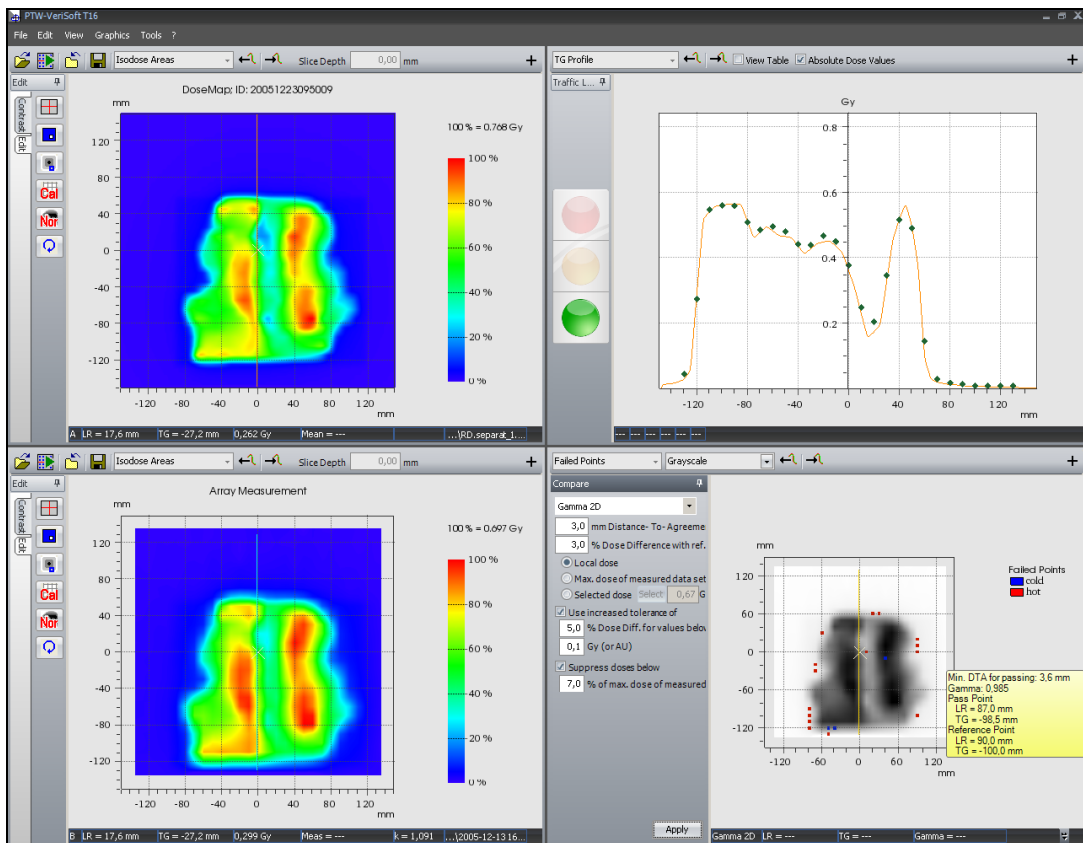


DICOM Conformance Statement

VeriSoft

Version 6.1 or higher



1 Conformance Statement Overview

VeriSoft is used for IMRT patient plan verification.

The software compares measured dose matrices with corresponding calculated matrices from a treatment planning system and verifies the dose distribution. Comparisons are evaluated numerically and graphically.

As corresponding calculated matrices the DICOM radiotherapy IODs RT Dose and RT Image, but also other Image IODs like CR, CT and SC are supported.

Other storage SOP Classes not listed in Table 1 may be stored but are not useful in the application.

The providing of service is implemented in a separated application called PTWDicomSCP. This application receives the DICOM objects and put them in a local directory, VeriSoft is able to import the data from.

Provided Network Services:

SOP Classes	Category	User of Service (SCU)	Provider of Service (SCP)
CT Image Storage	transfer	Yes	Yes
CR Image Storage	transfer	Yes	Yes
RT Dose Storage	transfer	Yes	Yes
RT Image Storage	transfer	Yes	Yes
RT Plan Storage	transfer	Yes	Yes
RT Structure Set Storage	transfer	Yes	Yes
RT Beams Treatment Record Storage	transfer	Yes	Yes

Table 1: Provided Network Services

Provided Media Services:

VeriSoft does not support Media Interchange.

2 Table of Contents

1	Conformance Statement Overview	2
2	Table of Contents	3
2.1	List of Tables	4
2.2	List of Figures	4
3	Introduction	5
3.1	Revision History	5
3.2	Audience	5
3.3	Remarks	5
3.4	Terms and Definitions	5
3.5	Basics of DICOM Communication	5
3.6	Abbreviations	6
3.7	References	6
4	Networking	7
4.1	Implementation Model	7
4.1.1	Application Data Flow	7
4.1.2	Functional Definitions of AE's	7
4.1.3	Sequencing of Real-World Activities	7
4.2	AE Specifications	8
4.2.1	ECHO-SCP	8
4.2.2	STORAGE-SCP	10
4.3	Network Interfaces	13
4.3.1	Physical Network Interface	13
4.3.2	Additional Protocols	13
4.3.3	IPv4 and IPv6 Support	13
4.4	Configuration	13
5	MEDIA Interchange	14
5.1	Real World Activities	14
5.1.1	Activity – Load Directory or File	14
5.1.2	Application Profile Specific Conformance	14
5.2	Augmented and Private Profiles	14
5.2.1	Augmented Profiles	14
5.2.2	Private Profiles	14
5.3	MEDIA Configuration	14
6	Support of Character Sets	14
7	Security	14
8	Annexes	15
8.1	IOD contents	15
8.1.1	Created SOP Instance(s)	15
8.1.2	Usage of Attributes from Received IODs	27
8.1.3	Attribute Mapping	34
8.1.4	Coerced/Modified Files	34
8.1.5	Data Dictionary of Private Attributes	34
8.1.6	Coded Terminology and Templates	34
8.1.7	Grayscale Image Consistency	34
8.1.8	Standard Extended / Specialized/ Private SOP Classes	34
8.1.9	Private Transfer Syntaxes	34

