RAYSTATION 7

DICOM Conformance Statement IBA Driver

RayStation

1 OVERVIEW

This document specifies the DICOM interface for the treatment management system (TMS) RayTreatment IBA driver with Treatment Delivery Devices (TDD) from IBA. RayTreatment IBA driver can export data associated to a treatment delivery session such as RT Ion Plans, Beams Delivery Instructions, CT images and RT Structure set and recieve result for the treatment delivery session such as RT Ion Beams Delivery Results, CT and RT images, RT Structure sets and Spatial Registration objects.

1.1 NETWORK SERVICES

SOP Class Name	SOP Class UID	Provider of Service (SCP)	User of Service (SCU)
Transfer			
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Spatial Registration (REG) Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	No	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes
RT Beams Delivery Instruction Storage - Trial (Retired)	1.2.840.10008.5.1.4.34.1	No	Yes
Query/Retrieve			
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Workflow Management			
Unified Procedure Step - Push SOP Class - Trial (Retired)	1.2.840.10008.5.1.4.34.4.1	Yes	No
Unified Procedure Step - Pull SOP Class - Trial (Retired)	1.2.840.10008.5.1.4.34.4.3	Yes	No
Verification			
Verification SOP Class	1.2.840.10008.1.1	Yes	No

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3 INTRODUCTION

3.1 REVISION HISTORY

Date	Version	Comment
2017-12-06	1.0	First version

3.2 AUDIENCE

This document is written for users that need to understand how RayTreatment Driver IBA will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3 REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between RayTreatment Driver IBA and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.3.1 Interoperability validation needed

When using RayTreatment Driver IBA together with other software, the DICOM conformance statements must be compared and relevant validation tests run. The DICOM standard by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality. RaySearch is also active within the IHE-RO. Contact RaySearch for more info regarding adherence to IHE-RO profiles.

3.4 TERMS AND DEFINITIONS

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

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

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

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

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

Association – a network communication channel set up between Application Entities.

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

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

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Module – a set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM

messages.

Service Class Provider (SCP) – role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 BASICS OF DICOM COMMUNICATION

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

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

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

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

The Association Negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information). The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

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

3.6 ABBREVIATIONS

Name	Meaning
AE	Application Entity
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
IHE / IHE-RO	Integrating the Healthcare Enterprise. IHE-RO deals with integrating Radiation Oncology.
IOD	Information Object Definition
JPEG	Joint Photographic Experts Group
MR	Magnetic Resonance Imaging
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PTS	Proton Planning System (used by IBA)
RT	Radiotherapy
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TDD	Treatment Delivery Device
TMS	Treatment Management System
TPS	Treatment Planning System

3.7 REFERENCES

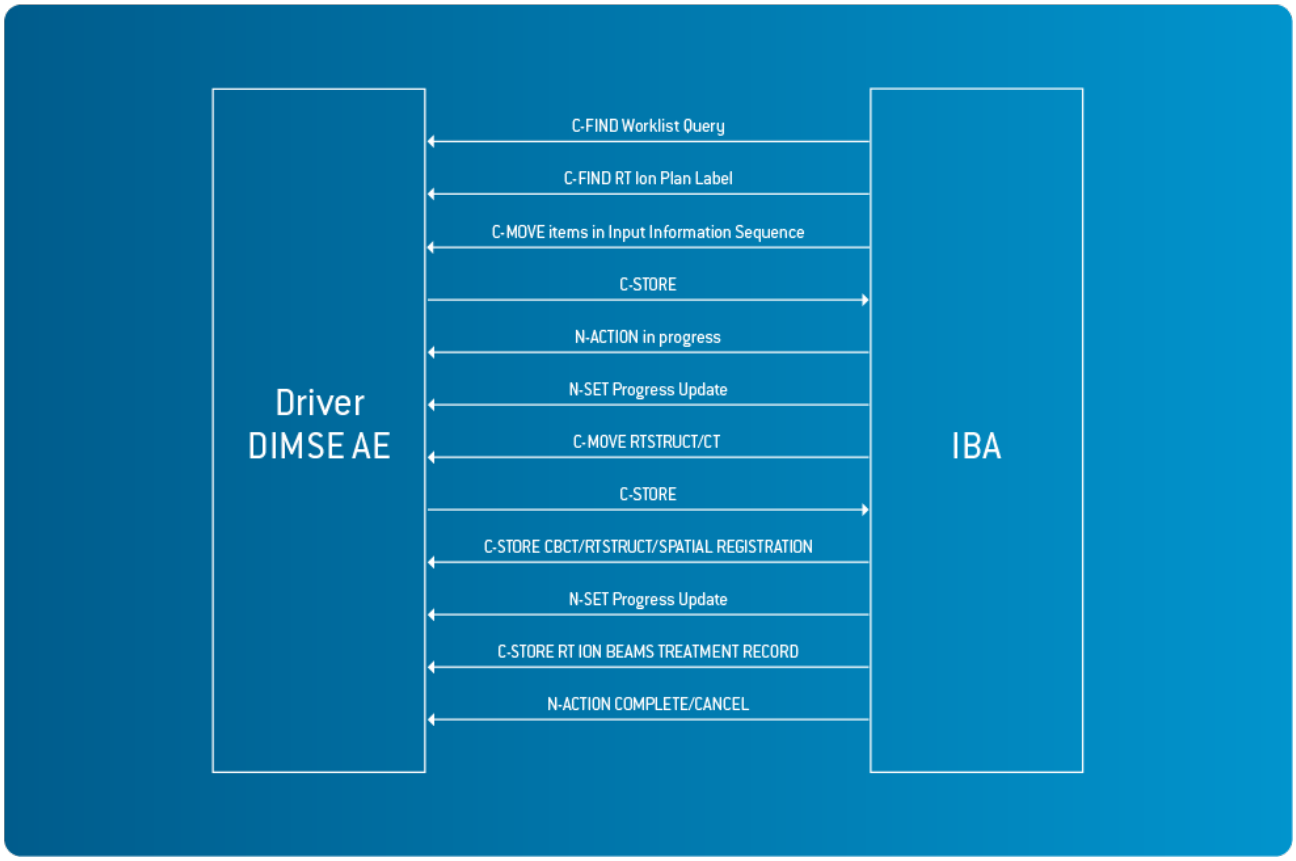
- NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/

4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

The following diagram illustrates the application data flow between RayTreatment Driver IBA and the specific TDD.



The scenario starts with a C-FIND query for Unified Procedure Steps from the remote client. The client can then make C-MOVE requests for items referenced in the Input Information Sequence in the UPS Worklist response and further on takes responsibility for the UPS by setting it to IN PROGRESS. Once the UPS is IN PROGRESS the RayTreatment Driver IBA only allows requests corresponding to the current session until the session has been completed in the application.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of the RayTreatment Driver IBA Application Entity

The following operations are supported:

CT Image:

- C-MOVE for planning CT images referenced in RT Struture Set.
- C-STORE for setup CT images.

Spatial Registration (REG):

- C-STORE for registration between setup and planning images.

RT Image:

- C-STORE for setup RT Images.

RT Structure Set:

- C-MOVE for RT Structure Set referenced in RT Ion Plan.
- C-STORE for RT Structure Set for the isocenter of the CBCT volume.

RT Ion Plan:

- C-MOVE for treatment delivery RT Ion Plan in UPS Worklist Input Information Sequence.

RT Ion Beams Treatment Record:

- C-MOVE for records in UPS Worklist Input Information Sequence.
- C-STORE for delivery result.

RT Beams Delivery Instruction:

- C-MOVE for beam delivery instructions in UPS Worklist Input Information Sequence.

Modality Performed Procedure Step - Pull:

- C-FIND for worklist query.
- N-ACTION for UPS status changes.
- N-SET for progress update.

Verification:

- C-ECHO for connection verfication.

4.1.3 Sequencing of Real World Activities

4.1.3.1 Preparate session

Once the patient is checked in to the session, Unified Procedure Steps will be created and available for Worklist query responses.

