Nucletron

Oncentra® External Beam Oncentra® Brachy

Oncentra® Brachy v4.5.3

170.730

DICOM Conformance Statement

CE 0344

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Contact information

MANUFACTURER

Nucletron B.V.

Subsidiary of Elekta AB

Waardgelder 1

3905 TH VEENENDAAL

The Netherlands

Tel.: +31 318 557 133

$C \in 0344$

TECHNICAL SUPPORT

Contact your local Elekta representative for technical support

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1 Conformance Statement Overview

The Oncentra Brachy application is a treatment planning system for brachytherapy treatment based on projective images or image sets like CT, MR or PET. It allows external systems to send images and or RT objects so that they can be imported by the Connectivity Module (CM) and subsequently used for 'Image Registration' and 'Target Definition' (AM), 'Brachy Planning' (BP) and 'Plan Analysis' (PA). The created RT objects and imported images can be exported by CM to external systems. The Connectivity Module also supports Query and Retrieve for querying external systems for images and RT objects, and imports them into the Oncentra Brachy database.

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Storage		
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage - For Presentation	Yes	Yes
CT Image Storage	Yes	Yes
US Image Storage	Yes	Yes
US Multiframe Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
NM Image Storage	Yes	Yes
PET Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
XRay Angiographic Image Storage	Yes	Yes
XRay Fluoroscopy Image Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Plan Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Print Management		
Basic Grayscale Print Management	Yes	No
Basic Color Print Management	Yes	No
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No
Printer SOP Class	Yes	No
Query and Retrieve		
Study Root Query/Retrieve Information Model FIND	Yes	No
Study Root Query/Retrieve Information Model MOVE	Yes	No
Patient Root Query/Retrieve Information Model FIND	Yes	No
Patient Root Query/Retrieve Information Model MOVE	Yes	No
Verification		
Verification	Yes	Yes

Table 1-1 Network Services

2 Table of Contents

3 Introduction

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

The Connectivity Module (CM) in the Oncentra Brachy product is a multi-function 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 4, Networking. The primary role of CM is as an interface between DICOM peers and the Oncentra Brachy database. CM will read DICOM data stored as Interchange Media objects (typically created by WinSCP32) and import valid data to the Oncentra Brachy proprietary database. It will also extract valid data and create DICOM Interchange Media objects for export via DICOM. This is described in Section 4.1.2.1 Functional Definition of the Communication Module AE and section 4.2.1 Communication Module AE.

An associated DICOM Storage SCP application from ETIAM SA, WinSCP32, is included in the Oncentra Brachy distribution. The WinSCP32 application is covered by this Conformance Statement, specifically in Section 4.1.2.2, Functional Definition of the WinSCP32 AE, and Section 4.2.2, WinSCP32 AE.

Oncentra Brachy 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 Brachy 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 Brachy system.

FR runs as a 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 4.1.2.3 Functional Definition of the File/Restore AE and section 4.2.3 File/Restore AE. 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.

3.1 Revision History

Document revision	Oncentra Brachy version	Changes
00	4.4	Not applicable
01	4.5	Updates for new version. Changes for DICOM standard 2011
02	4.5.1	Software issues solved.
03	4.5.2	Software issues solved.
04	4.5.3	Software issue solved.

3.2 Audience

This document is intended for system developers, system integrators, and users or potential users of the Oncentra Brachy system (or their agents). It is assumed that the reader of this document is familiar with the DICOM standard.

3.3 Remarks

This document does not guarantee successful DICOM communication between Oncentra Brachy and third-party applications which claim conformance to DICOM. It is the user's (or the user's agent) responsibility to address at least the issues in this section.

3.3.1 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 can 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.

3.3.2 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 before clinical use of the applications.

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

3.3.3 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. Therefore Nucletron will adapt or 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.

3.3.4 Private Tag Policy

In some cases Oncentra Brachy uses private attributes to store information that is only relevant for its own use. These attributes are listed in Section 8, Annexes, together with the public DICOM attributes. If DICOM data from Oncentra Brachy is copied and modified by a third-party application, these private attributes must be removed to ensure future data consistency. Oncentra Brachy will not use any private data from other vendors. Likewise, if Oncentra Brachy changes any DICOM data, all third-party private tags are removed to ensure future data consistency.

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

3.4 Terms and Definitions

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

Abstract Syntax	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Entity (AE)	An end point of a DICOM information exchange, including the DICOM network or media interface software (the software that sends or receives DICOM information objects or messages). A single device can have multiple Application Entities.
Application Entity Title	The externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.
Application Context	The specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.
Association	A network communication channel set up between *Application Entities*.
Attribute	A unit of information in an object definition; a data element identified by a *tag*. The information can have a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
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.
Information Object Definition (IOD)	The specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* can be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there can be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Joint Photographic Experts Group (JPEG)	A set of standardized image compression techniques, available for use by DICOM applications.
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (for example, CDs)
Module	A set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
Negotiation	First phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context	The set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data
Service Class Provider (SCP)	Role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
Service Class User (SCU)	Role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)
Service/Object Pair (SOP) Class	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP) Instance	An information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.
Tag	A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts.* The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, can now start exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it cannot be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities can also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a *Media Application Profile* that specifies "pre-negotiated" exchange media format, Abstract Syntax, and Transfer Syntax.

3.6 Abbreviations

ACR	American college of Radiology
AE	DICOM Application Entity.
AM	The Anatomy Modeling package; the part of the Oncentra Brachy 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 can be terminated by either the Service Class User or the Service Class Provider application.
BP	The Brachy Planning activity; the part of the Oncentra Brachy software that handles the creation of a brachytherapy treatment plan.
CM	The Connectivity Module; the part of the Oncentra Brachy software that handles all DICOM communication as well as the import and export of DICOM data to the Oncentra Brachy database.
DICOM	Digital Imaging and Communications in Medicine.
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 Brachy, used for filing and restoring patient cases to a DICOM Archive
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
IOD	DICOM Information Object Definition.
JPEG	Joint Photographic Experts Group
NEMA	National Electrical Manufacturers Association

OTP	Oncentra Treatment Planning, technical abbreviation for Oncentra Brachy
PA	The Plan Analysis activity; a part of the Oncentra Brachy software that handles multi-plan comparison, dose display and Dose Volume Histograms.
PACS	Picture Archiving and Communication System
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, for example, 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.

3.7 References

Reference	Version	Description
NEMA PS3	*	Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/
Oncentra Brachy Online Help	*	-

* the latest version of the referenced document

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow
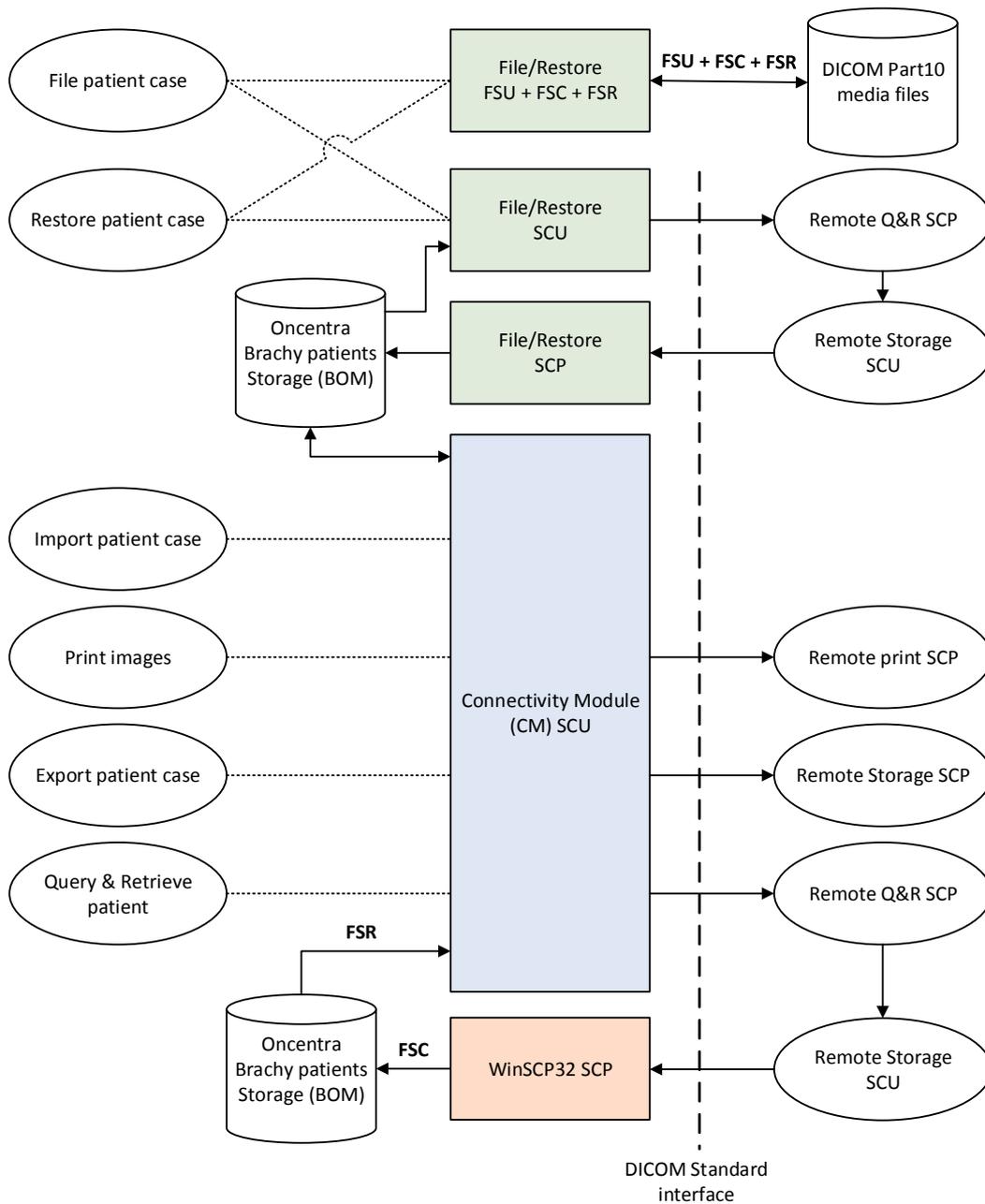
Figure 4-1 Implementation model
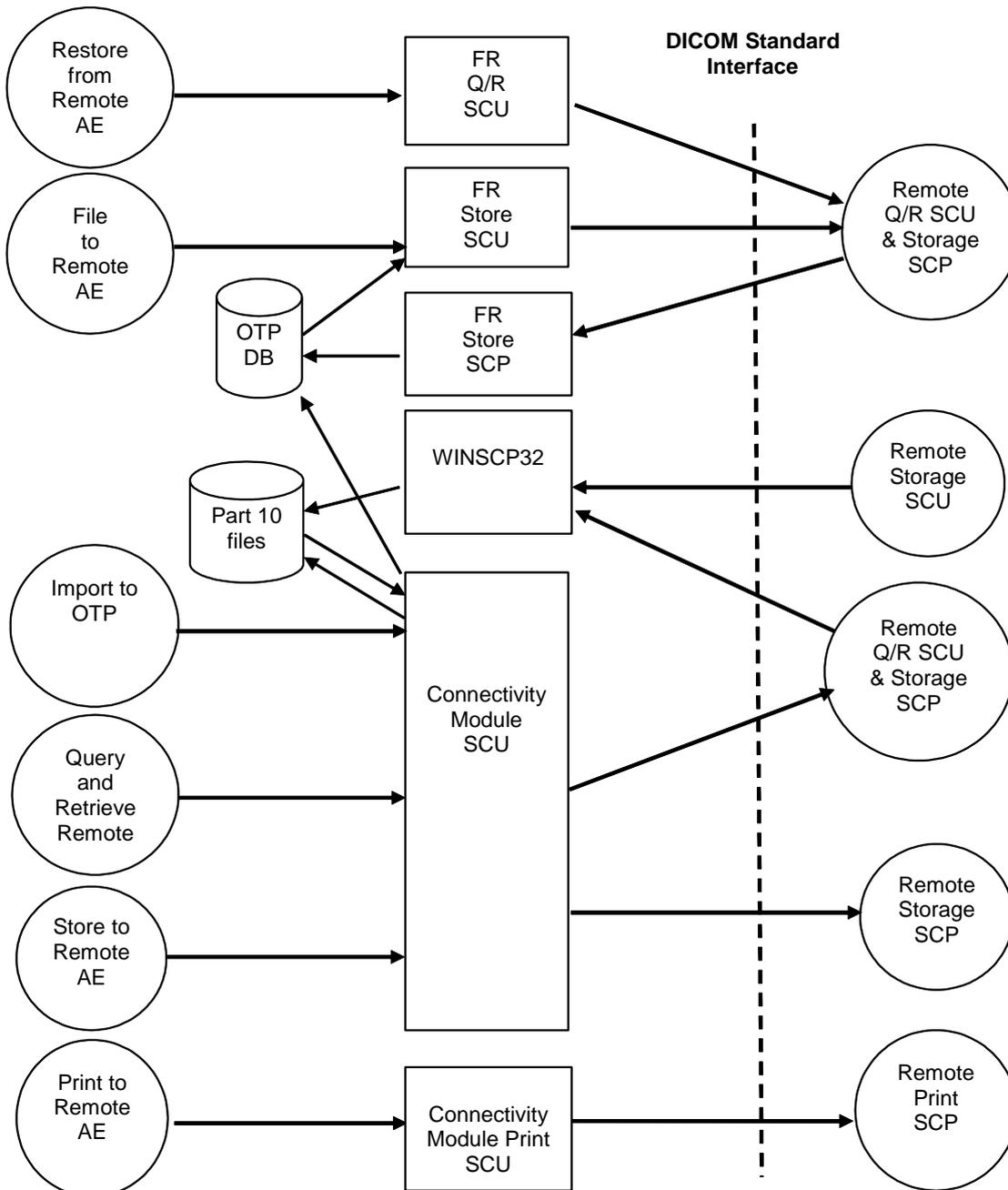
Figure 4-2 Application data flow diagram

