

Oncentra[®] mLDR v1.0
170.099

DICOM Conformance Statement

HOW TO CONTACT NUCLETRON OFFICES

Unless otherwise stated the service dispatch call number is the main telephone number.

Head Office and Manufacturer:

Nucletron B.V.
PO Box 930
3900 AX VEENENDAAL
Waardgelder 1
3905 TH VEENENDAAL
The Netherlands
Tel.: +31 318 557 133
Service: +31 318 557 111
E-mail info@nucletron.com
Web site: www.nucletron.com

Germany

Theranostic Medizintechnik GmbH
Obere Dammstrasse 8-10
D-42653 Solingen
Tel.: +49 212 5875 153
Fax: +49 212 5875 269
Service: +49 212 5875 333
E-mail: info@theranostic.de
Web site: www.theranostic.de

Italy

Nuclital srl
Viale Elvezia no. 52
20900 (MB)
Tel.: +39 039 322848 / 323148
Fax: +39 039 323913
E-mail: nuclital@it.nucletron.com

United Kingdom

Nucletron UK Ltd.
Nucletron House
Chowley Oak
Tattenhall
CHESTER CH3 9EX
Tel.: +44 1 829 771111
Fax: +44 1 829 770979
E-mail: sales@nucletron.co.uk

Sweden

Nucletron Scandinavia AB
Box 1704
Klostergatan 12
SE-751 47 Uppsala
Sweden
Tel: +46 18 565 000
Fax: +46 18 565 011
E-mail: info@se.nucletron.com

Europe / Middle East and Africa

BeNeLux

Nucletron B.V.
PO Box 930
3900 AX VEENENDAAL
Waardgelder 1
3905 TH VEENENDAAL
The Netherlands
Tel.: +31 318 557 236
Fax: +31 318 557 190
Service: +31 318 557 111
E-mail info@nl.nucletron.com
Web site: www.nucletron.com

France

Nucletron S.A.S.
17/19 Boulevard du Mont d'Est
Immeuble Le Michel Ange
93160 NOISY LE GRAND
Tel.: +33 148 15 50 64
Fax: +33 143 03 28 15
E-mail: info@fr.nucletron.com

Russia

Nucletron Representation Office Moscow
Krzhizanovskogo str. B 14 b.,3
117218 Moscow
Tel.: + 74 95 363 5188
Fax: + 74 95 363 5188
E-mail: info@ru.nucletron.com

Spain

Nucletron S.A.
Avda. de Castilla, 2
Parque Empresarial San Fernando
Edificio Francia, Planta 2^o, Esc. A
28830 San Fernando de Henares (Madrid)
Tel.: +34 918 250 067
Fax: +34 918 250 069
Service: +34 918 250 068
E-mail: info@es.nucletron.com

HOW TO CONTACT NUCLETRON OFFICES

Unless otherwise stated the service dispatch call number is the main telephone number.

USA

Nucletron
7021 Columbia Gateway Drive
Suite 200
Columbia, MD 21046
Tel.: +1 800 336 2249
Tel.: +1 410 312 4100
Fax: +1 443 769 1570
E-mail: info@us.nucletron.com

Hong Kong

Nucletron Asia Pacific Ltd.
Room 1005, Tower 2, Silvercord,
30 Canton Road, Tsim Sha Tsui,
Kowloon, HONG KONG
Tel.: +852 2311 2683 / 2684 / 3025
Fax: +852 2311 3672
E-mail: general@hk.nucletron.com

China

Nucletron Asia Pacific Ltd.
Beijing Representative Office
Room 2008, Tower A, North Ring Center,
No.18, Yu Min Road
Xicheng District,
Beijing 100029, China
Tel.: +86 10 8225 4965 / 4967
Fax: +86 10 8225 4963
E-mail: cnooffice@nucletron.com.cn
Web site: www.nucletron.com

Nucletron Asia Pacific Ltd.
Shanghai Representative Office
Room 1704, Wangjiao Plaza,
No.175, Yan An East Road,
Huangpu District,
Shanghai, 200002, China
Tel.: +86 21 6373 4380 / 4381
Fax: +86 21 6373 4383
E-mail: cnooffice@nucletron.com.cn
Web site: www.nucletron.com

