Digital Imaging and Communications in Medicine (DICOM)

Supplement 214: Cone-beam CT Radiation Dose SR

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Developed Pursuant to Work Item 2015-12-D (Cone-beam CT-RDSR)

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Scope and Field of Application

This Supplement creates a structured report with the necessary flexibility to address cone-beam CT acquisitions.

This generic radiation description is capable of representing previously addressed acquisition types (Angiography, Mammography, CR/DR, CT).

Radiotherapy treatment dose and radiopharmaceutical dose are out of scope.

OPEN Issues

Item	Issue
1	Q: Does creating a new VT require a new IOD?
2	Q: How will half value layer (HVL) be described on a time-window basis? HVL (DCM 111634) is not currently defined on a per-time-window basis
3	Q: Should repeat/reject information be included in the RDSR?
4	
5	

CLOSED Issues

Item	Issue
	Q: How are the time window start and stops aligned? Can there be gaps? A: Yes. The time windows must only be defined during irradiation events.
	Q: Since CBCT dosimetry is still not standardized, how will this supplement provide all the necessary options? A: We propose creating a new RDSR that is generalizable to a variety of implementations of CBCT.
	Q: How will this new RDSR handle the very large description resulting from describing data beyond the irradiation event level? A per-pulse description of the full radiation beam may produce a prohibitively large amount of data, which is unnecessary in cases where the conditions don't change from pulse to pulse. A: We propose using a mechanism like the multiframe functional grouping (share macros vs. per-frame macros).
	Q: Should this be a new CBCT RDSR IOD? or is the fact that is has the same summary section enough that it could go in the same IOD? A: This RDSR is different enough that it should be a new IOD.

Changes to NEMA Standards Publication PS 3.2-xxxx

Digital Imaging and Communications in Medicine (DICOM)

Part 2: Conformance

Item #00: Add new SOP Classes in Table A.1-2

Table A.1-2
UID VALUES

UID Value	UID NAME	Category
…		
1.2.840.10008.5.1.4.1.1.88.x	**Extended Radiation Dose SR**	**Transfer**
…		

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Changes to NEMA Standards Publication PS 3.3-xxxx

104 ## Digital Imaging and Communications in Medicine (DICOM)

Part 3: Information Object Definitions

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Item #01: Add the following column in PS 3.3 Section A.1.4, Table A.1-3 Composite Information Object Modules Overview - More Non-Images

IODs **Modules**	**eRDSR**
Patient	**M**
Clinical Trial Subject	**U**
General Study	**M**
Patient Study	**U**
Clinical Trial Study	**U**
SR Document Series	**M**
Clinical Trial Series	**U**
Synchronization	**C**
General Equipment	**M**
Enhanced General Equipment	**M**
SR Document General	**M**
SR Document Content	**M**
SOP Common	**M**

Item #02: Add PS3.3 Section A.35.X:

A.35.X Extended Radiation Dose SR IOD

A.35.X.1 Extended Radiation Dose SR IOD Description

The Extended Radiation Dose Structured Report IOD addresses cone-beam CT and tomosynthesis. This generic radiation description is capable of representing previously addressed acquisition types (Angiography, Mammography, CR/DR, CT).

This IOD is not intended for documenting radiation doses delivered during radiotherapy or due to application of radiopharmaceuticals.

A.35.X.2 Extended Radiation Dose SR IOD Entity-Relationship Model

The E-R Model in Section A.1.2 of this Part applies to the Extended Radiation Dose Structured Report IOD. Table A.35.X-1 specifies the Modules of the Extended Radiation Dose SR IOD.

A.35.X.3 Extended Radiation Dose SR IOD Module Table

Table A.35.X-1
Extended Radiation Dose Structured Report IOD MODULES

IE	Module	Reference	Usage
Patient	Patient	C.7.1.1	M
	Clinical Trial Subject	C.7.1.3	U
Study	General Study	C.7.2.1	M
	Patient Study	C.7.2.2	U
	Clinical Trial Study	C.7.2.3	U
Series	SR Document Series	C.17.1	M
	Clinical Trial Series	C.7.3.2	U
Frame of Reference	Synchronization	C.7.4.2	C - shall be present if system time is synchronized to an external reference. May be present otherwise.
Equipment	General Equipment	C.7.5.1	M
	Enhanced General Equipment	C.7.5.2	M
Document	SR Document General	C.17.2	M
	SR Document Content	C.17.3	M
	SOP Common	C.12.1	M

A.35.X.3.1 Extended Radiation Dose SR IOD Content Constraints

A.35.X.3.1.1 Template

The document may be constructed from Baseline TID eRDSRT01 “Extended Radiation Dose” invoked at the root node.

A.35.X.3.1.2 Value Type

Value Type (0040,A040) in the Content Sequence (0040,A730) of the SR Document Content Module is constrained to the following Enumerated Values (see Table C.17.3-7 for Value Type definitions):

TEXT
CODE
NUM
DATETIME
UIDREF
PNAME
COMPOSITE
IMAGE
CONTAINER
TMATRIX

A.35.X.3.1.3 Relationship Constraints

Relationships between content items in the content of this IOD shall be conveyed by-value. Table A.35.X-2 specifies the relationship constraints of this IOD. See Table C.17.3-2 for Relationship Type definitions.

Table A.35.X-2
Relationship Content Constraints for Extended Radiation Dose Structured Report IOD

Source Value Type	Relationship Type (Enumerated Values)	Target Value Type
CONTAINER	CONTAINS	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, IMAGE, COMPOSITE, CONTAINER, TMATRIX
CONTAINER	HAS OBS CONTEXT	DATETIME, CODE, TEXT, UIDREF, PNAME
TEXT, CODE, NUM, COMPOSITE	HAS OBS CONTEXT	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, COMPOSITE
CONTAINER, IMAGE, COMPOSITE	HAS ACQ CONTEXT	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, CONTAINER.
any type	HAS CONCEPT MOD	TEXT, CODE
TEXT, CODE, NUM, COMPOSITE	HAS PROPERTIES	TEXT, CODE, NUM, DATETIME, UIDREF, PNAME, IMAGE, COMPOSITE, CONTAINER.
PNAME	HAS PROPERTIES	TEXT, CODE, DATETIME, DATE, TIME, UIDREF, PNAME
TEXT, CODE, NUM	INFERRED FROM	TEXT, CODE, NUM, DATETIME, UIDREF, IMAGE, COMPOSITE, CONTAINER.

Note: The SOP Classes to which an IMAGE or COMPOSITE Value Type may refer, is documented in the Conformance Statement for an application (see PS 3.2 and PS 3.4).

Item #03: Change in PS 3.3 2018c Add to Table C.17-5. Document Content Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Value Type	(0040,A040)	1	The type of the value encoded in this Content Item. Defined Terms: TEXT NUM CODE DATE TIME DATETIME UIDREF PNAME COMPOSITE IMAGE

Attribute Name	Tag	Type	Attribute Description
			WAVEFORM SCOORD SCOORD3D TCOORD CONTAINER **TMATRIX** See Section C.17.3.2.1 for further explanation.
Concept Name Code Sequence	(0040,A043)	1C	Code describing the concept represented by this Content Item. Also conveys the value of Document Title and section headings in documents. Only a single Item shall be included in this sequence. Required if Value Type (0040,A040) is TEXT, NUM, CODE, DATETIME, DATE, TIME, UIDREF or PNAME. Required if Value Type (0040,A040) is CONTAINER and a heading is present, or this is the Root Content Item. Note That is, containers without headings do not require Concept Name Code Sequence Required if Value Type (0040,A040) is COMPOSITE, IMAGE, WAVEFORM, SCOORD, SCOORD3D or TCOORD, and the Purpose of Reference is conveyed in the Concept Name. See Section C.17.3.2.2 for further explanation.
>Include Table 8.8-1 "Code Sequence Macro Attributes"			*No Baseline CID is defined.*
Text Value	(0040,A160)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is TEXT. Text data that is unformatted and whose manner of display is implementation dependent. The text value may contain spaces, as well as multiple lines separated by CR LF, but otherwise no format control characters (such as horizontal or vertical tab and form feed) shall be present, even

Attribute Name	Tag	Type	Attribute Description
			if permitted by the Value Representation of UT. The text shall be interpreted as specified by Specific Character Set (0008,0005) if present in the SOP Common Module. Note The text may contain single or multi-byte characters and use code extension techniques as described in PS3.5 if permitted by the values of Specific Character Set (0008,0005).
DateTime	(0040,A120)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is DATETIME.
Date	(0040,A121)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is DATE.
Time	(0040,A122)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is TIME.
Person Name	(0040,A123)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is PNAME.
UID	(0040,A124)	1C	This is the value of the Content Item. Required if Value Type (0040,A040) is UIDREF.
Frame of Reference Transformation Matrix	**(3006,00C6)**	**1C**	**This is the value of the Content Item.** **Required if Value Type (0040,A040) is TMATRIX**
Include Table C.18.1-1 "Numeric Measurement Macro Attributes" if and only if Value Type (0040,A040) is NUM.			
Include Table C.18.2-1 "Code Macro Attributes" if and only if Value Type (0040,A040) is CODE.			
Include Table C.18.3-1 "Composite Object Reference Macro Attributes" if and only if Value Type (0040,A040) is COMPOSITE.			