The Oncentra Brachy application is a mixed Microsoft C++ and .Net application, which provides a user interface, network support and limited media support as a File Set Reader (FSR).

The Connectivity Module also provides a user interface for DICOM Query & Retrieve as well as DICOM print functionality. Active patient cases are stored in the Oncentra Brachy patient database. The Connectivity Module reads and writes SOP instances from and to this database on export or import of patient cases.

The File/Restore (FR) application provides a basic implementation for storing and retrieving patient cases to remote DICOM PACS systems or to DICOM file sets. The kind of file and restore option is configured through the user interface in the File/Restore application.

4.1.2 Functional Definitions of AE's

4.1.2.1 Functional Definition of the Communication Module AE

The Communication Module AE handles the communication between Oncentra Brachy and remote DICOM AE's (SCP). The AE title of the communication module can be configured in the "CM Utilities" tool; the default AE title is "OTP_SCU". The communication module provides the following DICOM services:

- Export to a remote DICOM AE by sending a storage request (DICOM Storage Service Class)

- Import DICOM media files from removable media and store the data in the Oncentra Brachy patient database

- Print to a DICOM printer by sending a print request (DICOM Print Management SOP Class)

- Query a remote DICOM AE by sending a find request (Patient or Study Root Query/Retrieve Information Model C-FIND)

- Retrieve data from a remote DICOM AE by sending a move request (Patient or Study Root Query/Retrieve Information Model C-MOVE)

4.1.2.2 Functional Definition of the WinSCP32 AE

The WinSCP32 AE (SCP) accepts an association from a remote DICOM AE (SCU) to receive a storage request (DICOM Storage Service Class). The received images and RT objects will be written to DICOM Part 10 files (FSC) so that they can be imported by the import functionality of the communication module.

4.1.2.3 Functional Definition of the File/Restore AE

4.1.2.3.1 File/Restore as SCU

The File/Restore AE (SCU) sends storage requests to the configured DICOM AE (SCP), which is typically a DICOM Archive. The File/Restore AE stores complete patient cases (images and RT objects) in the pre-configured archive, serving as a C-STORE SCU. After a validation of existence by a query request (C-FIND) on the archive system, the local patient case is removed and no longer accessible within Oncentra Brachy.

When at a certain point in time the user wants to restore the patient case that was filed in an archive system, the File/Restore AE sends a retrieve request (C-MOVE) of all known SOP instances of the patient case with as destination the File/Restore (SCP) AE.

4.1.2.3.2 File/Restore as SCP

The File/Restore SCP AE waits for incoming SOP instances that are being restored by C-MOVE requests of the File/Restore SCU to the DICOM Archive where the patient case was originally filed. Incoming patient case data is restored in the patient database and made available again within Oncentra Brachy after the complete patient case has been restored.

The File/Restore SCP is a temporary service, dedicated to the current restore operation. After the association for the C-MOVE has been released, the SCP stops listening for incoming association requests.

4.1.2.3.3 File/Restore as File sets on external storage

Besides File/Restore to a DICOM PACS it is also possible to file and restore data to DICOM Part 10 file sets. Depending on the target hardware and storage infrastructure, the file sets can be created on removable media like CD-R or DVD-R, network file shares or external storage devices.

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background (as a Microsoft Windows service) and are not dependent on any form of sequencing.

All SCU activities are sequentially initiated in the user interface, and another activity cannot be initiated until the prior activity has been completed or aborted.

4.2 AE Specifications

4.2.1 Communication Module AE

4.2.1.1 SOP Classes

The Communication Module AE provides Standard Conformance to the following SOP Classes.

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class			
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Standard Storage SOP Classes			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3	Yes	No
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5	Yes	No
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6	Yes	No
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	No
Print Management SOP Classes			
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No

Query & Retrieve SOP Classes			
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No

Table 4-1 SOP Classes supported by CM AE

4.2.1.2 Association Policies

4.2.1.2.1 General

The Communication Module AE initiates, but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1
Minimum PDU size sent	8192
Maximum PDU size sent	65536

Table 4-2 General association parameters for CM AE

4.2.1.2.2 Number of Associations

Maximum number of simultaneous associations	1

Table 4-3 Number of associations for CM AE

4.2.1.2.3 Asynchronous Nature

The Communication Module AE will only allow a single outstanding operation on an association. The Communication Module AE will not perform asynchronous operations window negotiation.

4.2.1.2.4 Implementation Identifying Information

Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

Table 4-4 DICOM Implementation Class and Version for CM AE

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Test Connection to DICOM Peer

4.2.1.3.1.1 Description and Sequencing of Activities

The Communication Module AE sends associations to remote DICOM peers to verify connectivity between Oncentra Branchy and the remote DICOM peer. This is verified by using the C-ECHO command.

4.2.1.3.1.2 Proposed Presentation Contexts

The following table lists proposed presentation contexts.

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

Table 4-5 Proposed Presentation Contexts for Export to DICOM peer

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The Communication Module AE provides standard conformance to the Verification SOP Class.

Upon receiving a C-ECHO response with the 'Success' status the test is completed as successful all other results, timeouts and association rejections are considered a failure of the connection test.

4.2.1.3.2 Activity – Export to DICOM Peer

4.2.1.3.2.1 Description and Sequencing of Activities

The Communication Module AE initiates an association with a remote DICOM AE, to perform a C-STORE command, after the following flow of events:

1. The user opens a patient case and starts the 'Export' activity in Oncentra Brachy.

2. A dialog is displayed with all the related data, images and RT objects, of the active patient case.

3. The user selects which data of the patient case to export and which additional formatting to apply to the objects for export, and selects the destination DICOM peer.

4. The Communication Module AE sets up a connection and negotiates communication parameters for transfer, after successful negotiation of the connection the objects are sent to the remote peer using the C-STORE command. After all objects have been sent the association is closed.

5. After successful export of the patient case the status of the case is updated to 'Published'.

Figure 4-3 Export to DICOM Peer

4.2.1.3.2.2 Proposed Presentation Contexts

The following table lists proposed presentation contexts. For readability of this table a reference is made to the Standard Storage SOP Classes that are supported by the Communication Module AE, since the transfer syntax, role and extended negotiation is equal for all Storage Sop Classes.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See 4.2.2.1 - Storage SOP Classes	See 4.2.2.1 - Storage SOP Classes	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

Table 4-6 Proposed Presentation Contexts for Export to DICOM peer

4.2.1.3.2.3 SOP Specific Conformance

CM provides standard conformance to the Storage Service Class.

The following table describes the behavior of the CM export function according to the received export responses.

