

***Technical Publication***

**DICOM Conformance Statement  
iPlan RT Dose 3.0**

**Document Revision 2**

**October 09, 2007**

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# 1 Conformance Statement Overview

This is a conformance statement for the BrainLAB software iPlan RT Dose. The main purpose of this software is to perform treatment planning and transfer treatment plans to third-party software.

The DICOM export part of the application is to

- Send DICOM data to another DICOM application or archive.
- Write DICOM data to the file system (no media interchange application profile supported so far).

SOP Classes	User Of Service (SCU)	Provider Of Service (SCP)
<b>Transfer</b>		
RT Plan Storage	Yes	No
RT Image Storage	Yes	No

*Table 1-1: Network services supported by iPlan RT Dose*

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## 3 Introduction

### 3.1 Revision History

Document Version	Date of Issue	Description
1	June 09, 2006	Release Version
2	October 09, 2007	Update of references

### 3.2 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

### 3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. However, by itself, it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between BrainLAB and non–BrainLAB equipment.
- This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended. An acceptance protocol is available to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. BrainLAB reserves the right to make changes to its products or to discontinue its delivery.

### 3.4 Abbreviations

There are a variety of terms and abbreviations used in the document that are defined in the DICOM Standard. Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization
PDU	DICOM Protocol Data Unit
Q/R	Query and Retrieve
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)

SOP            DICOM Service-Object Pair  
xBrain        BrainLAB advanced file format

### 3.5 References

- [1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-3.18 – 2004
- [2] DICOM Conformance Statement Converting DICOM Service 1.0, BrainLAB, April 19, 2005



BrainLAB uses DICOM by Merge.

### 3.6 Contact

In case of any questions or any inconsistencies concerning this Conformance Statement please contact [dicomrt@brainlab.com](mailto:dicomrt@brainlab.com).

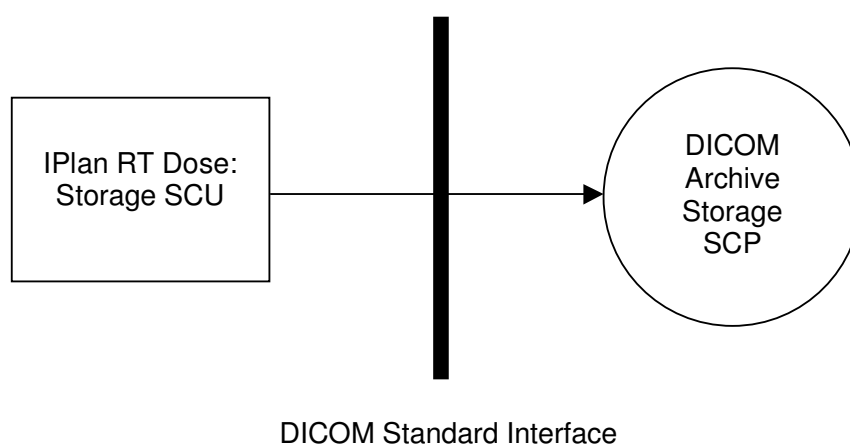
## 4 Networking

### 4.1 Implementation Model

The BrainLAB iPlan RT Dose application is an implementation of a Storage SCU that sends DICOM data to a DICOM archive or workstation.

#### 4.1.1 Application Data Flow Diagram

The Storage SCU:



#### 4.1.2 Functional Definition of Application Entity (AE)

Some communications and data transfer with remote AEs are accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

- Storage SCU:  
iPlan RT Dose creates a DICOM message and initiates an association with a Storage SCP negotiating all SOPs listed in Table 4-2. The DICOM data is then sent to the remote DICOM Storage SCP.

## 4.2 Application Entity Specifications

### 4.2.1 iPlan RT Dose Specification

#### 4.2.1.1 SOP Classes and Transfer Syntaxes

iPlan RT Dose sends a C-ECHO request in order to test the connection to a remote AE. It provides standard conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No

Table 4-1: Supported Verification SOP Classes

iPlan RT Dose exports DICOM data. It provides Standard Conformance to the following DICOM V3.0 SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No

Table 4-2: Supported Storage SOP Classes

iPlan RT Dose supports the following transfer syntaxes. In an association negotiation the syntaxes are proposed in the order of appearance in the list.