Attribute Name	Tag	Type	Attribute Description
Include Table C.18.4-1 "Image Reference Macro Attributes" if and only if Value Type (0040,A040) is IMAGE.			
Include Table C.18.5-1 "Waveform Reference Macro Attributes" if and only if Value Type (0040,A040) is WAVEFORM.			
Include Table C.18.6-1 "Spatial Coordinates Macro Attributes" if and only if Value Type (0040,A040) is SCOORD.			
Include Table C.18.9-1 "3D Spatial Coordinates Macro Attributes" if and only if Value Type (0040,A040) is SCOORD3D.			
Include Table C.18.7-1 "Temporal Coordinates Macro Attributes" if and only if Value Type (0040,A040) is TCOORD.			
Include Table C.18.8-1 "Container Macro Attributes" if and only if Value Type (0040,A040) is CONTAINER.			

Item #04: Change in PS 3.3 2018c Add TMATRIX Value Type to C.17.3-7

C.17.3.2.1 Content Item Value Type

The value of the name/value pair is encoded with one of the Value Types defined in Table C.17.3-7 (the choice of which may be constrained by the IOD in which this Module is contained). Value Type (0040,A040) explicitly conveys the type of Content Item value encoding.

Table C.17.3-7. Value Type Definitions

Value Type	Concept Name	Concept Value	Description
TEXT	Type of text, e.g., "Findings", or name of identifier, e.g., "Lesion ID"	Textual expression of the concept	Free text, narrative description of unlimited length. May also be used to provide a label or identifier value.
NUM	Type of numeric value or measurement, e.g., "BPD"	Numeric value and associated Unit of Measurement	Numeric value fully qualified by coded representation of the measurement name and unit of measurement.
CODE	Type of code, e.g., "Findings"	Coded expression of the concept	Categorical coded value. Representation of nominal or non-numeric ordinal values.
DATETIME	Type of DateTime, e.g., "Date/Time of onset"	Concatenated date and time	Date and time of occurrence of the type of event denoted by the Concept Name.
DATE	Type of Date, e.g., "Birth Date"	Calendar date	Date of occurrence of the type of event denoted by the Concept Name.
TIME	Type of Time, e.g "Start Time"	Time of day	Time of occurrence of the type of event denoted by the Concept Name.

Value Type	Concept Name	Concept Value	Description
UIDREF	Type of UID, e.g "Study Instance UID"	Unique Identifier	Unique Identifier (UID) of the entity identified by the Concept Name.
PNAME	Role of person, e.g., "Recording Observer"	Name of person	Person name of the person whose role is described by the Concept Name.
COMPOSITE	Purpose of Reference	Reference to UIDs of Composite SOP Instances	A reference to one Composite SOP Instance that is not an Image or Waveform.
IMAGE	Purpose of Reference	Reference to UIDs of Image Composite SOP Instances	A reference to one Image. IMAGE Content Item may convey a reference to a Softcopy Presentation State associated with the Image.
WAVEFORM	Purpose of Reference	Reference to UIDs of Waveform Composite SOP Instances	A reference to one Waveform.
SCOORD	Purpose of Reference	Listing of spatial coordinates	Spatial coordinates of a geometric region of interest in the DICOM image coordinate system. The IMAGE Content Item from which spatial coordinates are selected is denoted by a SELECTED FROM relationship.
SCOORD3D	Purpose of reference	Listing of spatial 3D coordinates	3D spatial coordinates (x,y,z) of a geometric region of interest in a Reference Coordinate System.
TCOORD	Purpose of Reference	Listing of temporal coordinates	Temporal Coordinates (i.e., time or event-based coordinates) of a region of interest in the DICOM waveform coordinate system. The WAVEFORM or IMAGE or SCOORD Content Item from which Temporal Coordinates are selected is denoted by a SELECTED FROM relationship.
CONTAINER	Document Title or document section heading. Concept Name conveys the Document Title (if the CONTAINER is the Document Root Content Item) or the category of observation.	The content of the CONTAINER. The value of a CONTAINER Content Item is the collection of Content Items that it contains.	CONTAINER groups Content Items and defines the heading or category of observation that applies to that content. The heading describes the content of the CONTAINER Content Item and may map to a document section heading in a printed or displayed document.
TMATRIX	**Purpose of Reference**	**A spatial transformation matrix.**	**A 4x4 affine transformation matrix that registers a homogeneous coordinate system A to B. Matrix elements shall be listed in row-major order. See Section C.20.2.1.1.**

Note

It is recommended that drawings and sketches, sometimes used in reports, be represented by IMAGE Content Items that reference separate SOP Instances (e.g., 8-bit, MONOCHROME2, Secondary Capture, or Multi-frame Single Bit Secondary Capture).

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Changes to NEMA Standards Publication PS 3.4-xxxx

176 **Digital Imaging and Communications in Medicine (DICOM)**

Part 4: Service Class Specifications

178

Item #05: Add SOP Class to Table B.3-3

Table B.3-3
STANDARD AND RELATED GENERAL SOP CLASSES

SOP Class Name	Related General SOP Class Name
…	
Extended Radiation Dose SR Storage	**Enhanced SR**
	Comprehensive SR
	Comprehensive 3D SR
	Extensible SR

Item #06: Add SOP Class to Table B.5-1

B.5 STANDARD SOP CLASSES

Table B.5-1
STANDARD SOP CLASSES

SOP Class Name	SOP Class UID	IOD (See PS 3.3)
…		
Extended Radiation Dose SR Storage	**1.2.840.10008.5.1.4.1.1.88.X**	**Extended Radiation Dose SR Storage IOD**

Item #07: Add Structured Reporting SOP Class to Section B.5.1.5

B.5.1.5 Structured Reporting Storage SOP Classes

The requirements of Annex O apply to the following SOP Classes:

- …
- **Extended Radiation Dose SR Storage**

Item #08: Add SOP Class to Section I.4.1.2

I.4.1.2 Structured Reporting Storage SOP Classes

The requirements of Annex O apply to the following SOP Classes:

- …
- **Extended Radiation Dose SR Storage**

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Changes to NEMA Standards Publication PS 3.6-xxxx

204 ## Digital Imaging and Communications in Medicine (DICOM)

Part 6: Data Dictionary

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Item #09: Add the following row to Table A-1

UID Value	UID Name	UID Type	Part
…			
1.2.840.10008.5.1.4.1.1.88.X	**Extended Radiation Dose Structured Report**	**SOP Class**	**PS 3.4**
…			

Item #10: Add the following row to Table A-1

Context UID	Context Identifier	Context Group Name
XXXX1	**eRDSRCID01**	**Reported Value Classifications**
XXXX2	**eRDSRCID02**	**Position Value Classifications**
XXXX3	**eRDSRCID03**	**RDSR Frame of Reference Types**

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Changes to NEMA Standards Publication PS 3.16-xxxx

222 **Digital Imaging and Communications in Medicine (DICOM)**

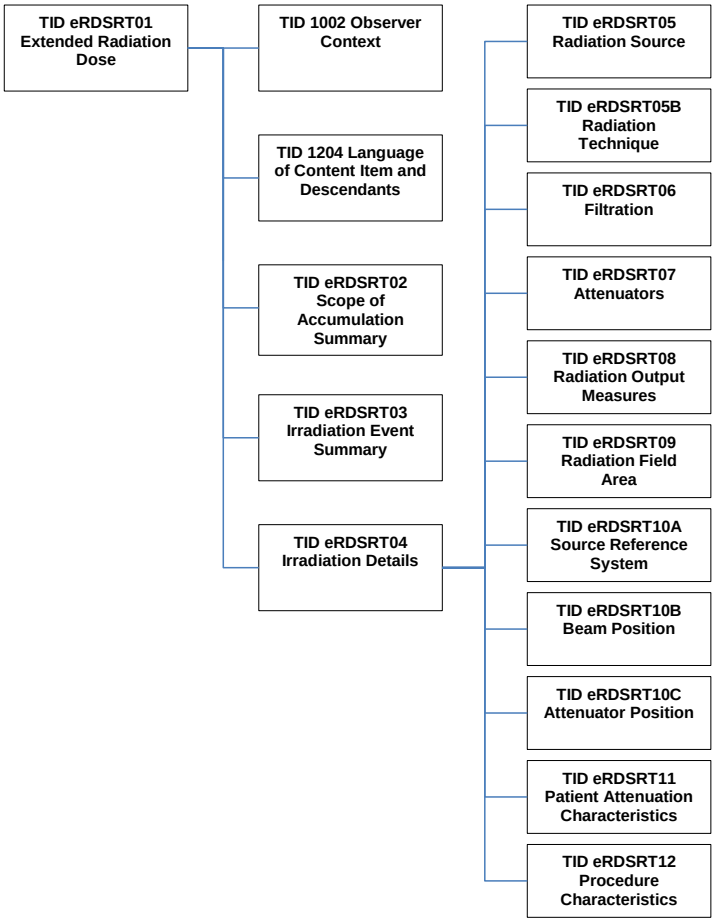
Part 16: Content Mapping Resource

224

Item #11: Add new Section to Annex A

EXTENDED RADIATION DOSE STRUCTURED REPORT IOD TEMPLATES

The templates that comprise the Extended Radiation Dose Structured Report are interconnected as in Figure A-x1.