4.1.3.2 Manual cancellation

The procedure step can be canceled by the user in the application. Further requests relation to the session will be rejected.

4.1.3.3 Complete session

All sessions, including canceled sessions, needs to be completed by the user in the application before another session can be started.

4.2 AE SPECIFICATIONS:

4.2.1 RayTreatment Driver IBA Application Entity

4.2.1.1 SOP Classes

The RayTreatment Driver IBA Application Entity provides Standard Conformance to the following DICOM v3.0 and Supplement 96 SOP Classes as an SCP.

SOP Class Name	SOP Class UID	Provider of Service (SCP)	User of Service (SCU)
Transfer			
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Spatial Registration (REG) Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	No	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes
RT Beams Delivery Instruction Storage - Trial (Retired)	1.2.840.10008.5.1.4.34.1	No	Yes
Query/Retrieve			
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Workflow Management			
Unified Procedure Step - Push SOP Class - Trial (Retired)	1.2.840.10008.5.1.4.34.4.1	Yes	No
Unified Procedure Step - Pull SOP Class - Trial (Retired)	1.2.840.10008.5.1.4.34.4.3	Yes	No

Verification			
Verification SOP Class	1.2.840.10008.1.1	Yes	No

4.2.1.2 Association Policies

4.2.1.2.1 General

The DICOM standard Application context shall be specified.

Application Context Name	1.2.840.10008.3.1.1.1

The maximum PDU size in not configurable and is set to 16384 for SCU and unlimited for SCP.

4.2.1.2.2 Number of Associations.

Any number of incoming concurrent associations are accepted. When responding to a C-MOVE, the performed C-STORE requests are made sequentially in one single association.

4.2.1.2.3 Asynchronous Nature

RayTreatment Driver IBA does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.2.1.2.4 Implementation Identifying Information

4.2.1.3 Association Initiation Policy

The implementation information for this Application Entity is:

Implementation Class UID	1.3.6.1.4.1.30071.8
Implementation Version Name	fo-dicom 3.0.5

4.2.1.3.1 Activity C-ECHO

4.2.1.3.1.1 Description and Sequencing of Activities

4.2.1.3.1.2 Accepted Presentation Context

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.2 Activity C-FIND

4.2.1.3.2.1 Description and Sequencing of Activities

See section 4.1.1.

4.2.1.3.3 Activity C-MOVE

4.2.1.3.3.1 Description and Sequencing of Activities

See section 4.1.1.

Service Status	Further meaning	Error Code	Reason
Failure	Query retrieve move destination unknown	A801	
	SOP Class not supported	0122	

	Processing failure	0110	
	Storage cannot understand	C000	
Success	Success	0000	

4.2.1.3.4 Activity C-STORE

4.2.1.3.4.1 Description and Sequencing of Activities

See section 4.1.1.

4.2.1.3.5 Activity N-ACTION

4.2.1.3.6 Description and Sequencing of Activities

See section 4.1.1.

Service Status	Further meaning	Error Code	Reason
Refused	QueryRetrieveUnableToProcess	C000	Unknown SOP Instance UID.
	NoLongerUpdateUps	C300	The UPS may no longer be updated
	IncorrectTransactionUid	C301	The correct Transaction UID was not provided
	AlreadyInProgress	C302	The UPS is already IN PROGRESS
	IncorrectUpsState	C304	The UPS has not met final state requirements for the requested state change
	SopInstanceUidDoesNotExists	C307	Specified SOP Instance UID does not exist or is not a UPS Instance managed by this SCP
Failure	AlreadyCanceled	B304	The UPS is already in the requested state of CANCELED
	AlreadyCompleted	B306	The UPS is already in the requested state of COMPLETED
Success	Success	0000	

4.2.1.3.7 Activity N-SET

4.2.1.3.8 Description and Sequencing of Activities

See section 4.1.1.

Service Status	Further meaning	Error Code	Reason
Refused	QueryRetrieveUnableToProcess	C000	Unknown SOP Instance UID.
	NoLongerUpdateUps	C300	The UPS may no longer be updated
	IncorrectTransactionUid	C301	The correct Transaction UID was not provided
	IncorrectUpsState	C304	The UPS has not met final state requirements for the requested state change
	SopInstanceUidDoesNotExists	C307	Specified SOP Instance UID does not exist or is not a UPS Instance managed by this SCP
Success	Success	0000	

5 MEDIA INTERCHANGE

Not applicable

6 TRANSFORMATION OF DICOM TO CDA

Not applicable

7 SUPPORT OF CHARACTER SETS

RayTreatment Driver IBA support the following character sets in addition to the default:

- ISO_IR 192

8 SECURITY

8.1 SECURITY PROFILES

No Security Profiles are supported.

8.2 ASSOICIATION LEVEL SECURITY

RayTreatment Driver IBA checks the following values for validation of received Association Open Requests:

- Called AE Titles.

8.3 APPLICATION LEVEL SECURITY

None supported.

9 ANNEXES

9.1 IOD CONTENTS

9.1.1 Created SOP Instance(s)

9.1.1.1 RT Ion Plan IOD

IE	Module	Used	Comment
Patient	Patient Module	No	Copied from RT Ion Plan.
Study	General Study Module	No	Copied from RT Ion Plan.
Series	RT Series Module	Yes	
Frame of Reference	Frame of Reference Module	No	Copied from RT Ion Plan.
Equipment	General Equipment Module	No	Copied from RT Ion Plan.
Plan	RT General Plan Module	Yes	
	RT Ion Tolerance Tables Module	Yes	
	RT Ion Beams Module	Yes	
	SOP Common Module	Yes	

9.1.1.1.1 RT Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	Generated.

9.1.1.1.2 RT General Plan Module

Attribute name	Tag	Vr	Type	Comment
RT Plan Label	(300A,0002)	SH	1	
Plan Intent	(300A,000A)	CS	3	Set to VERIFICATION if QA. Copied from TPS RT Ion Plan otherwise.
RT Plan Geometry	(300A,000C)	CS	1	
Referenced RT Plan Sequence	(300C,0002)	SQ	3	
>Referenced SOP Class UID	(0008,1150)	UI	1	SOP Class UID of TPS RT Ion Plan.
>Referenced SOP Instance UID	(0008,1155)	UI	1	SOP Instance UID of TPS Ion Plan.
>RT Plan Relationship	(300A,0055)	CS	1	Always PREDECESSOR.

9.1.1.1.3 RT Ion Tolerance Tables Module

Attribute name	Tag	Vr	Type	Comment
Ion Tolerance Table Sequence	(300A,03A0)	SQ	1	
>Tolerance Table Number	(300A,0042)	IS	1	Set to 1.
>Tolerance Table Label	(300A,0043)	SH	3	Configurable.
>Gantry Angle Tolerance	(300A,0044)	DS	3	Configurable.
>Beam Limiting Device Angle Tolerance	(300A,0046)	DS	3	Configurable.
>Beam Limiting Device Tolerance Sequence	(300A,0048)	SQ	3	Not set.
>RT Beam Limiting Device Type	(300A,00B8)	CS	1	Not set.

>Beam Limiting Device Position Tolerance	(300A,004A)	DS	1	Not set.
>Patient Support Angle Tolerance	(300A,004C)	DS	3	Configurable.
>Table Top Vertical Position Tolerance	(300A,0051)	DS	3	Configurable.
>Table Top Longitudinal Position Tolerance	(300A,0052)	DS	3	Configurable.
>Table Top Lateral Position Tolerance	(300A,0053)	DS	3	Configurable.
>Table Top Pitch Angle Tolerance	(300A,004F)	FL	3	Configurable.
>Table Top Roll Angle Tolerance	(300A,0050)	FL	3	Configurable.
>Snout Position Tolerance	(300A,004B)	FL	3	Configurable.
>Head Fixation Angle Tolerance	(300A,0152)	DS	3	Configurable.
>Chair Head Frame Position Tolerance	(300A,0153)	DS	3	Configurable.
>Fixation Light Azimuthal Angle Tolerance	(300A,0154)	DS	3	Not set.
>Fixation Light Polar Angle Tolerance	(300A,0155)	DS	3	Not set.