Transfer Syntax Name	Transfer Syntax UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1
DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2

Table 4-3: Supported Transfer Syntaxes

#### 4.2.1.2 Association Policies

##### 4.2.1.2.1 General

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

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

##### 4.2.1.2.2 Number of Associations

For both association initiation and acceptance:

Maximum number of simultaneous Associations	1
---	---



#### 4.2.1.2.3 Asynchronous Nature

The iPlan RT Dose does not support asynchronous communication (multiple outstanding transactions over a single association).

Maximum number of outstanding asynchronous transactions	1
---	---

#### 4.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Implementation Class UID	1.2.276.0.20.1.5.1.0.0.87867
Implementation Version Name	iPlan RT Dose

#### 4.2.1.3 Association Initiation Policy

iPlan RT Dose initiates an association in case the user wants to export a treatment plan and send it to a remote DICOM node.

##### 4.2.1.3.1 Activity – Store

###### 4.2.1.3.1.1 Associated Real-World Activity

A storage request is performed in order to send the DICOM data to a remote Storage SCP. The remote Storage SCP must be one of the AETs known by iPlan RT Dose.

###### 4.2.1.3.1.2 Proposed Presentation Contexts

Presentation Context Table			
Abstract Syntax	Transfer Syntax	Role	Ext. Neg
All SCU SOP Classes as defined in Table 4-1 and Table 4-2	All Transfer Syntaxes as defined in Table 4-3	SCU	None

Table 4-4: Proposed Presentation Contexts for Activity Store.

###### 4.2.1.3.1.3 SOP Specific Conformance

iPlan RT Dose provides standard conformance to the DICOM Verification Service Class and to the DICOM Storage SOP Classes. No extended negotiation is implemented.

## 4.3 Network Interfaces

### 4.3.1 Physical Network Interface

iPlan RT Dose supports the DICOM upper layer using TCP/IP. iPlan RT Dose is indifferent to the physical medium over which TCP/IP executes. It inherits this from the operating system upon which it is installed.

### 4.3.2 Additional Protocols

The usage of DNS and DHCP is possible and is based on the network configuration of the operating system upon which iPlan RT Dose is installed.

## 4.4 Configuration

### 4.4.1 AE Title / Presentation Address Mapping

Configuration of remote and local DICOM nodes can be performed with the platform files of iPlan RT Dose.

#### 4.4.1.1 Local AE Titles

The local AET can be defined separately for each configured Storage SCP within the platform files of iPlan RT Dose.

Application Entity	Default AE Title	Default TCP/IP Port
iPlan RT Dose	BL_IPLAN_SCU	104

#### 4.4.1.2 Remote AE Title/Presentation Address Mapping

In iPlan RT Dose you can specify several archives for export. The IP address/hostname, AET and listening port may be configured for each DICOM network archive separately.

### 4.4.2 Parameters

Additionally, a timeout may be specified for each DICOM network archive separately.

Parameter	Configurable	Default Value
Timeout	Yes	30
Maximum PDU Size	No	28672

## 5 Media Interchange

For export there is no media interchange application profile supported. The files are simply stored to the file system grouped by patient without using any DICOMDIR. For export it supports the same SOP Classes as the Storage SCU (see Table 4-2 or Table 4-4).

## 6 Support Of Extended Character Sets

iPlan RT Dose supports the ISO\_IR 100 character set (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set).

## 7 Security Profiles

No security profiles are supported.