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234 **Figure A-x1: Extended Radiation Dose Structured Report IOD Template Structure**

TID eRDSRT01 Extended Radiation Dose

236 This template defines a container (the root) with subsidiary content items for documenting the radiation output for an ionizing radiation imaging device. This template supports cone-beam CT, in addition to other modalities.

238 **Table TID eRDSRT01**
Extended Radiation Dose
240 **Type: Extensible**
Order: Non-Significant
242 **Root: Yes**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (113701, DCM, "X-Ray Radiation Dose Report")	1	M		Root Node
2	>	HAS CONCEPT MOD	INCLUDE	DTID 1204 "Language of Content Item and Descendants"	1	M		
3	>	HAS OBS CONTEXT	INCLUDE	DTID 1002 "Observer Context"	1-n	M		
3a	>	HAS OBS CONTEXT	CODE	EV (113705, DCM, "Scope of Accumulation")	1	M		EV (113014, DCM, "Study")
4	>	CONTAINS	INCLUDE	DTID eRDSRT02 "Accumulated Dose Data"	1-n	M		$Source
5	>	CONTAINS	INCLUDE	DTID eRDSRT03 "Irradiation Event Summary Data"	1-n	M		
6	>	CONTAINS	INCLUDE	DTID eRDSRT04, "Irradiation Details"	1	M		
7	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		
8	>	CONTAINS	INCLUDE	DTID 1020 "Person Participant"	1	U		$PersonProcedureRole = EV (113850, DCM, "Irradiation Authorizing")

244 **Content Item Descriptions**

Row 4	TID eRDSRT02 shall be included once for each source
Row 5	TID eRDSRT03 shall be included once for each irradiation event

TID eRDSRT02 Accumulated Dose Data

This template documents study-level summary data for a single irradiation source. Some rows are modality-specific, and may not apply to all uses.

Table TID eRDSRT02
Parameters

Parameter Name	Parameter Usage
$Source	String term identifying to which x-ray radiation source the data belong

Table TID eRDSRT02
Accumulated Dose Data
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX0, DCM, "Accumulated Dose Data")	1	M		
2	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		$Source
3	>	CONTAINS	CONTAINER	EV (122505, DCM, "Calibration")	1-n	MC	IFF Calibration Data is available	
4	>>	HAS CONCEPT MOD	CODE	EV (113794, DCM, "Dose Measurement Device")	1	M		DCID 10010 “Dose Measurement Devices”
5	>>	CONTAINS	DATETIME	EV (113723, DCM, "Calibration DateTime")	1	M		
6	>>	CONTAINS	NUM	EV (122322, DCM, "Calibration Factor")	1	M		UNITS = EV (1, UCUM, "no units")
7	>>	CONTAINS	NUM	EV (113763, DCM, "Calibration Uncertainty")	1	M		UNITS = EV (%, UCUM, "Percent")
8	>>	CONTAINS	TEXT	EV (113724, DCM, "Calibration Responsible Party")	1	M		
9	>>	CONTAINS	TEXT	EV (113720, DCM, "Calibration Protocol")	1	U		
10	>	CONTAINS	INCLUDE	DTID 1021 “Device Participant”	1	U	Required if the irradiating device is not the recording device and the dose was accumulated on a single device.	$DeviceProcedureRole = EV (113859, DCM, "Irradiating Device")
11	>	CONTAINS	NUM	EV (113722, DCM, "Dose Area Product Total")	1	U		UNITS = EV (Gy.m2, UCUM, "Gy.m2")
12	>	CONTAINS	NUM	EV (113726, DCM, "Fluoro Dose Area Product Total")	1	U		UNITS = EV (Gy.m2, UCUM, "Gy.m2")
13	>	CONTAINS	NUM	EV (113727, DCM, "Acquisition Dose Area Product Total")	1	U		UNITS = EV (Gy.m2, UCUM, "Gy.m2")
14	>	CONTAINS	NUM	EV (113730, DCM, "Total Fluoro Time")	1	U		UNITS = EV (s, UCUM, "s")
15	>	CONTAINS	NUM	EV (113855, DCM, "Total Acquisition Time")	1	U		UNITS = EV (s, UCUM, "s")

16	>	CONTAINS	NUM	EV (111637, DCM, "Accumulated Average Glandular Dose")	1-2	U		UNITS = EV (mGy, UCUM, "mGy")
17	>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	M		DCID 6022 “Side”
18	>	CONTAINS	CODE	EV (113947, DCM, "Detector Type")	1	U		DCID 10030 “Detector Types”
19	>	CONTAINS	NUM	EV (113731, DCM, "Total Number of Radiographic Frames")	1	U		UNITS = EV (1, UCUM, "no units")
20	>	CONTAINS	CONTAINER	EV (eRDSRXXX6, DCM, “Reference Point Dosimetry”)	1	U		
21	>>	CONTAINS	TEXT	EV (113780, DCM, "Reference Point Definition")	1	MC	XOR Row 22	
22	>>	CONTAINS	CODE	EV (113780, DCM, "Reference Point Definition")	1	MC	XOR Row 21	DCID 10025 “Radiation Dose Reference Points”
23	>>	CONTAINS	NUM	EV (113725, DCM, "Dose (RP) Total")	1	M		UNITS = EV (Gy, UCUM, "Gy")
24	>>	CONTAINS	NUM	EV (113728, DCM, "Fluoro Dose (RP) Total")	1	U		UNITS = EV (Gy, UCUM, "Gy")
25	>>	CONTAINS	NUM	EV (113729, DCM, "Acquisition Dose (RP) Total")	1	U		UNITS = EV (Gy, UCUM, "Gy")
26	>>	CONTAINS	NUM	EV (113737, DCM, "Distance Source to Reference Point")	1	U		UNITS = EV (mm, UCUM, "mm")
27	>	CONTAINS	NUM	EV (113812, DCM, "Total Number of Irradiation Events")	1	U		UNITS = EV ({events}, UCUM, "events")
28	>	CONTAINS	NUM	EV (113813, DCM, "CT Dose Length Product Total")	1	U		UNITS = EV (mGy.cm, UCUM, "mGy.cm")
29	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		

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Content Item Descriptions

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Row 2	Identify the physical X-Ray source
Row 5	Date that the calibration of the equipment's dose indicators was performed
Row 6	Typically a value provided by the medical physicist. The recorded dose or dose area product values in this report can be multiplied by this factor to obtain estimated real-world values. Note It is important that this value must not be applied to the measured values before storing them in the report.
Row 7	Value range from 0 to 100 percent. Uncertainty of the 'actual' value expressed as+/- of the mean.
Row 8	Identifies Individual or organization responsible for calibration
Row 9	Describes calibration protocol according to equipment standards or local guidelines.
Row 10	The device that produced the irradiation accumulated in this Template. I.e., the X-Ray source. This is not required to be present if the information is the same as that already recorded in TID 1004 “Device Observer Identifying Attributes” encoded via the inclusion of TID 1002 “Observer Context” in TID 10001 “Projection X-Ray Radiation Dose” Row 5, which in turn may be absent if identical to the content in the Enhanced General Equipment Module, or if more than one device produced the accumulated irradiation.

Row 11	The total Dose Area Product for all fluoroscopy and acquisition events for a given radiation source
Row 12	The fluoroscopy component of the total Dose Area Product
Row 13	The acquisition component of the total Dose Area Product
Row 14	Total clock time of Fluoroscopy accumulated over the defined scope of accumulation (i.e., the sum of the Irradiation Duration values for accumulated fluoroscopy irradiation events)
Row 15	Total clock time of acquisitions accumulated over the defined scope of accumulation (i.e., the sum of the Irradiation Duration values for accumulated acquisition irradiation events)
Row 21	A text definition of the Reference Point (RP) used for RP-related dose values.
Row 22	A coded definition of the Reference Point (RP) used for RP-related dose values
Row 23	Accumulated dose relative to reference point.
Row 24	The fluoroscopic component of the accumulated dose relative to reference point
Row 25	The acquisition component of the accumulated dose relative to reference point
Row 26	A single value for calculating reference point dose based on fixed distance.
Row 27	Total Number of irradiation events.
Row 28	The Dose Length Product (DLP) is calculated for every irradiation event. The Dose Length Product Total is the sum of the DLP values. The calculation is based on the CTDIvol result of each irradiation event.