9.1.1.1.4 RT Ion Beams Module

Attribute name	Tag	Vr	Type	Comment
Ion Beam Sequence	(300A,03A2)	SQ	1	Copied from TPS RT Ion Plan.
>Beam Number	(300A,00C0)	IS	1	Copied from TPS RT Ion Plan.
>Beam Name	(300A,00C2)	LO	1	Copied from TPS RT Ion Plan.
>Beam Type	(300A,00C4)	CS	1	Copied from TPS RT Ion Plan.
>Radiation Type	(300A,00C6)	CS	1	Copied from TPS RT Ion Plan.
>Scan Mode	(300A,0308)	CS	1	Copied from TPS RT Ion Plan.
>Primary Dosimeter Unit	(300A,00B3)	CS	1	Copied from TPS RT Ion Plan.
>Referenced Tolerance Table Number	(300C,00A0)	IS	3	Copied from TPS RT Ion Plan.
>Virtual Source-Axis Distances	(300A,030A)	FL	1	Copied from TPS RT Ion Plan.
>Treatment Delivery Type	(300A,00CE)	CS	1	Copied from TPS RT Ion Plan.
>Number of Wedges	(300A,00D0)	IS	1	Copied from TPS RT Ion Plan.
>Number of Compensators	(300A,00E0)	IS	1	Copied from TPS RT Ion Plan.
>Number of Boli	(300A,00ED)	IS	1	Copied from TPS RT Ion Plan.
>Number of Blocks	(300A,00F0)	IS	1	Copied from TPS RT Ion Plan.
>Number of Range Shifters	(300A,0312)	IS	1	Copied from TPS RT Ion Plan.
>Number of Lateral Spreading Devices	(300A,0330)	IS	1	Copied from TPS RT Ion Plan.
>Number of Range Modulators	(300A,0340)	IS	1	Copied from TPS RT Ion Plan.
>Patient Support Type	(300A,0350)	CS	1	Copied from TPS RT Ion Plan.
>Number of Control Points	(300A,0110)	IS	1	Copied from TPS RT Ion Plan.
>Ion Control Point Sequence	(300A,03A8)	SQ	1	Copied from TPS RT Ion Plan.
>Planned Verification Image Sequence	(300A,00CA)	SQ	3	Not set.
>Imaging Device-Specific Acquisition Parameters	(300A,00CC)	LO	3	

9.1.1.1.5 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	Copied from TPS RT Ion Plan.
SOP Instance UID	(0008,0018)	UI	1	Generated.

9.1.1.2 RT Ion Beams Treatment Record IOD

IE	Module	Used	Comment
Patient	Patient Module	Yes	
Study	General Study Module	Yes	
Series	RT Series Module	Yes	
Equipment	General Equipment Module	Yes	
Treatment Record	RT General Treatment Record Module	Yes	
	RT Treatment Machine Record Module	Yes	
	RT Ion Beams Session Record Module	Yes	
	SOP Common Module	Yes	

9.1.1.2.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Copied from RT Ion Plan.
Patient ID	(0010,0020)	LO	2	Copied from RT Ion Plan.
Patient's Birth Date	(0010,0030)	DA	2	Copied from RT Ion Plan.
Patient's Sex	(0010,0040)	CS	2	Copied from RT Ion Plan.

9.1.1.2.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	Copied from RT Ion Plan.
Study Date	(0008,0020)	DA	2	Copied from RT Ion Plan.
Study Time	(0008,0030)	TM	2	Copied from RT Ion Plan.
Referring Physician's Name	(0008,0090)	PN	2	Copied from RT Ion Plan.
Study ID	(0020,0010)	SH	2	Copied from RT Ion Plan.
Study Description	(0008,1030)	LO	3	Copied from RT Ion Plan.

9.1.1.2.3 RT Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	Always RTRECORD.
Series Instance UID	(0020,000E)	UI	1	Generated.
Series Number	(0020,0011)	IS	2	Copied from RT Ion Plan.

9.1.1.2.4 General Equipment Module

Attribute name	Tag	Vr	Type	Comment
Manufacturer	(0008,0070)	LO	2	Set to "RaySearch Laboratories".
Manufacturer's Model Name	(0008,1090)	LO	3	Set to "RayTreatment"
Software Version(s)	(0018,1020)	LO	3	Set to 1.0.0.0

9.1.1.2.5 RT General Treatment Record Module

Attribute name	Tag	Vr	Type	Comment
Instance Number	(0020,0013)	IS	1	Set to 1.
Treatment Date	(3008,0250)	DA	2	Set to current date.

Treatment Time	(3008,0251)	TM	2	Set to current time.
Referenced RT Plan Sequence	(300C,0002)	SQ	2	
>Referenced SOP Class UID	(0008,1150)	UI	1	Set to RT Ion Plan SOP Class UID.
>Referenced SOP Instance UID	(0008,1155)	UI	1	Set to RT Ion Plan SOP Instance UID.
Referenced Treatment Record Sequence	(3008,0030)	SQ	3	References all already receieved Treatment Records from the current session.
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	

9.1.1.2.6 RT Treatment Machine Record Module

Attribute name	Tag	Vr	Type	Comment
Treatment Machine Sequence	(300A,0206)	SQ	1	
>Treatment Machine Name	(300A,00B2)	SH	2	Not set.
>Manufacturer	(0008,0070)	LO	2	Set to "RaySearch Laboratories".
>Institution Name	(0008,0080)	LO	2	Not set.
>Manufacturer's Model Name	(0008,1090)	LO	2	Set to "RayTreatment".
>Device Serial Number	(0018,1000)	LO	2	Set to empty string.

9.1.1.2.7 RT Ion Beams Session Record Module

Attribute name	Tag	Vr	Type	Comment
Number of Fractions Planned	(300A,0078)	IS	2	Copied from RT Ion Plan.
Primary Dosimeter Unit	(300A,00B3)	CS	1	Set to MU.
Treatment Session Ion Beam Sequence	(3008,0021)	SQ	1	
>Referenced Beam Number	(300C,0006)	IS	1	
>Beam Name	(300A,00C2)	LO	1	Copied from RT Ion Plan.
>Beam Type	(300A,00C4)	CS	1	Copied from RT Ion Plan.
>Radiation Type	(300A,00C6)	CS	1	Copied from RT Ion Plan.
>Scan Mode	(300A,0308)	CS	1	Copied from RT Ion Plan.
>Number of Wedges	(300A,00D0)	IS	1	Copied from RT Ion Plan.
>Number of Compensators	(300A,00E0)	IS	1	Copied from RT Ion Plan.
>Recorded Compensator Sequence	(3008,00C0)	SQ	1C	
>Referenced Compensator Number	(300C,00D0)	IS	1	Copied from RT Ion Plan.
>Compensator ID	(300A,00E5)	SH	3	Copied from RT Ion Plan.
>Number of Boli	(300A,00ED)	IS	1	Copied from RT Ion Plan.
>Referenced Bolus Sequence	(300C,00B0)	SQ	1C	
>Referenced ROI Number	(3006,0084)	IS	1	Copied from RT Ion Plan.
>Number of Blocks	(300A,00F0)	IS	1	Copied from RT Ion Plan.
>Recorded Block Sequence	(3008,00D0)	SQ	1C	
>Referenced Block Number	(300C,00E0)	IS	1	Copied from RT Ion Plan.
>Recorded Snout Sequence	(3008,00F0)	SQ	1C	
>Snout ID	(300A,030F)	SH	1	Copied from RT Ion Plan.
>Applicator Sequence	(300A,0107)	SQ	1C	
>Applicator ID	(300A,0108)	SH	1	Copied from RT Ion Plan.
>Applicator Type	(300A,0109)	CS	1	Copied from RT Ion Plan.