2.1 List of Tables

Table 1: Provided Network Services	2
Table 2: Abbreviations	6
Table 3: References	6
Table 4: SOP classes supported by ECHO-SCP	8
Table 5: Maximum PDU size received as a SCP for ECHO-SCP	8
Table 6: Number of associations for ECHO-SCP	8
Table 7: Acceptable presentation contexts for ECHO-SCP and receive ECHO request	9
Table 8: SOP Classes supported by STORAGE-SCP	10
Table 9: Maximum PDU size received as a SCP for STORAGE-SCP	10
Table 10: Number of Associations as a SCP for STORAGE-SCP	10
Table 11: Acceptable Presentation Contexts for STORAGE-SCP and Receive Storage Request	11
Table 12: Response Status for STORAGE-SCP and Receive Storage Request	12
Table 13: IOD of created 4D-Dosimetry RT Dose SOP Instances	15
Table 14: Patient Module of created 4D-Dosimetry SOP Instances	16
Table 15: General Study Module of created 4D-Dosimetry SOP Instances	16
Table 16: RT Series Module of created 4D-Dosimetry SOP Instances	16
Table 17: Frame Of Reference Module of created 4D-Dosimetry SOP Instances	17
Table 18: General Equipment Module of created 4D-Dosimetry SOP Instances	17
Table 19: General Image Module of created 4D-Dosimetry SOP Instances	17
Table 20: Image PLANE Module of created 4D-Dosimetry SOP Instances	17
Table 21: Image PIXEL Module of created 4D-Dosimetry SOP Instances	18
Table 22: Multi-Frame Module of created 4D-Dosimetry SOP Instances	18
Table 23: RT Dose Module of created 4D-Dosimetry SOP Instances	18
Table 24: SOP Common Module of created 4D-Dosimetry SOP Instances	19
Table 25: Private O4D Calculation Module of created 4D-Dosimetry SOP Instances	20
Table 26: IOD of created DVH 4D RT Dose SOP Instances	20
Table 27: Patient Module of created DVH 4D SOP Instances	21
Table 28: General Study Module of created DVH 4D SOP Instances	21
Table 29: RT Series Module of created DVH 4D SOP Instances	21
Table 30: Frame Of Reference Module of created DVH 4D SOP Instances	21
Table 31: General Equipment Module of created DVH 4D SOP Instances	22
Table 32: General Image Module of created DVH 4D SOP Instances	22
Table 33: Image Plane Module of created DVH 4D SOP Instances	22
Table 34: Image Pixel Module of created DVH 4D SOP Instances	22
Table 35: Multi-Frame Module of created DVH 4D SOP Instances	23
Table 36: RT Dose Module of created DVH 4D SOP Instances	23
Table 37: RT DVH Module of created DVH 4D SOP Instances	24
Table 38: SOP Common Module of created DVH 4D SOP Instances	24
Table 39: Private DVH Calculation Module of created DVH 4D SOP Instances	26
Table 40: Usage of Attributes from Received IODs for VeriSoft Baseoption	30
Table 41: Usage of Attributes from Received IODs for VeriSoft DVH 4D	34

2.2 List of Figures

Figure 1: Network Implementation Model	7
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3 Introduction

3.1 Revision History

Version	Date	Description
1.0	2011-01	Initial Release of DICOM Conformance for VeriSoft 4.2
1.1	2013-09	DICOM Conformance for VeriSoft 6.0

3.2 Audience

This document is intended for VeriSoft users or potential customer, system administrators and integrators of medical equipment, support and service personnel. It is assumed that the reader is familiar with the DICOM standard.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between VeriSoft and other application using DICOM in an environment of medical devices. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. 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.

VeriSoft has been carefully tested to assure the implementation of the actual DICOM Standard. Nevertheless the Conformance Statement does not guarantee successful interoperability with other vendors. It is the user's responsibility to specify and carry out validation tests to ensure full functionality after installation. Newer versions of the DICOM Standard could make changes necessary in the application to avoid incompatibility.

3.4 Terms and Definitions

DICOM terms and definitions which are used in this document are defined by the DICOM Standard, which is the authoritative source for formal definitions of these terms. (See NEMA PS 3.2 [1])

3.5 Basics of DICOM Communication

See NEMA PS 3.2 [1]

3.6 Abbreviations

The following symbols and abbreviations are used in this document.

Abbreviation	Description
AE	Application Entity
DICOM	Digital Imaging and Communications in Medicine
NEMA	National Electrical Manufacturers Association
FSC	File-Set Creator
FSR	File-Set Reader
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
IOD	Information Object Definition
RT	Radio Therapy
PDU	Protocol Data Unit

Table 2: Abbreviations

3.7 References

Index	Reference
[1]	Digital Imaging and Communications in Medicine (DICOM), Parts 1-20 (2011), National Electrical Manufacturers Association (NEMA) 1300 N. 17th Street Rosslyn, VA 22209, United States of America http://medical.nema.org/

Table 3: References

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

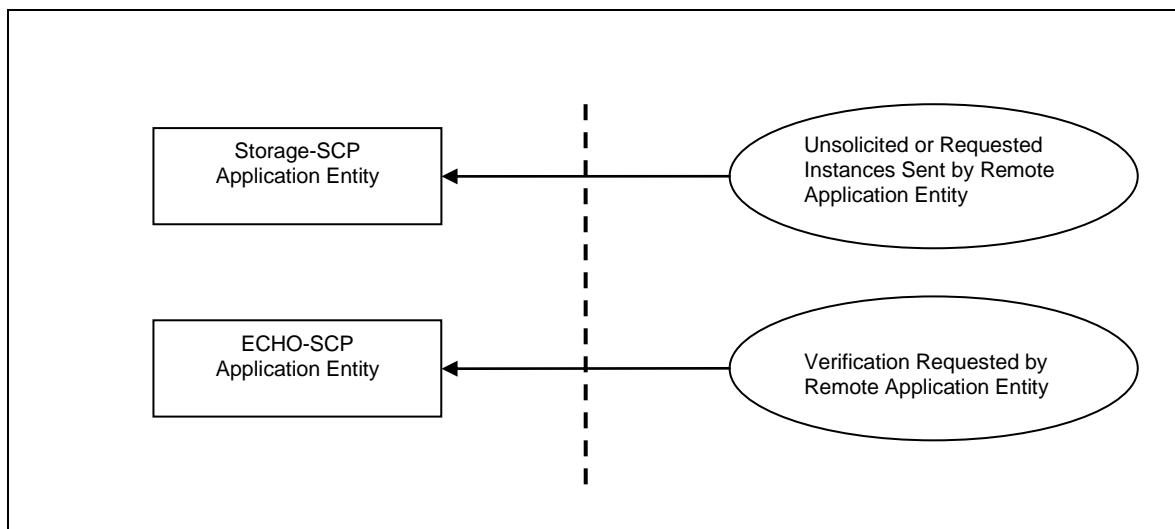


Figure 1: Network Implementation Model

Conceptually the network services may be modeled as the following separate AEs, though in fact all the AEs share a single (configurable) AE Title:

- ECHO-SCP, which responds to verification requests
- STORAGE-SCP, which receives incoming images and other composite instances

4.1.2 Functional Definitions of AE's

4.1.2.1 ECHO-SCP

ECHO-SCP waits in the background for connections, will accept associations with Presentation Contexts for SOP Class of the Verification Service Class, and will respond successfully to echo requests.

