

DICOM Conformance Statement

*Oncentra[®] Prostate 4.2
including
Oncentra[®] Seeds*

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Contact Information

TECHNICAL SUPPORT HELPDESK

Tel.: +31 318 557 111

Fax: +31 318 557 361

E-mail: oncossupport@nucletron.com

HEAD OFFICE AND MANUFACTURER

Nucletron B.V.

Waardgelder 1

3905 TH VEENENDAAL

The Netherlands

Tel.: +31 318 557 133

E-mail: info@nucletron.com

Website: www.nucletron.com

For other office locations visit www.elekta.com

Table of Contents

1.	Introduction	1
1.1	Scope	1
1.1.1	Oncentra Prostate.....	1
1.1.2	Smoothbase.....	1
1.2	Intended Audience.....	1
2.	Document History	2
3.	Related Documents	2
4.	Definitions, Terms and Abbreviations	2
5.	Implementation Model	3
5.1	Application Data Flow Diagram	4
5.2	Data Types	5
5.3	Data Hierarchy.....	6
5.4	Functional Definitions of AE's.....	6
5.4.1	Query/Retrieve SCU AE.....	6
5.4.2	Storage SCU AE.....	6
5.4.3	Storage SCP AE	6
5.4.4	Print SCU AE.....	6
5.4.5	Modality worklist SCU AE.....	7
5.5	Sequencing of Real-World Activities.....	7
6.	AE Specifications	7
6.1	Query Retrieve SCU AE – Specification	7
6.1.1	Association Establishment Policies.....	7
6.1.2	Association Initiation by Real-World Activity	8
6.1.3	Association Acceptance Policy.....	8
6.2	Storage SCU AE – Specification	9
6.2.1	Association Establishment Policies.....	9
6.2.2	Association Initiation by Real-World Activity	9
6.2.3	Association Acceptance Policy.....	10
6.3	Storage SCP AE – Specification	10
6.3.1	Association Establishment Policies.....	10
6.3.2	Association Initiation by Real-World Activity	11
6.3.3	Association Acceptance Policy.....	11
6.4	Print SCU AE – Specifications	12
6.4.1	Association Establishment Policies.....	13
6.4.2	Association Initiation by Real-World Activity	13
6.4.3	Association Acceptance Policy.....	14
6.5	Modality Worklist SCU AE – Specification	14
6.5.1	Association Establishment Policies.....	14
6.5.2	Association Initiation by Real-World Activity	15
6.5.3	Association Acceptance Policy.....	15

Table of Contents

6.5.4	SOP Specific Conformance - Modality Worklist Management	16
7.	Communication Profiles	17
7.1	Supported Communication Stacks	17
7.2	TCP/IP Stack.....	17
7.3	Physical Media Support	18
8.	Extensions/Specializations/Privatizations	18
8.1	Standard Extended/Specialized/Private SOPs.....	18
8.2	Private Transfer Syntaxes.....	18
9.	Configuration	18
9.1	AE Title/Presentation Address Mapping	18
9.2	Configurable Parameters	19
10.	Support of Extended Character Sets	19
11.	Codes and Controlled Terminology	19
12.	Security Profiles	19
Appendix A	DICOM – Oncentra Prostate; DICOM – Oncentra Prostate; Specific Implementations Details	20
A.1	Definitions.....	20
A.2	CT Image Module Table (A.3).....	21
A.3	MR Image Module Table (A.4)	21
A.4	US Image Module Table (A.6).....	22
A.5	US Multi Frame Image Module Table (A.7).....	23
A.6	RT Structure Set Module Table (A.19).....	24
A.7	Patient Module Attributes (C.7.1.1).....	25
A.8	General Study Module Attributes (C.7.2.1).....	25
A.9	Patient Study Module Attributes (C.7.2.2).....	26
A.10	General Series Module Attributes (C.7.3.1)	26
A.11	Frame Of Reference Module Attributes (C.7.4.1).....	27
A.12	General Equipment Module Attributes (C.7.5.1)	28
A.13	US Probe Module Attributes (Private).....	28
A.14	General Image Module Attributes (C.7.6.1)	28
A.15	Image Plane Module Attributes (C.7.6.2).....	29
A.16	Image Pixel Module Attributes (C.7.6.3)	29
A.17	CT Image Module Attributes (C.8.2.1)	30
A.18	MR Image Module Attributes (C.8.3.1)	31
A.19	US Image Module Attributes (C.8.5.6).....	32
A.20	General Acquisition Attributes (Private).....	35
A.21	General Geometry Attributes (Private).....	35
A.22	General Template Attributes (Private)	35
A.22.1.	General Template Components Attributes (Private).....	35
A.23	RT Series Module Attributes (C.8.8.1).....	36
A.24	Structure Set Module Attributes (C.8.8.5)	36
A.25	ROI Geometry Attributes.....	37
A.26	ROI Contour Module Attributes (C.8.8.6).....	38
A.27	RT ROI Observations Module Attributes (C.8.8.8)	38

A.28	VOI LUT Module Attributes (C.11.2).....	39
A.29	SOP Common Module Attributes (C.12.1).....	39
Appendix B	RT Treatment Plan & RT Dose	40
B.1	RT Plan IOD (A.20).....	40
B.2	RT General Plan Module (C.8.8.9)	41
B.3	RT Prescription Module (C.8.8.10)	41
B.4	Fraction Scheme Module (C.8.8.13).....	42
B.5	RT Brachy Application Setups Module (C.8.8.15).....	43
B.6	Approval Module (C.8.8.9)	49
B.7	Marker Module (Private) – Patient-, Marker-, Applicator Points.....	50
B.8	Settings Module (Private).....	50
B.9	Approval (C.8.8.16).....	50
B.10	SOP Common Module Attributes (C.12.1).....	50
B.11	RT Dose IOD Module Table.....	51
B.11.1.	Patient Module.....	51
B.11.2.	General Study Module	52
B.11.3.	RT Series Module	52
B.11.4.	Frame of Reference Module.....	53
B.11.5.	General Equipment Module.....	53
B.11.6.	General Image Module.....	53
B.11.7.	Image Plane Module	54
B.11.8.	Image Pixel Module.....	54
B.11.9.	Multi-Frame Module	55
B.11.10.	RT Dose Module.....	55
B.11.11.	Structure Set Module	56
B.11.12.	ROI Contour Module	57
B.11.13.	RT Dose ROI Module.....	58
B.11.14.	SOP Common Module Attributes (C.12.1)	58
Appendix C	Private Data Elements	59
C.1	US Probe Module Attributes (Private).....	59
C.2	General Acquisition Attributes (Private).....	60
C.3	General Geometry Attributes (Private).....	60
C.4	General Template Attributes (Private)	60
C.5	General Template Components Attributes (Private).....	61
C.6	ROI Geometry Attributes.....	61
C.7	Marker Module (Private) – Patient-, Marker-, Applicator Points.....	62
C.8	Settings Module (Private).....	62

1. Introduction

This conformance statement specifies how the Oncentra Prostate application conforms to the DICOM 2003 V3.0 standard and the IEC Technical Report 61852. This document follows the guidelines for DICOM conformance statements of IEC technical Report 62266. Oncentra Prostate uses the DICOM protocol to receive and transmit objects that are used in the radiation therapy process.

1.1 Scope

1.1.1 Oncentra Prostate

Oncentra Prostate is a 'real time' treatment planning system for brachytherapy, specially designed for the treatment of prostate cancer. Direct 3D ultrasound imaging of the implant gives the possibility to update the treatment plan during insertion of the catheters in the prostate.

Before treatment, the software provides the physician with anatomical and dosimetric information, which is used to determine the positioning and loading of radioactive sources. The software also provides a variety of plan evaluation tools to assist in generating the most optimal dose distribution (e.g. dose verification at a point and dose volume histograms).

1.1.2 Smoothbase

Oncentra Prostate uses Smoothbase as database to store plans and images. The Smoothbase database is used in different Nucletron products. The main features of Smoothbase are:

- User management.
- Store and retrieve images, treatment plans, etc.
- Import treatment plans, images, etc. from another DICOM source or,
- Export treatment plans, images, etc. to another DICOM destination or,
- Import or export treatment plans, images, etc. to a DICOM Media file.
- Print images to a DICOM printer
- Query and Retrieve User (SCU) functionality, which may be used to query and retrieve DICOM objects from a remote Query and Retrieve Provider (SCP).
- Query worklist functionality (SCU) and handling of query responses.

1.2 Intended Audience

This document is intended for:

- Users of Oncentra Prostate, who want to use DICOM with the Application.
- Marketing and Sales persons.
- System Integrators of medical equipment.
- Other vendors offering interfacing via DICOM.

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

2. Document History

Revision	Who	Reason for Change	Changes
00	John de Ridder	Initial version for Oncentra Prostate 4.0 including Oncentra Seeds	DICOM tag 3004,000C is now confirm DICOM Standard 2008.
01	John de Ridder	Release of Oncentra Prostate v4.1 including Oncentra Seeds	Two tags added for connectivity with Flexitron afterloader.
02	John de Ridder	Release of Oncentra Prostate v4.2 including Oncentra Seeds	Multi language support and Supporting all mandatory tags from DICOM standard 2011.

3. Related Documents

Reference	Revision	Description
777.00315 MAN	*	Oncentra Prostate including Oncentra Seeds Reference Manual
777.00316 MAN	*	Oncentra Prostate including Oncentra Seeds User Manual
777.00331 MAN	*	Oncentra Prostate including Oncentra Seeds Service Manual
DICOM2003	*	Digital Imaging and Communications in Medicine

* Latest version (available via the Nucletron Extranet).

4. Definitions, Terms and Abbreviations

This section provides the definitions of terms, acronyms, and abbreviations, which are used throughout the document.

Abbreviation	Description
Oncentra Prostate	Software tool to acquire ultrasound images and to perform and verify the prostate treatment plans.
Smoothbase	Database used in several Nucletron products to store and retrieve patient data and to exchange such data with other products using DICOM.
AE	Application Entity, according to DICOM terminology
DICOM	Digital Imaging and Communications in Medicine, a standard on image communications in medical applications
DIMSE	DICOM Message Service element
IE	Information Entity
IOD	Information Object Definition, according to DICOM terminology
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
SCU	Service Class User, according to DICOM terminology
SCP	Service Class Provider, according to DICOM terminology
SOP	Service-Object-Pair, a definition of an information object (like an image) and of a service (like storage) that can be performed for the object
TCP/IP	Transmission Control Protocol / Internet Protocol, a widely used computer networking protocol
VR	Value Representation, a data encoding method in DICOM
UID	Unique Identifier used to identify an object by a worldwide unique Identifier, according to DICOM terminology.
C-MOVE	DIMSE for transfer of object instance(s) from a remote AE, whose attributes match a specified set of attributes, to another remote AE, which could be the AE of the requestor.
C-FIND	DIMSE for matching of a set of attributes to the attributes of a set of DICOM object instances on a remote AE.

Abbreviation	Description
C-STORE	DIMSE for transfer of a DICOM object instance to a remote AE.
US	Ultrasound System
ROI	Region of Interest; defined contour on a slice
VOI	Volume of interest; consists of multiple ROI's

5. Implementation Model

In its current version Smoothbase is, very basically, an implementation of

- Export Command, which can send DICOM objects to a Remote Storage SCP.
- Import Command, which can receive DICOM objects from a Remote Storage SCU.
- DICOM Basic Print, which can send DICOM objects to a DICOM Basic Print SCP.
- Query and Retrieve User (SCU) functionality, which may be used to query and retrieve DICOM objects from a remote Query and Retrieve Provider (SCP).
- Query worklist (SCU) functionality, which can be used to query a worklist from a remote worklist provider.

The data flow diagram shown in Figure 1 represents all DICOM Application Entities present in an instantiation of the Oncentra Prostate product and maps these to real world activities and applicable user actions.

5.1 Application Data Flow Diagram

Figure 1 shows a diagram illustrating the data flow in the application model.