260 **TID eRDSRT03 Irradiation Event Summary Data**

This template documents irradiation event-level summary data.

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Table TID eRDSRT03
264 **Irradiation Event Summary Data**
Type: Extensible
266 **Order: Non-Significant**
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (113706, DCM, "Irradiation Event Summary Data ")	1	M		
2	>	CONTAINS	UIDREF	EV (113769, DCM, "Irradiation Event UID")	1	M		
3	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
4	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
5	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
6	>	CONTAINS	TEXT	EV (113605, DCM, "Irradiation Event Label")	1	U		
7	>>	HAS CONCEPT MOD	CODE	EV (113606, DCM, "Label Type")	1	MC	IF the value of Row 6 is the value of an Attribute in the images.	DCID 10022 “Label Types”
8	>	CONTAINS	CODE	EV (113721, DCM, "Irradiation Event Type")	1	M		DCID 10002 “Irradiation Event Types”

9	>	CONTAINS	CODE	EV (111031, DCM, "Image View")	1	U		DCID 4010 “DX View” DCID 4014 “View for Mammography”
10	>>	HAS CONCEPT MOD	CODE	EV (111032, DCM, "Image View Modifier")	1-n	U		DCID 4011 “DX View Modifier” DCID 4015 “View Modifier for Mammography”
11	>>	CONTAINS	CODE	EV (113946, DCM, "Projection Eponymous Name")	1	U		DCID 4012 “Projection Eponymous Name”
12	>	CONTAINS	NUM	EV (113845, DCM, “Exposure Index")	1	U		UNITS = EV (1, UCUM, "no units")
13	>	CONTAINS	NUM	EV (113846, DCM, "Target Exposure Index")	1	U		UNITS = EV (1, UCUM, "no units")
14	>	CONTAINS	NUM	EV (113847, DCM, "Deviation Index")	1	U		UNITS = EV (1, UCUM, "no units")
15	>	CONTAINS	IMAGE	EV (113795, DCM, "Acquired Image")	1-n	MC	IFF Image Object is created for this irradiation event	
16	>	CONTAINS	NUM	EV (113738, DCM, "Dose (RP)")	1	U		UNITS = EV (Gy, UCUM, "Gy")
17	>	CONTAINS	NUM	EV (111631, DCM, "Average Glandular Dose")	1	U		UNITS = EV (mGy, UCUM, "mGy")
18	>	CONTAINS	CODE	EV (128551, DCM, "Is Repeated Acquisition")	1	U		DCID 231 “Yes-No Only”
19	>>	HAS CONCEPT MOD	CODE	EV (128552, DCM, "Reason for Repeating Acquisition")	1	M		DCID 10034 “Reason for Repeating Acquisition” OR DCID 7011 “Rejected for Quality Reasons”
20	>>	CONTAINS	UIDREF	EV (eRDSRXX8, DCM, “Repeated Image UID")	1	MC	IF known by system	
21	>	CONTAINS	CODE	EV (eRDSRXX5, DCM, "Is Rejected Acquisition")	1	U		DCID 231 “Yes-No Only”
22	>>	HAS CONCEPT MOD	CODE	EV (eRDSRXX7, DCM, "Reason for Rejecting Acquisition")	1	M	IFF Row 21 = (R-0038D, SRT, “Yes")	DCID 10034 “Reason for Repeating Acquisition” OR DCID 7011 “Rejected for Quality Reasons”
23	>	CONTAINS	NUM	EV (113768, DCM, "Number of Pulses")	1	U		UNITS = EV (1, UCUM, "no units")
23 a	>>	HAS CONCEPT MOD	CODE	EV (121401, DCM, “Derivation")	1	MC	IFF count of pulses in Row 23 is estimated	EV (R-10260, SRT, "Estimated")
24	>	CONTAINS	NUM	EV (113834, DCM, "Exposure Time per Rotation")	1	U		UNITS = EV (s, UCUM, "s")
25	>	CONTAINS	CONTAINER	EV (113829, DCM, "CT Dose")	1	U		
26	>>	CONTAINS	NUM	EV (113830, DCM, "Mean CTDIvol")	1	M		UNITS = EV (mGy, UCUM, "mGy")
27	>>	CONTAINS	CODE	EV (113835, DCM, "CTDIw Phantom Type")	1	M		DCID 4052 “Phantom Devices”
28	>>	CONTAINS	NUM	EV (113836, DCM, "CTDIfreeair Calculation Factor")	1	U		UNITS = EV (mGy/mA.s, UCUM, "mGy/mA.s")
29	>>	CONTAINS	NUM	EV (113837, DCM, "Mean CTDIfreeair")	1	U		UNITS = EV (mGy, UCUM, "mGy")
30	>>	CONTAINS	NUM	EV (113838, DCM, "DLP")	1	M		UNITS = EV (mGy.cm, UCUM, "mGy.cm")
31	>>	CONTAINS	NUM	EV (113839, DCM, "Effective Dose")	1	U		UNITS = EV (mSv, UCUM, "mSv")

32	>>>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	MC	IF row 31 is present	DCID 10011 “Effective Dose Evaluation Method”
33	>>> >	HAS PROPERTIES	NUM	EV (113840, DCM, "Effective Dose Conversion Factor")	1	MC	IF row 32 is present and equals (113800, DCM, "DLP to E conversion via MC computation") or equals (113802, DCM, "DLP to E conversion via measurement")	UNITS = EV (mSv/mGy.cm, UCUM, "mSv/mGy.cm")
34	>>	CONTAINS	NUM	EV (113930, DCM, "Size Specific Dose Estimation")	1-n	U		UNITS = EV (mGy, UCUM, "mGy")
35	>>>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	M		DCID 10023 “Size Specific Dose Estimation Method for CT”
36	>>> >	INFERRED FROM	NUM	EV (113931, DCM, "Measured Lateral Dimension")	1	MC	IF row 35 equals (113934, DCM, "AAPM 204 Lateral Dimension") or (113936, DCM, "AAPM 204 Sum of Lateral and AP Dimension")	UNITS = EV (mm, UCUM, "mm")
37	>>> >	INFERRED FROM	NUM	EV (113932, DCM, "Measured AP Dimension")	1	MC	IF row 35 equals (113935, DCM, "AAPM 204 AP Dimension") or (113936, DCM, "AAPM 204 Sum of Lateral and AP Dimension")	UNITS = EV (mm, UCUM, "mm")
38	>>> >	INFERRED FROM	NUM	EV (113933, DCM, "Derived Effective Diameter")	1	MC	IF row 35 equals (113934, DCM, "AAPM 204 Lateral Dimension") or (113935, DCM, "AAPM 204 AP Dimension") or (113936, DCM, "AAPM 204 Sum of Lateral and AP Dimension") or (113937, DCM, "AAPM 204 Effective Diameter Estimated From Patient Age")	UNITS = EV (mm, UCUM, "mm")
39	>>> >	INFERRED FROM	NUM	EV (113980, DCM, "Water Equivalent Diameter")	1	MC	IF row 35 equals (113981, DCM, "Water Equivalent Diameter Representative Value")	UNITS = EV (mm, UCUM, "mm")
40	>>> >>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	M		DCID 10024 “Water Equivalent Diameter Method”
41	>>> >	INFERRED FROM	UIDREF	EV (113985, DCM, "Series or Instance used for Water Equivalent Diameter estimation")	1-n	MC	IF row 35 equals (113982, DCM, "Water Equivalent Diameter Integrated Across Scan Range") or (113984, DCM, "Water Equivalent Diameter From Localizer") or (row 31 equals (113983, DCM, "Water Equivalent Diameter From Raw Data") and the Raw Data is encoded in DICOM).	