4.1.2.2 STORAGE-SCP

STORAGE-SCP waits in the background for connections, will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class, and will store the received instances to the local database where they may subsequently be listed and viewed through the user interface.

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and not dependent on any sequencing.

4.2 AE Specifications

4.2.1 ECHO-SCP

4.2.1.1 SOP Classes

ECHO-SCP provide Standard Conformance to the following SOP Class

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

Table 4: SOP classes supported by ECHO-SCP

4.2.1.2 Association Policies

4.2.1.2.1 General

ECHO-SCP accepts but never initiates associations.

Maximum PDU size received	16384
---------------------------	-------

Table 5: Maximum PDU size received as a SCP for ECHO-SCP

4.2.1.2.2 Number of Associations

Maximum number of simultaneous associations	1
---	---

Table 6: Number of associations for ECHO-SCP

4.2.1.2.3 Asynchronous Nature

ECHO-SCP will only allow a single outstanding operation on an Association. Therefore, ECHO-SCP will not perform asynchronous operations window negotiation.

4.2.1.3 Association Initiation Policy

ECHO-SCP does not initiate associations.

4.2.1.4 Association Acceptance Policy

When ECHO-SCP accepts an association, it will respond to echo requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be accepted, too.

4.2.1.4.1 Activity – Receive Echo Request

4.2.1.4.1.1 Description and Sequencing of Activities

The association gets established when the peer DICOM entity accepts the Verification related presentation context. In a sub-subsequent step a C-ECHO message is exchanged.

The results of the “Verify Communication” activity are shown to the user as success or failure. For example, a Storage Provider not only the Verification information is evaluated, but also the response regarding the proposed Storage SOP Classes.

4.2.1.4.1.2 Accepted Presentation Contexts

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

Table 7: Acceptable presentation contexts for ECHO-SCP and receive ECHO request

4.2.1.4.1.2.1 Extended Negotiation

No extended negotiation is performed.

4.2.1.4.1.3 SOP Specific Conformance

4.2.1.4.1.3.1 SOP Specific Conformance to Verification SOP Class

ECHO-SCP provides standard conformance to the Verification Service Class.

4.2.1.4.1.3.2 Presentation Context Acceptance Criterion

ECHO-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.1.4.1.3.3 Transfer Syntax Selection Policies

ECHO-SCP prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

- first encountered explicit Transfer Syntax,
- default Transfer Syntax.

ECHO-SCP will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting a Transfer Syntax for each.

4.2.2 STORAGE-SCP

4.2.2.1 SOP Classes

STORAGE-SCP provide Standard Conformance to the following SOP Class(es):

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	No	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes

Table 8: SOP Classes supported by STORAGE-SCP

4.2.2.2 Association Policies

4.2.2.2.1 General

STORAGE-SCP accepts but never initiates associations.

Maximum PDU size received	16384
---------------------------	-------

Table 9: Maximum PDU size received as a SCP for STORAGE-SCP

4.2.2.2.2 Number of Associations

Maximum number of simultaneous associations	1
---	---

Table 10: Number of Associations as a SCP for STORAGE-SCP

4.2.2.2.3 Asynchronous Nature

STORAGE-SCP will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCP will not perform asynchronous operations window negotiation.

4.2.2.3 Association Initiation Policy

STORAGE-SCP does not initiate associations.

4.2.2.4 Association Acceptance Policy

When STORAGE-SCP accepts an association, it will respond to storage requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

4.2.2.4.1 Activity – Receive Storage Request

4.2.2.4.1.1 Description and Sequencing of Activities

As instances are received they are copied to the local file system (in a DICOM DIR structure) and a record inserted into the local storage folder. If the received instance is a duplicate of a previously received instance, the new file will be ignored.

4.2.2.4.1.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 10	See Table 10	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Table 11: Acceptable Presentation Contexts for STORAGE-SCP and Receive Storage Request

4.2.2.4.1.2.1 Extended Negotiation

No extended negotiation is performed, though STORAGE-SCP:

- is a Level 2 Storage SCP (Full – does not discard any data elements)
- does not support digital signatures
- does not coerce any received data elements

4.2.2.4.1.3 SOP Specific Conformance

4.2.2.4.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Storage Service Class.

4.2.2.4.1.3.2 Presentation Context Acceptance Criterion

STORAGE-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.2.4.1.3.3 Transfer Syntax Selection Policies

STORAGE-SCP prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

- first encountered explicit Transfer Syntax,
- default Transfer Syntax.

STORAGE-SCP will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting a Transfer Syntax for each.

4.2.2.4.1.3.4 Response Status

STORAGE-SCP will behave as described in the Table below when generating the C-STORE response command message.

Service Status	Further Meaning	Status Codes	Reason
Refused	Out of Resources	A700	The capacity of the DICOM Dir has come to an end. (Try to store more than 99999 files of one modality)
Error	Data Set does not match SOP Class	A9xx	Never sent – data set is not checked prior to storage
	Cannot understand	Cxxx	Never sent
Warning	Coercion of Data Elements	B000	Never sent - no coercion is ever performed
	Data Set does not match SOP Class	B007	Never sent - data set is not checked prior to storage
	Elements Discarded	B006	Never sent – all elements are always stored
Success		0000	

Table 12: Response Status for STORAGE-SCP and Receive Storage Request

4.3 Network Interfaces

4.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes; which is dependent on the underlying operating system and hardware.

4.3.2 Additional Protocols

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

4.3.3 IPv4 and IPv6 Support

This product supports both IPv4 and IPv6. It does not utilize any of the optional configuration identification or security features of IPv6.

4.4 Configuration

Local application entity and remote application entity information can be configured with the Configuration Dialogs and are described in the application user manual and online help.

5 MEDIA Interchange

Media Interchange is not scope of this document since it is not supported.

5.1 Real World Activities

5.1.1 Activity – Load Directory or File

The path to the DICOMDIR is set by a configuration dialog.

If the directory contains a DICOMDIR, a browser will be displayed, from which instances may be selected and in turn loaded for display, imported into the local database.

5.1.2 Application Profile Specific Conformance

There are no extensions or specializations.

5.2 Augmented and Private Profiles

5.2.1 Augmented Profiles

None

5.2.2 Private Profiles

None

5.3 MEDIA Configuration

None

6 Support of Character Sets

Extended character sets are not directly supported.

