

DICOM Conformance Statement

***AI-Rad Companion Chest X-ray
VB20A***



1 Overview

AI-Rad Companion Chest X-ray is a cloud-based/on-premises(edge) application, which communicates indirectly with other DICOM nodes since it makes use of the network services provided by teamplay DICOM Hub and teamplay Receiver.

AI-Rad Companion Chest X-ray:

- Receives the input DICOM data from teamplay DICOM Hub after a storage request to teamplay Receiver using the configurable AET (E.g., "AIRC").
- Displays images to a user (browser-based viewer application).
- Generates result objects in DICOM Secondary Capture format, DICOM Structured Report (TID 1500), DICOM Grayscale Softcopy Presentation States (GSPS).
- Stores result DICOM data via teamplay DICOM Hub and teamplay Receiver to one or several target DICOM nodes configured in teamplay DICOM Hub.

AI-Rad Companion Chest X-ray conforms to the DICOM Standard [2] and supports the network services through teamplay DICOM Hub as described in Table 1 - Network Services.

Please refer to the DICOM Conformance Statements of teamplay DICOM Hub and teamplay Receiver [1] for further information on the provided network services.

NOTE: - This DICOM Conformance Statement is applicable for **AI-Rad Companion Chest X-ray** of version VB20A and later until superseded by a more recent document applicable to a more recent version.

Table 1: Network Services

SOP Classes	SOP Class UID	User of Service (SCU)		Provider of Service (SCP)	
		Create	Send	Store	Display
SOP Classes created by AI-Rad Companion Chest X-ray					
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No ¹	No ¹	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No ¹	No ¹	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No ¹	No ¹	No

¹ Network communication is performed by teamplay DICOM hub and teamplay receiver. Please refer to the DICOM Conformance Statements of teamplay DICOM Hub and teamplay Receiver [1] for further information.



Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
N/A		

Table 3: Implementation Identifying Information

Name	Value
Implementation Class UID	13.12.2.1107.5.8.21
Implementation Version Name	AI-Rad Companion

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3 Introduction

3.1 Revision History

Version	Date	Change
R0.1	02/26/2024	Initial Version for VB20A. Updated Table 31: Imaging Measurement Report for DICOM SR for <ul style="list-style-type: none">DICOM SR updates for including Observation UIDUpdated Performed Procedure Code in DICOM SR
R1.0	03/04/2024	Released after Review.

3.2 Audience

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

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between **AI-Rad Companion Chest X-ray** and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. DICOM by itself does not guarantee interoperability.

The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

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

- The comparison of conformance statements is the first step towards assessing interconnectivity and interoperability between **AI-Rad Companion Chest X-ray** and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

Siemens Healthineers reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens Healthineers representative for the most recent product information.

3.4 Definitions, Terms and Abbreviations

Definitions, terms, and abbreviations used in this document are defined within the different parts of the DICOM standard.

Additional Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
FSC	File Set Creator

FSR	File Set Reader
FSU	File Set Updater
GSDf	Grayscale Standard Display Function
GSps	Grayscale Softcopy Presentation State
IOD	DICOM Information Object Definition
ISO	International Standard Organization
N/A	Not Applicable
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
ROI	Region Of Interest
RT	Radiation Therapy
SC	Secondary Capture
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM Server)
SOP	DICOM Service-Object Pair
SR	Structured Report
TFT	Thin Film Transistor (Display)
TID	Template ID
U	Unique Key Attribute
UID	Unique Identifier
UTF-8	Unicode Transformation Format-8
VR	Value Representation

3.5 References

- [1] DICOM Conformance Statements of teamplay – <https://www.siemens-healthineers.com/en-in/services/it-standards/dicom-conformance-statements-digital-and-automation/teamplay>
- [2] NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at <https://www.dicomstandard.org/>)
- [3] AI-Rad Companion Data Privacy and Security White Paper – Based on on-demand request from the end users.
- [4] Teamplay Data Privacy and Security White Paper – Based on on-demand request from the end users.
- [5] Integrating the Healthcare Enterprise – IHE Radiology Technical Framework – <http://www.ihe.net>

4 Networking

Please refer to the latest version of DICOM Conformance Statements of teampay DICOM Hub and teampay Receiver [1] for further information on the provided networking capabilities for AI-Rad Companion Chest X-ray.

AI-Rad Companion Chest X-ray only supports a subset of transfer syntaxes supported by teampay and the following table lists the supported transfer syntaxes.