## 8 Annexes

### 8.1 IOD Contents

#### 8.1.1 Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the “Presence of Module” column are:

MNAP            Module not always present  
 ALWAYS        Module always present

##### 8.1.1.1 Created IODs

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-3	ALWAYS
Study	General Study	Table 8-4	ALWAYS
	Patient Study	Table 8-5	ALWAYS
Series	RT Series	Table 8-14	ALWAYS
Equipment	General Equipment	Table 8-7	ALWAYS
Plan	RT General Plan Module	Table 8-15	ALWAYS
	RT Prescription Module	Table 8-17	ALWAYS
	RT Tolerance Tables	Table 8-18	MNAP
	RT Patient Setup	Table 8-19	ALWAYS
	RT Fraction Scheme	Table 8-20	ALWAYS
	RT Beams Module	Table 8-21	ALWAYS
	RT Beam Profile Module	Table 8-22	ALWAYS
	Approval	Table 8-23	ALWAYS
SOP Common	Table 8-10	ALWAYS	

*Table 8-1: RT Plan Storage IOD*

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8-3	ALWAYS
Study	General Study	Table 8-4	ALWAYS
	Patient Study	Table 8-5	ALWAYS
Series	RT Series	Table 8-14	ALWAYS
Frame of Reference	Frame of Reference	Table 8-13	ALWAYS
Equipment	General Equipment	Table 8-7	ALWAYS
Image	General Image	Table 8-8	ALWAYS
	Image Pixel	Table 8-9	ALWAYS
	RT Image	Table 8-16	ALWAYS
	VOI LUT	Table 8-11	ALWAYS
	Curve	Table 8-12	ALWAYS
	SOP Common	Table 8-10	ALWAYS

Table 8-2: RT Image Storage IOD

### 8.1.1.2 Created Modules

The following tables use a number of abbreviations. The abbreviations used in the “Presence” column are:

VNAP	Value not always present (attribute set to zero length if no value is present)
ANAP	Attribute not always present
ALWAYS	Attribute is always present
EMPTY	Attribute is set to zero length

The abbreviations used in the “Source” column:

USER	The attribute value source is from user input
AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter

#### 8.1.1.2.1 Common Modules

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Name	(0010,0010)	PN		VNAP	AUTO
Patient ID	(0010,0020)	LO		VNAP	AUTO
Patient's Birth Date	(0010,0030)	DA		VNAP	AUTO
Patient's Sex	(0010,0040)	CS		VNAP	AUTO

Table 8-3: Patient Module

Attribute Name	Tag	VR	Value	Presence	Source
Study Instance UID	(0020,000D)	UI	Newly generated	ALWAYS	AUTO
Study Date	(0008,0020)	DA		ANAP	AUTO
Study Time	(0008,0030)	TM		ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN		EMPTY	AUTO
Study ID	(0020,0010)	SH		VNAP	AUTO
Accession Number	(0008,0050)	SH		EMPTY	AUTO
Study Description	(0008,1030)	LO		ANAP	AUTO

Table 8-4: General Study Module

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Height	(0010,1020)	DS		ANAP	AUTO
Patient's Weight	(0010,1030)	DS		ANAP	AUTO

Table 8-5: Patient Study Module

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS		ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated	ALWAYS	AUTO
Series Number	(0020,0011)	IS		ALWAYS	AUTO
Series Date	(0008,0021)	DA		ANAP	AUTO
Series Time	(0008,0031)	TM		ANAP	AUTO
Series Description	(0008,103E)	LO		ANAP	AUTO

Table 8-6: General Series Module

Attribute Name	Tag	VR	Value	Presence	Source
Manufacturer	(0008,0070)	LO	"BrainLAB"	ALWAYS	AUTO
Station Name	(0008,1010)	SH	<Host Name>	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	"iPlan RT Dose"	ALWAYS	AUTO
Software Version(s)	(0018,1020)	LO		ALWAYS	AUTO
Private Creator Code	(0009,0010)	LO	"BrainLAB_Conversion"	ALWAYS	AUTO
Export Platform Name	(0009,1001)	LO	Configured Platform Name	ALWAYS	CONFIG
Export Platform Data	(0009,1002)	OB	XML stream	ALWAYS	CONFIG

Table 8-7: General Equipment Module

Attribute Name	Tag	VR	Value	Presence	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA	<Current Date>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<Current Time>	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS		EMPTY	AUTO

