPTH = Depth in mm. RAD_DEPTH = Radiological depth in mm. At least one item is required if Dose Component Sequence (3005,xx26) is sent.
>>Dose Component Value	(3005,xx28)	1C	Value of the dose component identified by Dose Component Type (3005,xx27). Required if Dose Component Sequence (3005,xx26) is sent.
End private attributes			
Private attributes	(3007,00xx)	3	Private creator group “NUCLETRON”
>Point Set Generation Reference	(3007,xx30)	3	Referenced ROI Number. Used in brachy dose only when dose point is generated from structure set referenced by this RT Plan.
End private attributes			
Private attributes	(300B,00xx)	3	Private creator group “NUCLETRON”
>Referenced RT Plan ROI Number	(300B,xx00)	3	Referenced ROI Number. Used in brachy dose only when dose point is generated from structure set embedded in this RT Plan.
> Referenced Contour Number	(300B,xx01)	3	Referenced Contour Number. References the contour referenced by the referenced ROI number in previous attribute (300B,xx00) or (3007,xx30).
End private attributes			

5.10.15 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.2' SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Used
Instance Creation Date	(0008,0012)	3	SCU - Provided SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Provided SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not provided SCP - Not used

5.11 Spatial Registration Object Implementation

5.11.1 Spatial Registration IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	SCU - Supported SCP - Used
Study	General Study	C.7.2.1	M	SCU - Supported SCP - Used
Series	General Series	C.7.3.1	M	SCU - Supported SCP - Used
	Spatial Registration Series	C.20.1	M	SCU - Supported SCP - Used
Frame of Reference	Frame of Reference	C.7.4.1	M	SCU - Supported SCP - Used
Equipment	General Equipment	C.7.5.1	M	SCU - Supported SCP – Not used
Spatial Registration	Spatial Registration	C.20.2	M	SCU - Supported SCP - Used
	Common Instance Reference	C.12.2	M	SCU - Supported SCP - Used
	SOP Common	C.12.1	M	SCU - Supported SCP - Used

5.11.2 Patient Module

Attribute Name	Tag	Type	Notes
Patient Name	(0010,0010)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient ID	(0010,0020)	2	SCU - Provided as specified in the Oncentra database. SCP - Must be entered on import to Oncentra by user if not specified via DICOM.
Patient's Birth Date	(0010,0030)	2	SCU - Provided as specified in the Oncentra database. SCP - Used.
Patient's Sex	(0010,0040)	2	SCU - Provided as specified in the Oncentra database. SCP - Used
Referenced Patient Sequence	(0008,1120)	3	SCU - Not provided SCP - Not used

Attribute Name	Tag	Type	Notes
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Patient's Birth Time	(0010,0032)	3	SCU - Not provided SCP - Not used
Other Patient Ids	(0010,1000)	3	SCU - Not provided SCP - Not used
Other Patient Names	(0010,1001)	3	SCU - Not provided SCP - Not used
Ethnic Group	(0010,2160)	3	SCU - Not provided SCP - Not used
Patient Comments	(0010,4000)	3	SCU - Not provided SCP - Not used

5.11.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Provided. SCP - Used to validate study/series contents.
Study Date	(0008,0020)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Time	(0008,0030)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Referring Physician's Name	(0008,0090)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study ID	(0020,0010)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Accession Number	(0008,0050)	2	SCU - Duplicated from Reference Image Series SCP - Not used
Study Description	(0008,1030)	3	SCU - Duplicated from Reference Image Series SCP - Not used
Physician(s) of Record	(0008,1048)	3	SCU - Not provided SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not provided SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided SCP - Not used

5.11.4 General Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - Provided 'REG'. SCP - Used
Series Instance UID	(0020,000E)	1	SCU – Provided SCP - Used
Series Number	(0020,0011)	2	SCU – Provided '1' SCP – Not used
Laterality	(0020,0060)	2C	SCU - Not supported

Attribute Name	Tag	Type	Notes
Series Date	(0008,0021)	3	SCU – Provided SCP – Not used
Series Time	(0008,0031)	3	SCU – Provided SCP – Not used
Performing Physicians' Name	(0008,1050)	3	SCU - Not supported
Protocol Name	(0018,1030)	3	SCU - Not supported
Series Description	(0008,103E)	3	SCU – Provided "Nucletron Oncentra Anatomy Modeling Registration" SCP – Not used
Operators' Name	(0008,1070)	3	SCU - Not supported
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not supported
Body Part Examined	(0018,0015)	3	SCU - Not supported
Patient Position	(0018,5100)	2C	SCU - Not supported
Smallest Pixel Value in Series	(0028,0108)	3	SCU - Not supported
Largest Pixel Value in Series	(0028,0109)	3	SCU - Not supported
Request Attributes Sequence	(0040,0275)	3	SCU - Not supported
>Requested Procedure ID	(0040,1001)	1C	SCU - Not supported
>Scheduled Procedure Step ID	(0040,0009)	1C	SCU - Not supported
>Scheduled Procedure Step Description	(0040,0007)	3	SCU - Not supported
>Scheduled Action Item Code Sequence	(0040,0008)	3	SCU - Not supported
Performed Procedure Step ID	(0040,0253)	3	SCU - Not supported
Performed Procedure Step Start Date	(0040,0244)	3	SCU - Not supported
Performed Procedure Step Start Time	(0040,0245)	3	SCU - Not supported
Performed Procedure Step Description	(0040,0254)	3	SCU - Not supported
Performed Action Item Sequence	(0040,0260)	3	SCU - Not supported