7 Security

The DICOM capabilities of VeriSoft do not support any specific security measures

8 Annexes

8.1 IOD contents

8.1.1 Created SOP Instance(s)

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

VNAP	Value Not Always Present (attribute sent zero length if no value is present)
ANAP	Attribute Not Always Present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value

The abbreviations used in the “Source” column:

MWL	the attribute value source Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
MPPS	the attribute value is the same as that use for Modality Performed Procedure Step
CONFIG	the attribute value source is a configurable parameter

8.1.1.1 VeriSoft Baseoption 4D-Dosimetry RT Dose IOD

IE	Module	Reference	Presence of Module
Patient	Patient	Table 14	ALWAYS
Study	General Study	Table 15	ALWAYS
Series	RT Series	Table 16	ALWAYS
Frame of Reference	Frame of Reference	Table 17	ALWAYS
Equipment	General Equipment	Table 18	ALWAYS
Dose	General Image	Table 19	ALWAYS
	Image Plane	Table 20	ALWAYS
	Image Pixel	Table 21	ALWAYS
	Multi-Frame	Table 22	ALWAYS.
	RT Dose	Table 23	ALWAYS
	SOP Common	Table 24	ALWAYS
	Private O4D Calculation	Table 25	ALWAYS

Table 13: IOD of created 4D-Dosimetry RT Dose SOP Instances

8.1.1.2 4D-Dosimetry RT Dose Modules

Patient Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Values supplied via received IODs or user input (Print Parameters).	VNAP	AUTO/USER
Patient ID	(0010,0020)	LO	Values supplied via received IODs or user input (Print Parameters).	VNAP	AUTO/USER
Patient's Birth Date	(0010,0030)	DA		VNAP	AUTO
Patient's Sex	(0010,0040)	CS		VNAP	AUTO

Table 14: Patient Module of created 4D-Dosimetry SOP Instances

General Study Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Generated by application	ALWAYS	AUTO
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<hhmmss>	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN		EMPTY	AUTO
Study ID	(0020,0010)	SH	Generated by application	VNAP	AUTO
Accession Number	(0008,0050)	SH		EMPTY	AUTO
Study Description	(0008,1030)	LO		EMPTY	AUTO

Table 15: General Study Module of created 4D-Dosimetry SOP Instances

RT Series Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	RTDOSE	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by application	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by application	ALWAYS	AUTO
Series Date	(0008,0021)	DA		EMPTY	AUTO
Performing Physician's Name	(0008,1050)	PN	User input (Print Parameters).	VNAP	USER
Series Description	(0008,103E)	LO	User input (Print Parameters).	VNAP	USER

Table 16: RT Series Module of created 4D-Dosimetry SOP Instances

Frame Of Reference Module of created 4D-Dosimetry SOP Instances

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

Table 17: Frame Of Reference Module of created 4D-Dosimetry SOP Instances

General Equipment Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	PTW-Freiburg	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	User input (Print Parameters).	VNAP	USER
Manufacturer's Model Name	(0008,1090)	LO	O4D Calculation	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	VeriSoft x.x.x.x (Version)	ALWAYS	AUTO

Table 18: General Equipment Module of created 4D-Dosimetry SOP Instances

General Image Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by application	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yyyymmdd>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ALWAYS	AUTO

Table 19: General Image Module of created 4D-Dosimetry SOP Instances

Image PLANE Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Spacing	(0028,0030)	DS	Generated by application	ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)	DS	Generated by application	ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS	Generated by application	ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS	Generated by application	ALWAYS	AUTO

Table 20: Image PLANE Module of created 4D-Dosimetry SOP Instances

Image PIXEL Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Generated by application	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by application	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	32	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	32	ALWAYS	AUTO
High Bit	(0028,0102)	US	31	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	Generated by application	ALWAYS	AUTO

Table 21: Image PIXEL Module of created 4D-Dosimetry SOP Instances

Multi-Frame Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Generated by application	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	(3004,000C)	ALWAYS	AUTO

Table 22: Multi-Frame Module of created 4D-Dosimetry SOP Instances

RT Dose Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	32	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	32	ALWAYS	AUTO
High Bit	(0028,0102)	US	31	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Dose Units	(3004,0002)	CS	GY	ALWAYS	AUTO
Dose Type	(3004,0004)	CS	PHYSICAL	ALWAYS	AUTO
Dose Summation Type	(3004,000A)	CS	Generated by application: RANGESELECTION	ALWAYS	AUTO
Grid Frame Offset Vector	(3004,000C)	DS	Generated by application	ALWAYS	AUTO
Dose Grid Scaling	(3004,000E)	DS	Generated by application	ALWAYS	AUTO
Tissue Heterogeneity Correction	(3004,0014)	CS	IMAGE	ALWAYS	AUTO

Table 23: RT Dose Module of created 4D-Dosimetry SOP Instances

SOP Common Module of created 4D-Dosimetry SOP Instance

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	RTDoseStorage	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by application	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	<yyyymmdd>	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	<hhmmss>	ALWAYS	AUTO

Table 24: SOP Common Module of created 4D-Dosimetry SOP Instances

Private O4D Calculation Module of created 4D-Dosimetry SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator	(300F,0010)	LO	PTW O4D Calculation	ALWAYS	AUTO
XCC File	(300F,1000)	LT	Selected XCC File	ALWAYS	USER
Scan Device	(300F,1001)	LO	Read from loaded XCC file	ALWAYS	AUTO
Detector Array	(300F,1002)	LO	Read from loaded XCC file	ALWAYS	AUTO
Isocenter Position	(300F,1003)	DS	Generated by application	ALWAYS	AUTO
Voxel Side Length	(300F,1010)	DS	Options Dialog – Tab 4D Dosimetry	ALWAYS	USER
LoadMode	(300F,1004)	LO	Generated by application; Value indicating whether a single XCC file, added up XCC files or merged XCC files have been the base for the O4D calculation.	ALWAYS	AUTO
Source Detector Distance	(300F,1011)	FL	From Configuration	ALWAYS	CONFIG
Phantom Radius	(300F,1013)	FL	From Configuration	ALWAYS	CONFIG
Pdd Directory	(300F,1014)	LT	Options Dialog – Tab 4D Dosimetry	ALWAYS	USER
Water Polystyrol Conversion Factor	(300F,1015)	LT	Options Dialog – Tab 4D Dosimetry	ALWAYS	USER
Gantry Rotation	(300F,1020)	LO	Read from loaded XCC file	ALWAYS	AUTO
Gantry Upright Position	(300F,1021)	LO	Read from loaded XCC file	ALWAYS	AUTO
Range Selection	(300F,1022)	LO	Select Range Dialog	ALWAYS	USER
Pdd Filename	(300F,1025)	LO	Select Range Dialog	ALWAYS	USER
Cylinder Length Limit	(300F,1026)	FL	Select Range Dialog	ALWAYS	USER
Cylinder Radius Limit	(300F,1027)	FL	Select Range Dialog	ALWAYS	USER
Extended OofPdd Filename	(300F,1030)	LO	From Configuration	ALWAYS	CONFIG
Extended Oof Limits	(300F,1031)	LO	From Configuration	VNAP	CONFIG
DoseRate SignalToNoise Limit in GyPerMin	(300F,1032)	FL	From Configuration	ALWAYS	CONFIG
Field Dependent Pdd Curves Dose Limit in Percent	(300F,1034)	FL	From Configuration	ALWAYS	CONFIG