Table 8-8: General Image Module



Attribute Name	Tag	VR	Value	Presence	Source
Samples per Pixel	(0028,0002)	US	"1"	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Rows	(0028,0010)	US		ALWAYS	CONFIG
Columns	(0028,0011)	US		ALWAYS	CONFIG
Bits Allocated	(0028,0100)	US	"16"	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	"16"	ALWAYS	AUTO
High Bit	(0028,0102)	US	"15"	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	"0"	ALWAYS	AUTO
Pixel Aspect Ratio	(0028,0034)	IS		ANAP	AUTO/CONFIG
Pixel Data	(7FE0,0010)	OB OW		ALWAYS	AUTO

Table 8-9: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence	Source
SOP Class UID	(0008,0016)	DS		ALWAYS	AUTO
SOP Instance UID	(0008,0018)	DS		ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	"ISO_IR 100"	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	<Current Date>	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	<Current Time>	ALWAYS	AUTO

Table 8-10: SOP Common Module

Attribute Name	Tag	VR	Value	Presence	Source
Window Center	(0028,1050)	DS	"32768"	ALWAYS	AUTO
Window Width	(0028,1051)	DS	"65536"	ALWAYS	AUTO

Table 8-11: VOI LUT

Attribute Name	Tag	VR	Value	Presence	Source
Curve Dimensions	(50xx,0005)	US	"2"	ALWAYS	AUTO
Number of Points	(50xx,0010)	US		ALWAYS	AUTO
Type of Data	(50xx,0020)	CS	"ROI"	ALWAYS	AUTO
Data Value Representation	(50xx,0103)	US	"3"	ALWAYS	AUTO
Curve Data	(50xx,3000)	OW		ALWAYS	AUTO
Curve Description	(50xx,0022)	LO	<ROI type " _ " ROI name>	ALWAYS	AUTO
Axis Units	(50xx,0030)	SH	"PIXL/PIXL"	ALWAYS	AUTO
Curve Label	(50xx,2500)	LO	<ROI name>	ALWAYS	AUTO

Table 8-12: Curve

Attribute Name	Tag	VR	Value	Presence	Source
Frame of Reference UID	(0020,0052)	UI		ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO		EMPTY	AUTO

Table 8-13: Frame of Reference

## 8.1.1.2.2 RT Specific Modules

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS	"RTPLAN" or "RTIMAGE"	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		EMPTY	AUTO

Table 8-14: RT Series Module

Attribute Name	Tag	VR	Value	Presence	Source
RT Plan Label	(300A,0002)	LO	(see Note 8-1)	ALWAYS	AUTO/ USER
RT Plan Name	(300A,0003)	SH	(see Note 8-1)	ANAP	AUTO/ USER
RT Plan Description	(300A,0004)	ST	(see Note 8-1)	ANAP	AUTO/ USER
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Operators' Name	(0008,1070)	PN	User logged in to the system	VNAP	AUTO
RT Plan Date	(300A,0006)	DA		ALWAYS	AUTO
RT Plan Time	(300A,0007)	TM		ALWAYS	AUTO
RT Plan Geometry	(300A,000C)	CS	"TREATMENT_DEVICE"	ALWAYS	AUTO
Referenced RT Plan Sequence	(300C,0002)	SQ	(see Note 8-2)	ANAP	CONFIG/ AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
>RT Plan Relationship	(300A,0055)	CS	"SIBLING" (see Note 8-2)	ANAP	AUTO

Table 8-15: RT General Plan Module

Attribute Name	Tag	VR	Value	Presence	Source
Samples per Pixel	(0028,0002)	US	"1"	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	"16"	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	"16"	ALWAYS	AUTO
High Bit	(0028,0102)	US	"15"	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	"0"	ALWAYS	AUTO
RT Image Label	(3002,0002)	SH	Reference to beam or isocenter (see Note 8-4)	ALWAYS	AUTO/USER
RT Image Name	(3002,0003)	LO	Reference to beam or isocenter (see Note 8-4)	ALWAYS	AUTO/USER
RT Image Description	(3002,0004)	ST	Reference to beam or isocenter (see Note 8-4)	ALWAYS	AUTO/USER
Operators' Name	(0008,1070)	PN	From Operating System	ALWAYS	AUTO
Image Type	(0008,0008)	CS	"DERIVED\SECONDARY\DRR"	ALWAYS	AUTO
Conversion Type	(0008,0064)	CS	"WSD"	ALWAYS	AUTO