North and South
America

Asia Pacific

Canada

Nucletron Canada Inc.
Gateway Business Building 2
320 March Road, suite 100
Kanata, Ontario K2K 2E3
Canada
Tel: +1 800 826 2258 / +1 613 886 1103
Fax: +1 613 592 6559
E-mail: oncosupport@ca.nucletron.com

Australia

Nucletron Pty. Limited
1b Little Commodore Street
Newtown NSW 2042
Sydney
Tel.: +61 2 9517 1300
Fax: +61 2 9517 1311
Email: sales@au.nucletron.com

India

Nucletron India Pvt Ltd.
No. 3, D'Silva Road
Mylapore
Chennai 600 004
Tel.: +91 44 24992877 / 24991871
Fax: +91 44 24991967
E-mail: info@in.nucletron.com
Web site: www.nucletron-india.com

Singapore

Nucletron Asia Pacific Ltd.
Singapore Representative Office
3 Science Park Drive
The Franklin # 02 – 12/25
Suite 38
Singapore 118223
Tel.: +65 6779 1248
Fax: +65 6778 5238
E-mail: ulrich.krumme@hk.nucletron.com

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1. Introduction

This conformance statement specifies how the Oncentra mLDR application conforms to the DICOM PS 3.x-2006 standard and the IEC Technical Report 61852. This document follows the guidelines for DICOM conformance statements of IEC Technical Report 62266. The application uses the DICOM protocol to receive and transmit objects that are used in the radiation therapy process.

This conformance statement applies to Oncentra mLDR v1.0 and higher.

1.1 Scope

Oncentra mLDR is a treatment planning system which uses DICOM RTImage sets as input. No DICOM output is provided.

1.2 Intended Audience

This document is intended for:

- Users of Oncentra mLDR
- System administrators of medical equipment
- Other vendors offering interfacing via DICOM.

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

2. Related Documents

Reference	Revision	Description
[DICOM2006]	3.x-2006	Digital Imaging and Communications in Medicine
555.00175CIB	00*	Oncentra mLDR Release Notes
777.00173MAN	00*	Oncentra mLDR User Manual

* Latest version

3. Abbreviations

This section provides definitions of abbreviations used in this document.

Abbreviation	Description
US	Ultrasound
AE	Application Entity, according to DICOM terminology
DICOM	Digital Imaging and Communications in Medicine, a standard on image communications in medical applications
DIMSE	DICOM Message Service Element

Abbreviation	Description
ELE	Explicit Little Endian
FSR	File-Set Reader
IE	Information Entity
ILE	Implicit Little Endian
IOD	Information Object Definition, according to DICOM terminology
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
SCU	Service Class User, according to DICOM terminology
SCP	Service Class Provider, according to DICOM terminology
SOP	Service-Object-Pair, a definition of an information object (like an image) and of a service (like storage) that can be performed for the object
TCP/IP	Transmission Control Protocol / Internet Protocol, a widely used computer networking protocol
VR	Value Representation, a data encoding method in DICOM
UID	Unique Identifier used to identify an object by a worldwide unique Identifier, according to DICOM terminology.
C-MOVE	DIMSE for transfer of object instance(s) from a remote AE, whose attributes match a specified set of attributes, to another remote AE, which could be the AE of the requestor.
C-FIND	DIMSE for matching of a set of attributes to the attributes of a set of DICOM object instances on a remote AE.
C-STORE	DIMSE for transfer of a DICOM object instance to a remote AE.

4. StoreScp DICOM Conformance

4.1 Introduction

This conformance statement describes the conformance specifics of StoreScp software configurations supporting various Windows compatible devices. This is basically a copy of the DICOM Conformance statement for the DCMTK store SCP application as provided by the Offis DCMTK toolkit. It is valid for DCMTK StoreScp version 3.5.4.