Filter	(300F,1035)	LO	Read from PDD file	ALWAYS	USER
NonCAX Calculation OffAxis Magnification	(300F,1036)	FL	From Configuration	ALWAYS	CONFIG
NonCAX Output Factors Calculation Parameters	(300F,1037)	LO	From Configuration	ALWAYS	CONFIG
Octavius Volume Effect FieldSize_1x1 Dose Correction Factor	(300F,1038)	FL	From Configuration	ALWAYS	CONFIG
Octavius Volume Effect FieldSize_2x2 Dose Correction Factor	(300F,1039)	FL	From Configuration	ALWAYS	CONFIG
VMAT OofPdd Filename	(300F,103A)	LO	From Configuration	ALWAYS	CONFIG
VMAT Detection Level	(300F,103B)	FL	From Configuration	ALWAYS	CONFIG
VMAT Detection Histogram Bin Width	(300F,103C)	FL	From Configuration	ALWAYS	CONFIG
Angles	(300F,103D)	DS	Read from loaded XCC file	ALWAYS	AUTO

Table 25: Private O4D Calculation Module of created 4D-Dosimetry SOP Instances

8.1.1.3 VeriSoft DVH 4D RT Dose IOD

IOD of created DVH 4D RT Dose SOP Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 27	ALWAYS
Study	General Study	Table 28	ALWAYS
Series	RT Series	Table 29	ALWAYS
Frame of Reference	Frame of Reference	Table 30	ALWAYS
Equipment	General Equipment	Table 31	ALWAYS
Dose	General Image	Table 32	ALWAYS
	Image Plane	Table 33	ALWAYS
	Image Pixel	Table 34	ALWAYS
	Multi-Frame	Table 35	ALWAYS.
	RT Dose	Table 36	ALWAYS
	RT DVH	Table 37	ALWAYS
	SOP Common	Table 38	ALWAYS
	Private DVH Calculation	Table 39	ALWAYS

Table 26: IOD of created DVH 4D RT Dose SOP Instances

8.1.1.4 DVH 4D RT Dose Modules

Patient Module of created DVH 4D SOP Instances

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

Table 27: Patient Module of created DVH 4D SOP Instances

General Study Module of created DVH 4D SOP Instances

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

Table 28: General Study Module of created DVH 4D SOP Instances

RT Series Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	RTDOSE	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by application	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by application	ALWAYS	AUTO
Series Date	(0008,0021)	DA		EMPTY	AUTO
Performing Physician's Name	(0008,1050)	PN		EMPTY	AUTO
Series Description	(0008,103E)	LO		EMPTY	AUTO

Table 29: RT Series Module of created DVH 4D SOP Instances

Frame Of Reference Module of created DVH 4D SOP Instances

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

Table 30: Frame Of Reference Module of created DVH 4D SOP Instances

General Equipment Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	PTW-Freiburg	ALWAYS	AUTO
Institution Name	(0008,0080)	LO		EMPTY	AUTO
Manufacturer's Model Name	(0008,1090)	LO	DVH Calculation	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	PTWPatientModuleLib10	ALWAYS	AUTO

Table 31: General Equipment Module of created DVH 4D SOP Instances

General Image Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by application	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yyyymmdd>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ALWAYS	AUTO

Table 32: General Image Module of created DVH 4D SOP Instances

Image Plane Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Spacing	(0028,0030)	DS	Generated by application	ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)	DS	Generated by application	ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS	Generated by application	ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS	Generated by application	ALWAYS	AUTO

Table 33: Image Plane Module of created DVH 4D SOP Instances

Image Pixel Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Generated by application	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by application	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	32	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	32	ALWAYS	AUTO
High Bit	(0028,0102)	US	31	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	Generated by application	ALWAYS	AUTO

Table 34: Image Pixel Module of created DVH 4D SOP Instances

Multi-Frame Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Generated by application	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	(3004,000C)	ALWAYS	AUTO

Table 35: Multi-Frame Module of created DVH 4D SOP Instances

RT Dose Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	32	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	32	ALWAYS	AUTO
High Bit	(0028,0102)	US	31	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Dose Units	(3004,0002)	CS	GY	ALWAYS	AUTO
Dose Type	(3004,0004)	CS	PHYSICAL	ALWAYS	AUTO
Dose Summation Type	(3004,000A)	CS	PLAN	ALWAYS	AUTO
Grid Frame Offset Vector	(3004,000C)	DS	Generated by application	ALWAYS	AUTO
Dose Grid Scaling	(3004,000E)	DS	Generated by application	ALWAYS	AUTO
Tissue Heterogeneity Correction	(3004,0014)	CS	IMAGE	ALWAYS	AUTO
Referenced RT Plan Sequence	(300C,0002)	SQ	Value supplied via received IODs	ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	RTPlanStorage	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Value supplied via received IODs	ALWAYS	AUTO

Table 36: RT Dose Module of created DVH 4D SOP Instances

RT DVH Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Structure Set Sequence	(300C,0060)	SQ	Value supplied via received IODs	ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	RTStructureSetStorage	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Value supplied via received IODs	ALWAYS	AUTO
DVH Sequence	(3004,0050)	SQ	Generated by application	ALWAYS	AUTO
>DVH Referenced ROI Sequence	(3004,0060)	SQ	Generated by application	ALWAYS	AUTO
>>DVH ROI Contribution Type	(3004,0062)	CS	Value supplied via received IODs	ALWAYS	AUTO
>>Referenced ROI Number	(3006,0084)	IS	Value supplied via received IODs	ALWAYS	AUTO
>DVH Type	(3004,0001)	CS	CUMULATIVE	ALWAYS	AUTO
>Dose Units	(3004,0002)	CS	GY	ALWAYS	AUTO
>Dose Type	(3004,0004)	CS	PHYSICAL	ALWAYS	AUTO
>DVH Dose Scaling	(3004,0052)	DS	Generated by application	ALWAYS	AUTO
>DVH Volume Units	(3004,0054)	CS	CM3	ALWAYS	AUTO
>DVH Number of Bins	(3004,0056)	IS	Generated by application	ALWAYS	AUTO
>DVH Data	(3004,0058)	DS	Generated by application	ALWAYS	AUTO