Service Status	Further Meaning	Status Codes	Behavior
Failure	Refused: Out of Resources	A7xx	Abort the transfer operation and display a message to the user that the export failed.
	Error: Data Set does not match SOP Class	A9xx	
	Error: Cannot understand	Cxxx	
Warning	Coercion of Data Elements	B000	Ignore and continue. After the transfer of all objects is finished a message is displayed to the user that warnings have occurred during export.
	Data Set does not match SOP Class	B007	
	Elements Discarded	B006	
Success		0000	CM will continue with next SOP instance or when all objects are send CM closes the association.

Table 4-7 DICOM C-STORE response status handling behavior

Note:

After any export is finished, a message shows the user if the transfer was successful and if any warnings occurred. In case of an error, a message shows how many objects were sent successfully.

4.2.1.3.3 Activity – Print to DICOM Printer

4.2.1.3.3.1 Description and Sequencing of Activities

The Communication Module AE initiates an association with a DICOM printer, to print 1 or multiple DICOM images, after the following flow of events:

1. The user opens a patient case and starts the 'Export' activity in Oncentra Brachy.

2. A dialog is displayed with all the related data, images and RT objects, of the active patient case.

3. The user selects which images of the patient case to print, and then starts DICOM print.

4. The user selects the correct DICOM printer and sets up the DICOM film in the film composer. After this the Print operation can be started and the DICOM images will be printed on the target DICOM printer.

5. The Communication Module AE sets up a connection and negotiates communication parameters for transfer. After successful negotiation of the connection, the film setup is sent to the DICOM printer and then the DICOM images.
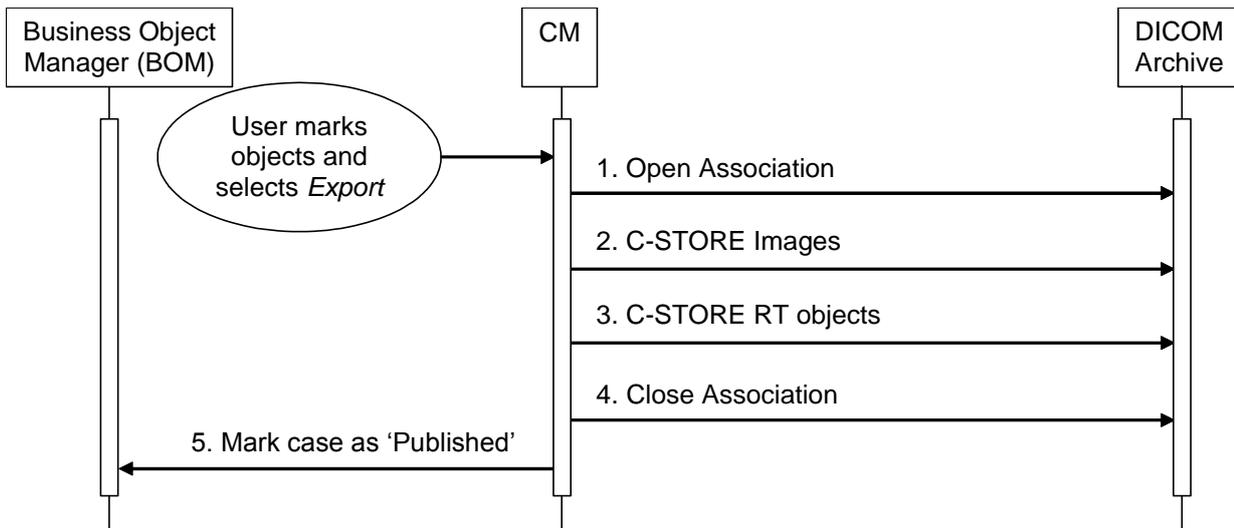
Figure 4-4 Print to DICOM Printer

4.2.1.3.3.2 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	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 4-8 Proposed Presentation Contexts for Print to DICOM Printer

4.2.1.3.3.3 SOP Specific Conformance for Print SOP Classes

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the print-job is considered as failed. The reason is logged and the job failure is reported to the user.
Association aborted by the SCP or network layers	The print-job is considered as failed. The reason is logged and the job failure is reported to the user.

Table 4-9 General Print SOP class failure behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request to get printer status information was successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is considered as failed. The status meaning is logged and reported to the user.

Table 4-10 General Print SOP Class Response Status Handling Behavior

4.2.1.3.4   Activity – Query on DICOM Peer

4.2.1.3.4.1   Description and Sequencing of Activities

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

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

2. When the user 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 show the study list. Before clicking on Update, the operator can optionally click on the Parameters button to select Patient or Study level filters to be applied to the displayed study list.

4.2.1.3.4.2   Proposed Presentation Contexts

The following table lists proposed presentation contexts.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Table 4-11 Proposed Presentation Contexts for Query on DICOM Peer

4.2.1.3.4.3   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 can be selected and filters can be applied by entering the appropriate criteria in the Parameters form.

Attribute Name	Tag	Note
Query/Retrieve Level	(0008,0052)	
Retrieve AE Title	(0008,0054)	
Instance Availability	(0008,0056)	

Table 4-12 Requested Keys for All levels (Additional)

Attribute Name	Tag	Note
Patient Name	(0010,0010)	Optionally populated from query dialog
Patient ID	(0010,0020)	Optionally populated from query dialog
Patient Birth Date	(0010,0030)	Optionally populated from query dialog
Patient Sex	(0010,0040)	Optionally populated from query dialog

Table 4-13 Requested Keys for Patient Root Query

Attribute Name	Tag	Note
Study Date	(0008,0020)	Optionally populated from query dialog
Accession Number	(0008,0050)	Optionally populated from query dialog
Modalities in study	(0008,0061)	
Referring Physicians Name	(0008,0090)	
Study Description	(0008,1030)	Optionally populated from query dialog
Number of Study Related Series	(0008,1206)	
Number of Study Related Instances	(0008,1206)	
Patient Name	(0010,0010)	
Patient ID	(0010,0020)	
Patient Birth Date	(0010,0030)	
Patient Sex	(0010,0040)	
Study Instance UID	(0020,000D)	
Study ID	(0020,0010)	Optionally populated from query dialog

Table 4-14 Requested Keys for Study Root query

Attribute Name	Tag	Note
Modality	(0008,0060)	
Series Description	(0008,103E)	
Study Instance UID	(0020,000D)	Populated from selection dialog
SeriesInstanceUID	(0020,000E)	
SeriesNumber	(0020,0011)	
Number of Series Related Instances	(0020,1209)	

Table 4-15 Requested Series Level Keys

Attribute Name	Tag	Note
SOP Class UID	(0008,0016)	
SOP Instance UID	(0008,0018)	
Series Instance UID	(0020,000E)	Populated from selection dialog
Study Instance UID	(0020,000D)	Populated from selection dialog
Instance Number	(0020,0013)	

Table 4-16 Requested Image Level Keys

4.2.1.3.5   Activity – Retrieve from DICOM Peer

4.2.1.3.5.1   Description and Sequencing of Activities

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.

- 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.
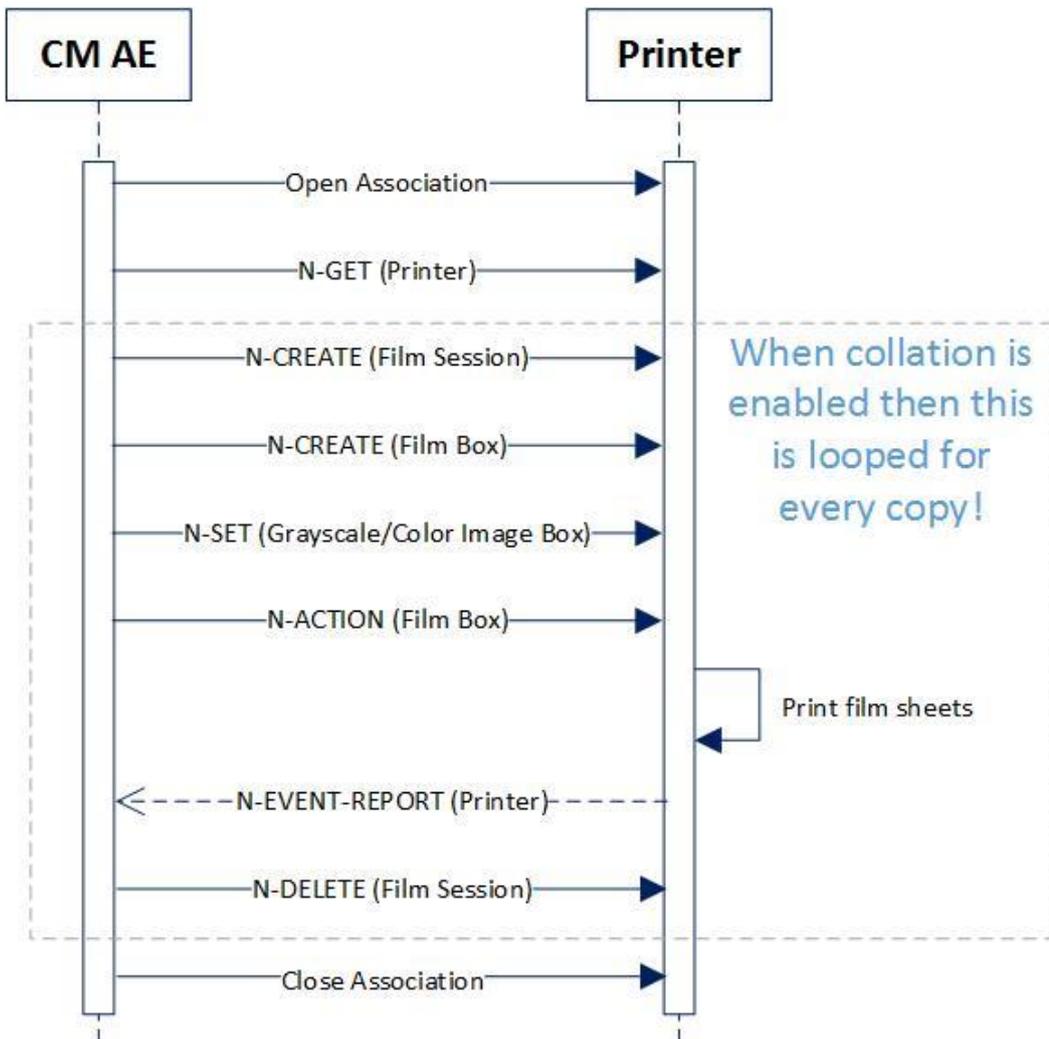
4.2.1.3.5.2 Proposed Presentation Contexts

The following table lists proposed presentation contexts.