>Number of Range Shifters	(300A,0312)	IS	1	Copied from RT Ion Plan.
>Recorded Range Shifter Sequence	(3008,00F2)	SQ	1C	
>Referenced Range Shifter Number	(300C,0100)	IS	1	Copied from RT Ion Plan.
>Range Shifter ID	(300A,0318)	SH	1	Copied from RT Ion Plan.
>Number of Lateral Spreading Devices	(300A,0330)	IS	1	Copied from RT Ion Plan.
>Recorded Lateral Spreading Device Sequence	(3008,00F4)	SQ	1C	
>Referenced Lateral Spreading Device Number	(300C,0102)	IS	1	Copied from RT Ion Plan.
>Lateral Spreading Device ID	(300A,0336)	SH	1	Copied from RT Ion Plan.
>Number of Range Modulators	(300A,0340)	IS	1	Copied from RT Ion Plan.
>Recorded Range Modulator Sequence	(3008,00F6)	SQ	1C	
>Referenced Range Modulator Number	(300C,0104)	IS	1	Copied from RT Ion Plan.
>Range Modulator ID	(300A,0346)	SH	1	Copied from RT Ion Plan.
>Range Modulator Type	(300A,0348)	CS	1	Copied from RT Ion Plan.
>Beam Current Modulation ID	(300A,034C)	SH	1C	Copied from RT Ion Plan.
>Patient Support Type	(300A,0350)	CS	1	Possible values: • TABLE - Treatment delivery system table • CHAIR - Treatment delivery system chair Copied from RT Ion Plan.
>Current Fraction Number	(3008,0022)	IS	2	Set to fraction number of the current fraction.
>Treatment Delivery Type	(300A,00CE)	CS	2	Copied from the Beam Delivery Instruction for the current session.
>Treatment Termination Status	(3008,002A)	CS	1	Possible values: • NORMAL - treatment terminated normally • OPERATOR - operator terminated treatment • MACHINE - machine terminated treatment • UNKNOWN - status at termination unknown Set to UNKNOWN.
>Treatment Verification Status	(3008,002C)	CS	2	Set to NOT_VERIFIED
>Specified Primary Meterset	(3008,0032)	DS	3	Set to manual edit value.
>Delivered Primary Meterset	(3008,0036)	DS	3	Set to manual edit value.
>Number of Control Points	(300A,0110)	IS	1	Set to 2.
>Ion Control Point Delivery Sequence	(3008,0041)	SQ	1	Always 2 items.
>Referenced Control Point Index	(300C,00F0)	IS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Value copied from last Control Point item in RT Ion Plan.
>Treatment Control Point Date	(3008,0024)	DA	1	Set to current date.
>Treatment Control Point Time	(3008,0025)	TM	1	Set to current time.
>Specified Meterset	(3008,0042)	DS	2	If first: 0. If second: Manual edit value.
>Delivered Meterset	(3008,0044)	DS	1	If first: 0. If second: Manual edit value.
>Nominal Beam Energy	(300A,0114)	DS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Value copied from last Control Point item in RT Ion Plan.
>Ion Wedge Position Sequence	(300A,03AC)	SQ	1C	
>Referenced Wedge Number	(300C,00C0)	IS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Value copied from last Control Point item in RT Ion Plan.
>Wedge Position	(300A,0118)	CS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Value copied from last Control Point item in RT Ion Plan.

>Wedge Thin Edge Position	(300A,00DB)	FL	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Value copied from last Control Point item in RT Ion Plan.
>Beam Limiting Device Position Sequence	(300A,011A)	SQ	1C	If second: Not set.
>RT Beam Limiting Device Type	(300A,00B8)	CS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Leaf/Jaw Positions	(300A,011C)	DS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Range Shifter Settings Sequence	(300A,0360)	SQ	1C	
>Referenced Range Shifter Number	(300C,0100)	IS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Range Shifter Setting	(300A,0362)	LO	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Lateral Spreading Device Settings Sequence	(300A,0370)	SQ	1C	
>Referenced Lateral Spreading Device Number	(300C,0102)	IS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Lateral Spreading Device Setting	(300A,0372)	LO	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Range Modulator Settings Sequence	(300A,0380)	SQ	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Referenced Range Modulator Number	(300C,0104)	IS	1	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Range Modulator Gating Start Value	(300A,0382)	FL	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Range Modulator Gating Stop Value	(300A,0384)	FL	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Gantry Angle	(300A,011E)	DS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Gantry Rotation Direction	(300A,011F)	CS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Gantry Pitch Rotation Direction	(300A,014C)	CS	2C	Always NONE.
>Beam Limiting Device Angle	(300A,0120)	DS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Beam Limiting Device Rotation Direction	(300A,0121)	CS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Scan Spot Tune ID	(300A,0390)	SH	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Number of Scan Spot Positions	(300A,0392)	IS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Scan Spot Position Map	(300A,0394)	FL	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Scan Spot Metersets Delivered	(3008,0047)	FL	1C	If first: A n-list of zeros where n is equal to Number of Scan Spot Positions on first Control Point copied from RT Ion Plan. If second: Not set.
>Number of Paintings	(300A,039A)	IS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Patient Support Angle	(300A,0122)	DS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Patient Support Rotation Direction	(300A,0123)	CS	1C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Pitch Angle	(300A,0140)	FL	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Pitch Rotation Direction	(300A,0142)	CS	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Roll Angle	(300A,0144)	FL	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.

>Table Top Roll Rotation Direction	(300A,0146)	CS	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Vertical Position	(300A,0128)	DS	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Longitudinal Position	(300A,0129)	DS	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Table Top Lateral Position	(300A,012A)	DS	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.
>Snout Position	(300A,030D)	FL	2C	If first: Value copied from first Control Point item in RT Ion Plan. If second: Not set.

9.1.1.2.8 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	Generated.
Specific Character Set	(0008,0005)	CS	1C	

9.1.1.3 RT Beams Delivery Instruction Trial (Retired) IOD

IE	Module	Used	Comment
Patient	Patient Module	Yes	
	Clinical Trial Subject Module	No	
Study	General Study Module	Yes	
	Patient Study Module	No	
	Clinical Trial Study Module	No	
Series	General Series Module	Yes	
	Clinical Trial Series Module	No	
Equipment	General Equipment Module	Yes	
Plan	RT Beams Delivery Instruction Module	Yes	
	Common Instance Reference Module	No	
	General Reference Module	No	
	SOP Common Module	Yes	

9.1.1.3.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Copied from RT Ion Plan.
Patient ID	(0010,0020)	LO	2	Copied from RT Ion Plan.
Patient's Birth Date	(0010,0030)	DA	2	Copied from RT Ion Plan.
Patient's Sex	(0010,0040)	CS	2	Possible values: M, F, O.. Copied from RT Ion Plan.

9.1.1.3.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	Copied from RT Ion Plan.
Study Date	(0008,0020)	DA	2	Copied from RT Ion Plan.
Study Time	(0008,0030)	TM	2	Copied from RT Ion Plan.
Referring Physician's Name	(0008,0090)	PN	2	Copied from RT Ion Plan.
Study ID	(0020,0010)	SH	2	Copied from RT Ion Plan.

Accession Number	(0008,0050)	SH	2	Copied from RT Ion Plan.
Study Description	(0008,1030)	LO	3	Not set.

9.1.1.3.3 General Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	Always PLAN.
Series Instance UID	(0020,000E)	UI	1	Generated.
Series Number	(0020,0011)	IS	2	Set to 1.
Series Date	(0008,0021)	DA	3	Not set.
Series Time	(0008,0031)	TM	3	Not set.
Series Description	(0008,103E)	LO	3	Not set.

9.1.1.3.4 General Equipment Module

Attribute name	Tag	Vr	Type	Comment
Manufacturer	(0008,0070)	LO	2	Set to "RaySearch Laboratories".
Station Name	(0008,1010)	SH	3	Not set.