RT Image Plane	(3002,000C)	CS	"NORMAL"	ALWAYS	AUTO
X-Ray Image Receptor Translation	(3002,000D)	DS	Configured for application	ALWAYS	CONFIG
X-Ray Image Receptor Angle	(3002,000E)	DS	"0"	ALWAYS	AUTO
RT Image Orientation	(3002,0010)	DS	"1.0/0.0/0.0/0.0/-1.0/0.0"	ANAP	AUTO
Image Plane Pixel Spacing	(3002,0011)	DS	Configured for application	ALWAYS	CONFIG
RT Image Position	(3002,0012)	DS		ALWAYS	AUTO
Radiation Machine Name	(3002,0020)	SH		ALWAYS	CONFIG/USER
Exposure Sequence	(3002,0030)	SQ		ANAP	CONFIG
> Beam Limiting Device Sequence	(300A,00B6)	SQ		ANAP	AUTO
>> RT Beam Limiting Device Type	(300A, 00B8)	CS		ANAP	AUTO
>> Number of Leaf/Jaw Pairs	(300A,00BC)	IS		ANAP	AUTO
>> Leaf Position Boundaries	(300A,00BE)	DS		ANAP	AUTO
>> Leaf/Jaw Position	(300A,011C)	DS		ANAP	AUTO
Primary Dosimeter Unit	(300A,00B3)	CS	"MU"	ALWAYS	AUTO
Radiation Machine SAD	(3002,0022)	DS	Configured for the application	ALWAYS	CONFIG
Radiation Machine SSD	(3002,0024)	DS		ALWAYS	AUTO
RT Image SID	(3002,0026)	DS	Configured for the application	ALWAYS	CONFIG
Referenced RT Plan Sequence	(300C,0002)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
Referenced Beam Number	(300C,0006)	IS		ANAP	AUTO
Referenced Fraction Group Number	(300C,0022)	IS		ALWAYS	AUTO
Gantry Angle	(300A,011E)	DS	User input or application configuration	ALWAYS	USER/CONFIG
Beam Limiting Device Angle	(300A,0120)	DS	User input	ALWAYS	USER
Patient Support Angle	(300A,0122)	DS	User input	ALWAYS	USER
Table Top Vertical Position	(300A,0128)	DS	User input	ALWAYS	USER
Table Top Longitudinal Position	(300A,0129)	DS	User input	ALWAYS	USER
Table Top Lateral Position	(300A,012A)	DS	User input	ALWAYS	USER
Private Creator Code	(3273,0010)	LO	"BrainLAB_PatientSetup" (see Note 8-6)	ANAP	USER/CONFIG
Isocenter Position	(3273,1000)	DS	see Note 8-6	ANAP	USER/CONFIG

Patient Position	(3273,1001)	CS	see Note 8-6	ANAP	USER/CONFIG
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*Table 8-16: RT Image*

Attribute Name	Tag	VR	Value	Presence	Source
Dose Reference Sequence	(300A,0010)	SQ		ALWAYS	AUTO
>Dose Reference Number	(300A,0022)	IS		ALWAYS	AUTO
>Dose Reference Structure Type	(300A,0014)	CS	"COORDINATES"	ALWAYS	AUTO
>Dose Reference Description	(300A,0016)	ST		ALWAYS	AUTO
>Dose Reference Type	(300A,0020)	CS	"TARGET"	ALWAYS	AUTO
>Target Prescription Dose	(300A,0026)	DS		ALWAYS	AUTO