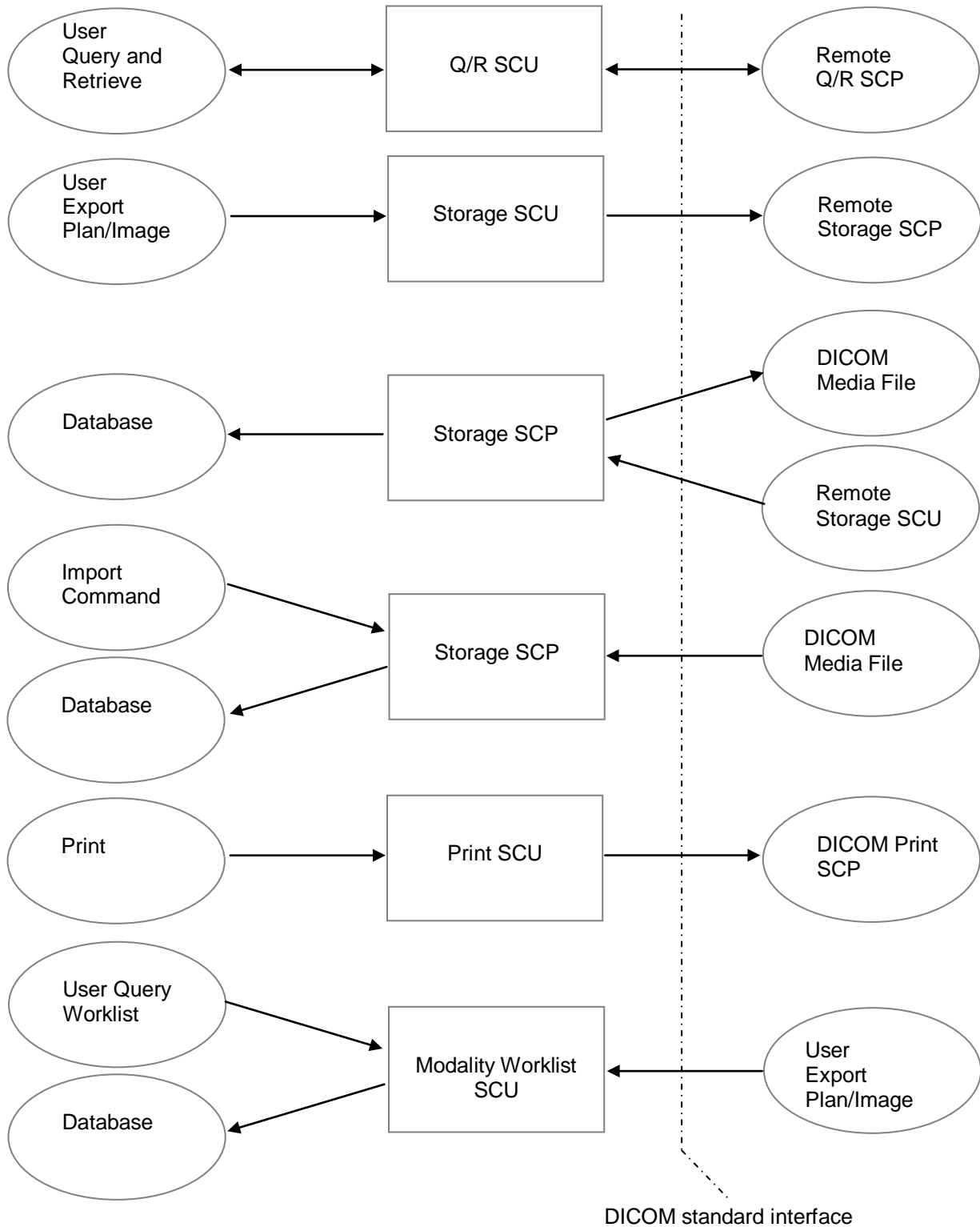


Figure 1 Application Data Flow Diagram

The Export Command is invoked when a user requests to transfer objects to a Remote Storage SCP. The objects are retrieved from the database and sent to the remote system.

The Storage SCP is a background process, which is started when the system boots. When an association is received, the incoming objects will be validated and stored in the database.

The Import command is invoked when a user requests to import from a DICOM media file. The selected DICOM media is imported and incoming objects will be validated and stored in the database.

The DICOM Print is invoked when a user requests to print images to a remote DICOM printer. The images are composed to the Basic Grayscale Print protocol and sent to the remote system.

On request of the user, the Modality Worklist is queried at the remote modality worklist SCP. The worklist items returned are made available to the user. The user can select a worklist item from the worklist. The attributes settings that belong to the selected worklist item will be applied to the objects created, at the moment that the requested task in the selected worklist item is carried out.

5.2 Data Types

Smoothbase supports the following data types:

- US frames including planning mode (PRE, LIFE, POST) (see Appendix A for details)
- CT Slices
- MR Slices
- Contours
- Treatment plans
- Images (Screenshots)

The previously handled volumes are calculated automatically from the frames during loading.

The supported data types are stored using the DICOM format using the following mapping to the supported DICOM standard:

Data Type	DICOM format
US frame	DICOM US
CT Slices	DICOM CT
MR Slices	DICOM MR
Contours	RT Structure Set
Treatment plans	RT Brachy Plan
Images	Secondary Capture

5.3 Data Hierarchy

The following figure shows the relationship between the different data.

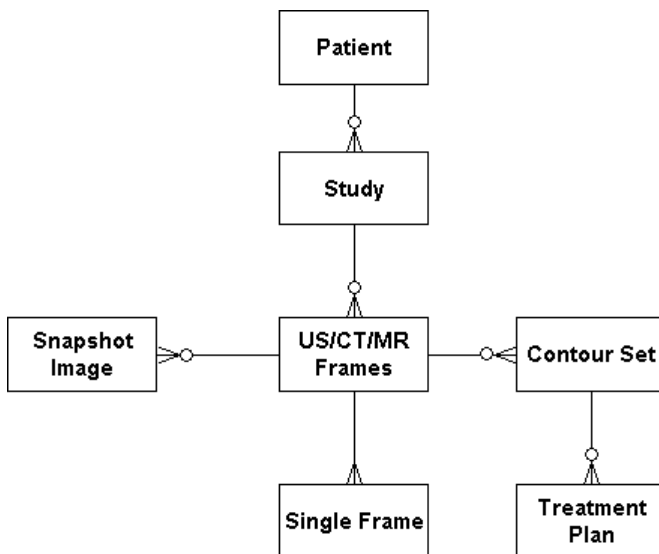


Figure 2 Data hierarchy

5.4 Functional Definitions of AE's

All communications and transfer with the remote application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack or the DICOM Media File.

5.4.1 Query/Retrieve SCU AE

The Query/Retrieve SCU AE supports negotiation and establishment of association with a Query/Retrieve SCP AE. It supports querying for patients, studies, series and series items (plans/images), as well as issuing of C-MOVE requests for selected information objects. If a Find or Move request is issued, the SCU AE will synchronously wait for a response from the remote SCP AE.

5.4.2 Storage SCU AE

The Storage SCU AE establishes an association with a user selected remote AE just prior to sending a Store request to that AE.

5.4.3 Storage SCP AE

The Storage SCP AE waits for an association to accept at the TCP/IP port number 104. When an association request is received with valid connections criteria, the Storage SCP AE responds with a list of SOP class UIDs that it will accept. It then waits for a Store request. If a Store is received, then from all incoming plans and images that are conformant to the association, Smoothbase domain objects are created. These domain objects are validated against their validation rules and stored in the database when valid.

5.4.4 Print SCU AE

The Print SCU AE establishes an association with a user selected remote AE just prior to sending a Print request to that AE.

5.4.5 Modality worklist SCU AE

The modality worklist SCU AE supports negotiation and establishment of association with modality worklist SCP AE. It supports querying for the basic worklist.

5.5 Sequencing of Real-World Activities

Not applicable.

6. AE Specifications

6.1 Query Retrieve SCU AE – Specification

The Query Retrieve SCU AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a Query Retrieve SCU.

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi Frame Image	1.2.840.10008.5.1.4.1.1.3.1
RT Structure Set	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
RT Dose	1.2.840.10008.5.1.4.1.1.481.2

6.1.1 Association Establishment Policies

6.1.1.1 General

The Query Retrieve SCU AE will initiate an association as a Query Retrieve Service Class User, requesting data about object instances and object instances themselves.

The PDU size is configurable and should be defined between 4096 bytes and 28672K bytes.

6.1.1.2 Number of Associations

The maximum number of simultaneous associations is one.

6.1.1.3 Asynchronous Nature

The Query Retrieve SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

6.1.1.4 Implementation Identifying Information

The Implementation Identifying information is defined as followed:

- The implementation class UID is 2.16.840.1.
- The implementation version name is MergeCOM3_321

6.1.2 Association Initiation by Real-World Activity

The Query Retrieve SCU AE initiates an association for the appropriate Query Retrieve Service Class that corresponds to the set of information objects that is requested for lookup or for transfer. The association is closed when all queries have been performed or all requested information objects have been transferred or when an error occurs.

The user selects a function for querying and retrieving messages from a known source that supports Query and Retrieve as a Provider.

6.1.2.1 Real-World Activity for Find and Move execution operations of Oncentra Application

The Oncentra application opens associations to do C-FINDs and C-MOVES. The associations are closed after an error or when the initiator requests them to be closed.

6.1.2.2 Associated Real-World Activity for the Find and Move operations

The Oncentra application can load patient data by means of a DICOM Query Retrieve dialog.

Based on operator supplied search parameters, the application selects an appropriate query model to be used in a C-FIND request to a selected Query Retrieve Provider.

The result returned from the Query Retrieve Provider, if any, is displayed in a dialog, from which the operator may select candidates for retrieval to the Smoothbase Storage Provider.

The selected retrieval candidate data, if any selected, is used in a new association with a C-MOVE request to the Query Retrieve Provider. The result, if successful, is displayed in the application and may be used for further processing.

6.1.2.3 Proposed Presentation Contexts

The presentation contexts that are proposed by the Query Retrieve SCU AE for the Query Retrieve operations are specified in the following table.

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Study Root Query Retrieve Information Model - Find	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Study Root Query Retrieve Information Model - Move	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

NOTE:

Big Endian is not yet supported in the current version of Smoothbase.

6.1.3 Association Acceptance Policy

The Query Retrieve SCU AE never accepts an association.

6.2 Storage SCU AE – Specification

The Storage SCU AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a Storage SCU.

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi Frame Image	1.2.840.10008.5.1.4.1.1.3.1
RT Structure Set	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
RT Dose	1.2.840.10008.5.1.4.1.1.481.2

6.2.1 Association Establishment Policies

6.2.1.1 General

The Storage SCU AE will initiate an association as an SCU of Storage Services when a local operator requests to send objects over the network to a remote Storage SCP. The association is closed when the object has been sent to the remote Storage SCP. The Storage SCU AE is able to abort the association when an error occurs.

The PDU size is configurable and should be defined between 4096 bytes and 28672K bytes.

6.2.1.2 Number of Associations

The maximum number of simultaneous associations is one.

6.2.1.3 Asynchronous Nature

The Storage SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

6.2.1.4 Implementation Identifying Information

The Implementation Identifying information is defined as followed:

- The implementation class UID is 2.16.840.1.
- The implementation version name is MergeCOM3_321

6.2.2 Association Initiation by Real-World Activity

The Storage SCU AE initiates an association for the appropriate Storage Services Class that corresponds to the set of objects requested for transfer. The association is closed when all objects have been sent to the remote DICOM system or when an error occurs.

6.2.2.1 Real-World Activity for the Transfer Objects operation

The Storage SCU AE initiates associations for the transfer of objects to a remote DICOM system.

6.2.2.1.1 Associated Real-World Activity

The user selects the Export Command and the DICOM destination. The DICOM destination can be configured with one or more DICOM Export adapters.

Once the association has been established, the Storage SCU AE sends a Store message.

6.2.2.1.2 Proposed Presentation Contexts

The presentation contexts that are proposed by the Storage SCU AE for the Transfer Objects operation are specified in the following table.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Applies to all supported storage SOP classes		Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

6.2.3 Association Acceptance Policy

The Storage SCU AE never accepts an association.

6.3 Storage SCP AE – Specification

The Storage SCP AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a Verification SCP.

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

The Storage SCP AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a Storage SCP.

6.3.1 Association Establishment Policies

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi Frame Image	1.2.840.10008.5.1.4.1.1.3.1
RT Structure Set	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
RT Dose	1.2.840.10008.5.1.4.1.1.481.2

6.3.1.1 General

The Storage SCP AE will wait for an association as an SCP of Storage Services. When a Store request is received, the corresponding objects are validated and when valid, stored in the database.

The PDU size is configurable and should be defined between 4096 bytes and 28672K bytes.

6.3.1.2 Number of Associations

The maximum number of simultaneous associations is one.

6.3.1.3 Asynchronous Nature

The Storage SCP AE does not support asynchronous communication (multiple outstanding transactions over a single association).

6.3.1.4 Implementation Identifying Information

The Implementation Identifying information is defined as followed:

- The implementation class UID is 2.16.840.1.
- The implementation version name is MergeCOM3_321

6.3.2 Association Initiation by Real-World Activity

The Storage SCP AE never initiates an association.

6.3.3 Association Acceptance Policy

The Storage SCP AE accepts an association for the Verification and Storage Service Class. The Storage SCP is able to abort the association when an error occurs.

NOTE:

Only those associations are accepted that are registered with the Storage SCP AE.

6.3.3.1 Real-World Activity for the Echo Response operation

The Storage SCP AE waits for an association request and accepts associations to do, among other things, the Verification Service. The association is closed after an error or when the initiator requests it to be closed.