9.1.1.3.5 RT Beams Delivery Instruction Module

Attribute name	Tag	Vr	Type	Comment
Beam Task Sequence	(0074,1020)	SQ	1	
>Beam Task Type	(0074,1022)	CS	1	Always • TREAT - Treat
>Treatment Delivery Type	(300A,00CE)	CS	1	Possible values: TREATMENT, CONTINUATION.
>Continuation Start Meterset	(0074,0120)	FD	1C	
>Continuation End Meterset	(0074,0121)	FD	1C	
>Current Fraction Number	(3008,0022)	IS	1	
>Referenced Beam Number	(300C,0006)	IS	1	
>Table Top Vertical Setup Displacement	(300A,01D2)	DS	2	
>Table Top Longitudinal Setup Displacement	(300A,01D4)	DS	2	
>Table Top Lateral Setup Displacement	(300A,01D6)	DS	2	
>Referenced RT Plan Sequence	(300C,0002)	SQ	3	
>Referenced Series Sequence	(0008,1115)	SQ	1C	
>Series Instance UID	(0020,000E)	UI	1	Series Instance UID of RT Ion Plan.
>Retrieve AE Title	(0008,0054)	AE		AE-title of RayTreatment.
>Referenced SOP Sequence	(0008,1199)	SQ		
>Referenced SOP Class UID	(0008,1150)	UI	1	SOP Class UID of RT Ion Plan.
>Referenced SOP Instance UID	(0008,1155)	UI	1	SOP Instance UID of RT Ion Plan.
>Study Instance UID	(0020,000D)	UI	1	
Omitted Beam Task Sequence	(300C,0111)	SQ	3	Already treated beams are listed in this sequences.
>Referenced Beam Number	(300C,0006)	IS	1	
>Reason for Omission	(300C,0112)	CS	1	Always ALREADY_TREATED.

9.1.1.3.6 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	Generated.
Specific Character Set	(0008,0005)	CS	1C	
Instance Creation Date	(0008,0012)	DA	3	
Instance Creation Time	(0008,0013)	TM	3	

9.1.1.4 Unified Procedure Step Trial (Retired) IOD

IE	Module	Used
Unified Procedure Step	SOP Common Module	Yes
	Unified Procedure Step Relationship Module	Yes
	Unified Procedure Step Scheduled Procedure Information Module	Yes
	Unified Procedure Step Progress Information Module	Yes
	Unified Procedure Step Performed Procedure Information Module	No
	Patient Medical Module	No
	Transaction Module	Yes

9.1.1.4.1 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	
Timezone Offset From UTC	(0008,0201)	SH	3	

9.1.1.4.2 Unified Procedure Step Relationship Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN		
Patient ID	(0010,0020)	LO		
Patient's Birth Date	(0010,0030)	DA		
Patient's Sex	(0010,0040)	CS		Possible values: • M - Male • F - Female • O - Other

9.1.1.4.3 Unified Procedure Step Scheduled Procedure Information Module

Attribute name	Tag	Vr	Type	Comment
Scheduled Procedure Step Priority	(0074,1200)	CS		Possible values: • HIGH - High • MEDIUM - Medium • LOW - Low
Procedure Step Label	(0074,1204)	LO		
Scheduled Station Name Code Sequence	(0040,4025)	SQ		
>Code Value	(0008,0100)	SH	1C	
>Coding Scheme Designator	(0008,0102)	SH	1C	
>Code Meaning	(0008,0104)	LO	1	

Scheduled Procedure Step Start DateTime	(0040,4005)	DT		
Expected Completion DateTime	(0040,4011)	DT		
Scheduled Workitem Code Sequence	(0040,4018)	SQ		
>Code Value	(0008,0100)	SH	1C	
>Coding Scheme Designator	(0008,0102)	SH	1C	
>Code Meaning	(0008,0104)	LO	1	
Scheduled Processing Parameters Sequence	(0074,1210)	SQ		
>Value Type	(0040,A040)	CS	1	Always • TEXT - Text
>Concept Name Code Sequence	(0040,A043)	SQ	1	
>Code Value	(0008,0100)	SH	1C	
>Coding Scheme Designator	(0008,0102)	SH	1C	
>Code Meaning	(0008,0104)	LO	1	
>Text Value	(0040,A160)	UT	1C	
Input Information Sequence	(0040,4021)	SQ		
>Study Instance UID	(0020,000D)	UI	1	
>Referenced Series Sequence	(0008,1115)	SQ	1C	
>Series Instance UID	(0020,000E)	UI	1	
>Retrieve AE Title	(0008,0054)	AE		
>Referenced SOP Sequence	(0008,1199)	SQ		
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	
Study Instance UID	(0020,000D)	UI		
Input Availability Flag	(0040,4020)	CS	1	Possible values: • COMPLETE - Complete • INCOMPLETE - Incomplete

9.1.1.4.4 Unified Procedure Step Progress Information Module

Attribute name	Tag	Type	Vr	Comment
Procedure Step State	(0074,1000)	CS		Possible values: • SCHEDULED - Scheduled • IN PROGRESS - In Progress • CANCELED - Canceled • COMPLETED - Completed

9.1.1.4.5 Transaction Module

Attribute name	Tag	Vr	Type	Comment
Transaction UID	(0008,1195)	UI	3	

9.1.2 Usage of Attributes From Received IODs

9.1.2.1 CT Image IOD

IE	Module	Used
Patient	Patient Module	Yes

Study	General Study Module	Yes
Series	General Series Module	Yes
Frame of Reference	Frame of Reference Module	Yes
Equipment	General Equipment Module	No
Image	General Image Module	No
	Image Plane Module	No
	Image Pixel Module	No
	Contrast/Bolus Module	No
	CT Image Module	Yes
	SOP Common Module	Yes

9.1.2.1.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Validates with current session.
Patient ID	(0010,0020)	LO	2	Validates with current session.
Patient's Birth Date	(0010,0030)	DA	2	Validates with current session.
Patient's Sex	(0010,0040)	CS	2	Validates with current session.

9.1.2.1.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	Validates with RT Ion Plan of current session.

9.1.2.1.3 General Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	
Series Date	(0008,0021)	DA	3	
Series Time	(0008,0031)	TM	3	
Series Description	(0008,103E)	LO	3	
Patient Position	(0018,5100)	CS	2C	Supported values: FFDL, FFDR, FFP, FFS, HFDL, HFDR, HFP, HFS.

9.1.2.1.4 Frame of Reference Module

Attribute name	Tag	Vr	Type	Comment
Frame of Reference UID	(0020,0052)	UI	1	

9.1.2.1.5 CT Image Module

Attribute name	Tag	Vr	Type	Comment
Image Type	(0008,0008)	CS	1	Supported values: DERIVED, SECONDARY, AXIAL, CBCT, ORIGINAL, PRIMARY.
Samples per Pixel	(0028,0002)	US	1	
Photometric Interpretation	(0028,0004)	CS	1	
Bits Allocated	(0028,0100)	US	1	
Bits Stored	(0028,0101)	US	1	
High Bit	(0028,0102)	US	1	

Rescale Intercept	(0028,1052)	DS	1	
Rescale Slope	(0028,1053)	DS	1	
Table Height	(0018,1130)	DS	3	
Patient Support Angle	(300A,0122)	DS	3	
Table Top Pitch Angle	(300A,0140)	FL	3	
Table Top Roll Angle	(300A,0144)	FL	3	
Table Top Longitudinal Position	(300A,0129)	DS	3	
Table Top Lateral Position	(300A,012A)	DS	3	

9.1.2.1.6 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.2 RT Image IOD

IE	Module	Used
Patient	Patient Module	Yes
Study	General Study Module	Yes
Series	RT Series Module	Yes
Frame of Reference	Frame of Reference Module	Yes
Equipment	General Equipment Module	No
Image	General Image Module	No
	Image Pixel Module	No
	Contrast/Bolus Module	No
	Cine Module	No
	Multi-frame Module	No
	RT Image Module	Yes
	SOP Common Module	Yes
	Frame Extraction Module	No

9.1.2.2.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Validates with current session.
Patient ID	(0010,0020)	LO	2	Validates with current session.
Patient's Birth Date	(0010,0030)	DA	2	Validates with current session.
Patient's Sex	(0010,0040)	CS	2	Validates with current session.

9.1.2.2.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	Validates with RT Ion plan of current session.