StoreScp acts as a SCP for the following Meta SOP Classes:

- Verification
- Storage

4.2 Implementation Model

4.2.1 Application Data Flow Diagram

StoreScp is a Windows application for the transfer of DICOM images. If started manually the StoreScp application will appear in the Windows task bar and run continuously until stopped.

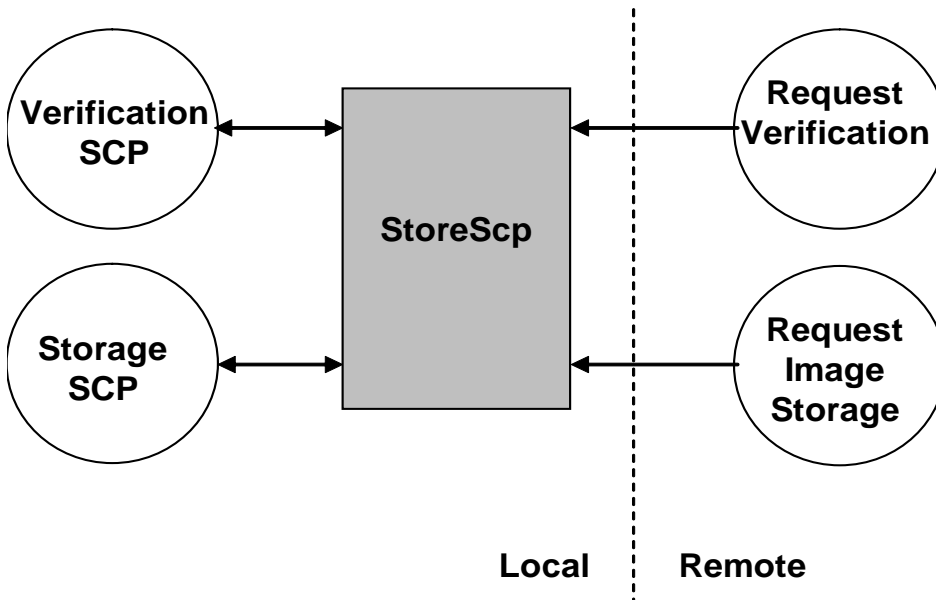


Figure 4-1 StoreScp Implementation Model

4.2.2 Functional Definitions of AE's

4.2.2.1 Verification Service as SCP

StoreScp waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, StoreScp expects it to be a DICOM application. StoreScp will accept associations with Presentation Contexts for SOP Classes of the Verification Service Class.

4.2.2.2 Image Storage Service as SCP

StoreScp waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, StoreScp expects it to be a DICOM application. StoreScp will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class. It will receive images on these Presentation Contexts and write them to files in the format compliant to Part 10 of the DICOM standard.

4.2.3 Sequencing of Real-World Activities

Not applicable.

4.3 Application Entity Specifications

4.3.1 StoreScp AE - Specification

StoreScp provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP specified in the following tables:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1

Table 4-1 Supported SOP Classes for Verification SCP

4.3.1.1 Association Establishment Policies

4.3.1.1.1 General

Minimum PDU size accepted: 8192 bytes

Maximum PDU size accepted: 16384 bytes

4.3.1.1.2 Number of Associations

Up to 10 simultaneous associations are supported.

4.3.1.1.3 Asynchronous Nature

StoreScp does not support asynchronous operations.

4.3.2 Associated Real-World Activity

See Section 4.2.

4.3.3 Proposed Presentation Contexts

StoreScp will propose the following different Presentation Contexts:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCP	None
See note	See note	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See note	See note	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Table 4-2 Proposed Presentation Contexts

Note:

This applies to all supported Storage Abstract Syntax. Encoded transfer syntaxes acceptance may be disabled in the configuration file storescp.cfg.

4.3.4 SOP Specific Conformance to Storage SOP Classes

StoreScp conforms to the SOP's of the Storage Service Class at Level 2 (Full). No elements are discarded or coerced by StoreScp . In the event of a successful C-STORE operation, the image has successfully been written to disk as a standard file. As such, it may be accessed in the same manner as any other file. StoreScp will never delete a file that it has received; the duration of the storage of the image is determined by other users of the system.