6.3.3.1.1 Presentation Context table

Only the presentation context listed in the following table will be accepted by the Storage SCP AE for the Verification Service Class.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification Service Class	1.2.840.10008.1.1	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

6.3.3.2 Real-World Activity for the Receive Objects operation

The Storage SCP AE waits for an association and offers to do the Storage service. The association is closed after an error or when the initiator requests it to be closed.

6.3.3.2.1 Associated Real-World Activity

Once the association has been established, the Storage SCP AE waits for the transmission of conformant Storage Service messages.

6.3.3.2.2 Presentation Context table

Only the presentation contexts listed in the following table will be accepted by the Storage SCP AE for the Storage Service Class.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Applies to all supported storage SOP classes		Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCP	None

6.3.3.2.3 SOP Specific Conformance for all storage SOP Classes

The Storage SCP AE, responds to a C-STORE request with one of the following response codes.

Service Status	Status Description	Status Code (0000,0900)	Related Fields
Success		0000	None
Error	Incoming object was not valid or could not be written to the database.	0110	None
Error	The new SOP Instance Value supplied by the invoking DIMSE-service-user was already registered for a SOP Instance of the specified SOP Class (Duplicate SOP Instance UID).	0111	
Error	Data Set does not match SOP Class.	A900	
Error	Send Study Instance UID (0020,000D) is already known under a different Patient ID (0010,0020).	A9A8	
Error	Send Series Instance UID (0020,000E) is already known under a different Study Instance UID (0020,000D).	A9A9	
Warning	Certain attributes have been changed in order to coerce the SOP Instance into the Query Model of the SCP.	B000	

NOTE:

Attributes with a value type of 'Coded String (CS)' will only be accepted if they have a value as defined in the DICOM standard, unless stated otherwise in Appendix A. When the CS value is not recognized as a defined term, then status code 0110 is returned.

6.3.3.2.4 Presentation Context Acceptance Criterion

Not applicable since only a single presentation context for each Storage Service Class is supported.

6.3.3.2.5 Transfer Syntax Selection Policies

Transfer syntaxes are accepted in the following order.

Transfer Syntax Name
Explicit VR Little Endian
Implicit VR Little Endian

6.4 Print SCU AE – Specifications

The Print SCU AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a DICOM Basic Print SCU.

SOP Class Name	SOP Class UID
Basic Grayscale Print Management (META)	1.2.840.10008.5.1.1.9
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Printer	1.2.840.10008.5.1.1.16

6.4.1 Association Establishment Policies

6.4.1.1 General

The Print SCU AE will initiate an association as an SCU of Print Services when a local operator requests to print images over the network to a remote Basic Print SCP.

The maximum PDU size is 28672.

6.4.1.2 Number of Associations

The maximum number of simultaneous associations is one.

6.4.1.3 Asynchronous Nature

The Print SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

6.4.1.4 Implementation Identifying Information

The Implementation Identifying information is defined as followed:

- The implementation class UID is 2.16.840.1.
- The implementation version name is MergeCOM3_321

6.4.2 Association Initiation by Real-World Activity

The Print SCU AE initiates an association for the appropriate Print Services Class that corresponds to the set of images requested to be printed. The association is closed when all images have been printed or when an error occurs.

6.4.2.1 Real-World Activity for the Print Image operation

The Print SCU AE initiates associations for the printing of images to a Basic Print SCP.

6.4.2.1.1 Associated Real-World Activity

Once the association has been established, the Print SCU sends a Basic Film Session, N_CREATE message to the Basic Print SCP. This is followed by a Basic Film Box, N_CREATE message. The Print SCU then sends a Basic Grayscale Image Box, N_SET message. Finally, an N_ACTION message is sent to instruct the Basic Print SCP to print either at the Basic Film Session or at the Basic Film Box level.

6.4.2.1.2 Proposed Presentation Contexts

The presentation contexts that are proposed by the Print SCU AE for the Print Image operation are specified in the following table.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management (META)	1.2.840.10008.5.1.1.9	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

NOTE:

Big Endian is not yet supported in the current version of Smoothbase.

6.4.2.1.3 SOP Specific Conformance

Attribute values for SOP classes proposed by the Print SCU AE are specified in the following table.

SOP Class Name	Command	Attribute Name	Range
Basic Film Session	N_CREATE	Number of Copies	
		Medium Type	
		Film Destination	
		Film Session Label	
Basic Film Box	N_CREATE	Film Orientation	
		Magnification Type	
		Max Density	
		Border Density	
		Empty Image Density	
		Min Density	
Basic Grayscale Image Box	N_SET	Trim	
		Image Position	
		Samples Per Pixel	1
		Photometric Interpretation	Monochrome 1 or 2
		Rows	Depending on Image
		Columns	Depending on Image
		Pixel Aspect Ratio	Depending on Image
		Bits Allocated	16
		Bits Stored	12
		High Bit	11
		Pixel Representation	
Pixel Data			
Printer	N_GET / N_EVENT_REPORT	Magnification Type	

6.4.3 Association Acceptance Policy

The Print SCU AE never accepts an association.

6.5 Modality Worklist SCU AE – Specification

The Modality Worklist SCU AE provides Standard Conformance to the following DICOM V3.0 SOP Classes as a Modality Worklist SCU.

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

6.5.1 Association Establishment Policies

6.5.1.1 General

The Modality Worklist SCU AE will initiate an association as a Service Class User, requesting data about object instances and object instances themselves.

The PDU size is configurable and should be defined between 4096 bytes and 28672K bytes.

6.5.1.2 Number of Associations

The maximum number of simultaneous associations is one.

6.5.1.3 Asynchronous Nature

The Modality Worklist SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

6.5.1.4 Implementation Identifying Information

The Implementation Identifying information is defined as followed:

- The implementation class UID is 2.16.840.1.
- The implementation version name is MergeCOM3_321

6.5.2 Association Initiation by Real-World Activity

The Modality Worklist SCU AE initiates an association for the appropriate Modality Worklist Service Class that corresponds to the set of worklist objects that is requested for lookup or for transfer. The association is closed when all queries have been performed or all requested information objects have been transferred or when an error occurs.

The Oncentra user selects a function for querying and retrieving messages from a known source that supports Modality Worklist as a Provider.

6.5.2.1 Real-World Activity for Find execution operations of Oncentra Prostate

The Oncentra application opens associations to do C-FINDs. The associations are closed after an error or when the initiator requests them to be closed.

6.5.2.1.1 Associated Real-World Activity for the Find and Move operations

The Oncentra application can load worklist data by means of a DICOM Modality Worklist dialog.

Based on operator supplied search parameters, the application uses a C-FIND request to a selected Modality Worklist Provider.

The result returned from the Modality Worklist Provider, if any, is displayed in a list, from which the operator may select a worklist item. The attribute values that belong to the selected worklist item will be used by the application while performing the tasks requested in the selected worklist item or any other task for which these attribute values can be used.

6.5.2.1.2 Proposed Presentation Contexts

The presentation contexts that are proposed by the Modality Worklist SCU AE for the Modality Worklist operation(s) are specified in the following table.

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model - Find	1.2.840.10008.5.1.4.31	Explicit VR Little Endian Implicit VR Little Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

NOTE:

Big Endian is not yet supported in the current version of Smoothbase.

6.5.3 Association Acceptance Policy

The Modality Worklist SCU AE never accepts an association.

6.5.4 SOP Specific Conformance - Modality Worklist Management

6.5.4.1 Matching keys and return keys

The user can configure/select the matching keys that will be used in the query. The following keys are provided to the user:

Module / Attribute Name	Tag	Match Key Type	Match
Scheduled Procedure Step			
Scheduled Station AE Title	(0040,0001)	R	SV
Scheduled Procedure Step Start Date	(0040,0002)	R	SV or RM
Scheduled Procedure Step Start Time	(0040,0003)	R	SV or RM

Start Date: The user can select the start date from a list, containing the following values: Today, (= everything from today and later), Yesterday, (=everything from yesterday and later), Last 3 days, Last 7 days, all values are mapped in Scheduled Procedure Start Date (0040,0002).

- SV - single value
- RM - range matching
- WC - wildcard matching
- SM - Sequence matching

The Oncentra application will provide support for requests on the following information:

Module / Attribute Name	Tag	Return Key Type
Scheduled Procedure Step		
Scheduled Station AE Title	(0040,0001)	1
Scheduled Procedure Step Start Date	(0040,0002)	1
Scheduled Procedure Step Start Time	(0040,0003)	1
Scheduled Performing Physician's Name	(0040,0006)	2
Scheduled Procedure Step Description	(0040,0005)	1C
Patient Identification		
Patient ID	(0010,0020)	1
Patients Name	(0010,0010)	1
Patient Demographic		
Patients Birth Date	(0010,0030)	2
Patients Sex	(0010,0040)	2
Patients Weight	(0010,1030)	2
Patient's Age	(0010,1010)	3
Patient's Size	(0010,1020)	3
Patient Comments	(0010,4000)	3
Imaging Service Request		
Accession Number	(0008,0050)	2

Module / Attribute Name	Tag	Return Key Type
Referring Physician's Name	(0008,0090)	2
Requested Procedure		
Study Instance UID	(0020,000D)	1
Study ID	(0020,0010)	3
Study Description	(0008,1030)	3
Study Date	(0008,0020)	3
Study Time	(0008,0030)	3
Visit Status		
Current Patient Location	(0038,0300)	2

6.5.4.2 Status codes processed when receiving messages from a modality worklist SCP

Service Status	Further Meaning	Status Codes	Oncentra Prostate Behavior
Refused	Out of resources	A700	No worklist
Failed	Identifier does not match SOP class	A900	No worklist
	Unable to process	Cxxx	No worklist
Cancel	Matching terminated due to cancel request	FE00	No worklist
Success	Matching is complete - No final identifies will be supplied	0000	Worklist displayed
Pending	Matches are continued - Current match is supplied and any Optional Keys were supported in the same manner as required keys	FF00	Indication that the Worklist is retrieved
	Matches are continuing - Warning that one or more Optional Keys were not supported for this identifier	FF01	Indication that the Worklist is retrieved

7. Communication Profiles

7.1 Supported Communication Stacks

Smoothbase, in conjunction with MergeCOM-3, provides DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8.

7.2 TCP/IP Stack

Smoothbase uses the MergeCOM-3 Advanced DICOM Tool Kit to communicate over the TCP/IP protocol stack on any physical interconnection media supporting the TCP/IP stack. The tool kit inherits the TCP/IP stack from the Microsoft Windows operating system upon which it executes.

7.3 Physical Media Support

The Smoothbase AE is indifferent to the physical medium over which TCP/IP executes; it inherits this from the Microsoft Windows operating system upon which it executes.

8. Extensions/Specializations/Privatizations

8.1 Standard Extended/Specialized/Private SOPs

None supported.

8.2 Private Transfer Syntaxes

None supported.

9. Configuration

The lower-level configuration parameters are default set during the installation of the software. These settings work for the most systems, but it is possible that some modifications are needed to improve the communication with a remote system.

Most parameters should NEVER be changed. Doing so could break DICOM conformance. Never change lower-level communication parameters. Contact Nucletron service department for advice.

9.1 AE Title/Presentation Address Mapping

Presentation address mapping is configured through the Configure DICOM dialog of Smoothbase application.

The Presentation Address of the application is specified according to the following table:

AE Title/Presentation Address Mapping	Defaults	Description
AE Title	Smoothbase	The default SCU and SCP for Oncentra Prostate. Note that the AE title for SCU and SCP should be equal for correct working.
TCP/IP port	104	
AE Title	OncProstate	SCP for Oncentra Prostate. Can be configured in the Dynamic Imaging module. Only CT /MR images can be sent to StoreSCP server.
TCP/IP port	105	

These parameters are configurable by a Nucletron Service engineer.

In case there are multiple workstations with Smoothbase applications, each workstation must have a unique AE title for the storage provider to ensure that external systems can address them uniquely.

9.2 Configurable Parameters

The logging of error messages, warning messages, informational messages and trace messages can be enabled or disabled in the configuration file.

The maximum PDU size can be configured in the configuration file.

- The default size is 28672 bytes.

10. Support of Extended Character Sets

The System supports the following character sets:

ISO_IR 6:	Default repertoire
ISO_IR 100:	Latin alphabet No. 1

The System supplies this value in the Specific Character Set Attribute (0008,0005). This attribute is supplied in the SOP common module and in any sequence item.

11. Codes and Controlled Terminology

Not supported.

12. Security Profiles

Not supported.

Appendix A DICOM – Oncentra Prostate; DICOM – Oncentra Prostate; Specific Implementations Details

This appendix lists the supported Information Object Definitions (IODs). In each section header, a reference is given between brackets to the corresponding section in the official DICOM Standard document, part 3.