9.1.2.2.3 RT Series Module

Attribute name	Tag	Vr	Type	Comment

Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	
Series Date	(0008,0021)	DA	3	
Series Time	(0008,0031)	TM	3	

9.1.2.2.4 Frame of Reference Module

Attribute name	Tag	Vr	Type	Comment
Frame of Reference UID	(0020,0052)	UI	1	

9.1.2.2.5 RT Image Module

Attribute name	Tag	Vr	Type	Comment
Samples per Pixel	(0028,0002)	US	1	
Photometric Interpretation	(0028,0004)	CS	1	
Bits Allocated	(0028,0100)	US	1	
Bits Stored	(0028,0101)	US	1	
High Bit	(0028,0102)	US	1	
Pixel Representation	(0028,0103)	US	1	
RT Image Label	(3002,0002)	SH	1	
Image Type	(0008,0008)	CS	1	Supported values: ORIGINAL, PRIMARY, RADIOGRAPH, CBCT_PROJECTION, DERIVED, SECONDARY, DRR, CT_PROJECTION, PORTAL.
RT Image Plane	(3002,000C)	CS	1	
Patient Support Angle	(300A,0122)	DS	3	
Table Top Pitch Angle	(300A,0140)	FL	3	
Table Top Roll Angle	(300A,0144)	FL	3	
Table Top Vertical Position	(300A,0128)	DS	3	
Table Top Longitudinal Position	(300A,0129)	DS	3	
Table Top Lateral Position	(300A,012A)	DS	3	
Patient Position	(0018,5100)	CS	1C	Supported values: • HFP - Head First-Prone. • HFS - Head First-Supine • HFDR - Head First-Decubitus Right • HFDL - Head First-Decubitus Left • FFDR - Feet First-Decubitus Right. • FFDL - Feet First-Decubitus Left. • FFP - Feet First-Prone. • FFS - Feet First-Supine.

9.1.2.2.6 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.3 RT Structure Set IOD

IE	Module	Used
Patient	Patient Module	Yes
Study	General Study Module	Yes

Series	RT Series Module	Yes
Equipment	General Equipment Module	No
Structure Set	Structure Set Module	Yes
	ROI Contour Module	Yes
	RT ROI Observations Module	Yes
	SOP Common Module	Yes

9.1.2.3.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Validates with current session.
Patient ID	(0010,0020)	LO	2	Validates with current session.
Patient's Birth Date	(0010,0030)	DA	2	Validates with current session.
Patient's Sex	(0010,0040)	CS	2	Validates with current session.

9.1.2.3.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	

9.1.2.3.3 RT Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	

9.1.2.3.4 Structure Set Module

Attribute name	Tag	Vr	Type	Comment
Structure Set Label	(3006,0002)	SH	1	
Referenced Frame of Reference Sequence	(3006,0010)	SQ	3	
>Frame of Reference UID	(0020,0052)	UI	1	
>RT Referenced Study Sequence	(3006,0012)	SQ	3	
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	
>RT Referenced Series Sequence	(3006,0014)	SQ	1	
>Series Instance UID	(0020,000E)	UI	1	
>Contour Image Sequence	(3006,0016)	SQ	1	
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	
Structure Set ROI Sequence	(3006,0020)	SQ	1	

9.1.2.3.5 ROI Contour Module

Attribute name	Tag	Vr	Type	Comment
ROI Contour Sequence	(3006,0039)	SQ	1	
>Referenced ROI Number	(3006,0084)	IS	1	
>Contour Sequence	(3006,0040)	SQ	3	

>Contour Geometric Type	(3006,0042)	CS	1	
>Number of Contour Points	(3006,0046)	IS	1	
>Contour Data	(3006,0050)	DS	1	

9.1.2.3.6 RT ROI Observations Module

Attribute name	Tag	Vr	Type	Comment
RT ROI Observations Sequence	(3006,0080)	SQ	1	
>Observation Number	(3006,0082)	IS	1	
>Referenced ROI Number	(3006,0084)	IS	1	
>RT ROI Interpreted Type	(3006,00A4)	CS	2	Supported values: • INITLASERISO - Planned table position for treatment. • ACQ_ISOCENTER - Acquisition table position. • INITMATCHISO - Table position at beginning of actual registration.
>ROI Physical Properties Sequence	(3006,00B0)	SQ	3	
>ROI Physical Property	(3006,00B2)	CS	1	Supported values: • PATSUPPORT_ANGLE - Table yaw angle. • TTOP_PITCH_ANGLE - Table pitch angle. • TTOP_ROLL_ANGLE - Table roll angle.
>ROI Physical Property Value	(3006,00B4)	DS	1	

9.1.2.3.7 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.4 Spatial Registration IOD

IE	Module	Used
Patient	Patient Module	Yes
Study	General Study Module	Yes
Series	General Series Module	Yes
	Spatial Registration Series Module	No
Frame of Reference	Frame of Reference Module	Yes
Equipment	General Equipment Module	No
Spatial Registration	Spatial Registration Module	Yes
	Common Instance Reference Module	No
	General Reference Module	Yes
	SOP Common Module	Yes

9.1.2.4.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	Validates with current session.
Patient ID	(0010,0020)	LO	2	Validates with current session.
Patient's Birth Date	(0010,0030)	DA	2	Validates with current session.
Patient's Sex	(0010,0040)	CS	2	Validates with current session.

9.1.2.4.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	

9.1.2.4.3 General Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	
Patient Position	(0018,5100)	CS	2C	Supported values: • HFP - Head First-Prone • HFS - Head First-Supine • HFDR - Head First-Decubitus Right • HFDL - Head First-Decubitus Left • FFDR - Feet First-Decubitus Right • FFDL - Feet First-Decubitus Left • FFP - Feet First-Prone • FFS - Feet First-Supine

9.1.2.4.4 Frame of Reference Module

Attribute name	Tag	Vr	Type	Comment
Frame of Reference UID	(0020,0052)	UI	1	

9.1.2.4.5 Spatial Registration Module

Attribute name	Tag	Vr	Type	Comment
Content Date	(0008,0023)	DA	1	
Content Time	(0008,0033)	TM	1	
Instance Number	(0020,0013)	IS	1	
Content Label	(0070,0080)	CS	1	
Registration Sequence	(0070,0308)	SQ	1	
>Frame of Reference UID	(0020,0052)	UI	1C	
>Referenced Image Sequence	(0008,1140)	SQ	1C	
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	
>Matrix Registration Sequence	(0070,0309)	SQ	1	
>Matrix Sequence	(0070,030A)	SQ	1	
>Frame of Reference Transformation Matrix	(3006,00C6)	DS	1	
>Frame of Reference Transformation Matrix Type	(0070,030C)	CS	1	Supported value: RIGID.

9.1.2.4.6 General Reference Module

Attribute name	Tag	Vr	Type	Comment

9.1.2.4.7 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	

SOP Instance UID	(0008,0018)	UI	1	

9.1.2.5 RT Ion Plan IOD

IE	Module	Used
Patient	Patient Module	Yes
Study	General Study Module	Yes
Series	RT Series Module	Yes
Frame of Reference	Frame of Reference Module	No
Equipment	General Equipment Module	No
Plan	RT General Plan Module	Yes
	RT Patient Setup Module	Yes
	RT Fraction Scheme Module	Yes
	RT Ion Beams Module	Yes
	SOP Common Module	Yes

9.1.2.5.1 Patient Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN	2	
Patient ID	(0010,0020)	LO	2	
Patient's Birth Date	(0010,0030)	DA	2	
Patient's Sex	(0010,0040)	CS	2	

9.1.2.5.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	
Study Date	(0008,0020)	DA	2	
Study Time	(0008,0030)	TM	2	
Referring Physician's Name	(0008,0090)	PN	2	
Study ID	(0020,0010)	SH	2	
Accession Number	(0008,0050)	SH	2	
Study Description	(0008,1030)	LO	3	

9.1.2.5.3 RT Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	

9.1.2.5.4 RT General Plan Module

Attribute name	Tag	Vr	Type	Comment
RT Plan Label	(300A,0002)	SH	1	
RT Plan Geometry	(300A,000C)	CS	1	