42	>>>>	INFERRED FROM	NUM	EV (113986, DCM, "Z value of location of Water Equivalent Diameter estimation")	1	MC	IF row 35 equals (113981, DCM, "Water Equivalent Diameter Representative Value")	UNITS = EV (mm, UCUM, "mm")
43	>>	CONTAINS	INCLUDE	DTID 10015 “CT Dose Check Details”	1	U		
44	>	CONTAINS	TEXT	EV (113842, DCM, "X-Ray Modulation Type")	1	U		
45	>	CONTAINS	UIDREF	EV (112227, DCM, “Frame of Reference UID”)	1	U		If present, shall be the same UID as in the images resulting from this irradiation event.
46	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1	U		
47	>	CONTAINS	INCLUDE	DTID 1020 “Person Participant”	1-n	U		$PersonProcedureRole = EV (113851, DCM, "Irradiation Administering")
48	>	CONTAINS	INCLUDE	DTID 1021 “Device Participant”	1	MC	Required if the irradiating device is not the recording device.	$DeviceProcedureRole = EV (113859, DCM, "Irradiating Device")

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Row 3	This shall correspond to the start of the first irradiation in the Irradiation Event. This is the starting point for the calculation of Row 36 "Irradiation Duration".
Row 4	This shall correspond to the end of the last irradiation in the Irradiation Event.
Row 5	This is a physical source
Row 8	Cone-beam CT is expected to use (113613, DCM, “Rotational Acquisition”)
Row 15	Reference to Image instances created during this event, if any. The UID reference(s) provided here shall be the values at the time the images were initially created. (Note that image UIDs may be changed as the images are managed over a long term.)
Row 16	Dose applied by this irradiation event, relative to defined reference point. This value may be provided at the Irradiation Event level, but is redundant if the Output Measurement Position is at the same position as the Reference Point defined in eRDSRT02.
Rows 18, 19, 20	If an acquisition is a repeat because an earlier acquisition was unsatisfactory, this may be recorded along with a coded reason and the earlier acquisition’s image UID. This is intended to help with subsequent analysis by providing a priori information about why the study might be flagged as an outlier with higher dose exposure values than usual for the type of study.
Rows 21, 22	If an acquisition is a rejected because it was unsatisfactory, this may be recorded along with a coded reason. This is intended to help with subsequent analysis by providing a priori information about why the study might be flagged as an outlier with higher dose exposure values than usual for the type of study.
Row 23	If a precise count of pulses is not available, an estimated number shall be provided, and the Row 23a Concept Modifier shall indicate "Estimated"
Row 24	Exposure time as measured/recorded by the system per rotation.
Row 25	CT Dose for one acquisition
Row 26	"Mean $CTDI_{vol}$" refers to the average value of the $CTDI_{vol}$ applied within this acquisition. $CTDI_{vol}$ is the volume $CTDI_w$, where $CTDI_w$, is the weighted computed tomography dose index 100 as defined in IEC 60601-2-44. For Sequenced and Spiral scanning, $CTDI_{vol} = CTDI_w$ / Pitch Factor. For Stationary and Free scanning, $CTDI_{vol} = CTDI_w \times$ Cumulative Exposure Time/ Exposure Time Per Rotation. According to IEC 60601-2-44 Ed 3 for Constant Angle Acquisition may be calculated as $CTDI_{vol} = (CTDI_w /$ Current Time Product (mAs)) $\times$ X-Ray Tube Current (mA) x (Nominal Total Collimation Width (mm) / Table Speed (mm/s)). Note

	The ratio $CTDI_w$ / Current Time Product is evaluated independently of the Constant Angle Acquisition but with the same settings of tube voltage and Total Collimation Width as those of the Constant Angle Acquisition. See also $CTDI_{vol}$ (0018,9345) and Spiral Pitch Factor (0018,9311) in the "Enhanced Computed Tomography Image IOD" in PS3.3.
Row 27	The type of phantom used for CTDI measurement according to IEC 60601-2-44(e.g., Head 16 cm diameter PMMA, Body 32 cm diameter PMMA).
Row 28	The $CTDI_{free}$ air Calculation Factor is the $CTDI_{free}$ air per mAs, expressed in units of mGy/mAs. The $CTDI_{free}$ air Calculation Factor may be used in one method calculating Dose. For example, for this acquisition, Effective Dose = Mean X-Ray Tube Current × Cumulative Exposure Time × $CTDI_{free}$ air Calculation Factor × (Effective Dose/ $CTDI_{free}$ air).
Row 29	Mean$CTDI_{free}$ air is the mean CTDI for this acquisition, evaluated free-in-air according to IEC 60601-2-44. Mean$CTDI_{free}$ air = Mean X-Ray Tube Current × Cumulative Exposure Time × $CTDI_{free}$ air Calculation Factor. The $CTDI_{free}$ air may be used in one method of calculating Effective Dose.
Row 30	For Spiral scanning, DLP = $CTDI_{vol}$ × Scanning Length. For Sequenced scanning, DLP = $CTDI_{vol}$ × Nominal Total Collimation Width × Cumulative Exposure Time / Exposure Time per Rotation. For Stationary and Free scanning, DLP = $CTDI_{vol}$ × Nominal Total Collimation Width (according to IEC 60601-2-44).
Row 31	Effective Dose in mSv of the irradiation event.
Row 33	The Effective Dose Conversion Factor is the ratio of the Effective Dose to the DLP, expressed in units of mSv/mGy.cm, and it is used as a factor in one method of estimating Effective Dose. Monte Carlo Simulations (or dosimetric measurements in an anthropomorphic phantom, e.g., the Alderson-Rando phantom) may be used as a basis for the evaluation of Effective Dose Conversion Factors.
Row 34	More than one Size Specific Dose Estimation may be included, for example if different computation methods are used.
Row 35	The methods of [AAPM Report 204] are listed in CID 10023 "Size Specific Dose Estimation Method for CT"; other methods may be used. The phantom size (16 cm or 32 cm) used for the calculation is available from the phantom type defined in Row 27.
Row 36	The condition specifies inclusion of the Measured Lateral Dimension if it was used in the calculation.
Row 37	The condition specifies inclusion of the Measured AP Dimension if it was used in the calculation.
Row 38	The Derived Effective Diameter is conditionally included, whether it was derived from measurements or estimated from age, but may not be used for other (non-AAPM Report 204) methods.
Row 39	A single value for Water Equivalent Diameter is encoded in Row 39 if the method uses a single value. It is required if the method uses a representative slice, but may also be present if the method used a Localizer or Raw Data at a single location rather than the entire scan range.
Row 40	The modifier is intended to specify the family of methods and not the specific technique (e.g., for AAPM 220 (113987, DCM, "AAPM 220") is used, not (113981, DCM, "Water Equivalent Diameter Representative Value"), etc.).
Row 41	If the method uses multiple slices across the scan range, the reconstructed image Series or (list of) Instances used is referenced; the values for Water Equivalent Diameter may or may not be recorded in the CT Image Module or CT Exposure Macro of those images. More than one Series may be referenced if the reconstructed images for this acquisition used for Water Equivalent Diameter estimation span multiple series. If the Water Equivalent Diameter was computed from raw views rather than reconstructed images, then the Raw Data is referenced, if it was encoded in DICOM (it is not required to be).
Row 42	This location is patient (not table or gantry) relative, to allow it to be defined in the Patient Coordinate System and hence related to the Image Position (Patient) in the reconstructed images (see TID 10014 "Scanning Length", included at Row 9). It is required if the method uses a representative slice, but may also be present if the method used a Localizer or Raw Data at a single location rather than the entire scan range.
Row 43	Record of details associated with using the NEMA Dose Check Standard (NEMA XR-25-2010).
Row 44	The type of exposure modulation. May use the value of Exposure Modulation Type (0018,9323) from CT Exposure Macro or from CT Image Module.
Row 47	People responsible for the administration of the radiation reported in the irradiation event. May include values that would appear in Performing Physicians' Name (0008,1050), Performing Physician Identification Sequence (0008,1052), Operators' Name (0008,1070) and/or Operator Identification Sequence (0008,1072).

Row 48	The device that produced the irradiation in this irradiation event

TID eRDSRT04 Irradiation Details

This template describes the radiation dose characteristics beyond the irradiation event level. The complete time window and frame of reference are defined in this template.

Table TID eRDSRT04
Irradiation Details
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX04, DCM, "Irradiation Details")	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	UIDREF	EV (eRDSRXX9, DCM, "RDSR Frame of Reference UID")	1	M		
5	>	CONTAINS	CODE	EV (eRDSRXX22, DCM, "RDSR Frame of Reference Type")	1	M		DCID eRDSRCID03 "RDSR Frame of Reference Types"
6	>	CONTAINS	TEXT	EV (eRDSRXX35, DCM, "RDSR Frame of Reference Description")	1	M		
7	>	CONTAINS	INCLUDE	DTID (eRDSRT05, "Radiation Source Characteristics")	1-n	M		
8	>	CONTAINS	INCLUDE	DTID (eRDSRT05B, "Radiation Technique")	1-n	M		
9	>	CONTAINS	INCLUDE	DTID (eRDSRT06, "Filtration")	1-n	MC	IF filtration characteristics are known	
10	>	CONTAINS	INCLUDE	DTID (eRDSRT07, "Attenuators")	1-n	MC	IF attenuator characteristics are known	
11	>	CONTAINS	INCLUDE	DTID (eRDSRT08, "Radiation Output Measures")	1-n	M		
12	>	CONTAINS	INCLUDE	DTID (eRDSRT09, "Radiation Field Area")	1-n	M		
13	>	CONTAINS	INCLUDE	DTID (eRDSRT10A, "X-ray Source Reference System")	1-n	M		
14	>	CONTAINS	INCLUDE	DTID (eRDSRT10B, "Beam Position")	1-n	M		
15	>	CONTAINS	INCLUDE	DTID (eRDSRT10C, "Attenuator Position")	1-n	MC	IF Row 10 is present AND any attenuator position is known	
16	>	CONTAINS	INCLUDE	DTID (eRDSRT11, "Patient Attenuation Characteristics")	1-n	MC	IF patient attenuation characteristics are known	
17	>	CONTAINS	INCLUDE	DTID (eRDSRT12, "Procedure Characteristics")	1-n	MC	IF procedure characteristics are known	