A.1 Definitions

	SCP (Importer)	Description
Modules		
	SCP - Not supported	The module is not supported by the application. That means that the received module is ignored during import.
	SCP - Not used	The module is not used by the application, but the received module is made persistent. On an export the module is used for export.
Attribute		
	SCP - Not Supported	
	SCP - Used	Means that the application uses this attribute.
	SCP - Not used.	The attribute is not used by the application. The content of the attribute is remained and re-used on an export.
	SCP - Ignored	The attribute is ignored by the application. The content of the attribute is lost on export.
	SCP - Supported by application if supplied ...	The attribute is supported by the application when specified parameters are supplied.
	SCP - Supported if supplied ...	The attribute is supported by the 'Storage SCP' when specified parameters are supplied.

	SCU (Exporter)	Description
Modules		
	SCU - Provided	The Module as it initially is provided by the application. When the module has been imported, the original content is provided on export.
	SCU - Not provided	The module is not provided by the application when a new IOD is made.
Attribute		
	SCU - Provided	The attribute as it initially is provided by the application. When the attribute is imported, this value is provided on an export.
	SCU - Not provided	The attribute is not provided by the application on an export. When the attribute is imported, this value is provided on an export. Note that: DICOM type 1 is always sent. In case type 2 a 'null' value is sent.

	SCU (Exporter)	Description
	SCU – Not Provided Conditionally	The attribute is not provided by the application on an export. When the attribute is imported, this value is provided or not provided on an export depending on application activities. Note that: DICOM type 1 is always sent. In case type 2 a 'null' value is sent.
	SCU - Supported values	If not all options are supported, a list with supported options follows e.g. Beam Type: SCU: Supported Values 'Photons and Electrons'

A.2 CT Image Module Table (A.3)

IE	Module	Section	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Provided
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	General Series	C.7.3.1	M	
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Frame of Reference	Frame Of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	
	Image Pixel	C.7.6.3	M	
	Contrast/Bolus	C.7.6.4	C - Required if contrast media was used in this image	SCP - Not supported SCU - Not provided
	CT Image	C.8.2.1	M	
	Overlay Plane	C.9.2	U	SCP - Not supported SCU - Not provided
	VOI LUT	C.11.2	U	SCP - Used SCU - Provided
	SOP Common	C.12.1	M	

A.3 MR Image Module Table (A.4)

IE	Module	Section	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Provided
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	General Series	C.7.3.1	M	

IE	Module	Section	DICOM Usage	Notes
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Frame of Reference	Frame Of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	
	Image Pixel	C.7.6.3	M	
	Contrast/Bolus	C.7.6.4	C - Required if contrast media was used in this image	SCP - Not supported SCU - Not provided
	MR Image	C.8.3.1	M	
	Overlay Plane	C.9.2	U	SCP - Not supported SCU - Not provided
	VOI LUT	C.11.2	U	SCP - Used SCU - Provided
	SOP Common	C.12.1	M	

A.4 US Image Module Table (A.6)

IE	Module	Section	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Provided
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	General Series	C.7.3.1	M	
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Frame of Reference	Frame Of Reference	C.7.4.1	M	
	US Frame of Reference	C.8.5.1	U	
	Synchronization	C7..4.2.	U	SCP - Used SCU - Provided
Equipment	General Equipment	C.7.5.1	M	
	US Probes	Private	U	SCP - Used SCU – Provided Support of the optional Telemed Probe: Only applicable for Oncentra Prostate v3.3 and higher
Acquisition	General Acquisition	Private	M	
Geometry	General Geometry	Private	M	
Template	General Template	Private	M	
	General Template Component	Private	U	Only required when using the Utrecht Interstitial Fletcher Applicator Set
Image	General Image	C.7.6.1	M	

IE	Module	Section	DICOM Usage	Notes
	Image Plane	C.7.6.2	M	Required for image positioning. Additional added module. This module is required for Oncentra Prostate.
	Image Pixel	C.7.6.3	M	
	Contrast/Bolus	C.7.6.4	C - Required if contrast media was used in this image	SCP - Not supported SCU - Not provided
	Palette Color Lookup Table	C.7.9	C - Required if Photometric Interpretation (0028,0004) has a value of PALETTE COLOR	SCP - Not supported SCU - Not provided
	US Region Calibration	C.8.5.5	U	SCP - Not supported SCU - Not provided
	US Image	C.8.5.6	M	
	Overlay Plane	C.9.2	U	SCP - Not supported SCU - Not provided
	VOI LUT	C.11.2	U	SCP - Used SCU - Supported
	SOP Common	C.12.1	M	
	Curve	C.10.2	U	

A.5 US Multi Frame Image Module Table (A.7)

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Provided
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	General Series	C.7.3.1	M	
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Frame of Reference	Frame Of Reference	C.7.4.1	M	
	US Frame of Reference	C.8.5.1	C - Required if images are spatially related	

IE	Module	Reference	DICOM Usage	Notes
	Synchronization	C.7.4.2	C – Required if Modality (0008,0060) = IVUS. May be present otherwise.	
Equipment	General Equipment	C.7.5.1	M	
Acquisition	General Acquisition	Private	M	
Geometry	General Geometry	Private	M	
Template	General Template	Private	M	
	General Template Component	Private	U	Only required when using the Utrecht Interstitial Fletcher Applicator Set
Image	General Image	C.7.6.1	M	
	Image Plane	C.7.6.2	M	Required for positioning. Additional added module. This module is required for Oncentra Prostate.
	Image Pixel	C.7.6.3	M	
	Contrast/Bolus	C.7.6.4	C - Required if contrast media was used in this image	SCP - Not supported SCU - Not provided
	Cine	C.7.6.5	M	
	Multi-frame	C.7.6.6	M	
	Palette Color Lookup Table	C.7.9	C - Required if Photometric Interpretation (0028,0004) has a value of PALETTE COLOR	SCP - Not supported SCU - Not provided
	US Region Calibration	C.8.5.5	U	SCP - Not supported SCU - Not provided
	US Image	C.8.5.6	M	
	VOI LUT	C.11.2	U	SCP - Used SCU - Supported
	SOP Common	C.12.1	M	
	Curve	C.10.2	U	

A.6 RT Structure Set Module Table (A.19)

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	

IE	Module	Reference	DICOM Usage	Notes
	Patient Study	C.7.2.2	U	SCP - Used SCU - Provided
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	RT Series	C.8.8.1	M	
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Equipment	General Equipment	C.7.5.1	M	
Structure Set	Structure Set	C.8.8.5	M	
	ROI Geometry	Private	M	
	ROI Contour	C.8.8.6	M	
	RT ROI Observations	C.8.8.8	M	
	SOP Common	C.12.1	M	

A.7 Patient Module Attributes (C.7.1.1)

Attribute Name	Tag	Type	Internal value	Notes
Patient's Name	(0010,0010)	2		
Patient ID	(0010,0020)	2		
Patient's Birth Date	(0010,0030)	2		
Patient's Sex	(0010,0040)	2		
Referenced Patient Sequence	(0008,1120)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Patient's Birth Time	(0010,0032)	3		
Other Patient IDs	(0010,1000)	3		
Other Patient Names	(0010,1001)	3		SCP - Not used SCU - Not supported
Ethnic Group	(0010,2160)	3		
Patient Comments	(0010,4000)	3		

A.8 General Study Module Attributes (C.7.2.1)

Attribute Name	Tag	Type	Internal value	Notes
Study Instance UID	(0020,000D)	1		
Study Date	(0008,0020)	2	VOL3_STUDYDATE	
Study Time	(0008,0030)	2		
Referring Physician's Name	(0008,0090)	2		
Study ID	(0020,0010)	2		
Accession Number	(0008,0050)	2		
Study Description	(0008,1030)	3		

Attribute Name	Tag	Type	Internal value	Notes
Physician(s) of Record	(0008,1048)	3		
Name of Physician(s) Reading Study	(0008,1060)	3		SCP - Not used SCU - Not supported
Referenced Study Sequence	(0008,1110)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Procedure Code Sequence	(0008,1032)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported

A.9 Patient Study Module Attributes (C.7.2.2)

Attribute Name	Tag	Type	Internal value	Notes
Admitting Diagnoses Description	(0008,1080)	3		SCP - Not used SCU - Not supported
Admitting Diagnoses Code Sequence	(0008,1084)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Patient's Age	(0010,1010)	3		
Patient's Size	(0010,1020)	3		
Patient's Weight	(0010,1030)	3		
Occupation	(0010,2180)	3		SCP - Not used SCU - Not supported
Additional Patient History	(0010,21B0)	3		SCP - Not used SCU - Not supported

A.10 General Series Module Attributes (C.7.3.1)

Attribute Name	Tag	Type	Internal value	Notes
Modality	(0008,0060)	1		
Series Instance UID	(0020,000E)	1		
Series Number	(0020,0011)	2		
Laterality	(0020,0060)	2C		
Series Date	(0008,0021)	3		
Series Time	(0008,0031)	3		
Performing Physician's Name	(0008,1050)	3		
Protocol Name	(0018,1030)	3		
Series Description	(0008,103E)	3		
Operators' Name	(0008,1070)	3		

Attribute Name	Tag	Type	Internal value	Notes
Referenced Study Component Sequence	(0008,1111)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Body Part Examined	(0018,0015)	3		
Patient Position	(0018,5100)	2C		
Smallest Pixel Value in Series	(0028,0108)	3		SCP - Not used SCU - Not supported
Largest Pixel Value in Series	(0028,0109)	3		SCP - Not used SCU - Not supported
Request Attributes Sequence	(0040,0275)	3		SCP - Not used SCU - Not supported
>Requested Procedure ID	(0040,1001)	1C		SCP - Not used SCU - Not supported
>Scheduled Procedure Step ID	(0040,0009)	1C		SCP - Not used SCU - Not supported
>Scheduled Procedure Step Description	(0040,0007)	3		SCP - Not used SCU - Not supported
>Scheduled Protocol Code Sequence	(0040,0008)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Performed Procedure Step ID	(0040,0253)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Start Date	(0040,0244)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Start Time	(0040,0245)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Description	(0040,0254)	3		SCP - Not used SCU - Not supported
Performed Protocol Code Sequence	(0040,0260)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Comments on the Performed Procedure Step	(0040,0280)	3		SCP - Not used SCU - Not supported

A.11 Frame Of Reference Module Attributes (C.7.4.1)

Attribute Name	Tag	Type	Internal value	Notes
Frame of Reference UID	(0020,0052)	1		
Position Reference Indicator	(0020,1040)	2		

A.12 General Equipment Module Attributes (C.7.5.1)

Attribute Name	Tag	Type	Internal value	Notes
Manufacturer	(0008,0070)	2		
Institution Name	(0008,0080)	3		
Institution Address	(0008,0081)	3		SCP - Not used SCU - Not supported
Station Name	(0008,1010)	3		
Institutional Department Name	(0008,1040)	3		
Manufacturer's Model Name	(0008,1090)	3		
Device Serial Number	(0018,1000)	3		
Software Version(s)	(0018,1020)	3		Export only
Spatial Resolution	(0018,1050)	3		SCP - Not used SCU - Not supported
Date of Last Calibration	(0018,1200)	3		SCP - Not used SCU - Not supported
Time of Last Calibration	(0018,1201)	3		SCP - Not used SCU - Not supported
Pixel Padding Value	(0028,0120)	3		SCP - Not used SCU - Not supported

A.13 US Probe Module Attributes (Private)

A.14 General Image Module Attributes (C.7.6.1)

Attribute Name	Tag	Type	Internal value	Notes
Instance Number	(0020,0013)	2	Covers all required acquisition/image values	
Patient Orientation	(0020,0020)	2C		
Content Date	(0008,0023)	2C		
Content Time	(0008,0033)	2C		
Image Type	(0008,0008)	3		
Acquisition Number	(0020,0012)	3		
Acquisition Date	(0008,0022)	3		
Acquisition Time	(0008,0032)	3		
Acquisition Datetime	(0008,002A)	3		SCP - Not used SCU - Not supported
Referenced Image Sequence	(0008,1140)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
>Referenced Frame Number	(0008,1160)	3		SCP - Not used SCU - Not supported

Attribute Name	Tag	Type	Internal value	Notes
Derivation Description	(0008,2111)	3		
Source Image Sequence	(0008,2112)	3		SCP - Not used SCU - Not supported
Images in Acquisition	(0020,1002)	3		
Image Comments	(0020,4000)	3		
Quality Control Image	(0028,0300)	3		
Burned In Annotation	(0028,0301)	3		
Lossy Image Compression	(0028,2110)	3		
Lossy Image Compression Ratio	(0028,2112)	3		
Icon Image Sequence	(0088,0200)	3		SCP - Not used SCU - Not supported
Presentation LUT Shape	(2050,0020)	3		

A.15 Image Plane Module Attributes (C.7.6.2)

Attribute Name	Tag	Type	Internal value	Notes
Pixel Spacing	(0028,0030)	1		
Image Orientation (Patient)	(0020,0037)	1	(USAQ_TGEOM)	
Image Position (Patient)	(0020,0032)	1	(USAQ_TGEOM)	
Slice Thickness	(0018,0050)	2		
Slice Location	(0020,1041)	3	(USAQ_TGEOM)	