9.1.2.5.5 RT Patient Setup Module

Attribute name	Tag	Vr	Type	Comment
Patient Setup Sequence	(300A,0180)	SQ	1	
>Patient Setup Number	(300A,0182)	IS	1	

9.1.2.5.6 RT Fraction Scheme Module

Attribute name	Tag	Vr	Type	Comment
Fraction Group Sequence	(300A,0070)	SQ	1	
>Fraction Group Number	(300A,0071)	IS	1	
>Number of Fractions Planned	(300A,0078)	IS	2	
>Number of Beams	(300A,0080)	IS	1	
>Number of Brachy Application Setups	(300A,00A0)	IS	1	

9.1.2.5.7 RT Ion Beams Module

Attribute name	Tag	Vr	Type	Comment
Ion Beam Sequence	(300A,03A2)	SQ	1	
>Beam Number	(300A,00C0)	IS	1	
>Beam Name	(300A,00C2)	LO	1	
>Beam Type	(300A,00C4)	CS	1	
>Radiation Type	(300A,00C6)	CS	1	Supported values: PHOTON, PROTON, ION.
>Scan Mode	(300A,0308)	CS	1	
>Primary Dosimeter Unit	(300A,00B3)	CS	1	
>Referenced Tolerance Table Number	(300C,00A0)	IS	3	
>Virtual Source-Axis Distances	(300A,030A)	FL	1	
>Referenced Patient Setup Number	(300C,006A)	IS	3	
>Treatment Delivery Type	(300A,00CE)	CS	1	Supported values: TREATMENT, SETUP.
>Number of Wedges	(300A,00D0)	IS	1	
>Number of Compensators	(300A,00E0)	IS	1	
>Ion Range Compensator Sequence	(300A,02EA)	SQ	1C	
>Compensator Number	(300A,00E4)	IS	1	
>Compensator ID	(300A,00E5)	SH	3	
>Compensator Divergence	(300A,02E0)	CS	1	
>Compensator Mounting Position	(300A,02E1)	CS	1	
>Compensator Rows	(300A,00E7)	IS	1	
>Compensator Columns	(300A,00E8)	IS	1	
>Compensator Pixel Spacing	(300A,00E9)	DS	1	
>Compensator Position	(300A,00EA)	DS	1	
>Compensator Thickness Data	(300A,00EC)	DS	1	
>Number of Boli	(300A,00ED)	IS	1	
>Referenced Bolus Sequence	(300C,00B0)	SQ	1C	
>Referenced ROI Number	(3006,0084)	IS	1	
>Number of Blocks	(300A,00F0)	IS	1	
>Ion Block Sequence	(300A,03A6)	SQ	1C	
>Isocenter to Block Tray Distance	(300A,00F7)	FL	1	

>Block Type	(300A,00F8)	CS	1	
>Block Divergence	(300A,00FA)	CS	1	
>Block Mounting Position	(300A,00FB)	CS	1	
>Block Number	(300A,00FC)	IS	1	
>Block Thickness	(300A,0100)	DS	1	
>Block Number of Points	(300A,0104)	IS	1	
>Block Data	(300A,0106)	DS	1	
>Snout Sequence	(300A,030C)	SQ	3	
>Snout ID	(300A,030F)	SH	1	
>Applicator Sequence	(300A,0107)	SQ	3	
>Applicator ID	(300A,0108)	SH	1	
>Applicator Type	(300A,0109)	CS	1	
>Number of Range Shifters	(300A,0312)	IS	1	
>Range Shifter Sequence	(300A,0314)	SQ	1C	
>Range Shifter Number	(300A,0316)	IS	1	
>Range Shifter ID	(300A,0318)	SH	1	
>Range Shifter Type	(300A,0320)	CS	1	
>Number of Lateral Spreading Devices	(300A,0330)	IS	1	
>Lateral Spreading Device Sequence	(300A,0332)	SQ	1C	
>Lateral Spreading Device Number	(300A,0334)	IS	1	
>Lateral Spreading Device ID	(300A,0336)	SH	1	
>Lateral Spreading Device Type	(300A,0338)	CS	1	
>Number of Range Modulators	(300A,0340)	IS	1	
>Range Modulator Sequence	(300A,0342)	SQ	1C	
>Range Modulator Number	(300A,0344)	IS	1	
>Range Modulator ID	(300A,0346)	SH	1	
>Range Modulator Type	(300A,0348)	CS	1	
>Beam Current Modulation ID	(300A,034C)	SH	1C	
>Patient Support Type	(300A,0350)	CS	1	
>Number of Control Points	(300A,0110)	IS	1	
>Ion Control Point Sequence	(300A,03A8)	SQ	1	
>Control Point Index	(300A,0112)	IS	1	
>Nominal Beam Energy	(300A,0114)	DS	1C	
>Ion Wedge Position Sequence	(300A,03AC)	SQ	1C	
>Referenced Wedge Number	(300C,00C0)	IS	1	
>Wedge Position	(300A,0118)	CS	1	
>Wedge Thin Edge Position	(300A,00DB)	FL	1C	
>Range Shifter Settings Sequence	(300A,0360)	SQ	1C	
>Referenced Range Shifter Number	(300C,0100)	IS	1	
>Range Shifter Setting	(300A,0362)	LO	1	
>Lateral Spreading Device Settings Sequence	(300A,0370)	SQ	1C	
>Referenced Lateral Spreading Device Number	(300C,0102)	IS	1	
>Lateral Spreading Device Setting	(300A,0372)	LO	1	

>Range Modulator Settings Sequence	(300A,0380)	SQ	1C	
>Referenced Range Modulator Number	(300C,0104)	IS	1	
>Range Modulator Gating Start Value	(300A,0382)	FL	1C	
>Range Modulator Gating Stop Value	(300A,0384)	FL	1C	
>Gantry Angle	(300A,011E)	DS	1C	
>Gantry Rotation Direction	(300A,011F)	CS	1C	
>Gantry Pitch Rotation Direction	(300A,014C)	CS	2C	
>Beam Limiting Device Angle	(300A,0120)	DS	1C	
>Beam Limiting Device Rotation Direction	(300A,0121)	CS	1C	
>Scan Spot Tune ID	(300A,0390)	SH	1C	
>Number of Scan Spot Positions	(300A,0392)	IS	1C	
>Scan Spot Position Map	(300A,0394)	FL	1C	
>Scanning Spot Size	(300A,0398)	FL	3	
>Number of Paintings	(300A,039A)	IS	1C	
>Patient Support Angle	(300A,0122)	DS	1C	
>Patient Support Rotation Direction	(300A,0123)	CS	1C	
>Table Top Pitch Angle	(300A,0140)	FL	2C	
>Table Top Pitch Rotation Direction	(300A,0142)	CS	2C	
>Table Top Roll Angle	(300A,0144)	FL	2C	
>Table Top Roll Rotation Direction	(300A,0146)	CS	2C	
>Table Top Vertical Position	(300A,0128)	DS	2C	
>Table Top Longitudinal Position	(300A,0129)	DS	2C	
>Table Top Lateral Position	(300A,012A)	DS	2C	
>Snout Position	(300A,030D)	FL	2C	
>Isocenter Position	(300A,012C)	DS	2C	

9.1.2.5.8 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.6 RT Ion Beams Treatment Record IOD

IE	Module	Used
Patient	Patient Module	Yes
Study	General Study Module	Yes
Series	RT Series Module	Yes
Equipment	General Equipment Module	No
Treatment Record	RT General Treatment Record Module	Yes
	RT Treatment Machine Record Module	No
	RT Ion Beams Session Record Module	Yes
	SOP Common Module	Yes

9.1.2.6.1 Patient Module

Attribute name	Tag	Vr	Type	Comment

Patient's Name	(0010,0010)	PN	2	Validates with current session.
Patient ID	(0010,0020)	LO	2	Validates with current session.
Patient's Birth Date	(0010,0030)	DA	2	Validates with current session.
Patient's Sex	(0010,0040)	CS	2	Validates with current session.