The filename has the following syntax: RI-UID.dcm (where UID is the SOP Instance UID of the image).

4.3.4.1.1 Presentation Context Acceptance Criterion

StoreScp will accept all contexts in the intersection of the proposed and acceptable Presentation Contexts. The acceptable Presentation Contexts, which StoreScp may accept, are specified in the table in Section 4.3.3.

However, if encoded transfer syntax acceptance is disabled in the option dialog, no such transfer syntax will be accepted.

4.3.4.1.2 Transfer Syntax Selection Policies

StoreScp preferences, in decreasing order, if proposed by a Storage SCU, are the following:

Explicit VR Little Endian
Implicit VR Little Endian

Any proposed Presentation Context which includes one of these transfer syntax will be accepted. Any proposed Presentation Context that does not include one of these transfer syntax will be rejected.

4.4 Communication Profiles

4.4.1 Supported Communications Stacks

StoreScp provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.4.2 TCP/IP Stack

StoreScp inherits its TCP/IP stack from the Windows system upon which it executes.

4.4.3 Physical Media Support

StoreScp is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

4.5 Extensions/Specialization/Privatization

Not applicable.

5. Configuration

StoreScp configuration is included in the application user interface through the Option dialog.

5.1 AE Title/Presentation Address Mapping

StoreScp will accept any called AE Title.

5.2 Configurable Parameters

The default port number for the StoreScp server is 104. This parameter can be changed by editing StartServerStandAlone.bat on the desktop. Change line with "PORT=104, change the number and save the file. To configure the other StoreScp parameters, see the mLDR User Manual.

6. Support of Character Sets

The application supports the ISO_IR 100 character set.

7. Security

No special security measures are taken.

8. IOD Contents

8.1 RT Image IOD Module Table

IE	Module	Reference	DICOM Usage	Notes
Patient	Patient	C.7.1.1	M	
Study	General Study	C.7.2.1	M	
	Patient Study	C.7.2.2	U	SCU - Not supported SCP - Not used
Series	RT Series	C.8.8.1	M	
Frame of Reference	Frame of Reference	C.7.4.1	U	SCU - Not Supported SCP - Not used
Equipment	General Equipment	C.7.5.1	M	
Image	General Image	C.7.6.1	M	
	Image Pixel	C.7.6.3	M	
	Contrast/bolus	C.7.6.4	U	SCU - Not supported SCP - Not used
	Cine	C.7.6.5	U	SCU - Not supported SCP - Not used

IE	Module	Reference	DICOM Usage	Notes
	Multi-Frame	C.7.6.6	U	SCU - Not supported SCP - Not used
	RT Image	C.8.8.2	M	
	Modality LUT	C.11.1	U	SCU - Not supported SCP - Not used
	VOI LUT	C.11.2	U	SCU - Supported SCP - Used
	Approval	C.8.8.16	U	SCU - Not supported SCP - Not used
	Curve	C.10.2	U	SCU - Not supported SCP - Not used
	Audio	C.10.3	U	SCU - Not supported SCP - Not used
	SOP Common	C.12.1	M	

8.2 Patient Module

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

8.3 General Study Module

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	SCU - Used.. SCP - Used.
Study Date	(0008,0020)	2	SCU - Used.. SCP - Used.
Study Time	(0008,0030)	2	SCU - Used.. SCP - Used.
Referring Physician's Name	(0008,0090)	2	SCU - Used.. SCP - Used.