A.16 Image Pixel Module Attributes (C.7.6.3)

Attribute Name	Tag	Type	Internal value	Notes
Samples per Pixel	(0028,0002)	1	Covers all required acquisition/image values	only monochrome is supported, except for US, RGB is supported as well
Photometric Interpretation	(0028,0004)	1		
Rows	(0028,0010)	1		
Columns	(0028,0011)	1		
Bits Allocated	(0028,0100)	1		
Bits Stored	(0028,0101)	1		
High Bit	(0028,0102)	1		
Pixel Representation	(0028,0103)	1		
Pixel Data	(7FE0,0010)	1		
Planar Configuration	(0028,0006)	1C		SCP - Not used SCU - Not supported
Pixel Aspect Ratio	(0028,0034)	1C		
Smallest Image Pixel Value	(0028,0106)	3		
Largest Image Pixel Value	(0028,0107)	3		

Attribute Name	Tag	Type	Internal value	Notes
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C		SCP - Not used SCU - Not supported
Green Palette Color Lookup Table Descriptor	(0028,1102)	1C		SCP - Not used SCU - Not supported
Blue Palette Color Lookup Table Descriptor	(0028,1103)	1C		SCP - Not used SCU - Not supported
Red Palette Color Lookup Table Data	(0028,1201)	1C		SCP - Not used SCU - Not supported
Green Palette Color Lookup Table Data	(0028,1202)	1C		SCP - Not used SCU - Not supported
Blue Palette Color Lookup Table Data	(0028,1203)	1C		SCP - Not used SCU - Not supported

A.17 CT Image Module Attributes (C.8.2.1)

Attribute Name	Tag	Type	Internal value	Notes
Image Type	(0008,0008)	1		
Samples per Pixel	(0028,0002)	1		
Photometric Interpretation	(0028,0004)	1		
Bits Allocated	(0028,0100)	1		
Bits Stored	(0028,0101)	1		
High Bit	(0028,0102)	1		
Rescale Intercept	(0028,1052)	1		
Rescale Slope	(0028,1053)	1		
KVP	(0018,0060)	2		
Acquisition Number	(0020,0012)	2		
Scan Options	(0018,0022)	3		
Data Collection Diameter	(0018,0090)	3		
Reconstruction Diameter	(0018,1100)	3		
Distance Source to Detector	(0018,1110)	3		
Distance Source to Patient	(0018,1111)	3		
Gantry/Detector Tilt	(0018,1120)	3		
Table Height	(0018,1130)	3		
Rotation Direction	(0018,1140)	3		
Exposure Time	(0018,1150)	3		
X-ray Tube Current	(0018,1151)	3		
Exposure	(0018,1152)	3		
Exposure in uAs	(0018,1153)	3		
Filter Type	(0018,1160)	3		
Generator Power	(0018,1170)	3		
Focal Spot	(0018,1190)	3		
Convolution Kernel	(0018,1210)	3		

A.18 MR Image Module Attributes (C.8.3.1)

Attribute Name	Tag	Type	Internal value	Notes
Image Type	(0008,0008)	1		
Samples per Pixel	(0028,0002)	1		
Photometric Interpretation	(0028,0004)	1		
Bits Allocated	(0028,0100)	1		
Scanning Sequence	(0018,0020)	1		
Sequence Variant	(0018,0021)	1		
Scan Options	(0018,0022)	2		
MR Acquisition Type	(0018,0023)	2		
Repetition Time	(0018,0080)	2C		
Echo Time	(0018,0081)	2		
Echo Train Length	(0018,0091)	2		
Inversion Time	(0018,0082)	2C		
Trigger Time	(0018,1060)	2C		
Sequence Name	(0018,0024)	3		SCP - Not used SCU - Not supported
Angio Flag	(0018,0025)	3		SCP - Not used SCU - Not supported
Number of Averages	(0018,0083)	3		SCP - Not used SCU - Not supported
Imaging Frequency	(0018,0084)	3		SCP - Not used SCU - Not supported
Imaged Nucleus	(0018,0085)	3		SCP - Not used SCU - Not supported
Echo Number(s)	(0018,0086)	3		SCP - Not used SCU - Not supported
Magnetic Field Strength	(0018,0087)	3		SCP - Not used SCU - Not supported
Spacing Between Slices	(0018,0088)	3		SCP - Not used SCU - Not supported
Number of Phase Encoding Steps	(0018,0089)	3		SCP - Not used SCU - Not supported
Percent Sampling	(0018,0093)	3		SCP - Not used SCU - Not supported
Percent Phase Field of View	(0018,0094)	3		SCP - Not used SCU - Not supported
Pixel Bandwidth	(0018,0095)	3		SCP - Not used SCU - Not supported
Nominal Interval	(0018,1062)	3		SCP - Not used SCU - Not supported
Beat Rejection Flag	(0018,1080)	3		SCP - Not used SCU - Not supported
Low R-R Value	(0018,1081)	3		SCP - Not used SCU - Not supported
High R-R Value	(0018,1082)	3		SCP - Not used SCU - Not supported
Intervals Acquired	(0018,1083)	3		SCP - Not used SCU - Not supported

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

A.19 US Image Module Attributes (C.8.5.6)

Attribute Name	Tag	Type	Internal value	Notes
Samples per Pixel	(0028,0002)	1	Covers all required acquisition/image values	
Photometric Interpretation	(0028,0004)	1		
Bits Allocated	(0028,0100)	1		
Bits Stored	(0028,0101)	1		
High Bit	(0028,0102)	1		
Planar Configuration	(0028,0006)	1C		SCP - Not used SCU - Not supported
Pixel Representation	(0028,0103)	1		

Attribute Name	Tag	Type	Internal value	Notes
Frame Increment Pointer	(0028,0009)	1C		
Image Type	(0008,0008)	2		
Lossy Image Compression	(0028,2110)	1C		
Number of Stages	(0008,2124)	2C		
Number of Views in Stage	(0008,212A)	2C		
Ultrasound Color Data Present	(0028,0014)	3		SCP - Not used SCU - Not supported
Referenced Overlay Sequence	(0008,1130)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Referenced Curve Sequence	(0008,1145)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Stage Name	(0008,2120)	3		SCP - Not used SCU - Not supported
Stage Code Sequence	(0040,000A)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Stage Number	(0008,2122)	3		SCP - Not used SCU - Not supported
View Name	(0008,2127)	3		SCP - Not used SCU - Not supported
View Number	(0008,2128)	3		SCP - Not used SCU - Not supported
Number of Event Timers	(0008,2129)	3		SCP - Not used SCU - Not supported
Event Elapsed Time(s)	(0008,2130)	3		SCP - Not used SCU - Not supported
Event Timer Name(s)	(0008,2132)	3		SCP - Not used SCU - Not supported
Anatomic Region Sequence	(0008,2218)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
>Anatomic Region Modifier Sequence	(0008,2220)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Primary Anatomic Structure Sequence	(0008,2228)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported

DICOM Conformance Statement



Attribute Name	Tag	Type	Internal value	Notes
>Primary Anatomic Structure Modifier Sequence	(0008,2230)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Transducer Position Sequence	(0008,2240)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
>Transducer Position Modifier Sequence	(0008,2242)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Transducer Orientation Sequence	(0008,2244)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
>Transducer Orientation Modifier Sequence	(0008,2246)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Acquisition Datetime	(0008,002A)	1C		
Trigger Time	(0018,1060)	3		SCP - Not used SCU - Not supported
Nominal Interval	(0018,1062)	3		SCP - Not used SCU - Not supported
Beat Rejection Flag	(0018,1080)	3		SCP - Not used SCU - Not supported
Low R-R Value	(0018,1081)	3		SCP - Not used SCU - Not supported
High R-R Value	(0018,1082)	3		SCP - Not used SCU - Not supported
Heart Rate	(0018,1088)	3		SCP - Not used SCU - Not supported
IVUS Acquisition	(0018,3100)	1C		
IVUS Pullback Rate	(0018,3101)	1C		
IVUS Gated Rate	(0018,3102)	1C		
IVUS Pullback Start Frame Number	(0018,3103)	1C		
IVUS Pullback Stop Frame Number	(0018,3104)	1C		
Lesion Number	(0018,3105)	3		SCP - Not used SCU - Not supported
Output Power	(0018,5000)	3		SCP - Not used SCU - Not supported
Transducer Data	(0018,5010)	3		SCP - Not used SCU - Not supported
Transducer Type	(0018,6031)	3		SCP - Not used SCU - Not supported
Focus Depth	(0018,5012)	3		SCP - Not used SCU - Not supported

Attribute Name	Tag	Type	Internal value	Notes
Processing Function	(0018,5020)	3		SCP - Not used SCU - Not supported
Referenced Probe Number	(1003,1002)	3		SCP - Used SCU – Supported Support of the optional Telemed Probe: Only applicable for Oncentra Prostate v3.3 and higher.
Mechanical Index	(0018,5022)	3		SCP - Not used SCU - Not supported
Thermal Index	(0018,5024)	3		SCP - Not used SCU - Not supported
Cranial Thermal Index	(0018,5026)	3		SCP - Not used SCU - Not supported
Soft Tissue Thermal Index	(0018,5027)	3		SCP - Not used SCU - Not supported
Soft Tissue-focus Thermal Index	(0018,5028)	3		SCP - Not used SCU - Not supported
Soft Tissue-surface Thermal Index	(0018,5029)	3		SCP - Not used SCU - Not supported
Depth of Scan Field	(0018,5050)	3		SCP - Not used SCU - Not supported
Image Transformation Matrix	(0018,5210)	3		SCP - Not used SCU - Not supported
Image Translation Vector	(0018,5212)	3		SCP - Not used SCU - Not supported
Overlay Subtype	(60xx,0045)	3		SCP - Not used SCU - Not supported

A.20 General Acquisition Attributes (Private)

See section

General Acquisition Attributes (Private).

A.21 General Geometry Attributes (Private)

See section General Geometry Attributes (Private).

A.22 General Template Attributes (Private)

See section General Template Attributes (Private).

A.22.1. General Template Components Attributes (Private)

See section General Template Components Attributes (Private).

A.23 RT Series Module Attributes (C.8.8.1)

Attribute Name	Tag	Type	Internal value	Notes
Modality	(0008,0060)	1		
Series Instance UID	(0020,000E)	1		
Series Number	(0020,0011)	2		
Series Description	(0008,103E)	3		
Referenced Study Component Sequence	(0008,1111)	3		SCP - Not used SCU - Not supported
>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
Request Attributes Sequence	(0040,0275)	3		SCP - Not used SCU - Not supported
>Requested Procedure ID	(0040,1001)	1C		SCP - Not used SCU - Not supported
>Scheduled Procedure Step ID	(0040,0009)	1C		SCP - Not used SCU - Not supported
>Scheduled Procedure Step Description	(0040,0007)	3		SCP - Not used SCU - Not supported
>Scheduled Protocol Code Sequence	(0040,0008)	3		SCP - Not used SCU - Not supported
>>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported
Performed Procedure Step ID	(0040,0253)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Start Date	(0040,0244)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Start Time	(0040,0245)	3		SCP - Not used SCU - Not supported
Performed Procedure Step Description	(0040,0254)	3		SCP - Not used SCU - Not supported
Performed Protocol Code Sequence	(0040,0260)	3		SCP - Not used SCU - Not supported
>Code Sequence Macro	(8.8-,1)			SCP - Not used SCU - Not supported

A.24 Structure Set Module Attributes (C.8.8.5)

Attribute Name	Tag	Type	Internal value	Notes
Structure Set Label	(3006,0002)	1		
Structure Set Name	(3006,0004)	3		
Structure Set Description	(3006,0006)	3		
Instance Number	(0020,0013)	3		
Structure Set Date	(3006,0008)	2		
Structure Set Time	(3006,0009)	2		
Referenced Frame of Reference Sequence	(3006,0010)	3		

Attribute Name	Tag	Type	Internal value	Notes
>Frame of Reference UID	(0020,0052)	1C		
>Frame of Reference Relationship Sequence	(3006,00C0)	3		
>>Related Frame of Reference UID	(3006,00C2)	1C		
>>Frame of Reference Transformation Type	(3006,00C4)	1C		
>>Frame of Reference Transformation Matrix	(3006,00C6)	1C		
>>Frame of Reference Transformation Comment	(3006,00C8)	3		
>RT Referenced Study Sequence	(3006,0012)	3		
>>Referenced SOP Class UID	(0008,1150)	1C		
>>Referenced SOP Instance UID	(0008,1155)	1C		
>>RT Referenced Series Sequence	(3006,0014)	1C		
>>>Series Instance UID	(0020,000E)	1C		
>>>Contour Image Sequence	(3006,0016)	1C		
>>>>Referenced SOP Class UID	(0008,1150)	1C		SCP - Not used SCU - Not supported
>>>>Referenced SOP Instance UID	(0008,1155)	1C		SCP - Not used SCU - Not supported
>>>>Referenced Frame Number	(0008,1160)	3		
Structure Set ROI Sequence	(3006,0020)	3		
>ROI Number	(3006,0022)	1C		
>Referenced Frame of Reference UID	(3006,0024)	1C		
>ROI Name	(3006,0026)	2C		
>ROI Description	(3006,0028)	3		
>ROI Volume	(3006,002C)	3		
>ROI Generation Algorithm	(3006,0036)	2C		
>ROI Generation Description	(3006,0038)	3		

A.25 ROI Geometry Attributes

See section ROI Geometry Attributes.