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

Table 4-17 Proposed Presentation Contexts for Retrieve from DICOM Peer

4.2.1.3.5.3 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.

4.2.1.4 Association Acceptance Policy

The Communication Module Application Entity does not accept associations.

4.2.2 WinSCP32 AE

4.2.2.1 SOP Classes

The WinSCP32 AE provides Standard Conformance to the following SOP Classes.

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class			
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Standard Image Storage SOP Classes			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3	No	Yes
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5	No	Yes
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6	No	Yes
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Standard Non-Image Storage SOP Classes			
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes

Table 4-18 SOP Classes supported by WinSCP32 AE

Note:

The WinSCP32 application entity accepts all storage classes, but only the SOP Classes that can be used (imported) in Oncentra Brachy are listed here. For the complete list see [NEMA PS3] Part 4 Chapter B.5.

4.2.2.2 Association Policies

4.2.2.2.1 General

The WinSCP32 AE accepts but never initiates associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1
Minimum PDU size accepted	8192
Maximum PDU size accepted	16384

Table 4-19 General association parameters for WinSCP32 AE

4.2.2.2.2 Number of Associations

Maximum number of simultaneous associations	10

Table 4-20 Number of associations for WinSCP32 A

4.2.2.2.3 Asynchronous Nature

The WinSCP32 AE does not support asynchronous operations.

4.2.2.2.4 Implementation Identification Information

Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

Table 4-21: Implementation Class UID and Version Name for WinSCP32

4.2.2.3 Association Initiation Policy

The WinSCP32 Application Entity does not initiate associations.

4.2.2.4 Association Acceptance Policy

4.2.2.4.1 Activity – Receive DICOM IODs

4.2.2.4.1.1 Description and Sequencing of Activities

The WinSCP32 AE is able to receive DICOM IODs from the SOP Classes as listed in Section 4.2.2.1.

The WinSCP32 AE will receive any incoming IOD and store it as-is on disk in DICOM Part 10 format, after which the File/Restore application will add these files to the Oncentra Brachy patient database.

Though the WinSCP32 AE is capable and designed to receive and convert any incoming IOD at any time, the user can use the "Query / Retrieve from DICOM Peer" dialog (as described in Section 4.2.1.3.4.1 and Section 4.2.1.3.5.1) to query the contents of an external DICOM archive and to demand a store operation on study, series or instance level, targeting the WinSCP32 AE.

4.2.2.4.1.2 Accepted Presentation Contexts

WinSCP32 will accept the following 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

Table 4-22: Accepted Presentation Contexts for WinSCP32

Note:

This applies to all supported Abstract Syntaxes. Encoded transfer syntaxes only apply to the Image Storage Abstract Syntaxes, and they can be disabled via the WinSCP32 options dialog.

4.2.2.4.1.3 SOP Specific Conformance for Radio Therapy SOP Classes

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

Table 4-23 Radio Therapy SOP classes

The objects with Radio Therapy SOP classes show limited functionality in case they are originating from third-party creators.

4.2.3 File/Restore AE

4.2.3.1 SOP Classes

The File/Restore AE provides Standard Conformance to the following SOP Classes.

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class			
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Standard Image Storage SOP Classes			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
NM Image Storage (RET)	1.2.840.10008.5.1.4.1.1.5	Yes	Yes
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes
Standard Non-Image Storage SOP Classes			
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes

Table 4-24: SOP Classes supported by File/Restore AE

4.2.3.2 Association Policies

4.2.3.2.1 General

The File/Restore AE initiates and accepts associations.

The DICOM standard application context name for DICOM 3.0 is proposed:

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.2 Number of Associations

Maximum number of simultaneous outbound associations	1
Maximum number of simultaneous incoming associations	1

4.2.3.2.3 Asynchronous Nature

The File/Restore AE will only allow a single outstanding operation on an Association. The File/Restore AE will not perform asynchronous operations window negotiation.

4.2.3.2.4 Implementation Identifying Information

Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Implementation Version Name	ETIAM_DCMTK_353

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity – File to Archive - AE

4.2.3.3.1.1 Description and Sequencing of Activities

From the portal screen, the user has the option to File data to one of the pre-configured DICOM destinations. The user will select:

- A set of patients / cases to send to the archive

- A DICOM destination, as preconfigured.

Subsequently the user can start the background process to send the selected DICOM objects to the archive, and to delete them from the local system. The system will retain the necessary database records, to facilitate restoring of the data from the same DICOM archive. These records will contain a reference to the destination archive, for the purpose of restoring the data in a later stage.

4.2.3.3.1.2 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
See note	*See note*	DICOM - JPEG Baseline Encoding	1.2.840.10008.1.2.4.50	SCU	None
See note	*See note*	DICOM - JPEG Lossless Hierarchical First Order prediction	1.2.840.10008.1.2.4.70	SCU	None
See note	*See note*	DICOM - RLE Encoding	1.2.840.10008.1.2.5	SCU	None

Table 4-25: Proposed Presentation Contexts for File/Restore AE

Note:

This applies to all supported Abstract Syntaxes.

4.2.3.3.2 Activity – Restore from Archive

4.2.3.3.2.1 Description and Sequencing of Activities

From the portal screen, the user has the option to restore data from the archive where it had been filed in an earlier stage. The user will select a set of patients / cases that need to be restored from the archive.

Upon starting the Restore operation:

- the system will open a temporary SCP with the preconfigured port number and AE title, for handling incoming C-STORE Requests;

- the system will send C-FIND requests for the indicated Patient cases, to enumerate the available IODs;

- the system will send C-MOVE requests for the indicated Patient cases;

- the system will receive the C-STORE requests and store the associated IODs in DICOM files;

- the system will associate all DICOM files with the existing database records for the patients and cases.

- after a correct reception of the requested DICOM IODs and release of the C-MOVE association, the temporary SCP will be closed.

As a result, the system only allows restoring of patient data that had been filed to the archive from this very same system.

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Study Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Patient Root Query/Retrieve Information Model FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Table 4-26 Proposed Presentation Contexts for Restore from Archive

4.2.3.3.2.2   Accepted Presentation Contexts

File/Restore AE will accept the following 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

Table 4-27: Accepted Presentation Contexts for File/Restore AE

Note:

This applies to all supported Abstract Syntaxes.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The Oncentra Brachy application entities are indifferent of the physical medium over which TCP/IP executes. Support of different physical network interfaces is limited by the Microsoft Windows operation system and hardware on which Oncentra Brachy operates.

4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AE's, the application is dependent on the name resolution mechanism of the underlying operating system.

4.3.3 IPv4 and IPv6 Support

Oncentra Brachy supports IPv4. There is no support for IPv6.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

Application Entity	Default AE Title	Default TCP/IP Port
Communication Module	OTP_SCU	N/A
WinSCP32	OTP_INCOMING	104
File/Restore	<To Be Configured>	<To Be Configured>

Table 4-28 AE Title Configuration table

Note:

Multiple File/Restore application entities can be configured within Oncentra Brachy. No default AE Title or TCP/IP Port is given for a single configured File/Restore entry. See the Oncentra Brachy Online Help for instructions on how to configure the File/Restore archives.

4.4.2 Parameters

This section lists the parameters for DICOM associations and their configurability options.

Abstract Parameter	Configurable (Yes/No)	Default Value
General Parameters		
Any changes to default TCP/IP settings, such as configurable stack parameters.	NONE	
Size constraint in maximum object size	NONE	
Maximum PDU size the AE can receive	Yes	16384
Maximum PDU size the AE can send	Yes	16384
Number of simultaneous Associations by Service and/or SOP Class	Yes	5
SOP Class support	No	Any DICOM IOD is accepted, only a limited set is used for insertion in the Oncentra Brachy database. See Section 4.1.2.2
Transfer Syntax support	Accept/Refuse incoming Jpeg or RLE compressed images	Accept
AE Specific Parameters		
Other parameters that are configurable	AE-Title and Port number	OTP_INCOMING - 104

Table 4-29 Configuration Parameter

5 Media Interchange

The Oncentra Brachy application does not formally support application profiles in any of the roles FSC, FSR or FSU.

The Oncentra Brachy application is capable of importing DICOM 3.0 files, as referred to in the DICOM 3.0 standard, part 10. It is able to use any valid DICOMDIR file to determine the set of files, belonging to a case or patient. In case the DICOMDIR file is incomplete or absent, the system is also capable of reading and using the DICOM files directly (without using any DICOMDIR file). As only the applicable files for RT purposes can be imported, this feature does not formally claim the role of File Set Reader (FSR).

The Oncentra Brachy application is capable of exporting DICOM 3.0 files, as referred to in the DICOM 3.0 standard, part 10. It does not create a DICOMDIR file along with the IOD files, and the directory names are generated by the system. The destination directory root can be selected by the user exporting the data, which comprises the local hard disk, network locations or removable media (USB-compliant). The exported data serves as a full back-up of the patient case, but does not formally claim the role of File Set Creator (FSC).

The Oncentra Brachy application does not update any externally created File Set as a File Set Updater (FSU).

6 Support of Character Sets

Support extends to correctly decoding and displaying the correct symbol in the supported character sets for all names and strings received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided in the application.

In addition to the default character repertoire, the following Specific Character Sets are supported in Oncentra Brachy:

Character Set	Defined Term	Description
Latin alphabet No. 1	ISO_IR 100	ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set

Table 6-1: Supported Specific Character Sets

Note:

Whether or not characters are displayed correctly depends on the presence of the corresponding font support in the underlying operating system.

7 Security

7.1 Security Profiles

None supported.

7.2 Association Level Security

None supported, any calling AE Titles and/or IP addresses can open an Association.

7.3 Application Level Security

None supported.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

8.1.1.1 Introduction

8.1.1.1.1 Connectivity Module

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

CM acts as an interface to remote DICOM peers, as a Store SCU and as a Query/Retrieve SCU. Its primary function is to import valid DICOM data to Oncentra Brachy and to create valid DICOM data for export from Oncentra Brachy. 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 Brachy 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 Brachy application by performing import of the DICOM objects to the Oncentra Brachy 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 Brachy database. The DICOM objects can subsequently be sent to a remote DICOM peer by clicking the Export button in CM.