Commented [NB1]: Need to establish a UID, a point in that space and where it is. Supp 175

Content Item Descriptions

Row 2	The DateTime of the beginning of first instance of irradiation in the study
Row 3	The DateTime of the end of the last instance of irradiation in the study
Row 4	This is the FOR UID of the coordinate system used for this RDSR. It may be defined relative to a point in a room, a point on the equipment, or point on the patient support. The FOR shall not change during a study. All RDSRs with the same FOR UID are created on the same RDSR coordinate system. For a point defined within the room or on the equipment, any change following geometric calibration or service shall generate a new RDSR FOR UID.
Row 5	It defines the component that is used to define the origin of the RDSR coordinate system.
Row 6	The textual description of the coordinate system for the RDSR frame of reference. This should include a description of both the origin and the (x, y, z) orientation. It must follow a right-handed Cartesian coordinate system.
Row 7, 8, 9, 11, 12, 13, 14, 16	The subtemplate shall be included once for each time window for each source (e.g., two sources and three time windows results in a subtemplate being included six times)
Row 10, 15, 17	The subtemplate shall be included once for each time window

TID eRDSRT05 Radiation Source Characteristics

This template describes a radiation source (e.g., focal spot size, anode material, etc.).

Table TID eRDSRT05
Radiation Source Characteristics
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX05, DCM, “Radiation Source Characteristics”)	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	NUM	EV (113766, DCM, "Focal Spot Size")	1	M		UNITS = EV (mm, UCUM, "mm")
6	>	CONTAINS	CODE	EV (111632, DCM, "Anode Target Material")	1	U		DCID 10016 “Anode Target Material”
7	>	CONTAINS	CONTAINER	EV (eRDSRX10, DCM, “Inherent X-Ray Filtration”)	1-n	U		
8	>>	CONTAINS	CODE	EV (113757, DCM, "X-Ray Filter Material")	1	MC	XOR ROW 11	DCID 10067 “Radiation Attenuator Materials”
9	>>	CONTAINS	NUM	EV (eRDSRX11, DCM, “X-Ray Filter Thickness”)	1	MC	XOR ROW 11	UNITS = EV (mm, UCUM, "mm")
10	>>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, “Reported Value Classification”)	1	M		DCID eRDSRCID01 “Reported Value Classifications”

Commented [NB2]: Left off Jun 5, 2019

11	>>	CONTAINS	CODE	EV (128465, DCM, "Equivalent Attenuator Material")	1	MC	XOR ROW 8	DCID 10067 "Radiation Attenuator Materials"
12	>>	CONTAINS	NUM	EV (128469, DCM, "Equivalent Attenuator Thickness")	1	MC	XOR ROW 8	UNITS = EV (mm, UCUM, "mm")
13	>>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"

TID eRDSRT05B Radiation Technique

This template defines a container with content items to describe the details of the radiation technique (e.g., tube potential, tube current, etc.). The container shall be provided for each radiation source and time window.

Table TID eRDSRT05B
Radiation Technique
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX05B, DCM, "Radiation Technique")	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	NUM	EV (111634, DCM, "Half Value Layer")	1	U		UNITS = EV (mm, UCUM, "mm")
6	>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"
7	>	CONTAINS	NUM	EV (113733, DCM, "KVP")	1	M		UNITS = EV (kV, UCUM, "kV")
8	>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"
9	>	CONTAINS	NUM	EV (113733, DCM, "X-Ray Tube Current")	1	M		UNITS = EV (mA, UCUM, "mA")
10	>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"
11	>	CONTAINS	NUM	EV (113791, DCM, "Pulse Rate")	1	U		UNITS = EV ({pulse}/s, UCUM, "pulse/s")
12	>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"
13	>	CONTAINS	NUM	EV (113793, DCM, "Pulse Width")	1-n	U		UNITS = EV (ms, UCUM, "ms")
14	>>	HAS PROPERTIES	CODE	EV (eRDSRX12, DCM, "Reported Value Classification")	1	M		DCID eRDSRCID01 "Reported Value Classifications"

TID eRDSRT06 Filtration

This template defines a container with content items to describe the details of the added filtration (e.g., spectral filters, bowtie filters, etc.). The container shall be provided for each radiation source and time window.

Table TID eRDSRT06
Filtration
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX06, DCM, “Filtration”)	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	CONTAINER	EV (eRDSRX13, DCM, “Filter Description”)	1-n	M		
6	>>	CONTAINS	NUM	EV (eRDSRX14, DCM, “Filter Identification Index”)	1	M		UNITS = EV (1, UCUM, "no units")
7	>>	CONTAINS	CONTAINER	EV (eRDSRX11A, DCM, “Filter Properties”)	1	MC	XOR ROW 12	
8	>>>	CONTAINS	CODE	EV (113757, DCM, "Filter Material")	1	M		DCID 10067 “Radiation Attenuator Materials”
9	>>>	CONTAINS	CODE	EV (113772, DCM, “Filter Type”)	1	M		DCID 10007 “X-Ray Filter Types”
10	>>>	CONTAINS	NUM	EV (113758, DCM, “X-Ray Filter Thickness Minimum”)	1	M		UNITS = EV (mm, UCUM, "mm")
11	>>>	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	1	M		UNITS = EV (mm, UCUM, "mm")
12	>>	CONTAINS	CONTAINER	EV (128469, DCM, "Equivalent Attenuator Properties")	1	MC	XOR ROW 7	
13	>>>	CONTAINS	CODE	EV (128465, DCM, "Equivalent Attenuator Material")	1	M		DCID 10067 “Radiation Attenuator Materials”
14	>>>	CONTAINS	CODE	EV (113772, DCM, “Filter Type”)	1	M		DCID 10007 “X-Ray Filter Types”
15	>>>	CONTAINS	NUM	EV (113758, DCM, “X-Ray Filter Thickness Minimum”)	1	M		UNITS = EV (mm, UCUM, "mm")
16	>>>	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	1	M		UNITS = EV (mm, UCUM, "mm")

TID eRDSRT07 Attenuators

312 This template defines a container with content items to describe the details of the added attenuators (e.g., patient support, wedge, etc.). The container shall be provided for each time window.

314 **Table TID eRDSRT07**
Attenuators
316 **Type: Extensible**
Order: Non-Significant
318 **Root: No**

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX07, DCM, “Attenuators”)	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
5	>	CONTAINS	CONTAINER	EV (eRDSRX31, DCM, “Attenuator Description”)	1-n	M		
6	>>	CONTAINS	NUM	EV (eRDSRX32, DCM, “Attenuator Identification Index”)	1	M		UNITS = EV (1, UCUM, "no units")
7	>>	CONTAINS	CODE	EV (128458, DCM, “Attenuator Category”)	1	M		DCID 10066 “Attenuator Cateogy”
8	>>	CONTAINS	CONTAINER	EV (eRDSRX33A, DCM, “Attenuator Properties”)	1	MC	XOR ROW 13	
9	>>>	CONTAINS	CODE	EV (113757, DCM, "Filter Material")	1	M		DCID 10067 “Radiation Attenuator Materials”
10	>>>	CONTAINS	CODE	EV (113772, DCM, “Filter Type”)	1	M		DCID 10007 “X-Ray Filter Types”
11	>>>	CONTAINS	NUM	EV (113758, DCM, “X-Ray Filter Thickness Minimum”)	1	M		UNITS = EV (mm, UCUM, "mm")
12	>>>	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	1	M		UNITS = EV (mm, UCUM, "mm")
13	>>	CONTAINS	CONTAINER	EV (128469, DCM, "Equivalent Attenuator Properties")	1	MC	XOR ROW 8	
14	>>>	CONTAINS	CODE	EV (128465, DCM, "Equivalent Attenuator Material")	1	M		DCID 10067 “Radiation Attenuator Materials”
15	>>>	CONTAINS	CODE	EV (113772, DCM, “Filter Type”)	1	M		DCID 10007 “X-Ray Filter Types”
16	>>>	CONTAINS	NUM	EV (113758, DCM, “X-Ray Filter Thickness Minimum”)	1	M		UNITS = EV (mm, UCUM, "mm")
17	>>>	CONTAINS	NUM	EV (113773, DCM, “X-Ray Filter Thickness Maximum”)	1	M		UNITS = EV (mm, UCUM, "mm")

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TID eRDSRT08 Radiation Output Measures

322 This template defines a container with content items to describe the details of the air kerma at the output measurement point. The container shall be provided for each radiation source and time window.

Table TID eRDSRT08
Radiation Output Measures
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX08, DCM, “Radiation Output Measures”)	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	NUM	EV (eRDSRXX01, DCM, "Air Kerma at Output Measurement Point")	1	M		UNITS = EV (mGy, UCUM, "mGy")

Content Item Descriptions

Row 5	The accumulated air kerma over the specified time window. If the output measurement point position (eRDSRT10B) or x-ray source rotation matrix (eRDSRT10A) are updated, the time window describing the radiation output measures must also be updated.