A.26 ROI Contour Module Attributes (C.8.8.6)

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

A.27 RT ROI Observations Module Attributes (C.8.8.8)

Attribute Name	Tag	Type	Internal value	Notes
RT ROI Observation Sequence	(3006,0080)	1		
>Observation Number	(3006,0082)	1		
>Referenced ROI Number	(3006,0084)	1		
>ROI Observation label	(3006,0085)	3		
>ROI Observation Description	(3006,0088)	3		
>RT Related ROI Sequence	(3006,0030)	3		
>>Referenced ROI Number	(3006,0084)	1C		
>>RT ROI Relationship	(3006,0033)	3		
>RT ROI Identification Code Sequence	(3006,0086)	3		SCP - Not used SCU - Not supported
>Related RT ROI Observations Sequence	(3006,00A0)	3		
>>Observation Number	(3006,0082)	1C		
>RT ROI Interpreted Type	(3006,00A4)	2		
>RT ROI Interpreted Class	Private	3	VOIClass	
>ROI Interpreter	(3006,00A6)	2		
>Material ID	(3006,00E1)	3		
>ROI Physical Properties Sequence	(3006,00B0)	3		

Attribute Name	Tag	Type	Internal value	Notes
>>ROI Physical Property	(3006,00B2)	1C		
>>ROI Physical Property Value	(3006,00B4)	1C		

A.28 VOI LUT Module Attributes (C.11.2)

Attribute Name	Tag	Type	Internal value	Notes
VOI LUT Sequence	(0028,3010)	3		
>LUT Descriptor	(0028,3002)	1C		
>LUT Explanation	(0028,3003)	3		
>LUT Data	(0028,3006)	1C		
Window Center	(0028,1050)	3		
Window Width	(0028,1051)	1C		
Window Center & Width Explanation	(0028,1055)	3		

A.29 SOP Common Module Attributes (C.12.1)

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Provided SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra Prostate. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - Always '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
Timezone Offset From UTC	(0008,0201)	3	SCP – Not Used SCU – Not Provided

Appendix B RT Treatment Plan & RT Dose

B.1 RT Plan IOD (A.20)

IE	Module	Section	DICOM Usage	Comments
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Supported
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	RT Series	C.8.8.1	M	
	Clinical Trial Series	C.7.3.2	U	SCP - Not used SCU - Not provided
Frame of Reference	Frame of Reference	C.7.4.1	U (see note in DICOM description)	SCP - Not supported SCU - Not provided
Equipment	General Equipment	C.7.5.1	M	
Plan	RT General Plan	C.8.8.9	M	
	RT Prescription	C.8.8.10	U	SCP - Not used SCU - Not provided Conditionally
	RT Tolerance Tables	C.8.8.11	U	SCP - Not used SCU - Not provided Conditionally
	RT Patient Setup	C.8.8.12	U	SCP - Used SCU - Supported
	RT Fraction Scheme	C.8.8.13	U	SCP - Not used SCU - Not provided Conditionally
	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	SCP - Not used SCU - Not provided
	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	SCP - Used SCU - Provided
	Approval	C.8.8.16	U	SCP - Used SCU - Provided
	Markers	Private	U	SCP - Used SCU - Provided
	Settings	Private	U	SCP - Used SCU - Provided
	SOP Common	C.12.1	M	

B.2 RT General Plan Module (C.8.8.9)

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
RT Plan Label	300A,0002	1				
RT Plan Name	300A,0003	3				
RT Plan Description	300A,0004	3				
Instance Number	0020,0013	3				
Operators' Name	0008,1070	2				
RT Plan Date	300A,0006	2	PlannedAtDate			
RT Plan Time	300A,0007	2	PlannedAtTime			
Treatment Protocols	300A,0009	3				
Plan Intent	300A,000A	3				
Treatment Sites	300A,000B	3				
RT Plan Geometry	300A,000C	1				Always PATIENT
Referenced Structure Set Sequence	300C,0060	1C				
Referenced Dose Sequence	300C,0080	3				
Referenced RT Plan Sequence	300C,0002	3				
Private attributes	(300B,0010)	3				Used when plan is containing a Flexitron Plan Code. This is only used for brachy plans. SCP Used if provided
Flexitron Plan Code	(300B,1029)	3				SCU - Provided. The Flexitron Plan Code is provided to make the plan unique. On the destination application (e.g. TCC v2.1) the same Flexitron Plan Code must be entered to be able to import the RT Plan. SCP Used
End private attributes						
Referenced SOP Class UID	0008,1150					
Referenced SOP Instance UID	0008,1155					

B.3 RT Prescription Module (C.8.8.10)

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Dose Reference Sequence	300A,0010	3				

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>Target Maximum Dose	300A,0027	3				
Dose Reference Number	300A,0012					
Dose Reference Structure Type	300A,0014					
Dose Reference Description	300A,0016					
Referenced ROI Number	3006,0084					
Dose Reference Point Coordinates	300A,0018					
Dose Reference Type	300A,0020					
Target Minimum Dose	300A,0025					
Target Prescription Dose	300A,0026					
Nominal Prior Dose	300A,001A					
Constraint Weight	300A,0021					
Delivery Warning Dose	300A,0022					
Delivery Maximum Dose	300A,0023					
Target Underdose Volume Fraction	300A,0028					
Organ at Risk Full-volume Dose	300A,002A					
Organ at Risk Limit Dose	300A,002B					
Organ at Risk Maximum Dose	300A,002C					
Organ at Risk Overdose Volume Fraction	300A,002D					
Prescription Description	300A,000E					

B.4 Fraction Scheme Module (C.8.8.13)

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Fraction Group	300A,0070	1				
>Fraction Group Number	300A,0071	1				
>Referenced Patient Setup Number	300C,006A	3				
>Number of Fractions Planned	300A,0078	2				
>Number of Fraction Pattern Digits PerDay	300A,0079	3				

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>Repeat Fraction Cycle Length	300A,007A	3				
>Fraction Pattern	300A,007B	3				
>Number of Beams	300A,0080	1				Must be 0 (Brachy plans)
>Number of Brachy Application Setups	300A,00A0	1				
>Referenced Brachy Application SetupSequence	300C,000A	1C				
>>Referenced Brachy ApplicationSetup Number	300C,000C	1C				
>>Brachy Application Setup DoseSpecification Point	300A,00A2	3				
>>Brachy Application Setup Dose	300A,00A4	3				

NOTE:

1. An RT Dose IOD referenced within the Referenced Dose Sequence (300C,0080) can be used for storing grid-based (pixel) data, isodose curves, and/or individual dose points (with optional dose point names) for the current Fraction Group.
2. The fractionation pattern does not indicate the actual start of treatment, or the order or timing of fraction delivery. If treatment does not commence as outlined in the pattern, it is the application's responsibility to make any necessary adjustments.

B.5 RT Brachy Application Setups Module (C.8.8.15)

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Brachy Treatment Technique	300A,0200	1				Next to types specified in DICOM, TCS also accepts value UNDEFINED
Brachy Treatment Type	300A,0202	1				HDR, PDR
Treatment Machine Sequence	300A,0206	1				(AFTERLOADER)
>Treatment Machine Name	300A,00B2	2	Name			
>Manufacturer	0008,0070	3	Manufacturer			
>Institution Name	0008,0080	3				
>Institution Address	0008,0081	3				
>Institutional Department Name	0008,1040	3				
>Manufacturer's Model Name	0008,1090	3	Model			
>Device Serial Number	0018,1000	3	Serial			

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>Type	Private 1001,1010	3	Type	LO	1	HDR, PDR, ...
>System Type	Private 1001,1012	3	SystemType	LO	1	HDR, PDR, ...
>Number of sources	Private 1001,1014	3	Sources	SL	1	Must be 1
>Number of hardware channels	Private 1001,1016	3	hardwareChannels	SL	1	
>Number of software channels	Private 1001,1018	3	softwareChannels	SL	1	
>Detection of catheter tip	Private 1001,101A	3	catheterTipDetection	SL	1	
>Name for Channel Length	Private 1001,101C	3	channelLengthName	LO	1	
>min Channel Length	Private 1001,101E	3	MinChannelLength	FL	1	
>max Channel Length	Private 1001,1020	3	MaxChannelLength	FL	1	
>Source Movement Type	Private 1001,1022	3	SsMethod	SL	1	
>Number of Possible Step Sizes	Private 1001,1024	3	ssdPossibleSteps	SL	1	
>Step	Private 1001,1026	3	ssdSteps	FL	1-n	VM: ssdPossibleSteps
>Default Step	Private 1001,1028	3	ssDefStep	FL	1	
>Continuously min Step	Private 1001,002A	3	sscMinStep	FL	1	
>Continuously max Step	Private 1001,102C	3	sscMaxStep	FL	1	
>Common Stepping for all Channels	Private 1001,102E	3	commonSteppingAllChannels	SL	1	
>Drive Type	Private 1001,1030	3	driveType	SL	1	
>max Number of Steps per Channel	Private 1001,1032	3	maxStepsPerChannel	SL	1	
>Time Resolution	Private 1001,1034	3	TimeResolution	FL	1	
>max Time	Private 1001,1036	3	maxTime	FL	1	
Source Sequence	300A,0210	1				
>Source Number	300A,0212	1				
>Source Type	300A,0214	1	geometricType			Line, Point
>Source Manufacturer	300A,0216	3	manufacturer			

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>Source ID	Private 1001,1040	3	ID	LO	1	
>Active Source Diameter	300A,0218	3	activeCoreDiameter			
>Active Source Length	300A,021A	3	activeCoreLength			
>Material ID	300A,00E1	3	encapsulationMaterial			
> Encapsulation thickness tip	Private 1001,1041	3	tipThickness	FL	1	
> Encapsulation thickness wire	Private 1001,1042	3	wireThickness	FL	1	
> Encapsulation thickness lateral	Private 1001,1043	3	lateralThickness	FL	1	
>Source Encapsulation NominalThickness	300A,0222	3				
>Source Encapsulation NominalTransmission	300A,0224	3				
>Source Isotope Name	300A,0226	1	nuclide			
>Source Isotope Half Life	300A,0228	1	decayHalfTime			
> Half Life unit	Private 1001,1044	3	Unit	SL	1	
>Source Strength Units	((300A,0229)	1C				SCU – Not Provided; No Beta source supported SCP – Not Used
>Reference Air Kerma Rate	300A,022A	1	act_sstrength			
>Source Strength	(300A,022B)	1C				SCU – Not Provided; No Beta source supported SCP – Not Used
>Air Kerma Rate Reference Date	300A,022C	1	currentEntryDate			
>Air Kerma Rate Reference Time	300A,022E	1	currentEntryTime			
>Private attributes	(300B,0010)	3				
>Source Identification Number	(300B,100C)	3				Identification of the source as provided by the afterloader manufacturer
>End private attributes						
> Lamda	Private 1001,1045	3	Lamda	FL	1	

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
> Source strength conversion factor	Private 1001,1046	3	Source strength conversion factor	FL	1	
> Number radial dose distances	Private 1001,1047	3	rdfRadialDistanceCount	SL	1	
> Radial dose distance	Private 1001,1048	3	distance	FL	1-n	VM: rdfRadialDistanceCount
> Radial dose value	Private 1001,1049	3	radialDoseValue	FL	1-n	VM: rdfRadialDistanceCount
> Number anisotropy radial distances	Private 1001,104A	3	aRadialDistanceCount	SL	1	
> Anisotropy radial distance	Private 1001,104B	3	aRadialDistances	FL	1-n	VM: aRadialDistanceCount
> Number anisotropy polar angles	Private 1001,104C	3	aPolarAngleCount	SL	1	
> Anisotropic polar angle	Private 1001,104D	3	aPolarAngles	FL	1-n	VM: aPolarAngleCount
> Anisotropy function value	Private 1001,104E	3	anisotropyFunctions	FL	1-n	VM: aPolarAngleCount* aRadialDistanceCount
> Number anisotropy factor radial distances	Private 1001,104F	3	phiRadialDistanceCount	SL	1	
> Anisotropy factor radial distance	Private 1001,1050	3	distance	FL	1-n	VM: phiRadialDistanceCount
> Anisotropy factor data	Private 1001,1051	3	anisotropyFactors	FL	1-n	VM: phiRadialDistanceCount
> Anisotropy constant	Private 1001,1052	3	anisotropyConstant	FL	1	
> Calibration date	Private 1001,1053	3	calibrationDate	DA	1	
> Calibration time	Private 1001,1054	3	calibrationTime	DT	1	
> Source strength	Private 1001,1055	3	calibrationSourceStrength	FL	1	
> Unit	Private 1001,1056	3	calibrationUnit	LO	1	
> Calibration entry date	Private 1001,1057	3	calibrationEntryDate	DA	1	
> Calibration entry time	Private 1001,1058	3	calibrationEntryTime	DT	1	
> User	Private 1001,1059	3	calibrationEntryUser	LO	1	
Application Setup Sequence	300A,0230	1				