9.1.2.6.2 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	

9.1.2.6.3 RT Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	

9.1.2.6.4 RT General Treatment Record Module

Attribute name	Tag	Vr	Type	Comment
Instance Number	(0020,0013)	IS	1	
Treatment Date	(3008,0250)	DA	2	
Treatment Time	(3008,0251)	TM	2	
Referenced RT Plan Sequence	(300C,0002)	SQ	2	Should be 1.
>Referenced SOP Class UID	(0008,1150)	UI	1	
>Referenced SOP Instance UID	(0008,1155)	UI	1	Validates with RT Ion Plan of current session.

9.1.2.6.5 RT Ion Beams Session Record Module

Attribute name	Tag	Vr	Type	Comment
Primary Dosimeter Unit	(300A,00B3)	CS	1	Unit used for both primary and secondary meterset. Supported value: • MU - Monitor Unit
Treatment Session Ion Beam Sequence	(3008,0021)	SQ	1	
>Referenced Beam Number	(300C,0006)	IS	1	
>Beam Name	(300A,00C2)	LO	1	
>Beam Type	(300A,00C4)	CS	1	
>Radiation Type	(300A,00C6)	CS	1	
>Scan Mode	(300A,0308)	CS	1	
>Number of Wedges	(300A,00D0)	IS	1	
>Number of Compensators	(300A,00E0)	IS	1	
>Recorded Compensator Sequence	(3008,00C0)	SQ	1C	
>Referenced Compensator Number	(300C,00D0)	IS	1	
>Number of Boli	(300A,00ED)	IS	1	
>Number of Blocks	(300A,00F0)	IS	1	
>Number of Range Shifters	(300A,0312)	IS	1	
>Number of Lateral Spreading Devices	(300A,0330)	IS	1	

>Number of Range Modulators	(300A,0340)	IS	1	
>Patient Support Type	(300A,0350)	CS	1	
>Current Fraction Number	(3008,0022)	IS	2	Validates with current session.
>Treatment Delivery Type	(300A,00CE)	CS	2	Supported values: • TREATMENT - Normal patient treatment • SETUP - No treatment beam is applied for this RT Beam. To be used for specifying the gantry, couch, and other machine positions where X-Ray set-up images or measurements are to be taken. • CONTINUATION - continuation of interrupted treatment
>Treatment Termination Status	(3008,002A)	CS	1	Supported values: • NORMAL - treatment terminated normally • OPERATOR - operator terminated treatment • MACHINE - machine terminated treatment • UNKNOWN - status at termination unknown
>Specified Primary Meterset	(3008,0032)	DS	3	
>Specified Secondary Meterset	(3008,0033)	DS	3	
>Delivered Primary Meterset	(3008,0036)	DS	3	
>Delivered Secondary Meterset	(3008,0037)	DS	3	
>Specified Treatment Time	(3008,003A)	DS	3	
>Delivered Treatment Time	(3008,003B)	DS	3	
>Number of Control Points	(300A,0110)	IS	1	
>Ion Control Point Delivery Sequence	(3008,0041)	SQ	1	
>Referenced Control Point Index	(300C,00F0)	IS	1	
>Treatment Control Point Date	(3008,0024)	DA	1	
>Treatment Control Point Time	(3008,0025)	TM	1	
>Delivered Meterset	(3008,0044)	DS	1	
>Gantry Angle	(300A,011E)	DS	1C	
>Patient Support Angle	(300A,0122)	DS	1C	
>Table Top Pitch Angle	(300A,0140)	FL	2C	
>Table Top Roll Angle	(300A,0144)	FL	2C	
>Table Top Vertical Position	(300A,0128)	DS	2C	
>Table Top Longitudinal Position	(300A,0129)	DS	2C	
>Table Top Lateral Position	(300A,012A)	DS	2C	

9.1.2.6.6 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.7 RT Beams Delivery Instruction Trial (Retired) IOD

IE	Module	Used
Patient	Patient Module	No
	Clinical Trial Subject Module	No
Study	General Study Module	Yes
	Patient Study Module	No

	Clinical Trial Study Module	No
Series	General Series Module	Yes
	Clinical Trial Series Module	No
Equipment	General Equipment Module	No
Plan	RT Beams Delivery Instruction Module	Yes
	Common Instance Reference Module	No
	General Reference Module	No
	SOP Common Module	Yes

9.1.2.7.1 General Study Module

Attribute name	Tag	Vr	Type	Comment
Study Instance UID	(0020,000D)	UI	1	

9.1.2.7.2 General Series Module

Attribute name	Tag	Vr	Type	Comment
Modality	(0008,0060)	CS	1	
Series Instance UID	(0020,000E)	UI	1	

9.1.2.7.3 RT Beams Delivery Instruction Module

Attribute name	Tag	Vr	Type	Comment
Beam Task Sequence	(0074,1020)	SQ	1	
>Beam Task Type	(0074,1022)	CS	1	
>Treatment Delivery Type	(300A,00CE)	CS	1	Supported values: TREATMENT, CONTINUATION.
>Continuation Start Meterset	(0074,0120)	FD	1C	
>Continuation End Meterset	(0074,0121)	FD	1C	
>Current Fraction Number	(3008,0022)	IS	1	
>Referenced Beam Number	(300C,0006)	IS	1	
Omitted Beam Task Sequence	(300C,0111)	SQ	3	
>Referenced Beam Number	(300C,0006)	IS	1	
>Reason for Omission	(300C,0112)	CS	1	

9.1.2.7.4 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	

9.1.2.8 Unified Procedure Step Trial (Retired) IOD

IE	Module	Used
Unified Procedure Step	SOP Common Module	Yes
	Unified Procedure Step Relationship Module	Yes
	Unified Procedure Step Scheduled Procedure Information Module	Yes
	Unified Procedure Step Progress Information Module	Yes

Unified Procedure Step Performed Procedure Information Module	No
Patient Medical Module	No
Transaction Module	Yes

9.1.2.8.1 SOP Common Module

Attribute name	Tag	Vr	Type	Comment
SOP Class UID	(0008,0016)	UI	1	
SOP Instance UID	(0008,0018)	UI	1	
Timezone Offset From UTC	(0008,0201)	SH	3	

9.1.2.8.2 Unified Procedure Step Relationship Module

Attribute name	Tag	Vr	Type	Comment
Patient's Name	(0010,0010)	PN		
Patient ID	(0010,0020)	LO		

9.1.2.8.3 Unified Procedure Step Scheduled Procedure Information Module

Attribute name	Tag	Vr	Type	Comment
Scheduled Station Name Code Sequence	(0040,4025)	SQ		
>Code Value	(0008,0100)	SH	1C	
>Coding Scheme Designator	(0008,0102)	SH	1C	
>Code Meaning	(0008,0104)	LO	1	
Scheduled Procedure Step Start DateTime	(0040,4005)	DT		
Scheduled Workitem Code Sequence	(0040,4018)	SQ		
>Code Value	(0008,0100)	SH	1C	
>Coding Scheme Designator	(0008,0102)	SH	1C	
>Code Meaning	(0008,0104)	LO	1	
Input Availability Flag	(0040,4020)	CS	1	

9.1.2.8.4 Unified Procedure Step Progress Information Module

Attribute name	Tag	Vr	Type	Comment
Procedure Step State	(0074,1000)	CS		
Procedure Step Progress Information Sequence	(0074,1002)	SQ		
>Procedure Step Progress	(0074,1004)	DS		

9.1.2.8.5 Transaction Module

Attribute name	Tag	Vr	Type	Comment
Transaction UID	(0008,1195)	UI	3	

9.1.3 Attribute Mapping

9.1.4 Coerced/Modified Fields

9.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

All used Private Creators are listed in the table below. Usage of Private Attributes are listed in each module specification.

Attribute name	Tag	VR	VM	Value

9.3 CODED TERMINOLOGY AND TEMPLATES

9.3.1 Context Groups

9.3.2 Template Specifications

9.3.3 Private Code Definitions

9.4 GRAYSCALE IMAGE CONSISTENCY

9.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

None

9.6 PRIVATE TRANSFER SYNTAXES

None

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