Table 4: Supported Transfer Syntaxes

SOP Classes	SOP Class UID	Name List	UID List	FSC	FSR	Role	Extension Negotiation
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No	SCP/SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No	SCP/SCU	None
Digital X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	No	Yes	SCP/SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	No	Yes		
		JPEG Lossless	1.2.840.10008.1.2.4.70	No	Yes		
		Implicit VR Little Endian	1.2.840.10008.1.2	No	Yes		
		JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	No	Yes		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	No	Yes	SCP/SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	No	Yes		
		JPEG Lossless	1.2.840.10008.1.2.4.70	No	Yes		
		Implicit VR Little Endian	1.2.840.10008.1.2	No	Yes		
		JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	No	Yes		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes	Yes	SCP/SCU	None

5 Media Interchange

AI-Rad Companion Chest X-ray is not providing any means for media interchange.

6 Transformations of DICOM to CDA

N/A

7 Support of Extended Character Sets

7.1 Character sets for AI-Rad Companion Chest X-ray

AI-Rad Companion Chest X-ray supports the following character sets as defined in the tables in this section.

Table 5: Single-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO Registration Number	Character Set
Default repertoire	None	ISO_IR 6	ISO 646
Latin alphabet No. 1	ISO_IR 100	ISO_IR 100	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 2	ISO_IR 101	ISO_IR 101	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 3	ISO_IR 109	ISO_IR 109	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 4	ISO_IR 110	ISO_IR 110	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 5	ISO_IR 148	ISO_IR 148	Supplementary set
		ISO_IR 6	ISO 646
Cyrillic	ISO_IR 144	ISO_IR 6	Supplementary set
		ISO_IR 6	ISO 646
Arabic	ISO_IR 127	ISO_IR 127	Supplementary set
		ISO_IR 6	ISO 646
Greek	ISO_IR 126	ISO_IR 126	Supplementary set
		ISO_IR 6	ISO 646
Hebrew	ISO_IR 138	ISO_IR 138	Supplementary set
		ISO_IR 6	ISO 646
Japanese	ISO_IR 13	ISO_IR 13	JIS X 0201: Katakana
		ISO_IR 14	JIS X 0201: Romaji
Thai	ISO_IR 166	ISO_IR 166	TIS 620-253 (1990)
		ISO_IR 6	ISO 646

Table 6: Single-Byte Characters Sets with Code Extension

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO Registration Number	Character Set
Default repertoire	ISO 2022 IR 6	ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.1	ISO 2022 IR 100	ISO 2022	ESC 02/13 04/01	ISO-IR 100	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.2	ISO 2022 IR 101	ISO 2022	ESC 02/13 04/02	ISO-IR 101	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.3	ISO 2022 IR 109	ISO 2022	ESC 02/13 04/03	ISO-IR 109	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No. 4	ISO 2022 IR 110	ISO 2022	ESC 02/13 04/04	ISO-IR 110	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No. 5	ISO 2022 IR 148	ISO 2022	ESC 02/13 04/13	ISO-IR 148	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646

Table 7: Multi-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO Registration Number	Character Set
Unicode	ISO_IR 192	ISO 10646	Unicode in UTF-8
Chinese	GB18030	GB18030	GB 18030-2000 (China Association for Standardization)

Table 8: Multi-Byte Character Sets with Code Extension

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO Registration Number	Character Set
Japanese	ISO 2022 IR 159	ISO 2022	ESC 02/04 02/08 04/04	ISO-IR 159	JIS X 0212: Supplementary Kanji set
Korean	ISO 2022 IR 149	ISO 2022	ESC 02/04 02/09 04/03	ISO-IR 149	KS X 1001: Hangul and Hanja

All Special Character Sets(SCS) listed above are supported for incoming Data.

Three categories of character sets have to be differentiated because of their different encoding formats:

- Conventional ISO character sets: ISO_IR 6, ISO 2022 IR 6, ISO_IR 100, etc. → Encoded in ISO 2022
- ISO_IR 192 → Encoded in UTF-8
- GB18030 → Encoded in GB18030

It is not possible to recognize the following mismatches automatically on receiving or importing:

- An attribute value is encoded in ISO_IR 192 $\leftarrow \rightarrow$ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in GB18030 $\leftarrow \rightarrow$ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in ISO 2022 $\leftarrow \rightarrow$ (0008,0005) contains ISO_IR 192
- An attribute value is encoded in ISO 2022 $\leftarrow \rightarrow$ (0008,0005) contains GB18030

An IOD that contains one of the above-mentioned inconsistencies does not conform to DICOM. As these kinds of inconsistencies cannot be recognized by the system, the IOD will not be rejected but the character data might be corrupted.

AI-Rad Companion Chest X-ray supports Kanji characters in the byte zone after 74 (79, 7A, 7B and 7C).