TID eRDSRT09 Radiation Field Area

This template defines a container with content items to describe the details of the radiation field size (i.e., collimated area). The container shall be provided for each radiation source and time window.

Table TID eRDSRT09
Radiation Field Area
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX09, DCM, “Radiation Field Area”)	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	SCOORD3D	EV (eRDSRXX3, DCM, "Radiation Field Outline")	1-n	M		GRAPHIC TYPE = {POLYGON, ELLIPSE}
6	>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”

Content Item Descriptions

Row 5	The Radiation Field Outline describes the area and shape of the radiation field. The origin of the coordinates is the x-ray source position.

TID eRDSRT10A X-Ray Source Reference System

This template defines a container with content items to describe the details of the radiation source reference coordinate system. The container shall be provided for each radiation source and time window.

Table TID eRDSRT10A
X-Ray Source Reference System
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX10A, DCM, “X-Ray Source Reference System”)	1-n	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	TMATRIX	EV (eRDSRX16, DCM, “X-Ray Source Transformation Matrix”)	1	M		The origin of the coordinate system is the origin of the RDSR FOR.
6	>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”

Content Item Descriptions

Row 5	A 4x4 matrix to describe the rigid transformation matrix that maps a source coordinate system to the RDSR FOR. This matrix is used to transform positions provided in the source position coordinate system to the RDSR FOR coordinate system.

TID eRDSRT10B Beam Position

This template defines a container with content items to describe the positions of objects and locations that are defined in the x-ray radiation source coordinate system (e.g., output measurement point, filter position, etc.). The container shall be provided for each radiation source and time window.

Table TID eRDSRT10B
Beam Position
Type: Extensible
Order: Non-Significant

Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX10B, DCM, “Beam Position”)	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	SCOORD3D	EV (eRDSRXX2, DCM, "Output Measurement Point Position")	1	M		
6	>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”
7	>	CONTAINS	SCOORD3D	EV (eRDSRXX4, DCM, “Reference Point Position”)	1	MC	IF Reference Point Definition is provided in eRDSRT02	
8	>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”
9	>	CONTAINS	CONTAINER	EV (eRDSRX18, DCM, “Filter Position Sequence”)	1-n	MC	IF X-ray Filtration is described in eRDSRT06 and the position is known	
10	>>	CONTAINS	TEXT	EV (eRDSRX14, DCM, “Filter Identification Index”)	1	M		
11	>>	CONTAINS	SCOORD3D	EV (eRDSRX19, DCM, “Filter Vertices Position”)	1-n	M		GRAPHIC TYPE = {POLYGON, ELLIPSE}
12	>>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”
13	>>	CONTAINS	NUM	EV (eRDSRX30, DCM, “Filter Vertices Thickness”)	1-n	M		UNITS = EV (mm, UCUM, "mm")

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Content Item Descriptions

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Row 5	The Output Measurement Point Position describes the position where the measure of radiation output occurs. It is described in the source position coordinate system. It may be the same position as the reference point position (the reference point may be defined in eRDSRT02).
Row 7	If a reference point is defined in eRDSRT02, the position of the reference point in the source coordinate system must be described here.
Row 9	Must provide the position of each filter described in eRDSRT06, if known. Each position must include the identification of the filter, which must match the identification used in eRDSRT06.
Row 11	The list of vertices of the filter. The coordinate system for the filter vertices position is the x-ray source position coordinate system. The vertices must be coplanar
Row 13	The list of thicknesses of each vertex of the filter. It should be assumed that the thickness changes linearly between described points.

TID eRDSRT10C Attenuator Position

This template defines a container with content items to describe the details of the attenuator positions. The container shall be provided for each time window.

Table TID eRDSRT10C
Attenuator Position
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX10C, DCM, “Attenuator Position”)	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	CONTAINER	EV (eRDSRX20, DCM, “Attenuator Position Sequence”)	1-n	M		
5	>>	CONTAINS	NUM	EV (eRDSRX32, DCM, “Attenuator Identification Index”)	1	M		
6	>>	CONTAINS	SCOORD3D	EV (eRDSRX33, DCM, “Attenuator Vertices Position”)	1-n	M		GRAPHIC TYPE = {POLYGON, ELLIPSE}
7	>>>	HAS PROPERTIES	CODE	EV (eRDSRX17, DCM, “Position Value Classification”)	1	M		DCID eRDSRCID02 “Position Value Classifications”
8	>>	CONTAINS	NUM	EV (eRDSRX34, DCM, “Attenuator Vertices Thickness”)	1-n	M		UNITS = EV (mm, UCUM, "mm")

Content Item Descriptions

Row 4	Must provide the position of each attenuator described in eRDSRT07 if position is known. Each position must include the Identification of the attenuator, which must match the identification used in eRDSRT07.
Row 6	The list of vertices of the attenuator. The coordinate system for the attenuator vertices position is the x-ray source position coordinate system. The vertices must be coplanar.
Row 8	The list of thicknesses of each vertex of the attenuator. It should be assumed that the thickness changes linearly between described points.

TID eRDSRT11 Patient Attenuation Characteristics

This template defines a container with content items to describe the details of the patient attenuation characteristics that may be determined/used by the system (e.g., patient equivalent thickness, water equivalent diameter, etc.). The container shall be provided for each radiation source and time window.

Table TID eRDSRT11
Patient Attenuation Characteristics
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX11, DCM, “Patient Attenuation Characteristics”)	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	NUM	EV (111638, DCM, "Patient Equivalent Thickness")	1	U		UNITS = EV (mm, UCUM, "mm")
6	>	CONTAINS	NUM	EV (113980, DCM, “Water Equivalent Diameter”)	1	U		UNITS = EV (mm, UCUM, "mm")
7	>	CONTAINS	NUM	EV (113931, DCM, “Measured Lateral Dimension”)	1	U		UNITS = EV (mm, UCUM, "mm")
8	>	CONTAINS	NUM	EV (113932, DCM, “Measured AP Dimension”)	1	U		UNITS = EV (mm, UCUM, "mm")
9	>	CONTAINS	NUM	EV (113933, DCM, “Derived Effective Diameter”)	1	U		UNITS = EV (mm, UCUM, "mm")
10	>	CONTAINS	NUM	EV (111046, DCM, “Percent Fibroglandular Tissue”)	1	U		UNITS = EV (%, UCUM, “Percent”) Value = 0 – 100
11	>	CONTAINS	CODE	EV (F-01710, SRT, “Breast composition”)	1	U		DCID 6000 “Overall Breast Composition”

Content Item Descriptions

TID eRDSRT12 Procedure Characteristics

This template defines a container with content items to describe the details of the procedure characteristics (e.g., patient orientation, SID, etc.). The container shall be provided for each radiation source and time window.

Table TID eRDSRT12
Procedure Characteristics
Type: Extensible
Order: Non-Significant
Root: No

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (eRDSRXX12, DCM, “Procedure Characteristics”)	1	M		
2	>	CONTAINS	DATETIME	DT (111526, DCM, "DateTime Started")	1	M		
3	>	CONTAINS	DATETIME	DT (111527, DCM, "DateTime Ended")	1	M		
4	>	CONTAINS	TEXT	EV (113832, DCM, "Identification of the X-Ray Source")	1	M		
5	>	CONTAINS	TEXT	EV (125203, DCM, "Acquisition Protocol")	1	U		
6	>>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	UC	If anatomy is bi-lateral	DCID 244 “Laterality”
7	>	CONTAINS	CODE	EV (113745, DCM, "Patient Table Relationship")	1	U		DCID 21 “Patient Equipment Relationship”
8	>	CONTAINS	CODE	EV (113743, DCM, "Patient Orientation")	1	U		DCID 19 “Patient Orientation”
9	>>	HAS CONCEPT MOD	CODE	EV (113744, DCM, "Patient Orientation Modifier")	1	M		DCID 20 “Patient Orientation Modifier”
10	>	CONTAINS	CODE	EV (123014, DCM, "Target Region")	1	U		DCID 4030 “CT, MR and PET Anatomy Imaged”, DCID 4016 DCID 4026 DCID 4028
11	>	CONTAINS	CODE	EV (111635, DCM, "X-Ray Grid")	1-n	U		DCID 10017 “X-Ray Grid”
12	>	CONTAINS	NUM	EV (113750, DCM, “Distance Source to Detector”)	1	U		UNITS = EV (mm, UCUM, "mm")

Item #12: Add the following CID’s to Part 16 Annex B:

CID 10067 Radiation Attenuator Materials

Table CID 10067
Radiation Attenuator Materials
Type: Extensible Version: yyyymmdd

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
Include CID 10006 “X-Ray Filter Materials”				
SRT	F-61202	Carbon Fiber	256501007	C0108411
SRT		***Beryllium or Beryllium Compound***	***767162005***	***C0005140***