8.1.1.1.2 Patient Information

Some objects are normally not modified by Oncentra Brachy, for example CT and MR images. If such objects are exported from Oncentra Brachy, they will be exact duplicates of what was imported, except if the user has 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 Brachy, CM will copy the DICOM data to a new object, which is stored in the Oncentra Brachy database with the following modifications:

- The Patient Information is changed to match the user-defined Oncentra Brachy Patient Information.

- A new SOP Instance UID is defined using the Oncentra Brachy 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.

8.1.1.2 Detailed IOD Specifications

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

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

8.1.1.2.1   Common Modules

8.1.1.2.1.1   Patient Module

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

8.1.1.2.1.2   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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.1.3   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.
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 – Used if provided.
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

Attribute Name	Tag	Type	Notes
>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

8.1.1.2.1.4 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 Brachy. SCP - Used

8.1.1.2.1.5 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. See Section 8.1.1.2.2.6, General Image Module in CT, and Section 8.1.1.2.3.3, General Image Module
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

8.1.1.2.1.6   SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	See Section 8.1.1.2.2.7, SOP Common Module for CT (details only), Section 8.1.1.2.3.7, SOP Common Module For MR (details only), and Section 8.1.1.2.4.11, SOP Common Module for PET (details only).
SOP Instance UID	(0008,0018)	1	SCU - Provided. Created by Oncentra Brachy 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

8.1.1.2.2 CT Image Information Object Implementation

Oncentra Brachy can import and export CT images. Oncentra Brachy 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.

8.1.1.2.2.1 CT Image IOD Module Table

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

8.1.1.2.2.2 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

8.1.1.2.2.3 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

Attribute Name	Tag	Type	Notes
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 Brachy will be limited to the range [-1000, 3095]. If Oncentra Brachy 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

8.1.1.2.2.4 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.
Position Reference Indicator	(0020,1040)	2	SCU - Duplicated from SCP. SCP - Not used

8.1.1.2.2.5 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 8.1.1.2.1.5. 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

8.1.1.2.2.6 General Image Module in CT (details only)

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
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

8.1.1.2.2.7 SOP Common Module for CT (details only)

For the full definition of the SOP Common module, see Section 8.1.1.2.1.6.

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'.

8.1.1.2.3 MR Image Information Object Implementation

Oncentra Brachy can import and export MR images. Oncentra Brachy 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.

8.1.1.2.3.1 MR Image IOD Module Table

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

8.1.1.2.3.2 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

8.1.1.2.3.3   General Image Module in MR (details only)

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
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

8.1.1.2.3.4   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

8.1.1.2.3.5   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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.3.6 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
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

Attribute Name	Tag	Type	Notes
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
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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.3.7 SOP Common Module For MR (details only)

For the full definition of the SOP Common module, see Section 8.1.1.2.1.6.

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'.

8.1.1.2.4 PET Image Object Implementation

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

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

8.1.1.2.4.1 PET Image IOD Module Table

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
Patient	Patient	C.7.1.1	M	ALWAYS	
Study	General Study	C.7.2.1	M	ALWAYS	
	Patient Study	C.7.2.2	U	NOT CREATED	SCU - Duplicated from SCP. SCP - Not used
Series	General Series	C.7.3.1	M	ALWAYS	
	PET Series	C.8.9.1	M	ALWAYS	SCU - Duplicated from SCP. SCP - Not used
	PET Isotope	C.8.9.2	M	ALWAYS	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.	ALWAYS	SCU - Duplicated from SCP. SCP - Not used
	NM/PET Patient Orientation	C.8.4.6	M	ALWAYS	SCU - Duplicated from SCP. SCP - Not used
Frame of Reference	Frame of Reference	C.7.4.1	M	ALWAYS	
Equipment	General Equipment	C.7.5.1	M	ALWAYS	SCU - Duplicated from SCP. SCP - Not used

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
Image	General Image	C.7.6.1	M	ALWAYS	
	Image Plane	C.7.6.2	M	ALWAYS	
	Image Pixel	C.7.6.3	M	ALWAYS	
	PET Image	C.8.9.4	M	ALWAYS	
	Overlay Plane	C.9.2	U	NOT CREATED	SCU - SCP - Not used
	VOI LUT	C.11.2	U	NOT CREATED	SCU - SCP - Not used
	SOP Common	C.12.1	M	ALWAYS	

8.1.1.2.4.2 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
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

Attribute Name	Tag	Type	Notes
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
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

8.1.1.2.4.3   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

Attribute Name	Tag	Type	Notes
>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

8.1.1.2.4.4   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

8.1.1.2.4.5   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

8.1.1.2.4.6   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.

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

8.1.1.2.4.7   General Image Module for PET (details only)

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
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

8.1.1.2.4.8   Image Plane module for PET

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

8.1.1.2.4.9   Image Pixel module for PET

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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.4.10 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
Frame Time	(0018,1063)	1C	SCU - Duplicated from SCP. SCP - Not used

Attribute Name	Tag	Type	Notes
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
>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

8.1.1.2.4.11 SOP Common Module for PET (details only)

For the full definition of the SOP Common module, see Section 8.1.1.2.1.6.

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'.

8.1.1.2.5 Multi-frame True Color SC Image Object Implementation

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

8.1.1.2.5.1 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
	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

8.1.1.2.5.2 General Study Module for Multi-frame True Color SC Image (details only)

For the full definition of the General Study Module, see Section 8.1.1.2.1.2.

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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.5.3 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

8.1.1.2.5.4 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
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

8.1.1.2.5.5 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

8.1.1.2.5.6 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

Attribute Name	Tag	Type	Notes
>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
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

8.1.1.2.5.7   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

8.1.1.2.5.8 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

8.1.1.2.5.9 Multi-Frame Module

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

8.1.1.2.5.10 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
Digitizing Device Transport Direction	(0018,2020)	3	SCU - Not supported
Rotation of Scanned Film	(0018,2030)	3	SCU - Not supported

Attribute Name	Tag	Type	Notes
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 the snapshot will 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 the snapshot will 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 snapshot not on specific beam
Snap Shot Status	(0029,xx04)	3	SCU - Provided
End private attributes			

8.1.1.2.5.11 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

Note:

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

8.1.1.2.6   RT Structure Set Information Object Implementation

Oncentra Brachy can import and export RT Structures. Oncentra Brachy 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 Brachy 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 is 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. It reflects the Oncentra Brachy format of a RT Structure Set created by Oncentra Brachy.

8.1.1.2.6.1   RT Structure Set IOD Module Table

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
Patient	Patient	C.7.1.1	M	ALWAYS	
Study	General Study	C.7.2.1	M	ALWAYS	
	Patient Study	C.7.2.2	U	NOT CREATED	SCU - Not supported SCP - Not used

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
Series	RT Series	C.8.8.1	M	ALWAYS	
Equipment	General Equipment	C.7.5.1	M	ALWAYS	
Structure Set	Structure Set	C.8.8.5	M	ALWAYS	
	ROI Contour	C.8.8.6	M	ALWAYS	
	RT ROI Observations	C.8.8.8	M	ALWAYS	
	Approval	C.8.8.16	U	ALWAYS	SCU - Supported SCP - Used
	Audio	C.10.3	U	NOT CREATED	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	ALWAYS	

8.1.1.2.6.2 General Study Module for RT Structure Set objects

For a full overview of the General Study Module, see Section 8.1.1.2.1.2 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

8.1.1.2.6.3 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 Brachy. 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

8.1.1.2.6.4 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 Brachy, including build number, which can change if an Oncentra Brachy 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

8.1.1.2.6.5 Structure Set Module

Attribute Name	Tag	Type	Notes
Structure Set Label	(3006,0002)	1	SCU - Filled from Case label SCP - Required
Structure Set Name	(3006,0004)	3	SCU - Duplicated from SCP. (Not provided for Structure Set created by Oncentra Brachy.) 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 Brachy). SCP - Not used
Structure Set Time	(3006,0009)	2	SCU - Time of creation (i.e. when saved in Oncentra Brachy). 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 Brachy. 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 Brachy: X, Y, Z values. SCU - Provided if (3007,xx70) Patient Structure Set Grid Spacing Mode is set to '1' (Manual) SCP - Used if provided

Attribute Name	Tag	Type	Notes
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'
>>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.

Attribute Name	Tag	Type	Notes
>>>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	IROI1Index\IROI2Index\ 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
>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

Attribute Name	Tag	Type	Notes
>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 POINT_SET_Catheter POINT_SET_Lowest_dose_distance POINT_SET_Target POINT_SET_User_defined POINT_SET_Undefined For compatibility reasons the following values are accepted for existing plans, but are no longer used for new plans: POINT_SET_Basal_Linear POINT_SET_Basal_Triangular POINT_SET_Basal_Square 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. Examples: solid, transparent, wire.
>>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
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 the ROI grid must 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

Attribute Name	Tag	Type	Notes
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 Brachy RT Structure. SCP - Used if Oncentra Brachy 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 Brachy
>Treatment Planning Reference Point ROI Number (TPRP)	(3005,xx2E)	1C	SCU - Provided if TPRP is defined in AM. SCP - Used if defined by Oncentra Brachy. 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 Brachy. 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
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

Attribute Name	Tag	Type	Notes
>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
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			

8.1.1.2.6.6 ROI Contour Module

Attribute Name	Tag	Type	Notes
ROI Contour Sequence	(3006,0039)	1	SCU – Provided SCP – Used

Attribute Name	Tag	Type	Notes
>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 where the ROI is defined. 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
>> 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

Attribute Name	Tag	Type	Notes
>>> 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
>> 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			

8.1.1.2.6.7 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.
>Collapsed Cone Priority	(3007,xx72)	3	SCU – Provided SCP – Used if provided
>Is Collapsed Cone Hounsfield Based	(3007,xx73)	3	Indicates whether Hounsfield Values of CT image pixels inside the ROI are used in a Collapsed Cone dose calculation. Provided values TRUE or FALSE Only valid when a Material ID (300A,00E1) is defined SCU – Provided SCP – Used if provided

8.1.1.2.6.8 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

8.1.1.2.6.9 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.3' 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

8.1.1.2.7 RT Plan Information Object Implementation

Oncentra Brachy can import and export RT Plan objects. Oncentra Brachy 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 Brachy 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 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 Brachy 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).