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>Application Setup Type	300A,0232	1				Next to DICOM defined types, TCS also accepts UNDEFINED
>Application Setup Number	300A,0234	1				
>Application Setup Name	300A,0236	3				
>Application Setup Manufacturer	300A,0238	3				
>Template Number	300A,0240	3	id	IS		
>Template Type	300A,0242	3		SH		
>Template Name	300A,0244	3	name	LO		
>Total Reference Air Kerma	300A,0250	1	TimeTrack.track			
>Brachy Accessory Device Sequence	300A,0260	3		SQ		
>>Brachy Accessory Device Number	300A,0262	2C		IS		
>>Brachy Accessory Device ID	300A,0263	2C		SH		
>>Brachy Accessory Device Type	300A,0264	1C		CS		
>>Brachy Accessory Device Name	300A,0266	3		LO		
>>Material ID	300A,00E1	3		SH		
>> Brachy Accessory Device NominalThickness	300A,026A	3		DS		
>> Brachy Accessory Device NominalTransmission	300A,026C	3		DS		
>>Referenced ROI Number	3006,0084	2C		DS		
>Channel Sequence	300A,0280	1				
>>Channel Number	300A,0282	1				Def: index
>>Channel Length	300A,0284	2	channel_length			
>>Channel Total Time	300A,0286	1	Total time			Calculated (1)
>>Source Movement Type	300A,0288	1				STEPWISE
>>Number of Pulses	300A,028A	1C				Mandatory for PDR plans. If not available Number of Fractions Planned (300A,0078) is used instead.
>>Pulse Repetition Interval	300A,028C	1C				
>>Source Applicator Number	300A,0290	3	index			
>>Source Applicator ID	300A,0291	2C	id + virtual/life identification			Prefix V/L

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>>Source Applicator Type	300A,0292	1C	type			
>>Source Applicator Name	300A,0294	3	name			
>>Source Applicator Length	300A,0296	1C	Length - dist_tip2source			
>>Source Applicator Manufacturer	300A,0298	3	--			
>>Material ID	300A,00E1	3	material			
>> Density	Private 1001,1070	3	density	FD	1	
>> Outer diameter	Private 1001,1071	3	outer_diameter	FD	1	
>> Inner diameter	Private 1001,1072	3	inner_diameter	FD	1	
>> Min free length	Private 1001,1073	3	min_free_length	FD	1	
>> Dinstance tip to SDP	Private 1001,1074	3	dist_tip2source	FD	1	
>> Reconstructed length	Private 1001,1075	3	reconstruct_length	FD	1	
>> Free length	Private 1001,1076	3	free_length	FD	1	
>> Retraction length	Private 1001,1077	3	retraction_length	FD	1	
>> Depth	Private 1001,1078	3	depth	FD	1	
>> Catheter Template Mode	Private 1001,1079	3	tpl_mode	SL	1	
>> Template row	Private 1001,107A	2C	Template row	SL	1	If tpl_mode = 0 or = 1
>> Template column	Private 1001,107B	2C	Template column	SL	1	If tpl_mode = 0 or = 1
>> Applicator Control Point Sequence	Private 1001,1080	3				(cath->cpkt_list)
>>> CDP number	Private 1001,1081	3	Unique number	SL	1	
>>> CDP type	Private 1001,1082	3	type	SL	1	
>>> CDP 3D Position	Private 1001,1083	3	Coordinates	FD	3	
>> Source Applicator Wall NominalThickness	300A,029C	3				

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>> Source Applicator Wall NominalTransmission	300A,029E	3				
>>Source Applicator Step Size	300A,02A0	1C	source_step			
>>Transfer Tube Number	300A,02A2	2				
>>Transfer Tube Length	300A,02A4	2C	channel_length			
>>Channel Shield Sequence	300A,02B0	3				
>>Referenced Source Number	300C,000E	1	Number of source			
>>Number of Control Points	300A,0110	1	Number active SDPs			
>>Final Cumulative Time Weight	300A,02C8	1C				Always 100
>>Brachy Control Point Sequence	300A,02D0	1				(active cath->spkt_list)
>>>Control Point Index	300A,0112	1	Index from 0			(2)
>>>Cumulative Time Weight	300A,02D6	2				(2)
>>>Control Point Relative Position	300A,02D2	1				(2)
>>>Control Point 3D Position	300A,02D4	3	ASDP coordinates			
>>>Brachy Referenced Dose Reference Sequence	300C,0055	3				
>>>>Referenced Dose Reference Number	300C,0051	1C				
>>>>Cumulative Dose Reference	300A,010C	1C				
>> Virtual Channel sequence	Private 1001,10FF	3		SQ	1	To be set if Source Applicator ID points on life catheter and virtual catheter is present
>>>Same as standard Channel Sequence						

NOTE:

An Material ID (300A,00E1) may also be specified within a referenced ROI, if an ROI is used to describe the object.

B.6 Approval Module (C.8.8.9)

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
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Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Approval Status	300E,0002	1				
Review Date	300E,0004	2C				
Review Time	300E,0005	2C				
Reviewer Name	300E,0008	2C				

B.7 Marker Module (Private) – Patient-, Marker-, Applicator Points

See section Marker Module (Private) – Patient-, Marker-, Applicator Points.

B.8 Settings Module (Private)

See section Settings Module (Private).

B.9 Approval (C.8.8.16)

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

B.10 SOP Common Module Attributes (C.12.1)

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Provided SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra Prostate. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - Always '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
Timezone Offset From UTC	(0008,0201)	3	SCP – Not Used SCU – Not Provided

B.11 RT Dose IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
	Clinical Trial Subject	C.7.1.3	U	SCP - Not used SCU - Not provided
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCP - Used SCU - Supported
	Clinical Trial Study	C.7.2.3	U	SCP - Not used SCU - Not provided
Series	RT Series	C.8.8.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	M	
Equipment	General Equipment	C.7.5.1	M	
Dose	General Image	C.7.6.1	C-Required if dose data contains grid-based doses.	
	Image Plane	C.7.6.2	C-Required if dose data contains grid-based doses.	
	Image Pixel	C.7.6.3	C-Required if dose data contains grid-based doses.	
	Multi-Frame	C.7.6.6	C - Required if dose data contains grid-based doses and pixel data is multi-frame data.	SCU - Supported SCP - Used
	Overlay Plane	C.9.2	U	SCU - Not supported SCP - Not used
	Multi-Frame Overlay	C.9.3	U	SCU - Not supported SCP - Not used
	Modality LUT	C.11.1	U	SCU - Not supported SCP - Not used
	RT Dose	C.8.8.3	M	
	RT DVH	C.8.8.4	U	SCU - Not supported SCP - Not used
	Structure Set	C.8.8.5	C-Required if dose data contains dose points or isodose curves.	SCU - Not supported SCP - Not used
	ROI Contour	C.8.8.6	C-Required if dose data contains dose points or isodose curves.	SCU - Not supported SCP - Not used
	RT Dose ROI	C.8.8.7	C-Required if dose data contains dose points or isodose curves.	SCU - Not supported SCP - Not used
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

B.11.1. Patient Module

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

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

B.11.2. 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
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	(0008,1120)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not provided SCP - Not used

B.11.3. 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 Prostate. 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

Attribute Name	Tag	Type	Notes
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

B.11.4. Frame of Reference Module

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

B.11.5. 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 - Not provided SCP - Not used
Manufacturer's Model Name	(0008,1090)	3	SCU - Not provided SCP - Not used
Device Serial Number	(0018,1000)	3	SCU - Not provided SCP - Not used
Software Versions	(0018,1020)	3	SCU - Not provided 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

B.11.6. General Image Module

Attribute Name	Tag	Type	Notes
Instance Number	(0020,0013)	2	SCU - Zero length 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

Attribute Name	Tag	Type	Notes
Acquisition Date	(0008,0022)	3	SCU - Not provided SCP - Not used
Acquisition Time	(0008,0032)	3	SCU - Not provided SCP - Not used
Referenced Image Sequence	(0008,1140)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Derivation Description	(0008,2111)	3	SCU - Not provided SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Not provided SCP - Not used
Image Comments	(0020,4000)	3	SCU - Not provided SCP - Not used

B.11.7. 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

B.11.8. 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 - '16' SCP - Required
Bits Stored	(0028,0101)	1	SCU - '16' SCP - Required
High Bit	(0028,0102)	1	SCU - '15' SCP - Required
Pixel Representation	(0028,0103)	1	SCU - '0' (unsigned integer). SCP - Required
Pixel Data	(7FE0,0010)	1	SCU - Provided SCP - Required

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

B.11.9. 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

B.11.10. 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 - '16' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '16' SCP - Used
High Bit	(0028,0102)	1C	SCU - '15' SCP - Required
Pixel Representation	(0028,0103)	1C	SCU - '0' (unsigned integer). SCP - Required
Dose Units	(3004,0002)	1	SCU - 'GY' SCP - Used
Dose Type	(3004,0004)	1	SCU - 'PHYSICAL' SCP - Used
Dose Comment	(3004,0006)	3	SCU - Not provided SCP - Not used
Normalization Point	(3004,0008)	3	SCU - Not provided SCP - Not used
Dose Summation Type	(3004,000A)	1	SCU - 'BRACHY, FRACTION or 'PLAN' SCP - Used

Attribute Name	Tag	Type	Notes
Referenced RT Plan Sequence	(300C,0002)	1C	SCU - Provided SCP - Required
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Provided SCP - Required
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Provided SCP - Required
>Referenced Fraction Group Sequence	(300C,0020)	1C	SCU - Provided SCP - Required
>>Referenced Fraction Group Number	(300C,0022)	1C	SCU - Provided SCP - Required
>>Referenced Beam Sequence	(300C,0004)	1C	SCU - Not provided SCP - Not used
>>>Referenced Beam Number	(300C,0006)	1C	SCU - Not provided SCP - Not used
>>Referenced Brachy Application Setup Sequence	(300C,000A)	1C	SCU - Provided SCP - Required
>>>Referenced Brachy Application Setup Number	(300C,000C)	1C	SCU - Provided SCP - Required
Grid Frame Offset Vector	(3004,000C)	1C	SCU – Provided The Z-values are relative to the position of the first dose plane support as defined in DICOM 2008 standards. SCP – Required Only option a is support as defined in DICOM 2008 standards.
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

B.11.11. 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 Prostate). SCP – Not used
Structure Set Time	(3006,0009)	2	SCU – Time of creation (i.e.: when saved in Oncentra Prostate). 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

Attribute Name	Tag	Type	Notes
>>Frame of Reference Transformation Matrix	(3006,00C6)	1C	SCU – Not provided SCP – Not used
>>Frame of Reference Transformation Comment	(3006,00C8)	3	SCU – Not provided SCP – Not used
>RT Referenced Study Sequence	(3006,0012)	3	SCU – Not provided SCP – Not used
>>Referenced SOP Class UID	(0008,1150)	1C	SCU – Not provided SCP – Not used
>>Referenced SOP Instance UID	(0008,1155)	1C	SCU – Not provided SCP – Not used
>>RT Referenced Series Sequence	(3006,0014)	1C	SCU – Not provided SCP – Not used
>>>Series Instance UID	(0020,000E)	1C	SCU – Not provided SCP – Not used
>>>Contour Image Sequence	(3006,0016)	1C	SCU – Not provided SCP – Not used
>>>>Referenced SOP Class UID	(0008,1150)	1C	SCU – Not provided SCP – Not used
>>>>Referenced SOP Instance UID	(0008,1155)	1C	SCU – Not provided SCP – Not used
>>>>Referenced Frame Number	(0008,1160)	3	SCU – Not provided SCP – Not used
Structure Set ROI Sequence	(3006,0020)	3	SCU – Provided SCP – Required
>ROI Number	(3006,0022)	1C	SCU – Provided SCP – Required
>Referenced Frame of Reference UID	(3006,0024)	1C	SCU – Provided SCP – Required
>ROI Name	(3006,0026)	2C	SCU – Provided if available SCP – Used if available
>ROI Description	(3006,0028)	3	SCU – Not provided SCP – Not used
>ROI Volume	(3006,002C)	3	SCU – Duplicated from SCP. SCP – Not used
>ROI Generation Algorithm	(3006,0036)	2C	SCU – Provided SCP – Used if provided
>ROI Generation Description	(3006,0038)	3	SCU – Not provided SCP – Not used

B.11.12. 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

Attribute Name	Tag	Type	Notes
>>>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.