CID eRDSRCID01 Reported Value Classifications

Table CID eRDSRCID01
Reported Value Classifications
Type: Extensible Version: yyyymmdd

Coding Scheme Designator	Code Value	Code Meaning
SCT	373098007	Mean
SCT	373099004	Median
SCT	373100007	Mode
SCT	56851009	Maximum
SCT	255605001	Minimum
DCM	eRDSRCD001	Actual
SCT	117362005	Nominal

CID eRDSRCID02 Position Value Classifications

Table CID eRDSRCID02
Position Value Classifications
Type: Extensible Version: yyyymmdd

Coding Scheme Designator	Code Value	Code Meaning
DCM	eRDSRCD003	Position for duration of time window
DCM	eRDSRCD004	Position at beginning of time window
DCM	eRDSRCD005	Position at end of time window
DCM	eRDSRCD006	Position at middle of time window

CID eRDSRCID03 RDSR Frame of Reference Types

Table CID eRDSRCID03
RDSR Frame of Reference Types
Type: Extensible Version: yyyymmdd

Coding Scheme Designator	Code Value	Code Meaning
DCM	eRDSRCD007	Room origin
DCM	eRDSRCD008	Equipment origin
DCM	eRDSRCD009	Patient support origin
DCM	112171	Fiducial mark

Item #13: Add the following Coded terms to Part 16 Annex D: Table D-1

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
…			
113831	CT X-Ray Source Parameters	Identification, tube-potential, tube-current, and exposure-time parameters associated with an X-Ray source during an acquisition.	
113832	Identification of the X-Ray Source	Identifies the particular X-Ray source ~~**(in a multi-source CT system)**~~ for which the set of X-Ray source parameter values is reported.	
113833	Maximum X-Ray Tube Current	Maximum X-Ray tube current	
…			
eRDSRXX0	Accumulated Dose Data	Container for the scope of accumulation summary details. This includes all dosimetric-related values that can be summarized for an entire exam.	
eRDSRXXX6	Reference Point Dosimetry	Container for the reference point definition and accumulated dose values at the reference point.	
eRDSRXX1	Irradiation Event Summary Data	Container for the irradiation event summary details. This includes all dosimetric-related values that can be summarized for an irradiation event.	
eRDSRXX8	Repeated Image UID	For an irradiation event that is a repeated acquisition, this provides the Image UID of the image that is being repeated.	
eRDSRXX5	Is Rejected Acquisition	Coded value that indicates an irradiation event was rejected	
eRDSRXX7	Reason for Rejecting Acquisition	For a rejected acquisition, provided a coded reason for rejection	
eRDSRXX04	Irradiation Details	Container for the irradiation details following the new RDSR format. This is the template that contains the other templates describing the different time windows.	
eRDSRXX9	RDSR Frame of Reference UID	The UID of the RDSR frame of reference.	
eRDSRXX22	RDSR Frame of Reference Type	The type of component used to describe the RDSR frame of reference.	
eRDSRXX35	RDSR Frame of Reference Description	The textual description of the RDSR frame of reference. It should include a description of where the origin is, as well as the orientation of the coordinate system.	
eRDSRXX05	Radiation Source Characteristics	Container for the radiation source characteristics	
eRDSRX10	Inherent X-Ray Filtration	Container to describe the inherent x-ray filtration	
eRDSRX11	X-Ray Filter Thickness	The thickness of the x-ray filtration	
eRDSRX12	Reported Value Classification	The classification of a reported value. This describes if a reported value is a mean, median, maximum, minimum, etc.	
eRDSRXX05B	Radiation Technique	Container for radiation technique details	
eRDSRXX06	Filtration	Container for the filtration description and time windows	
eRDSRX13	Filter Description	Container for each filter described in the template	
eRDSRX14	Filter Identification Index	Numerical index for each filter described. The filter identification index is used to link to the position of the filters described in the beam position template.	
eRDSRX11A	Filter Properties	Container for the filter material and type descriptions	
eRDSRXX07	Attenuators	Container for the attenuators descriptions and time windows	

eRDSRX31	Attenuator Description	Container for each attenuator described in the template	
eRDSRX32	Attenuator Identification Index	Numerical index for each attenuator described. The attenuator identification index is used to link to the position of the attenuators in the attenuation position template.	
eRDSRX33A	Attenuator Properties	Container for the attenuator material and type descriptions.	
eRDSRXX08	Radiation Output Measures	Container for the output measurement point dose accumulation time windows and values.	
eRDSRXX01	Air Kerma at Output Measurement Point	The air kerma (in mGy) accumulated at the output measurement point during a given period of time.	
eRDSRXX09	Radiation Field Area	Container for the description of the radiation field area and corresponding time windows and source index.	
eRDSRXX3	Radiation Field Outline	A list of three-dimensional coordinates that describe the perimeter of the radiation field. The points must be coplanar and are limited to describing either polygons or ellipses.	
eRDSRX17	Position Value Classifications	This describes the classification of position provided for a given description. It specifies if it is an average position, actual position, beginning position, etc.	
eRDSRXX10A	X-Ray Source Reference System	Container that describes the x-ray source coordinate reference system and the rotational matrix that relates it to the RDSR coordinate system.	
eRDSRX16	X-Ray Source Transformation Matrix	The 4x4 rigid transformation matrix that relates the source coordinate system to the RDSR coordinate system. For items that are described in the source coordinate system, they can be related back to the RDSR coordinate system by using this matrix. This matrix simplifies the geometric description of items that are in a constant position with respect to the source, but may be rotating or moving with a source during an irradiation.	
eRDSRXX10B	Beam Position	Container for component positions described in the source coordinate system.	
eRDSRXX2	Output Measurement Point Position	The three-dimensional coordinate of the output measurement position. The output measurement position is described in the source coordinate system.	
eRDSRXX4	Reference Point Position	The three-dimensional coordinate of the reference point position. The reference point position is described in the source coordinate system. The reference point may be at the same position as the output measurement point.	
eRDSRX18	Filter Position Sequence	Container to describe the positions and dimensions of an x-ray filter	
eRDSRX19	Filter Vertices Position	Series of three-dimensional coordinates that describe the perimeter of an x-ray filter. The points must be coplanar.	
eRDSRX30	Filter Vertices Thickness	Series of values describing the material thickness of each vertex provided by the Filter Vertices Position.	
eRDSRXX10C	Attenuator Position	Container for the description of positions and correspond time windows for attenuators	
eRDSRX20	Attenuator Position Sequence	Container to describe the positions and dimensions of an attenuator	
eRDSRX33	Attenuator Vertices Position	Series three-dimensional coordinates that describe the perimeter of an attenuator. The points must be coplanar.	
eRDSRX34	Attenuator Vertices Thickness	Series of values describing the material thickness of each vertex provided by the Attenuator Vertices Position.	

eRDSRXX11	Patient Attenuation Characteristics	Container to describe various patient attenuation characteristics that may be known by the system and may change during the course of a study. For example, the Patient Equivalent Thickness or Water Equivalent Diameter.	
eRDSRXX12	Procedure Characteristics	Container to describe various procedure characteristics that may change during an exam and may be useful to aid in dosimetry or quality assurance.	
eRDSRCD001	Actual	A qualifier value that specifies the reported value is known by either measurement or calculation of the system.	
eRDSRCD003	Position for duration of time window	Position qualifier that indicates the reported position was the position of the object during the duration of the reported time window.	
eRDSRCD004	Position at beginning of time window	Position qualifier that indicates the reported position was the position of the object at the beginning of the reported time window	
eRDSRCD005	Position at end of time window	Position qualifier that indicates the reported position was the position of the object at the end of the reported time window	
eRDSRCD006	Position at middle of time window	Position qualifier that indicates the reported position was the position of the object at the exact middle of the reported time window	
eRDSRCD007	Room origin	The origin of the RDSR Frame of Reference is defined as part of the room in which the equipment is located	
eRDSRCD008	Equipment origin	The origin of the RDSR Frame of Reference is defined as part of the equipment	
eRDSRCD009	Patient support origin	The origin of the RDSR Frame of Reference is defined as part of the patient support	

Changes to NEMA Standards Publication PS 3.17-xxxx

Digital Imaging and Communications in Medicine (DICOM)

Part 17: Explanatory Information

Item #14: Add Extended Radiation Dose Reporting Use Case Annex

XXX Extended Radiation Dose Structured Report Document (Informative)

This Annex contains examples of the use of Extended Radiation Dose templates within Radiation Dose Structured Report Documents

XXX.1 <name it> Example

The following example ….

- Cone-beam CT (single run)
  - Potentially applicable to CT, XA, Dental, RT
- XA example from PowerPoint (fluoro runs, DSA, CBCT)
- Conventional CT example (Localizer and helical scan w/ TCM)

Table XXX.1-1. <name it> Example

Node	Code Meaning of Concept Name	Code or Example Value	TID
1	Extended Radiation Dose Report	*<CONTAINER>*	TID eRDSRT01