Table 37: RT DVH Module of created DVH 4D SOP Instances

SOP Common Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	RTDoseStorage	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by application	ALWAYS	AUTO
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	AUTO
Instance Creation Date	(0008,0012)	DA	<yyyymmdd>	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	<hhmmss>	ALWAYS	AUTO

Table 38: SOP Common Module of created DVH 4D SOP Instances

Private DVH Calculation Module of created DVH 4D SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator	(300D,0010)	LO	PTW DVH Calculation	ALWAYS	AUTO
AutoSave Path	(300D,1000)	LT	Options Dialog – Tab DVH	ALWAYS	USER
Use Interpolation For WEPL Calculation	(300D,1001)	US	From Configuration	ALWAYS	CONFIG
Roi Body Contour Name	(300D,1002)	LO	Options Dialog – Tab DVH	ALWAYS	USER
Angle Step	(300D,1010)	FL	From Configuration	ALWAYS	CONFIG
Bin Width In Gy	(300D,1011)	FL	From Configuration	ALWAYS	CONFIG
Electron Density For DVH	(300D,1012)	FL	From Configuration	ALWAYS	CONFIG
HU Air Limit Value	(300D,1013)	FL	From Configuration	ALWAYS	CONFIG
HU Calibration Table File Name	(300D,1014)	LO		EMPTY	AUTO
Calibration Factor	(300D,1016)	FL	Options Dialog – Tab DVH	ALWAYS	AUTO
Private Creator	(300F,0010)	LO	PTW O4D Calculation	ALWAYS	AUTO
XCC File	(300F,1000)	LT	Selected XCC File	ALWAYS	USER
Scan Device	(300F,1001)	LO	Read from loaded XCC file	ALWAYS	AUTO
Detector Array	(300F,1002)	LO	Read from loaded XCC file	ALWAYS	AUTO
Isocenter Position	(300F,1003)	DS		ALWAYS	AUTO
Voxel Side Length	(300F,1010)	DS	Options Dialog – Tab DVH	ALWAYS	USER
Source Detector Distance	(300F,1011)	FL	From Configuration	ALWAYS	CONFIG
Phantom Radius	(300F,1013)	FL	From Configuration	ALWAYS	CONFIG
Pdd Directory	(300F,1014)	LT	Options Dialog – Tab 4D Dosimetry	ALWAYS	USER
Gantry Rotation	(300F,1020)	LO	Read from loaded XCC file	ALWAYS	AUTO
Gantry Upright Position	(300F,1021)	LO	Read from loaded XCC file	ALWAYS	AUTO
Range Selection	(300F,1022)	LO	Select Range Dialog	ALWAYS	USER
Pdd Filename	(300F,1025)	LO	Select Range Dialog	ALWAYS	USER
Extended OofPdd Filename	(300F,1030)	LO	From Configuration	ALWAYS	CONFIG
Extended Oof Limits	(300F,1031)	LO	From Configuration	VNAP	CONFIG
Field Dependent Pdd Curves Dose Limit in Percent	(300F,1034)	FL	From Configuration	ALWAYS	CONFIG
Filter	(300F,1035)	LO	Read from PDD file	ALWAYS	USER
NonCAX Calculation OffAxis Magnification	(300F,1036)	FL	From Configuration	ALWAYS	CONFIG
NonCAX Output Factors Calculation Parameters	(300F,1037)	LO	From Configuration	ALWAYS	CONFIG
VMAT OofPdd Filename	(300F,103A)	LO	From Configuration	ALWAYS	CONFIG
Angles	(300F,103D)	DS	Read from loaded XCC file	ALWAYS	AUTO

Private Creator	(3011,0010)	LO	PTW IMAGE	ALWAYS	AUTO
PTWNumberOfFrames	(3011,1009)	IS	Generated by application	ALWAYS	AUTO
PTWRows	(3011,100A)	US	Generated by application	ALWAYS	AUTO
PTWColumns	(3011,100B)	US	Generated by application	ALWAYS	AUTO
PTWPixelData	(3011,1017)	OW	Generated by application	ALWAYS	AUTO

Table 39: Private DVH Calculation Module of created DVH 4D SOP Instances

8.1.2 Usage of Attributes from Received IODs

8.1.2.1 Display of data in VeriSoft Baseoption

Attribute Name	Tag	Comments
SOP Class UID	(0008,0016)	Uniquely identifies the SOP Class.
SOP Instance UID	(0008,0018)	Uniquely identifies the SOP Instance.
Patient Module		
Patient's Name	(0010,0010)	Patient ID matches Patent ID in application.
Patient ID	(0010,0020)	Patient's name matches Patient's name in application.
Series Module		
Modality	(0008,0060)	Modality type.
Frame Of Reference Module		
Frame of Reference UID	(0020,0052)	In case of loading an additional RT Plan object: Frame of Reference UID of the associated RT Plan must match Frame of Reference UID of the image object (if both are present, a warning is shown in case of no matching).
General Equipment Module		
Manufacturer	(0008,0070)	Used for Manufacturer specific data processing.
Manufacturer's Model Name	(0008,1090)	Used for Model Name specific data processing.
Software Versions	(0018,1020)	Used for Software Versions specific data processing.
Image Plane Module		
Pixel Spacing	(0028,0030)	Original resolutions in DICOM images in mm. If resolutions can not be read, resolutions will be set to 1 mm.
Image Orientation (Patient)	(0020,0037)	The direction cosines of the first row and the first column with respect to the patient. Used for calculation of the Isocenter Position.
Image Position (Patient)	(0020,0032)	The x, y, and z coordinates of the upper left hand corner of the image in mm relative to the Patient Coordinate System. Used for calculation of the Isocenter Position.