*Table 8-17: RT Prescription Module*

Attribute Name	Tag	VR	Value	Presence	Source
Tolerance Table Sequence	(300A,0040)	SQ		VNAP	AUTO
>Tolerance Table Number	(300A,0042)	IS		ALWAYS	AUTO
>Tolerance Table Label	(300A,0043)	SH	From Machine Profile	ALWAYS	CONFIG

*Table 8-18: RT Tolerance Tables Module*

Attribute Name	Tag	VR	Value	Presence	Source
Patient Setup Sequence	(300A,0180)	SQ		ALWAYS	AUTO
>Patient Setup Number	(300A,0182)	IS		ALWAYS	AUTO
>Patient Position	(0018,5100)	CS		ALWAYS	AUTO

*Table 8-19: RT Patient Setup Module*

Attribute Name	Tag	VR	Value	Presence	Source
Fraction Group Sequence	(300A,0070)	SQ		ALWAYS	AUTO
>Fraction Group Number	(300A,0071)	IS		ALWAYS	AUTO
>Referenced Dose Reference Sequence	(300C,0050)	SQ		ANAP	CONFIG
>>Referenced Dose Reference Number	(300C,0051)	IS		ANAP	CONFIG
>Number of Fractions Planned	(300A,0078)	IS		ALWAYS	AUTO
>Number of Beams	(300A,0080)	IS		ALWAYS	AUTO
>Referenced Beam Sequence	(300C,0004)	SQ		ALWAYS	AUTO
>>Beam Dose Specification Point	(300A,0082)	DS	(see Note 8-3)	ALWAYS	AUTO

>>Beam Dose	(300A,0084)	DS		ALWAYS	AUTO
>>Beam Meterset	(300A,0086)	DS		ALWAYS	AUTO
>>Referenced Beam Number	(300C,0006)	IS		ALWAYS	AUTO
>Number of Brachy Application Setups	(300A,00A0)	IS		ALWAYS	AUTO