B.11.13. 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

B.11.14. SOP Common Module Attributes (C.12.1)

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Provided SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Created by Oncentra Prostate. SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - Always '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
Timezone Offset From UTC	(0008,0201)	3	SCP - Not Used SCU - Not Provided

Appendix C Private Data Elements

C.1 US Probe Module Attributes (Private)

Only applicable for Oncentra Prostate v3.3. Support of the optional Telemed Probe.

The Private Creator "PRIVAT_CODE_STRING_1003", attribute tag (1003,0010) identifies the fixed implementation of these private attributes elements (1003,XX00-XXFF).

Attribute Name	Tag	Type	Internal value	Notes
Number Of Probes	(1003,XX01)	3		
US Probe Sequence	(1003,XX10)	3		
> Identifier	(1003,XX11)	3		
> Probe Name	(1003,XX12)	3		
> Depth	(1003,XX13)	3		
> Frequency	(1003,XX14)	3		
> Gain	(1003,XX15)	3		
> Power	(1003,XX16)	3		
> Dynamic Range	(1003,XX17)	3		
> Frame Averaging	(1003,XX18)	3		
> Field Of View	(1003,XX19)	3		
> TGC	(1003,XX20)	3		
> Number Of Focus Sets	(1003,XX2A)	3		
> Current Focus Set	(1003,XX2B)	3		
> Focus Set Sequence	(1003,XX40)	3		
>> Identifier	(1003,XX41)	3		
>> Number of focus zone	(1003,XX42)	3		
>> Focus	(1003,XX43)	3		
>> Image Enhancement Filter Index	(1003,XX2C)	3		
> Rejection Filter Low	(1003,XX2D)	3		
> Rejection Filter High	(1003,XX2E)	3		
> Brightness	(1003,XX2F)	3		
> Contrast	(1003,XX30)	3		
> Gamma	(1003,XX31)	3		
> Speckle Enabled	(1003,XX32)	3		
> Speckle Level	(1003,XX33)	3		

C.2 General Acquisition Attributes (Private)

The Private Creator “PRIVAT_CODE_STRING_0019”, attribute tag (0019,0010) identifies the fixed implementation of these private attributes elements (0019, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	Notes
Calibration	(0019, xx00)	3	USAQ_CALIBRATION	VM 1
Depth Conversion	(0019, xx01)	3	USAQ_DEPTHINFO	VM 1
Stepsize	(0019, xx02)	3	USAQ_STEPSIZE	VM 1
Warning	(0019, xx03)	3	USAQ_WARNING	VM 1-n
DataID	(0019, xx04)	3	USAQ_DATA_ID	VM 1

C.3 General Geometry Attributes (Private)

The Private Creator “PRIVAT_CODE_STRING_0021”, attribute tag (0021,0010) identifies the fixed implementation of these private attributes elements (0021, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	Notes
Distance Base Plane to Template	(0021, xx70)	3	USAQ_P2T	VM 1
Volume to Patient Matrix	(0021, xx71)	3	VOL3_MVOL2PAT	VM 1 4x4 Matrix
Patient to World Matrix	(0021, xx72)	3	VOL3_PAT2WORLD	VM 1 4x4 Matrix
Base Plane	(0021, xx73)	3	VOL3_BPLANE	VM 1
Reference Plane	(0021, xx74)	3	VOL3_RPLANE	VM 1
Apex Plane	(0021, xx75)	3	VOL3_APLANE	VM 1
Base Plane Offset	(0021, xx76)	3	VOL3_BPLANE_OFFSET	VM 1

C.4 General Template Attributes (Private)

The Private Creator “PRIVAT_CODE_STRING_300B”, attribute tag (300B,0010) identifies the fixed implementation of these private attributes elements (300B, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	Notes
Template Mode	(300B, xx00)	3		Fixed Template Free Template Template free
Template ID	(300B, xx01)	2C	VOL3_TPL_ID	If not template free
Number of Columns	(300B, xx02)	2C	VOL3_TPL_COL	If not template free
Column Distance	(300B, xx03)	2C	VOL3_TPL_COL_DIST	If not template free
Number of Rows	(300B, xx04)	2C	VOL3_TPL_ROW	If not template free
Row Distance	(300B, xx05)	2C	VOL3_TPL_ROW_DIST	If not template free
Origin	(300B, xx06)	2C	VOL3_TPL_ORIGIN	If not template free
Column Numbering	(300B, xx07)	2C	VOL3_TPL_COL_NUM	VM: “Number of columns”
Row Numbering	(300B, xx08)	2C	VOL3_TPL_ROW_NUM	VM: “Number of rows”

Attribute Name	Tag	Type	Internal value	Notes
Used Holes Array	(300B, xx09)	2C	VOL3_TPL_USED_HOLES	VM: "Number of columns" x "Number of rows"
Lock Status	(300B, xx0A)	3		If not template free

C.5 General Template Components Attributes (Private)

The Private Creator "PRIVAT_CODE_STRING_300B", attribute tag (300B,0010) identifies the fixed implementation of these private attributes elements (300B, XX00-XXFF).

Attribute Name	Tag	Type	Internal value (Prostate configuration file)	Notes
Identifier	(300B, xx0C)	3	Applicator Section → ID	ID of the Channel
ModificationType	(300B, xx0D)	3	Applicator Section → Modification → Type	Defines how the channel can be modified, depending on the used applicator. Enumerations: 0. None 1. Translation 2. Rotation 3. PointPath
ModificationValue	(300B, xx0E)	3		Value applied by the user. Unit: None: [--] Translation: [mm] Rotation: [°] PointPath: [mm]
TransformationMatrix	(300B, xx03)	3		Defining separate movement of a channel

C.6 ROI Geometry Attributes

The Private Creator "PRIVAT_CODE_STRING_3007", attribute tag (3007,0010) identifies the fixed implementation of these private attributes elements (3007, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	Notes
Volume to Patient Matrix	(3007, xx00)	3	VOL3_MVOL2PAT	VR: FD VM: 16 4x4 matrix
Volume Resolution Conversion	(3007, xx01)	3	VolResolutionConversion	VR: FD, VM:3
Volume Data Conversion	(3007, xx02)	3	MVolDataConversion	FD, VM:16 4x4 matrix
Patient Data Conversion	(3007, xx03)	3	MVolPatConversion	VR: FD, VM:16 4x4 matrix
DICOM Data Conversion	(3007, xx04)	3		VR: FD VM: 16 4x4 matrix

C.7 Marker Module (Private) – Patient-, Marker-, Applicator Points

The Private Creator “PRIVAT_CODE_STRING_1001”, attribute tag (1001,0010) identifies the fixed implementation of these private attributes elements (1001, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Marker sequence	(1001, xxA0)	3			1-n	
> Marker type	(1001, xxA1)	1		SL	1	
> Marker number	(1001, xxA2)	1	Index	SL	1	Has to be unique for markers of the same type
> Marker 3D position	(1001, xxA3)	1	Coordinates	FD	3	

C.8 Settings Module (Private)

The Private Creator “PRIVAT_CODE_STRING_1001”, attribute tag (1001,0010) identifies the fixed implementation of these private attributes elements (1001, XX00-XXFF).

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
Settings Sequence						
>Distance unit	(1001, xxB0)	3	distances	SL	1	Cm/mm
>Dose unit	(1001, xxB1)	3	dose_unit	SL	1	Gc/cGy
>Normalisation mode	(1001, xxB2)	3	normalisation_mode	SL	1	
>Normalisation Factor	(1001, xxB3)	3	normalization_factor	FD	1	
>F-Value	(1001, xxB4)	3	f_value	FD	1	
>Prescribed Dose	(1001, xxB5)	3	P_d	FD	1	
>Absolute Dose Factor	(1001, xxB6)	3	absolute_dose_factor	FD	1	
>Decoupled sk	(1001, xxB7)	3	Decoupleddecoupled_sk	SL	1	
>Absolute Time Factor	(1001, xxB8)	3	absolute_time_factor	FD	1	
>Total Treatment Time.	(1001, xxB9)	3	TimeTrack.total_time	FD	1	
>TG 43 Model	(1001, xxBA)	3	dose_calc.source_type	SL	1	
>3D Dose Grid Size	(1001, xxBB)	3	dose_calc.grid_step	SL	1	
>Dose grid corner 1	(1001, xxBC)	3	pat_gridborder[0]	FD	3	
>Dose grid corner 2	(1001, xxBD)	3	pat_gridborder[1]	FD	3	
>Patient Data conversion	(1001, xxBE)	3	Patient Data Conversion	FD	16	
>Volume Data conversion	(1001, xxBF)	3	Volume Data Conversion	FD	16	
>Volume Data Vector	(1001, xxC0)	3	Volume Resolution Conversion	FD	3	
> DICOM Data Conversion		3		FD	16	4x4 Matrix
>Optimization method	(1001, xxC1)	3	opt_method	SL	1	
>Display method	(1001, xxC2)	3	opt_method_out	SL	1	
>Geometrical Method	(1001, xxC3)	3	geoopt_onvol	SL	1	

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>VOI based optimization settings sequence	(1001, xxC4)	3				
>> VOI number	(1001, xxC5)	3	ID	SL	1	
>> VOI name	(1001, xxC6)	3	name	LO	1	
>> VOI type	(1001, xxC7)	3	type	SL	1	
>> VOI class	(1001, xxC8)	3	VOIclass	SL	1	
>> VOI Priority	(1001, xxC9)	3	VOI_priority	SL	1	
>> No of Points	(1001, xxCA)	3	points	SL	1	
>> Percent on Surface	(1001, xxCB)	3	perc	FD	1	
>> Surface Margin	(1001, xxCC)	3	s_margin	FD	1	
>> Selected	(1001, xxCD)	3	status	SL	1	
>> Dose Limit	(1001, xxCE)	3	dose_limit	FD	1	
>> Importance Factor	(1001, xxCF)	3	imp_factor	FD	1	
>> Importance Factor from	(1001, xxD0)	3	imp_factor_from	FD	1	
>> Importance Factor to	(1001, xxD1)	3	imp_factor_to	FD	1	
>> Focus	(1001, xxD2)	3	iobj_selected	FD	1	
>Surface Sampling Method	(1001, xxD3)	3	ptv_surf_tri	SL	1	
>Number of sampling Points per ccm	(1001, xxD4)	3	surf_points	FD	1	
>Convergence Accuracy	(1001, xxD5)	3	accuracy	SL	1	
>Max No of convergence Iterations	(1001, xxD6)	3	iterations	SL	1	
>Weight smoothing	(1001, xxD7)	3	weights_smooth	FD	1	
>Steps per importance factor	(1001, xxD8)	3	step	SL	1	
>Constraints PTV-Dmax	(1001, xxD9)	3	constr_ptv	FD	1	
>Constraints NT-Dmax	(1001, xxDA)	3	constr_nt	FD	1	
>Algorithmic Population size	(1001, xxDB)	3	actual_popsiz	SL	1	
>Algorithmic Generations	(1001, xxDC)	3	gener	SL	1	
>Algorithmic Initializations	(1001, xxDD)	3	initialization	SL	1	
>Min No of SDP	(1001, xxDE)	3	min_sdp	SL	1	
>Depth Method	(1001, xxDF)	3	depth_mode)	SL	1	
>Depth Defined On	(1001, xxE0)	3	depth_sel	SL	1	
>Depth	(1001, xxE1)	3	fixed_depth	FD	1	
>VOI based placement settings sequence	(1001, xxE2)	3				
>> VOI number	(1001, xxC5)	3	ID	SL	1	
>> VOI name	(1001, xxC6)	3	name	LO	1	
>> VOI type	(1001, xxC7)	3	type	SL	1	

Attribute Name	Tag	Type	Internal value	VR	VM	Notes
>> VOI class	(1001, xxC8)	3	VOIclass	SL	1	
>> VOI selected	(1001, xxE7)	3	status	SL	1	
>> Margin	(1001, xxE8)	3	margin	FD	1	
>Selection method	(1001, xxE9)	3	cath_sel	SL	1	
>Selection distance	(1001, xxEA)	3	cath_dist	FD	1	
>WBT On Contour Spacing	(1001, xxEB)	3	s	FD	1	
>WBT Urethra Margin	(1001, xxEC)	3	du	FD	1	
>WBT Searching Radius PTV	(1001, xxED)	3	d0	FD	1	
>WBT Searching Radius OAR	(1001, xxEE)	3	dd	FD	1	
>WBT Starting Point	(1001, xxEF)	3	sPnt	FD	3	
>WBT Surface	(1001, xxF0)	3	surf	FD	4	
>WBT No of Interior Catheters	(1001, xxF1)	3	cath_no	FD	4	
>WBT Relative Radius	(1001, xxF2)	3	rr	FD	4	
>Sorting Method	(1001, xxF3)	3	cath_sort	SL	1	