Note:

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

8.1.1.2.7.1 RT Plan IOD Module Table

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
Patient	Patient	C.7.1.1	M	ALWAYS	
Study	General Study	C.7.2.1	M	ALWAYS	
	Patient Study	C.7.2.2	U	NOT CREATED	SCU - Not Supported SCP - Not used
Series	RT Series	C.8.8.1	M	ALWAYS	
Frame of Reference	Frame of Reference	C.7.4.1	U	ALWAYS	SCU - Supported SCP - Used
Equipment	General Equipment	C.7.5.1	M	ALWAYS	
Plan	RT General Plan	C.8.8.9	M	ALWAYS	
	RT Prescription	C.8.8.10	U	ALWAYS	SCU - Supported SCP - Used
	RT Tolerance Tables	C.8.8.11	U	NOT CREATED	SCU - Not supported SCP - Not used
	RT Patient Setup	C.8.8.12	U	CREATED	SCU - Supported SCP - Not used
	RT Fraction Scheme	C.8.8.13	U	ALWAYS	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	CREATED	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	CREATED	SCU - Supported SCP - Used
	Approval	C.8.8.16	U	ALWAYS	SCU - Supported SCP - Used
	Audio	C.10.3	U	NOT CREATED	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	ALWAYS	

8.1.1.2.7.2 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

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 - 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

8.1.1.2.7.3   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
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

8.1.1.2.7.4   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			

8.1.1.2.7.5   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

Attribute Name	Tag	Type	Notes
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 Brachy, including build number, which can change if an Oncentra Brachy 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

8.1.1.2.7.6 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 Brachy Portal logon username SCP - Not used
RT Plan Date	(300A,0006)	2	SCU - Date of creation (i.e. when saved in Oncentra Brachy). SCP - Not used
RT Plan Time	(300A,0007)	2	SCU - Time of creation (i.e. when saved in Oncentra Brachy). 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

Attribute Name	Tag	Type	Notes
>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"
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 Brachy 4.1 or later. SCP - Ignored
Next Beam Number	(3005,xx25)	3	SCU - Provided if RT Plan created by Oncentra Brachy 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 Brachy
ROI Optimization info sequence	(3005,xx40)	3	SCU - Provided if RT Plan created by Oncentra Brachy SCP - Used if RT Plan created by Oncentra Brachy
>Referenced ROI Number	(3006,0084)	1C	SCU - Provided if RT Plan created by Oncentra Brachy and the referenced ROI is in the structures set referenced by the plan. SCP - Used if RT Plan Created by Oncentra Brachy
>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

Attribute Name	Tag	Type	Notes
>DoseEngineID	(300B,xx35)	3	SCU - SCU - Provided if the plan is Collapsed Cone optimized SCP - Used if provided
>DoseEngineAccuracy Level	(300B,xx36)	3	SCU - SCU - Provided if the plan is Collapsed Cone optimized SCP - Used if provided
>DoseEnginePrecalculationBLOB	(300B,xx37)	3	SCU - SCU - Provided if the plan is Collapsed Cone optimized SCP - Used if provided
>DoseEngineDoseValid	(300B,xx3A)	3	Indicates whether the Collapsed Cone dose is valid. Supported terms: TRUE FALSE When absent TRUE is assumed. SCU - Provided if the plan is Collapsed Cone optimized SCP - Used if provided
> End private attributes			
> ROI Optimisation Type	(3005,xx41)		SCU - Provided if RT Plan created by Oncentra Brachy SCP - Used if RT Plan Created by Oncentra Brachy Supported terms: TARGET ORGAN_AT_RISK
> Relative Standard Deviation	(3005,xx42)	1C	SCU - Provided if RT Plan created by Oncentra Brachy SCP - Used if RT Plan Created by Oncentra Brachy
Optimization Parameter Sequence	(3005,xx0D)	3	SCU - Provided if RT Plan created by Oncentra Brachy SCP - Used if RT Plan Created by Oncentra Brachy
>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 Brachy SCP - Used if RT Plan Created by Oncentra Brachy 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 Brachy SCP - Used if RT Plan Created by Oncentra Brachy 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	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: dose value and the RGB color triplet.
> Relative	(3007,xx05)	3	Used to say whether the Dose Value must 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 Brachy 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. 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.
>>Correlation Image Sequence	(0008,1140)	1C	Correlation series image list. Required if Correlation Image Series Sequence is sent.

Attribute Name	Tag	Type	Notes
>>> 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: 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: 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 Brachy 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.
>>>> Referenced SOP Class UID	(0008,1150)	1C	Uniquely identifies the referenced SOP List. Required if Referenced RT Dose Sequence is sent

Attribute Name	Tag	Type	Notes
>>>> 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			

8.1.1.2.7.7   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
>Dose Reference Number	(300A,0012)	1C	SCU - Provided SCP – Not used
>Dose Reference UID	(300A,0013)	3	SCU - Provided SCP - Not used

Attribute Name	Tag	Type	Notes
>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
>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

Attribute Name	Tag	Type	Notes
>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
End private attributes			

8.1.1.2.7.8 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

8.1.1.2.7.9 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 the same in all items in the Sequence.
>Patient Additional Position	(300A,0184)	1C	SCU - Not provided SCP - Not used
>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

Attribute Name	Tag	Type	Notes
>>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

8.1.1.2.7.10 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
>>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

Attribute Name	Tag	Type	Notes
>>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
>>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

8.1.1.2.7.11 RT Brachy Application Setups Module

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

Attribute Name	Tag	Type	Notes
>Reference Air Kerma Rate	(300A,022A)	1	SCU - Provided SCP - Used
>Source Strength	(300A,022B)	1C	SCU - Provided SCP - Used
>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

Attribute Name	Tag	Type	Notes
>Application Setup Manufacturer	(300A,0238)	3	SCU - Not provided SCP - Not used
>Template Number	(300A,0240)	3	SCU - Not provided SCP - Not used
>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

Attribute Name	Tag	Type	Notes
>> 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
>>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 Brachy 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"

Attribute Name	Tag	Type	Notes
>>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
>>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
>>Channel Marker Index	(300B,xx38)	3	Index of the catheter reconstruction point that is used as catheter marker If present, the Channel Marker Position (300B,xx39) should also be present. The catheter reconstruction points are the points in the (first and only) ROI Contour of the ROI referenced by Referenced RT Plan ROI Number (300B,xx00) or Referenced ROI Number (3006,0084) SCU – Provided if a catheter marker is present SCP – Used if provided
>>Channel Marker Position	(300B,xx39)	3	The distance from the zero point to the catheter marker (measured along the channel path) If present, the Channel Marker Index (300B,xx38) should also be present SCU – Provided if a catheter marker is present 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

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	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
> 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

8.1.1.2.7.12 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

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

8.1.1.2.7.13 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

8.1.1.2.8   RT Image Information Object Implementation

Oncentra Brachy can import and export RT Image objects. Oncentra Brachy 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 Brachy 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.

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

8.1.1.2.8.1   RT Image IOD Module Table

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

IE	Module	Reference	DICOM Usage	Presence of Module	Notes
	Multi-Frame	C.7.6.6	C - Required if pixel data is multi-frame data.	NOT CREATED	SCU - Not supported SCP - Not used
	RT Image	C.8.8.2	M	ALWAYS	
	Modality LUT	C.11.1	U	NOT CREATED	SCU - Not supported SCP - Not used
	VOI LUT	C.11.2	U	ALWAYS	SCU - Supported SCP - Used
	Approval	C.8.8.16	U	NOT CREATED	SCU - Not supported SCP - Not used
	Curve	C.10.2	U	NOT CREATED	SCU - Not supported SCP - Not used
	Audio	C.10.3	U	NOT CREATED	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	ALWAYS	

8.1.1.2.8.2   General Study Module for RT Image Objects (details only)

For a full overview of the General Study Module, see Section 8.1.1.2.1.2 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
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

8.1.1.2.8.3   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 Brachy. 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

8.1.1.2.8.4 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

8.1.1.2.8.5 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 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 the version number of Oncentra Brachy, including build number, which can change if an Oncentra Brachy 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

8.1.1.2.8.6 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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.8.7   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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.8.8   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
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 Brachy plan SCP - Not used
RT Image Name	(3002,0003)	3	SCU - Provided as concatenation of Plan Label and Beam Label from Oncentra Brachy, i.e. 'ppp:bbb'. SCP - Not used
RT Image Description	(3002,0004)	3	SCU – Provided as the Plan Label from Oncentra Brachy SCP - Not used
Operators' Name	(0008,1070)	2	SCU - Oncentra Brachy 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 - Provided by BP for flipped IBU images Absent or (1,0,0)(0,-1,0) for unflipped IBU images (1,0,0)(0,1,0) for vertically flipped IBU images (-1,0,0)(0,-1,0) for horizontally flipped IBU images (-1,0,0)(0,1,0) for both vertically and horizontally flipped IBU images 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

Attribute Name	Tag	Type	Notes
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
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

Attribute Name	Tag	Type	Notes
>>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
>>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"
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 Brachy. 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 Brachy. 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 Brachy. 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 Brachy. 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 Brachy. 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			

8.1.1.2.8.9 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

8.1.1.2.8.10 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - '1.2.840.10008.5.1.4.1.1.481.1' SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra Brachy. 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

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

8.1.1.2.9 RT Dose Information Object Implementation (SCU)

Oncentra Brachy can import and export RT Dose objects.

All RT Dose objects created by Oncentra Brachy 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 Brachy 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 Brachy 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 Brachy. It reflects the Oncentra Brachy format of an RT Dose created by Oncentra Brachy. When SCP is referenced for the RT Dose below, it is referring to an RT Dose that is imported by Oncentra Brachy via CM.