*Table 8-20: RT Fraction Scheme Module*

Attribute Name	Tag	VR	Value	Presence	Source
Beam Sequence	(300A,00B0)	SQ		ALWAYS	AUTO
>Beam Number	(300A,00C0)	IS	(see Note 8-4)	ALWAYS	AUTO
>Beam Name	(300A,00C2)	LO	(see Note 8-4)	ALWAYS	AUTO
>Beam Description	(300A,00C3)	LO	(see Note 8-4)	ALWAYS	AUTO
>Beam Type	(300A,00C4)	CS	"STATIC" or "DYNAMIC"	ALWAYS	AUTO
>Radiation Type	(300A,00C6)	CS	"PHOTON"	ALWAYS	AUTO
>Treatment Machine Name	(300A,00B2)	SH		ALWAYS	AUTO
>Manufacturer	(0008,0070)	LO	(see Note 8-5)	ALWAYS	AUTO
>Institution Name	(0008,0080)	LO	As configured in Settings file	ALWAYS	CONFIG
>Institutional Department Name	(0008,1040)	LO	As configured in Settings file	ALWAYS	CONFIG
>Manufacturer's Model Name	(0008,1090)	LO		ALWAYS	AUTO
>Primary Dosimeter Unit	(300A,00B3)	CS	"MU"	ALWAYS	AUTO
>Source-Axis Distance	(300A,00B4)	DS		ALWAYS	AUTO
>Beam Limiting Device Sequence	(300A,00B6)	SQ		ALWAYS	AUTO
>>RT Beam Limiting Device Type	(300A,00B8)	CS		ALWAYS	AUTO
>>Number of Leaf/Jaw Pairs	(300A,00BC)	IS		ALWAYS	AUTO
>>Leaf Position Boundaries	(300A,00BE)	DS		ANAP	AUTO
>Referenced Patient Setup Number	(300C,006A)	IS		ALWAYS	AUTO
>Treatment Delivery Type	(300A,00CE)	CS	"TREATMENT"	ALWAYS	AUTO
>Number of Wedges	(300A,00D0)	IS	"0"	ALWAYS	AUTO
>Number of Compensators	(300A,00E0)	IS	"0"	ALWAYS	AUTO
>Number of Boli	(300A,00ED)	IS	"0"	ALWAYS	AUTO
>Number of Blocks	(300A,00F0)	IS	"0" or "1"	ALWAYS	AUTO
>Block Sequence	(300A,00F4)	SQ	Only for m3 MLC Full Integration	ANAP	AUTO
>>Block Tray ID	(300A,00F5)	SH		ANAP	AUTO
>>Source to Block Tray Distance	(300A,00F6)	DS		ANAP	AUTO
>>Block Type	(300A,00F8)	CS	"APERTURE"	ANAP	AUTO
>>Block Divergence	(300A,00FA)	CS		ANAP	AUTO
>>Block Number	(300A,00FC)	IS		ANAP	AUTO
>>Material ID	(300A,00E1)	SH		ANAP	AUTO
>>Block Transmission	(300A,0102)	DS		ANAP	AUTO
>>Block Number of Points	(300A,0104)	IS		ANAP	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
>>Block Data	(300A,0106)	DS		ANAP	AUTO
>Final Cumulative Meterset Weight	(300A,010E)	DS	"1.0"	ALWAYS	AUTO
>Number of Control Points	(300A,0110)	IS		ALWAYS	AUTO
>Control Point Sequence	(300A,0111)	SQ		ALWAYS	AUTO
>>Control Point Index	(300A,0112)	IS		ALWAYS	AUTO
>>Cumulative Meterset Weight	(300A,0134)	DS		ALWAYS	AUTO
>>Referenced Dose Reference Sequence	(300C,0050)	SQ		ANAP	CONFIG
>>>Referenced Dose Reference Number	(300C,0051)	IS		ANAP	CONFIG
>>>Cumulative Dose Reference Coefficient	(300A,010C)	DS		ANAP	CONFIG
>>Nominal Beam Energy	(300A,0114)	DS		ALWAYS	AUTO
>>Dose Rate Set	(300A,0115)	DS		ALWAYS	AUTO
>>Beam Limiting Device Position Sequence	(300A,011A)	SQ		ALWAYS	AUTO
>>>RT Beam Limiting Device Type	(300A,00B8)	CS		ALWAYS	AUTO
>>>Leaf/Jaw Positions	(300A,011C)	DS		ALWAYS	AUTO
>>Gantry Angle	(300A,011E)	DS		ALWAYS	AUTO
>>Gantry Rotation Direction	(300A,011F)	CS		ALWAYS	AUTO
>>Beam Limiting Device Angle	(300A,0120)	DS		ALWAYS	AUTO
>>Beam Limiting Device Rotation Direction	(300A,0121)	CS		ALWAYS	AUTO
>>Patient Support Angle	(300A,0122)	DS		ALWAYS	AUTO
>>Patient Support Rotation Direction	(300A,0123)	CS		ALWAYS	AUTO
>>Table Top Eccentric Angle	(300A,0125)	DS		ALWAYS	AUTO
>>Table Top Eccentric Rotation Direction	(300A,0126)	CS		ALWAYS	AUTO
>>Table Top Vertical Position	(300A,0128)	DS		ALWAYS	AUTO
>>Table Top Longitudinal Position	(300A,0129)	DS		ALWAYS	AUTO
>>Table Top Lateral Position	(300A,012A)	DS		ALWAYS	AUTO
>>Isocenter Position	(300A,012C)	DS	Always empty	ALWAYS	AUTO
>>Source to Surface Distance	(300A,0130)	DS	As configured	ANAP	AUTO
>Private Creator Code	(3411,0010)	LO	"BrainLAB_BeamProfile"	ALWAYS	AUTO
>Referenced Beam Profile Number	(3411,1006)	IS		ALWAYS	AUTO

Table 8-21: RT Beams Module

Attribute Name	Tag	VR	Value	Presence	Source
Private Creator Code	(3411,0010)	LO	"BrainLAB_BeamProfile"	ALWAYS	AUTO