Image Pixel Module		
Rows	(0028,0010)	Original number of rows in DICOM image.
Columns	(0028,0011)	Original number of columns in DICOM image.
Bits Allocated	(0028,0100)	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated.
Bits Stored	(0028,0101)	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored.
High Bit	(0028,0102)	Most significant bit for pixel sample data. Each sample shall have the same high bit.
Pixel Representation	(0028,0103)	Data representation of the pixel samples. Each sample shall have the same pixel representation.
Pixel Data	(7FE0,0010)	A data stream of the pixel samples that comprise the Image.
Multi-Frame Module		
Number of Frames	(0028,0008)	The number of slices in a dose cube.
Frame Increment Pointer	(0028,0009)	Contains the Data Element Tag of the attribute which is used as the frame increment in Multi-frame pixel data.
RT Image Module		
X-Ray Image Receptor Translation	(3002,000D)	Position in (x,y,z) coordinates of origin of IEC X-RAY IMAGE RECEPTOR System in the IEC GANTRY coordinate system (mm).
Image Plane Pixel Spacing	(3002,0011)	Original resolutions in DICOM images in mm. Only read, if Pixel Spacing does not contain valid resolutions. If resolutions can not be read, resolutions will be set to 1 mm.
Radiation Machine SAD	(3002,0022)	Radiation source to Gantry rotation axis distance of radiation machine used in acquiring or computing image (mm).
RT Image SID	(3002,0026)	Distance from radiation machine source to image plane (in mm) along radiation beam axis.

RT Dose Module		
Dose Units	(3004,0002)	Units used to describe dose. Normally Gy.
Normalization Point	(3004,0008)	Coordinates (x, y, z) of normalization point in the patient based coordinate system in mm.
Referenced RT Plan Sequence	(300C,0002)	SOP Class UID of RT Plan has to be the same as Referenced SOP Class UID in Referenced RT Plan Sequence of RT Dose (if both are present, a warning is shown in case of no matching). SOP Instance UID of RT Plan has to be the same as Referenced SOP Instance UID in Referenced RT Plan Sequence of RT Dose (if both are present, a warning is shown in case of no matching).
Grid Frame Offset Vector	(3004,000C)	Array of elements indicating the slice location.
Dose Grid Scaling	(3004,000E)	Scaling factor that when multiplied by the dose grid data found in the Pixel Data attribute of the Image Pixel Module, yields grid doses in the dose units as specified by Dose Units. In case of TMS, Version < 6.1, the dose grid data will be divided by Dose Grid Scaling.
RT Plan Module		
SOP Class UID	(0008,0016)	SOP Class UID of RT Plan has to be the same as Referenced SOP Class UID in Referenced RT Plan Sequence of RT Dose (if both are present, a warning is shown in case of no matching).
SOP Instance UID	(0008,0018)	SOP Instance UID of RT Plan has to be the same as Referenced SOP Instance UID in Referenced RT Plan Sequence of RT Dose (if both are present, a warning is shown in case of no matching).
RT Beams Module		
Isocenter Position	(300A,012C)	Isocenter coordinates (x,y,z) in the patient based coordinate system. Used for calculation of the Isocenter Position.
RT Patient Setup		
Patient Position	(0018,5100)	Patient position descriptor relative to the patient support device. Used for administrative purposes only.
Setup Device Parameter	(300A,01BC)	Setup Parameter for Setup Device in appropriate IEC 61217 coordinate system. Used for calculation of the Isocenter Position.
RT Fraction Scheme		
Number of Fractions Planned	(300A,0078)	Total number of treatments (Fractions) prescribed for current Fraction Group. To get dose per fraction, dose will be divided by Number of Fractions Planned.

VOI LUT Module		
Window Center	(0028,1050)	Window Center for display.
Window Width	(0028,1051)	Window Width for display.
Modality LUT Module		
Rescale Intercept	(0028,1052)	The value b in relationship between stored values (SV) and the output units specified in Rescale Type (0028,1054). Output units = $m \cdot SV + b$.
Rescale Slope	(0028,1053)	m in the equation specified by Rescale Intercept
Rescale Type	(0028,1054)	Specifies the output units of Rescale Slope and Rescale Intercept.
Cine Module		
Frame Time Vector	(0018,1065)	An array which contains the real time increments (in msec) between frames for a Multi-frame image.

Table 40: Usage of Attributes from Received IODs for VeriSoft Baseoption

8.1.2.2 Display and calculation of data in VeriSoft DVH 4D

Attribute Name	Tag	Comments
SOP Common		
SOP Class UID	(0008,0016)	Uniquely identifies the SOP Class.
SOP Instance UID	(0008,0018)	Uniquely identifies the SOP Instance.
Patient Module		
Patient's Name	(0010,0010)	Patient ID matches Patent ID in application.
Patient ID	(0010,0020)	Patient's name matches Patient's name in application.
Patient's Birth Date	(0010,0030)	Date of birth of the named patient
Patient's Sex	(0010,0040)	Sex of the named patient.
Study Module		
Study Instance UID	(0020,000D)	Unique identifier for the Study.
Study Date	(0008,0020)	Date the Study started.
Study Time	(0008,0030)	Time the Study started.
Study Description	(0008,1030)	Institution-generated description or classification of the Study (component) performed.
Study ID	(0020,0010)	User or equipment generated Study identifier.
Series Module		
Modality	(0008,0060)	Type of equipment that originally acquired the data used to create the images in this Series.
Series Instance UID	(0020,000E)	Unique identifier of the Series.
Series Number	(0020,0011)	A number that identifies this Series.
Series Date	(0008,0021)	Date the Series started.
Series Description	(0008,103E)	Description of the Series.

Frame Of Reference Module		
Frame of Reference UID	(0020,0052)	Uniquely identifies the frame of reference for a Series.
Position Reference Indicator	(0020,1040)	Part of the imaging target used as a reference.
General Equipment Module		
Manufacturer	(0008,0070)	Used for Manufacturer specific data processing.
Manufacturer's Model Name	(0008,1090)	Used for Model Name specific data processing.
Software Versions	(0018,1020)	Used for Software Versions specific data processing.
Image Image Module		
Image Type	(0008,0008)	Image identification characteristics.
Image Plane Module		
Pixel Spacing	(0028,0030)	Original resolutions in DICOM images in mm.
Image Orientation (Patient)	(0020,0037)	The direction cosines of the first row and the first column with respect to the patient.
Image Position (Patient)	(0020,0032)	The x, y, and z coordinates of the upper left hand corner of the image in mm relative to the Patient Coordinate System.
Image Pixel Module		
Samples per Pixel	(0028,0002)	Number of samples (planes) in this image.
Photometric Interpretation	(0028,0004)	Specifies the intended interpretation of the pixel data.
Rows	(0028,0010)	Original number of rows in DICOM image.
Columns	(0028,0011)	Original number of columns in DICOM image.
Bits Allocated	(0028,0100)	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated.
Bits Stored	(0028,0101)	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored.
High Bit	(0028,0102)	Most significant bit for pixel sample data. Each sample shall have the same high bit.
Pixel Representation	(0028,0103)	Data representation of the pixel samples. Each sample shall have the same pixel representation.
Smallest Image Pixel Value	(0028,0106)	The minimum actual pixel value encountered in this image.
Largest Image Pixel Value	(0028,0107)	The maximum actual pixel value encountered in this image.
Pixel Data	(7FE0,0010)	A data stream of the pixel samples that comprise the Image.