8.1.1.2.9.1 RT Dose IOD Module Table

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

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

8.1.1.2.9.2   General Study Module for RT Dose Objects (details only)

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

8.1.1.2.9.3   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 Brachy. 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

8.1.1.2.9.4   Frame of Reference Module

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	SCU - Duplicated from Reference Image Series. SCP - Required

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

8.1.1.2.9.5 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
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 the version number of Oncentra Brachy, including build number, which can change if an Oncentra Brachy 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

8.1.1.2.9.6 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 Brachy 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

Attribute Name	Tag	Type	Notes
>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

8.1.1.2.9.7 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

8.1.1.2.9.8 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 - '32' SCP - Required
Bits Stored	(0028,0101)	1	SCU - '32' SCP - Required
High Bit	(0028,0102)	1	SCU - '31' 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

Attribute Name	Tag	Type	Notes
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

8.1.1.2.9.9 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

8.1.1.2.9.10 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 - '32' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '32' SCP - Used
High Bit	(0028,0102)	1C	SCU - '31' 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

Attribute Name	Tag	Type	Notes
>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
>>>>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 can 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

Attribute Name	Tag	Type	Notes
>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 can 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
>>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. The maximum length of the file name is 255 characters. Required if sequence is sent.
>>Line dose output file name	(3005,xx33)	1C	Name of file for line dose output result. The maximum length of the file name is 255 characters. 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 Brachy 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			

8.1.1.2.9.11 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 Brachy). SCP – Not used
Structure Set Time	(3006,0009)	2	SCU – Time of creation (i.e. when saved in Oncentra Brachy). SCP – Not used
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

Attribute Name	Tag	Type	Notes
>ROI Generation Algorithm	(3006,0036)	2C	SCU – Provided SCP – Used if provided Enumerated value MASTERPLANISO used to mark point as an ISO center point.
>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'.

8.1.1.2.9.12 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.

8.1.1.2.9.13 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 can 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			

8.1.1.2.9.14 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 Brachy. SCP - Used

Attribute Name	Tag	Type	Notes
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

8.1.1.2.10 Spatial Registration Object Implementation

8.1.1.2.10.1 Spatial Registration IOD Module Table

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

8.1.1.2.10.2 General Study Module for Spatial Registration Objects (details only)

For a full overview of the General Study Module, see Section 8.1.1.2.1.2 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

8.1.1.2.10.3 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
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

8.1.1.2.10.4 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

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

8.1.1.2.10.5 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 the version number of Oncentra Brachy, including build number, which can change if an Oncentra Brachy 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

8.1.1.2.10.6 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

Attribute Name	Tag	Type	Notes
>Referenced Image Sequence	(0008,1140)	1C	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
>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

8.1.1.2.10.7 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

8.1.1.2.10.8 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 Brachy. 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

8.1.2 Usage of Attributes from received IOD's

N/A

8.1.3 Attribute Mapping

N/A

8.1.4 Coerced/Modified fields

N/A

8.2 Data Dictionary of Private Attributes

Tag	Attribute Name	VR	VM	Attribute Description
(0021,00xx)	Private Creator			NUCLETRON
(0021,xx00)	Reference Image Series UID	UI	1	
(0029,00xx)	Private Creator	LO	1	NUCLETRON
(0029,xx00)	Pat Fall ID	DS	1	
(0029,xx01)	Form Type	CS	1	
(0029,xx02)	Form Index	SH	1	

Tag	Attribute Name	VR	VM	Attribute Description
(0029,xx03)	Snapshot Beam Number	IS	1	
(0029,xx04)	Snapshot Status	CS	1	
(3005,00xx)	Private Creator			MDS NORDION CALCULATION
(3005,xx00)	Density Basis In Dose Calculation	CS	1	
(3005,xx04)	Dose Calculation Algorithm Sequence	SQ	1	
(3005,xx06)	Dose Calculation Algorithm Name	CS	1	
(3005,xx08)	RTPlan Optimisation Status	CS	1	
(3005,xx0A)	RTPlan Calculation Status	CS	1	
(3005,xx0C)	Beam Specific Optimisation Parameter Sequence	SQ	1	
(3005,xx0D)	Plan Specific Optimisation Parameter Sequence	SQ	1	
(3005,xx0E)	Optimisation Parameter Type	LO	1	
(3005,xx10)	Optimisation Parameter Value	DS	1	
(3005,xx12)	Compensator Tray Material ID	SH	1	
(3005,xx13)	Compensator Tray Thickness	DS	1	
(3005,xx14)	Block Tray Material ID	SH	1	
(3005,xx15)	Block Tray Thickness	DS	1	
(3005,xx16)	External Axial Extension	DS	1	
(3005,xx17)	Algorithm Specific Parameter Sequence	SQ	1	
(3005,xx18)	Algorithm Specific Parameter Type	CS	1	
(3005,xx19)	Algorithm Specific Parameter Value	CS	1	
(3005,xx20)	TMS Beam Weight	DS	1	
(3005,xx22)	TMS Wedge Fraction	DS	1	
(3005,xx23)	Gy Per Meter set	DS	1	
(3005,xx24)	Effective Wedge Angle	DS	1	
(3005,xx25)	Next Beam Number	DS	1	
(3005,xx26)	Dose Component Sequence	SQ	1	
(3005,xx27)	Dose Component Type	CS	1	
(3005,xx28)	Dose Component Value	DS	1	
(3005,xx30)	QA Parameters Sequence	SQ	1	
(3005,xx31)	bRequest QA Output	CS	1	
(3005,xx32)	sLine Dose Input Filename	LT	1	
(3005,xx33)	sLine Dose Output Filename	LT	1	
(3005,xx40)	Roi Optimization Info Sequence	SQ	1	
(3005,xx41)	Roi Optimization Type	CS	1	
(3005,xx42)	Relative Standard Deviation	DS	1	
(3005,xx43)	Library Plan ROI Info	LT	1	
(3005,xx44)	Library Plan Info	ST	1	
(3005,00xx)	Private Creator	LO	1	MDS NORDION OTP ANATOMY
(3005,xx00)	AM ROI Private Attribute Sequence	SQ	1	
(3005,xx02)	bIs Complete Flag	CS	1	
(3005,xx04)	lVisualization Type	DS	1	
(3005,xx06)	lOpacity	DS	1	
(3005,xx08)	lClosure Type	DS	1	
(3005,xx0A)	bHelper Visible	CS	1	
(3005,xx0C)	bSliced Visible	CS	1	

Tag	Attribute Name	VR	VM	Attribute Description
(3005,xx0E)	bVisible	CS	1	
(3005,xx10)	Grid Spacing	DS	1	
(3005,xx12)	lTriangulation Algorithm	DS	1	
(3005,xx13)	Grid Spacing Mode	DS	1	
(3005,xx15)	Align To Structure Set Grid	CS	1	
(3005,xx2A)	lMean And IWindow	CS	1	
(3005,xx20)	sRegistration Type	LO	1	
(3005,xx22)	lNum Point Pairs	DS	1	
(3005,xx24)	Same As 44 or 54	UN	1	
(3005,xx26)	Same As 46 or 56	UN	1	
(3005,xx28)	Same As 48 or 58	UN	1	
(3005,xx2C)	AM Next ROI Number	DS	3	
(3005,xx2E)	TPRP Roi Number	DS	3	
(3005,xx30)	TPRT Frame Of Reference UID	DS	1	
(3005,xx44)	AM Registration Point Pair Sequence	SQ	1	
(3005,xx46)	AM Registration Point Pair	DS	1	
(3005,xx48)	AM Landmark Registration Name	LO	1	
(3005,xx54)	lNum Surface Pts	DS	1	
(3005,xx56)	lNum Iteration Pts	DS	1	
(3005,xx58)	AM Surface Point Pair	DS	1	
(3005,xx59)	TPRP Info Sequence	SQ	1	
(3005,00xx)	Private Creator	LO	1	MDS NORDION OTP DRR
(3005,xx00)	BMDRR Mean And Window	DS	1	
(3005,xx02)	BMDRR Image Quality Attributes	DS	1	
(3005,xx03)	dMagnification	DS	1	
(3005,xx04)	dDlg Focus Iso center Distance	DS	1	
(3005,xx05)	sBeam Direction	CS	1	
(3005,xx06)	dDlg Gantry Angle	DS	1	
(3005,xx07)	dL-Arm Angle	DS	1	
(3005,xx08)	dC-Arm Angle	DS	1	
(3005,xx09)	dDlg Isocenter Film Distance	DS	1	
(3005,xx0A)	dReconstruction Angle	DS	1	
(3005,xx0B)	bFlip Horizontal	DS	1	
(3005,xx0C)	bFlip Vertical	DS	1	
(3005,xx0D)	sReconstruction Method	CS	1	
(3005,xx0E)	dDimension Cross Wire	DS	1	
(3005,xx0F)	dDistance Top Cross To Side Cross Axis	DS	1	
(3005,xx10)	dDistance Bottom CrossTo Side Cross Axis	DS	1	
(3005,xx11)	dDistance Left Side Cross To Top Bottom Cross Axis	DS	1	
(3005,xx12)	dDistance Right Side CrossToTop Bottom Cross Axis	DS	1	
(3005,xx13)	dLarge Cross Point1	DS	2	
(3005,xx14)	dLarge Cross Point2	DS	2	
(3005,xx15)	dSmall Cross Point1	DS	2	
(3005,xx16)	dSmall Cross Point2	DS	2	
(3005,xx17)	dCross Translation	DS	2	