Attribute Name	Tag	Type	Notes
Study ID	(0020,0010)	2	SCU - Not used SCP - Not used
Accession Number	(0008,0050)	2	SCU - Not used SCP - Not used
Study Description	(0008,1030)	3	SCU - Used.. SCP - Used.
Physician(s) of Record	(0008,1048)	3	SCU - Not used SCP - Not used
Name of Physician(s) Reading Study	(0008,1060)	3	SCU - Not used SCP - Not used
Referenced Study Sequence	(0008,1110)	3	SCU - Not used SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not used SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not used SCP - Not used
Procedure Code Sequence	(0008,1032)	3	SCU - Not used SCP - Not used

8.4 RT Series Module

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	SCU - 'RTIMAGE' SCP - Supported value 'RTIMAGE'
Series Instance UID	(0020,000E)	1	SCU - Used SCP - Used
Series Number	(0020,0011)	2	SCU - Not Used SCP - Not Used
Series Description	(0008,103E)	3	SCU - Not provided SCP - Not used
Referenced Study Component Sequence	(0008,1111)	3	SCU - Not provided SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not provided SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not provided SCP - Not used

8.5 Frame of Reference Module

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

8.6 General Equipment Module

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

8.7 General Image Module

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

Attribute Name	Tag	Type	Notes
Derivation Description	(0008,2111)	3	SCU - Not used . SCP - Not used
Source Image Sequence	(0008,2112)	3	SCU - Not used. SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not used. SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not used SCP - Not used
>Referenced Frame Number	(0008,1160)	3	SCU - Not used SCP - Not used
Images in Acquisition	(0020,1002)	3	SCU - Not used. SCP - Not used
Image Comments	(0020,4000)	3	SCU - Not used . SCP - Not used
Quality Control Image	(0028,0300)	3	SCU - Not used. SCP - Not used
Burned In Annotation	(0028,0301)	3	SCU - Not used. SCP - Not used
Lossy Image Compression	(0028,2110)	3	SCU - Not used SCP - Not used
Lossy Image Compression Ratio	(0028,2112)	3	SCU - Not used SCP - Not used

8.8 Image Pixel Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - Used SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - Not used SCP - Not used
Rows	(0028,0010)	1	SCU - Used SCP - Used
Columns	(0028,0011)	1	SCU - Used SCP - Used
Bits Allocated	(0028,0100)	1	SCU - Used SCP - Used
Bits Stored	(0028,0101)	1	SCU - Used SCP - Used
High Bit	(0028,0102)	1	SCU - Used SCP - Used
Pixel Representation	(0028,0103)	1	SCU - Used SCP - Used
Pixel Data	(7FE0,0010)	1	SCU - Used SCP - Used All data will be converted to 8-bit grayscale.
Planar Configuration	(0028,0006)	1C	SCU - Not used. SCP - Not used
Pixel Aspect Ratio	(0028,0034)	1C	SCU - Not used. SCP - Not used
Smallest Image Pixel Value	(0028,0106)	3	SCU - Not used. SCP - Not used
Largest Image Pixel Value	(0028,0107)	3	SCU - Not used. SCP - Not used
Red Palette Color Lookup Table Descriptor	(0028,1101)	1C	SCU - Not used. SCP - Not used

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

8.9 RT Image Module

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	SCU - '1' SCP - Used
Photometric Interpretation	(0028,0004)	1	SCU - 'MONOCHROME2'. SCP - Used
Bits Allocated	(0028,0100)	1	SCU - '16' SCP - Used
Bits Stored	(0028,0101)	1	SCU - '12' SCP - Used
High Bit	(0028,0102)	1	SCU - '11' SCP - Used
Pixel Representation	(0028,0103)	1	SCU - '0' (unsigned integer). SCP - Used
RT Image Label	(3002,0002)	1	SCU - Not used SCP - Not used
RT Image Name	(3002,0003)	3	SCU - Not used SCP - Not used
RT Image Description	(3002,0004)	3	SCU - Not used SCP - Not used
Operators' Name	(0008,1070)	2	SCU - Not used SCP - Not used
Image Type	(0008,0008)	1	SCU - Not used SCP - Not used
Conversion Type	(0008,0064)	2	SCU - Not used SCP - Not used
Reported Values Origin	(3002,000A)	2C	SCU - Not used SCP - Not used
RT Image Plane	(3002, 000C)	1	SCU - Not used SCP - Not used
X-Ray Image Receptor Translation	(3002,000D)	3	SCU - Used SCP - Used
X-Ray Image Receptor Angle	(3002,000E)	2	SCU - Used SCP - Used
RT Image Orientation	(3002,0010)	2C	SCU - Not used SCP - Not used
Image Plane Pixel Spacing	(3002,0011)	2	SCU - Used SCP - Used
RT Image Position	(3002,0012)	2	SCU - Not used SCP - Not used
Radiation Machine Name	(3002,0020)	2	SCU - Used SCP - Used