Beam Profile Sequence	(3411,1001)	SQ		ALWAYS	AUTO
>Beam Profile Number	(3411,1002)	IS		ALWAYS	AUTO
>Beam Parameter Sequence	(3411,1003)	SQ		ALWAYS	AUTO
>>Parameter Description	(3411,1004)	UT		ALWAYS	AUTO
>>Parameter Data	(3411,1005)	OB		ALWAYS	AUTO

*Table 8-22: RT Beam Profile Module*

Attribute Name	Tag	VR	Value	Presence	Source
Approval Status	(300E,0002)	CS	“UNAPPROVED” or “APPROVED”	ALWAYS	AUTO
Review Date	(300E,0004)	DA		ANAP	AUTO
Review Time	(300E,0005)	TM		ANAP	AUTO
Reviewer Name	(300R,0008)	PN		ANAP	AUTO

*Table 8-23: Approval Module*

*Note 8-1:* iPlan RT Dose offers the possibility to configure which string element will be assigned to which DICOM attribute for RT Plan Label (300A,0002), RT Plan Name (300A,0003) and RT Plan Description (300A,0004) in order to guarantee the correct assignment in different target systems. See the iPlan RT Dose manual for details on how to configure the software.

*Note 8-2:* Due to some limitations of third-party systems, iPlan RT Dose offers the export of a DICOM RT Plan for each single isocenter. Thus, the Referenced RT Plan Sequence (300C,0002) is only present in cases where several plans are exported. To define the relationship between multiple plans, the list of Defined Terms “PRIOR”, “ALTERNATIVE”, “PREDECESSOR” and “VERIFIED\_PLAN” is extended by the term “SIBLING”. This is the only term currently supported by iPlan RT Dose.

*Note 8-3:* The Beam Dose Specification Point is either the Normalization Point defined for the corresponding PTV or, if not present, the center of gravity of this PTV.

*Note 8-4:* iPlan RT Dose offers the possibility to configure which string element will be assigned to which DICOM attribute for Beam Number (300A,00C0), Beam Name (300A,00C2) and Beam Description (300A,00C3) in order to guarantee the correct assignment in different record-and-verify systems. See the iPlan RT Dose manual for details on how to configure the software.

*Note 8-5:* Some target systems do not interpret this value as the manufacturer of the treatment delivery device, but as the manufacturer of the beam limiting device. Therefore, the value of this attribute can be configured accordingly.

## 8.2 Data Dictionary Of Private Attributes

The Private Attributes added to created SOP Instances are listed in the Table below. BrainLAB reserves blocks of private attributes in groups 0009 and 3411. Further details on usage of these private attributes are contained in Section 8.1.

Tag	Attribute Name	VR	VM
(0009,0010)	Private Creator Code “BrainLAB_Conversion”	LO	1
(0009,1001)	Export Platform Name	LO	1
(0009,1002)	Export Platform Data	OB	1
(3411,0010)	Private Creator Code “BrainLAB_BeamProfile”	LO	1

(3411,1001)	Beam Profile Sequence	SQ	1
(3411,1002)	Beam Profile Number	IS	1
(3411,1003)	Beam Parameter Sequence	SQ	1
(3411,1004)	Parameter Description	UT	1
(3411,1005)	Parameter Data	OB	1
(3411,1006)	Referenced Beam Profile Number	IS	1
(3273,0010)	Private Creator Code "BrainLAB_PatientSetup" (see Note 8-6)	LO	1
(3273,1000)	Isocenter Position (see Note 8-6)	DS	3
(3273,1001)	Patient Position (see Note 8-6)	CS	1

Table 8-24: Data Dictionary Of Private Attributes

Note 8-6: Some third party systems expect the isocenter position and the patient position within DICOM RT Image objects. For this reason iPlan RT Dose offers the possibility to enable a configurable private group. The tag numbers and the creator code are meant as recommendations. This private group will not be written per default.

### 8.3 Coded Terminology And Templates

None supported.

### 8.4 Grayscale Image Consistency

Not supported.

### 8.5 Standard Extended/Specialized/Private Sop Classes

None supported.

### 8.6 Private Transfer Syntaxes

None supported.



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