5.11.5 Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from Reference Image Series. SCP – Used if present
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from Reference Image Series SCP - Not used

5.11.6 General Equipment Module

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	SCU - 'Nucletron' SCP - Used
Institution Name	(0008,0080)	3	SCU - Not provided SCP - Not used
Institution Address	(0008,0081)	3	SCU - Not provided SCP - Not used
Station Name	(0008,1010)	3	SCU – Provided, workstation name. SCP - Not used
Institutional Department Name	(0008,1040)	3	SCU - Provided, as set in system configuration settings. SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - 'ONCENTRA' SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - 'OTP V#'. # is here replaced with the version number of Oncentra, including build number, which may change if an Oncentra service pack is applied. Example 'OTP V1.3.0.30'. SCP - Not used
Spatial Resolution	(0018,1050)	3	SCU - Not provided SCP - Not used
Date of Last Calibration	(0018,1200)	3	SCU - Not provided SCP - Not used
Time of Last Calibration	(0018,1201)	3	SCU - Not provided SCP - Not used
Pixel Padding Value	(0028,0120)	3	SCU - Not provided SCP - Not used

5.11.7 Spatial Registration Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - Provided 'REG'. SCP - Used
Content Date	(0008,0023)	1	SCU - Provided SCP – Not Used
Content Time	(0008,0033)	1	SCU - Provided SCP – Not Used
Instance Number	(0020,0013)	1	SCU - Provided SCP – Not Used
Content Label	(0070,0080)	1	SCU – Provided 'REGISTRATION' SCP – Not Used
Content Description	(0070,0081)	2	SCU - Not provided SCP - Not used
Content Creator's Name	(0070,0084)	2	SCU – Provided (workstation name) SCP – Not Used
Content Creator's Identification Sequence	(0070,0086)	3	SCU - Not provided SCP - Not used
Registration Sequence	(0070,0308)	1	SCU - Provided. SCP – Used First item in the sequence will always be the identity matrix.
>Frame of Reference UID	(0020,0052)	1C	SCU - Provided. SCP - Used
>Referenced Image Sequence	(0008,1140)	1C	SCU - Provided SCP - Not used
>>Referenced SOP Class UID	(0008,1150)	1	SCU - Provided. SCP – Not Used

Attribute Name	Tag	Type	Notes
>>Referenced SOP Instance UID	(0008,1155)	1	SCU - Provided. SCP – Not Used
>Matrix Registration Sequence	(0070,0309)	1	SCU - Provided. SCP - Used
>>Frame of Reference Transformation Comment	(3006,00C8)	3	SCU - Provided. SCP - Used
>>Registration Type Code Sequence	(0070,030D)	2	SCU - Provided. SCP - Used
>>>Code Value	(0008,0100)	1C	SCU - Provided. “125024” SCP – Not Used
>>>Coding Scheme Designator	(0008,0102)	1C	SCU - Provided. “DCM” SCP – Not Used
>>>Coding Scheme Version	(0008,0103)	1C	SCU - Provided. “20040115” SCP – Not Used
>>>Code Meaning	(0008,0104)	1C	SCU - Provided. “Image Content-based Alignment” SCP – Not Used
>>Matrix Sequence	(0070,030A)	1	SCU - Provided. SCP - Used
>>>Frame of Reference Transformation Matrix	(3006,00C6)	1	SCU - Provided. SCP - Used
>>>Frame of Reference Transformation Matrix Type	(0070,030C)	1	SCU – Provided ‘RIGID’ SCP - Used
>Used Fiducials Sequence	(0070,0314)	3	SCU - Not provided SCP - Not used

5.11.8 Common Instance Reference Module

Attribute Name	Tag	Type	Notes
Referenced Series Sequence	(0008,1115)	1	SCU - Provided. SCP – Not Used
>Series Instance UID	(0020,000E)	1	SCU - Provided. SCP – Not Used
>Referenced Instance Sequence	(0008,114A)	1	SCU - Provided. SCP – Not Used
>>Referenced SOP Class UID	(0008,1150)	1	SCU - Provided. SCP – Not Used
>>Referenced SOP Instance UID	(0008,1155)	1	SCU - Provided. SCP – Not Used
Studies Containing Other Referenced Instances Sequence	(0008,1200)	1C	SCU - Provided. SCP – Not Used
>Study Instance UID	(0020,000D)	1	SCU - Provided. SCP – Not Used
>Referenced Series Sequence	(0008,1115)	1	SCU - Provided. SCP – Not Used
>>Series Instance UID	(0020,000E)	1	SCU - Provided. SCP – Not Used

Attribute Name	Tag	Type	Notes
>>Referenced Instance Sequence	(0008,114A)	1	SCU - Provided. SCP – Not Used
>>>Referenced SOP Class UID	(0008,1150)	1	SCU - Provided. SCP – Not Used
>>>Referenced SOP Instance UID	(0008,1155)	1	SCU - Provided. SCP – Not Used

5.11.9 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.66.1' SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Used
Instance Creation Date	(0008,0012)	3	SCU - Provided SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Provided SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not provided SCP - Not used