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Attribute Name	Tag	Type	Notes
Primary Dosimeter Unit	(300A,00B3)	2	SCU - Not used SCP - Not used
Radiation Machine SAD	(3002,0022)	2	SCU - Used SCP - Used
Radiation Machine SSD	(3002,0024)	3	SCU - Used SCP - Used
RT Image SID	(3002,0026)	2	SCU - Used SCP - Used
Source to Reference Object Distance	(3002,0028)	3	SCU - Not used SCP - Not used
Referenced RT Plan Sequence	(300C,0002)	3	SCU - Not used SCP - Not used
>Referenced SOP Class UID	(0008,1150)	1C	SCU - Not used SCP - Not used
>Referenced SOP Instance UID	(0008,1155)	1C	SCU - Not used SCP - Not used
Referenced Beam Number	(300C,0006)	3	SCU - Used SCP - Used
Referenced Fraction Group Number	(300C,0022)	3	SCU - Not used SCP - Not used
Fraction Number	(3002,0029)	3	SCU - Not used SCP - Not used
Start Cumulative Meterset Weight	(300C,0008)	3	SCU - Not used SCP - Not used
End Cumulative Meterset Weight	(300C,0009)	3	SCU - Not used SCP - Not used
Exposure Sequence	(3002,0030)	3	SCU - Not used SCP - Not used
>Referenced Frame Number	(0008,1160)	1C	SCU - Not used SCP - Not used
>KVP	(0018,0060)	2C	SCU - Not used SCP - Not used
>X-Ray Tube Current	(0018,1151)	2C	SCU - Not used SCP - Not used
>Exposure Time	(0018,1150)	2C	SCU - Not used SCP - Not used
>Meterset Exposure	(3002,0032)	2C	SCU - Not used SCP - Not used
>Beam Limiting Device Sequence	(300A,00B6)	3	SCU - Not used SCP - Not used
>Applicator Sequence	(300A,0107)	3	SCU - Not used SCP - Not used
>Number of Blocks	(300A,00F0)	1C	SCU - Not used SCP - Not used
>Block Sequence	(300A,00F4)	2C	SCU - Not used SCP - Not used
Gantry Angle	(300A,011E)	3	SCU - Used SCP - Used
Gantry Pitch Angle	(300A,014A)	3	SCU - Not used SCP - Not used
Beam Limiting Device Angle	(300A,0120)	3	SCU - Used SCP - Used
Patient Support Angle	(300A,0122)	3	SCU - Not used SCP - Not used
Table Top Eccentric Axis Distance	(300A,0124)	3	SCU - Not used SCP - Not used
Table Top Eccentric Angle	(300A,0125)	3	SCU - Not used SCP - Not used

Attribute Name	Tag	Type	Notes
Iso Center Position	(300A,012C)	3	SCU - Used SCP - Used
Patient Position	(0018,5100)	2C	SCU - Not used SCP - Not used
Table Top Vertical Position	(300A,0128)	3	SCU - Used SCP - Used
Table Top Longitudinal Position	(300A,0129)	3	SCU - Used SCP - Used
Table Top Lateral Position	(300A,012A)	3	SCU - Used SCP - Used

8.10 SOP Common Module

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	SCU - Used SCP - Used
SOP Instance UID	(0008,0018)	1	SCU - Used SCP - Used
Specific Character Set	(0008,0005)	1C	SCU - 'ISO_IR 100' SCP - Used
Instance Creation Date	(0008,0012)	3	SCU - Not used. SCP - Not used
Instance Creation Time	(0008,0013)	3	SCU - Not used SCP - Not used
Instance Creator UID	(0008,0014)	3	SCU - Not used SCP - Not used