Multi-Frame Module		
Number of Frames	(0028,0008)	The number of slices in a dose cube.
RT Dose Module		
Dose Units	(3004,0002)	Units used to describe dose.
Dose Type	(3004,0004)	Type of dose.
Dose Summation Type	(3004,000A)	Type of dose summation.
Referenced RT Plan Sequence	(300C,0002)	Introduces sequence of one Class/Instance pair describing RT Plan associated with image.
Grid Frame Offset Vector	(3004,000C)	Array of elements indicating the slice location.
Dose Grid Scaling	(3004,000E)	Scaling factor that when multiplied by the dose grid data found in the Pixel Data attribute of the Image Pixel Module, yields grid doses in the dose units as specified by Dose Units.
Tissue Heterogeneity Correction	(3004,0014)	Specifies a list of patient heterogeneity characteristics used for calculating dose.
RT DVH Module		
DVH Sequence	(3004,0050)	Introduces sequence of DVHs.
>DVH Referenced ROI Sequence	(3004,0060)	Introduces sequence of referenced ROIs used to calculate DVH.
>>DVH ROI Contribution Type	(3004,0062)	Specifies whether volume within ROI is included or excluded in DVH.
>>Referenced ROI Number	(3006,0084)	Uniquely identifies ROI used to calculate DVH specified by ROI Number (3006,0022) in Structure Set ROI Sequence (3006,0020) in Structure Set Module within RT Structure Set referenced by referenced RT Plan in Referenced RT Plan Sequence (300C,0002) in RT Dose Module.
>DVH Type	(3004,0001)	Type of DVH.
>Dose Units	(3004,0002)	Type of DVH.
>Dose Type	(3004,0004)	Type of DVH.
>DVH Dose Scaling	(3004,0052)	Scaling factor that when multiplied by the dose bin widths found in DVH Data (3004,0058), yields dose bin widths in the dose units as specified by Dose Units (3004,0002).
>DVH Volume Units	(3004,0054)	Volume axis units.
>DVH Number of Bins	(3004,0056)	Number of bins n used to store DVH Data (3004,0058).
>DVH Data	(3004,0058)	A data stream describing the dose bin widths D_n and associated volumes V_n in DVH Volume Units (3004,0054) in the order $D_1V_1, D_2V_2, \dots, D_nV_n$.
>DVH Minimum Dose	(3004,0070)	Minimum calculated dose to ROI(s) described by DVH Referenced ROI Sequence (3004,0060).

>DVH Maximum Dose	(3004,0072)	Maximum calculated dose to ROI(s) described by DVH Referenced ROI Sequence (3004,0060).
>DVH Mean Dose	(3004,0074)	Mean calculated dose to ROI(s) described by DVH Referenced ROI Sequence (3004,0060).
RT Plan Module		
RT Plan Label	(300A,0002)	User-defined label for treatment plan.
SOP Class UID	(0008,0016)	Uniquely identifies the SOP Class.
SOP Instance UID	(0008,0018)	Uniquely identifies the SOP Instance.
RT Beams Module		
Isocenter Position	(300A,012C)	Isocenter coordinates (x,y,z) in the patient based coordinate system.
RT Patient Setup		
Patient Position	(0018,5100)	Patient position descriptor relative to the patient support device.
RT Fraction Scheme		
Number of Fractions Planned	(300A,0078)	Total number of treatments (Fractions) prescribed for current Fraction Group.
Number of Beams	(300A,0080)	Number of Beams in current Fraction Group
Structure Set Module		
Structure Set ROI Sequence	(3006,0020)	Introduces sequence of ROIs for current Structure Set.
>ROI Number	(3006,0022)	Identification number of the ROI. The value of ROI Number (3006,0022) shall be unique within the Structure Set in which it is created.
>ROI Name	(3006,0026)	User-defined name for ROI.
>Referenced Frame of Reference UID	(3006,0024)	Uniquely identifies Frame of Reference in which ROI is defined, specified by Frame of Reference UID (0020,0052) in Referenced Frame of Reference Sequence (3006,0010).
>ROI Generation Algorithm	(3006,0036)	Type of algorithm used to generate ROI.
ROI Contour Module		
ROI Contour Sequence	(3006,0039)	Introduces sequence of Contour Sequences defining ROIs.
>Referenced ROI Number	(3006,0084)	Uniquely identifies the referenced ROI described in the Structure Set ROI Sequence (3006,0020).
>ROI Display Color	(3006,002A)	RGB triplet color representation for ROI, specified using the range 0-255.
>Contour Sequence	(3006,0040)	Introduces sequence of Contours defining ROI. One or more items are permitted in this sequence.
>>Contour Geometric Type	(3006,0042)	Geometric type of contour.
>>Number of Contour Points	(3006,0046)	Number of points (triplets) in Contour Data (3006,0050)
>>Contour Data	(3006,0050)	Sequence of (x,y,z) triplets defining a contour in the patient based coordinate system described in C.7.6.2.1.1 (mm).

VOI LUT Module		
Window Center	(0028,1050)	Window Center for display.
Window Width	(0028,1051)	Window Width for display.
Modality LUT Module		
Rescale Intercept	(0028,1052)	The value b in relationship between stored values (SV) and the output units specified in Rescale Type (0028,1054). Output units = $m \cdot SV + b$.
Rescale Slope	(0028,1053)	m in the equation specified by Rescale Intercept
Rescale Type	(0028,1054)	Specifies the output units of Rescale Slope and Rescale Intercept.
Approval Module		
Approval Status	(300E,0002)	Approval status at the time the SOP Instance was created.

Table 41: Usage of Attributes from Received IODs for VeriSoft DVH 4D

8.1.3 Attribute Mapping

None

8.1.4 Coerced/Modified Files

None

8.1.5 Data Dictionary of Private Attributes

The Software AE does not define Private Attributes of interest.

8.1.6 Coded Terminology and Templates

The Software AE does not specify a custom coded terminology

8.1.7 Grayscale Image Consistency

Not applicable.

8.1.8 Standard Extended / Specialized/ Private SOP Classes

Neither Specialized nor Private SOP Classes are supported.

8.1.9 Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.