Tag	Attribute Name	VR	VM	Attribute Description
(3005,xx18)	dCross Angle	DS	1	
(3007,00xx)	Private Creator	LO	1	MDS NORDION OTP EM
(3007,xx00)	dAbs Dose Gy At 100 Percent	DS	1	
(3007,xx02)	sDose Display Mode	CS	1	
(3007,xx04)	EM Isoline Sequence	SQ	1	
(3007,xx05)	bRelative	CS	1	
(3007,xx06)	Dose Value	DS	1	
(3007,xx08)	RGB Triplet Color	DS	3	
(3007,xx0A)	Normalisation XYZ Point	DS	3	
(3007,xx0B)	Normalisation ROI Info Sequence	SQ	1	
(3007,xx0C)	Referenced ROI Number	DS	1	
(3007,xx0D)	sMin Max Average	CS	1	
(3007,xx0E)	dPrescribed Percentage Level	DS	1	
(3007,xx0F)	bNormalized	DS	1	
(3007,xx10)	dBeam Weight Point	DS	3	
(3007,xx11)	bBeam Weight Point On	DS	1	
(3007,xx12)	bDose Per Fx Display	DS	1	
(3007,xx13)	dWeight To Meterset Scale Factor	DS	1	
(3007,xx14)	sNormalization Type	LO	1	
(3007,xx15)	Normalization Distance	DS	1	
(3007,xx16)	Normalization Factor	DS	1	
(3007,xx17)	Dose Points Optimization Roi Number	DS	1	
(3007,xx18)	Normalization F-Factor	DS	1	
(3007,xx19)	Prescription Time	DT	1	
(3007,xx1A)	Line Type	DS	3	
(3007,xx1B)	Line Width	DS	3	
(3007,xx1C)	bVisible	CS	3	
(3007,00xx)	Private Creator	LO	1	NUCLETRON
(3007,xx15)	Normalization Point Weight	DS	1	
(3007,xx16)	Point Name	LO	1	
(3007,xx17)	Referenced Catheter	DS	1	
(3007,xx18)	Referenced Catheter Dwell Position	DS	1	
(3007,xx19)	Drr Generation Method	SH	1	
(3007,xx20)	Drr Generation Min Threshold	DS	1	
(3007,xx21)	Drr Generation Max Threshold	DS	1	
(3007,xx22)	Optimization Point Weight	DS	1	
(3007,xx23)	Optimization Relative Dose	DS	1	
(3007,xx24)	Reconstruncted Point Set Min Distance	DS	1	
(3007,xx25)	Used For Normalization	CS	1	
(3007,xx26)	Used For Optimization	CS	1	
(3007,xx27)	Margin Catheter Activation	DS	1	
(3007,xx28)	Margin Dose Control	DS	1	
(3007,xx29)	Organ At Risk Minimum Dose	DS	1	
(3007,xx30)	Point Set Generation Reference	IS	1	
(3007,xx31)	Internal Dose Reference Type	CS	1	

Tag	Attribute Name	VR	VM	Attribute Description
(3007,xx32)	Point Set Generation Distance	DS	1	
(3007,xx33)	Referenced Catheter Set	DS	1-n	
(3007,xx34)	Point Set Generation Direction	DS	3	
(3007,xx35)	Point Set Generation Rule Sequence	SQ	1	
(3007,xx36)	Point Set Generation Rule Type	LO	1	
(3007,xx37)	Point Set Generation Rule Name	LO	1	
(3007,xx38)	Point Set Generation Rule Number	IS	1	
(3007,xx39)	Point Set Generation Rule Number Of Points	IS	1	
(3007,xx40)	Point Set Generation Rule Referenced Catheter Dwell position Pairs	DS	1-n	
(3007,xx41)	Point Set Generation Rule Reference Sequence	SQ	1	
(3007,xx42)	Point Set Valid	CS	1	
(3007,xx43)	Point 2D Sequence	SQ	1	
(3007,xx44)	Point 2D Shifts	DS	1-n	
(3007,xx45)	Point 2D Data	DS	2-n	
(3007,xx46)	Point Set Generation Rule Clip Outside Implant	CS	1	
(3007,xx47)	Point Set Generation Rule Manually Modified	CS	1	
(3007,xx48)	Marker Positions	IS	1-n	
(3007,xx49)	Point 2D Marker Positions	IS	1-n	
(3007,xx4A)	Reconstruction Segment Error Sequence	SQ	1	
(3007,xx4B)	Marker Position	IS	1	
(3007,xx4C)	Point Offset From Tip	DS	1	
(3007,xx4D)	Point Relative Shift	DS	1	
(3007,xx4E)	Segment Length	DS	1	
(3007,xx4F)	Segment Error	DS	1	
(3007,xx50)	Segment Valid	CS	1	
(3007,xx51)	2D Catheter Reconstruction Catheter Shift	DS	1	
(3007,xx52)	2D Catheter Reconstruction Total Length Error	DS	1	
(3007,xx53)	2D Catheter Reconstruction Total Length Valid	CS	1	
(3007,xx54)	2D Catheter Reconstruction Valid	CS	1	
(3007,xx55)	2D Catheter Tracking Reconstruction State	CS	1	
(3007,xx56)	Drr Generation Field DRR	CS	1	
(3007,xx57)	Drr Generation CT Range Shift	CS	1	
(3007,xx58)	Drr Generation Inverted	CS	1	
(3007,xx59)	Patient Structure Set Grid Definition Point	DS	3	
(3007,xx60)	Patient Structure Set Grid Spacing	DS	3	
(3007,xx61)	Drr Generation Segment Union	DS	1	
(3007,xx62)	Drr Generation Field Margin	DS	1	
(3007,xx63)	High Dose Level	DS	1	
(3007,xx64)	Low Dose Level	DS	1	
(3007,xx65)	Vicinity Exponent	DS	1	
(3007,xx66)	Low Dose Distance	DS	1	
(3007,xx69)	Matrix Dimensions	DS	2	
(3007,xx6A)	Density Matrix Mode	DS	1	
(3007,xx6B)	Density Matrix Voxel Size	DS	3	
(3007,xx6C)	Density Matrix Definition Point	DS	3	
(3007,xx6D)	Density Matrix Position	DS	3	
(3007,xx6E)	Density Matrix Number Of Voxels	DS	3	

Tag	Attribute Name	VR	VM	Attribute Description
(3007,xx70)	Patient Structure Set Grid Spacing Mode	DS	1	
(3007,xx71)	Patient Structure Set Grid Definition Point Mode	DS	1	
(3007,xx72)	Collapsed Cone Priority	IS	3	
(3007,xx73)	Is Collapsed Cone Hounsfield Based	CS	3	
(3009,00xx)	Private Creator	LO	1	NUCLETRON
(3009,xx00)	Case Manifest Sequence	SQ	1	
(3009,xx01)	Reference Image Series Sequence	SQ	1	
(3009,xx02)	Correlation Image Series Sequence	SQ	1	
(3009,xx03)	RT Structure Set Sequence	SQ	1	
(3009,xx04)	Referenced RT Dose Series Sequence	SQ	1	
(3009,xx05)	Referenced RT Image Series Sequence	SQ	1	
(3009,xx06)	Approved	SQ	1	
(3009,xx20)	Natural Dvh Parameter Low Dose	DS	1	
(3009,xx21)	Natural Dvh Parameter High Dose	DS	1	
(3009,xx22)	Natural Dvh Parameter Number Of Points	DS	1	
(3009,xx23)	Natural Dvh Parameter Number Of Bins	DS	1	
(3009,xx24)	Natural Dvh Implant Margin	DS	3	
(3009,xx25)	Non-Natural Dvh Parameter Low Dose	DS	1	
(3009,xx26)	Non-Natural Dvh Parameter High Dose	DS	1	
(3009,xx27)	Non-Natural Dvh Parameter Number Of Points	DS	1	
(3009,xx28)	Non-Natural Dvh Parameter Number Of Bins	DS	1	
(3009,xx29)	Non-Natural Dvh Implant Margin	DS	3	
(3009,xx30)	Auto Dwell Time Gradient	CS	1	
(3009,xx4A)	Film Setup Changed During Reconstruction	CS	1	
(300B,00xx)	Private Creator			NUCLETRON
(300B,xx00)	Referenced RT Plan ROI Number	IS	1	
(300B,xx01)	Referenced Contour Number	IS	1	
(300B,xx02)	Reconstruction Starts At Tip	CS	1	
(300B,xx03)	Private Wedge Information	LT	1	
(300B,xx04)	Discarded Segment	DS	1	
(300B,xx05)	Treatment Machine Zip	DS	1	
(300B,xx06)	Source Zip	DS	1	
(300B,xx07)	Calibration Zip	DS	1	
(300B,xx08)	Source Calibration Time	DT	1	
(300B,xx09)	Reconstruction Mode	DS	1	
(300B,xx0A)	Treatment Unit Label	LO	1	
(300B,xx0B)	Pixel Data UID	UI	1	
(300B,xx0C)	Source Identification Number	DS	1	
(300B,xx0D)	Applicator Model BLOB	UN	1	
(300B,xx0E)	Reconstruction Method	DS	1	
(300B,xx0F)	Assembly Name	LO	1	
(300B,xx10)	Part Set Name	LO	1	
(300B,xx11)	Assembly Details	ST	1	
(300B,xx12)	Assembly Creation Date	LO	1	
(300B,xx13)	Reconstruction Model Id	LO	1	

Tag	Attribute Name	VR	VM	Attribute Description
(300B,xx14)	Channel Shield Active	CS	1	
(300B,xx15)	Channel Shield Start Angle	DS	1	
(300B,xx16)	Channel Shield Stop Angle	DS	1	
(300B,xx17)	Referenced Conformance Roi	DS	1	
(300B,xx18)	Roi Conformance Method	DS	1	
(300B,xx19)	Roi Conformance Parameters	ST	1	
(300B,xx20)	Roi Conformance State	DS	1	
(300B,xx21)	Referenced Isocenter Placement Roi	DS	1	
(300B,xx22)	Isocenter Placement State	DS	1	
(300B,xx23)	Library Plan ROI Info 23	LT	1	
(300B,xx24)	Library Plan ROI Info 24	LT	1	
(300B,xx25)	Channel Shield Reconstruction Error	CS	1	
(300B,xx26)	Has Measured Source Path	CS	1	
(300B,xx27)	Channel Tip length	DS	1	
(300B,xx28)	Rectangular Field Mode	DS	1	
(300B,xx29)	Flexitron Plan Code	LO	1	
(300B,xx30)	Intra-uterine Protrusion	DS	1	
(300B,xx31)	Config Table Name	LO	1	
(300B,xx32)	Rotation Angle Zx	DS	1	
(300B,xx33)	Hipo BLOB	UN	1	
(300B,xx34)	Locked	CS	1	
(300B,xx35)	Dose Engine ID	LO	3	
(300B,xx36)	Dose Engine Accuracy Level	LO	3	
(300B,xx37)	Dose Engine Pre-calculation BLOB	UN	3	
(300F,00xx)	Private Creator	LO		NUCLETRON
(300F,xx00)	Embedded Structure Set Sequence	SQ	1	
(300F,xx01)	Embedded Dcm Input Sequence	SQ	1	
(3003,00xx)	Private Creator	LO		PRIVATE_CODE_STRING_3003
(3003,xx10)	C-Arm Angle	DS	1	
(3003,xx20)	L-Arm Angle	DS	1	
(3003,xx30)	Flip Horizontal	DS	1	
(3003,xx31)	Flip Vertical	DS	1	