8 Attribute confidentiality profiles

8.1 De-identification

Please refer to the AI-Rad Companion Data Privacy and Security White Paper [3] for further information on the support of de-identification of attributes natively for AI-Rad Companion Cloud deployment. In case of edge (on-premises) deployment, no de-identification happens from teamplay.

AI-Rad Companion Chest X-ray does not support High privacy and Restrictive privacy levels.

9 Security

Please refer to DICOM Conformance Statements of teamplay Receiver and teamplay DICOM Hub [1] for supported security features.

10 Annexes

10.1 IOD Contents

10.1.1 Created SOP Instances

10.1.1.1 General Modules

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

- VNAP: Value is Not Always Present. Attribute is sent zero length if no value is present.
- ANAP: Attribute Not Always Present.
- ALWAYS: Attribute and Value are always present.
- EMPTY: Attribute is sent zero length.

The abbreviations used in the “Source” Column are

- MWL: The attribute value is copied from Modality Worklist.
- USER: The attribute value is entered by the user.
- AUTO: The attribute value is generated by the system.
- CONFIG: The attribute value is obtained by configuration

Table 9 lists all Attributes that are supported in the Patient Module.

Table 9: Patient Module

Attribute	Tag	Source	Value	Presence	Comments
Patient`s Name	(0010,0010)	AUTO	Copied from source image	VNAP	
Patient ID	(0010,0020)	AUTO	Copied from source image	VNAP	
Patient`s Birth Date	(0010,0030)	AUTO	Copied from source image	VNAP	
Patient`s Sex	(0010,0040)	AUTO	Copied from source image	VNAP	

Table 10 lists all Attributes that are supported in the General Study Module

Table 10: General Study Module

Attribute	Tag	Source	Value	Presence	Comments
Study Date	(0008,0020)	AUTO	Copied from source image	VNAP	
Study Time	(0008,0030)	AUTO	Copied from source image	VNAP	
Accession Number	(0008,0050)	AUTO	Copied from source image	VNAP	
Referring Physician's Name	(0008,0090)	AUTO	Copied from source image	VNAP	
Study Description	(0008,1030)	AUTO	Copied from source image	ANAP	
Study Instance UID	(0020,000D)	AUTO	Copied from source image	ALWAYS	
Study ID	(0020,0010)	AUTO	Copied from source image	VNAP	

Table 11 lists all Attributes that are supported in the Patient Study Module

Table 11: Patient Study Module

Attribute	Tag	Source	Value	Presence	Comments
Patient`s Age	(0010,1010)	AUTO	Copied from source image	ANAP	

Table 12 lists all Attributes that are supported in the General Equipment Module

Table 12: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	Siemens Healthineers	ALWAYS	
Manufacturer`s Model Name	(0008,1090)	AUTO	AI-Rad Companion Chest X-ray	ALWAYS	
Device Serial Number	(0018,1000)	AUTO	AI-Rad Companion system IVK number + teamplay serial number"	ALWAYS	
Secondary Capture Device Software Version	(0018,0019)	AUTO	VXXXX where XXXX indicates the used version of Chest X-ray. For Example:- VB20A.	ALWAYS	

Table 13 lists all Attributes that are supported in the SOP Common Module

Table 13: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	Copied from input image	ALWAYS	
Instance Creation Date	(0008,0012)	AUTO	Date when series is created	ALWAYS	
Instance Creation Time	(0008,0013)	AUTO	Time when series is created	ALWAYS	
SOP Class UID	(0008,0016)	AUTO	Secondary Capture: 1.2.840.10008.5.1.4.1.1.7 Comprehensive SR : 1.2.840.10008.5.1.4.1.1.88.33 GSPS: 1.2.840.10008.5.1.4.1.1.11.1	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO	Unique Identifier of the instance	ALWAYS	
Timezone Offset from UTC	(0008,0201)	AUTO	Copied from the input image. If not present then it is +0000	ALWAYS	

10.1.1.2 Secondary Capture Report

Table 14: Secondary Capture IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient Module	Table 9	ALWAYS
Study	General Study Module	Table 10	ALWAYS
	Patient Study Module	Table 11	ALWAYS
Series	General Series Module	Table 15	ALWAYS
Equipment	General Equipment Module	Table 12	ALWAYS
	SC Equipment Module	Table 16	ALWAYS
Image	General Image Module	Table 17	ALWAYS
	Image Pixel Module	Table 18	ALWAYS
	SC Image Module	Table 19	ALWAYS
	SOP Common	Table 13	ALWAYS

Table 15 lists all Attributes that are supported in the General Series IOD Module

Table 15: General Series IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Series Date	(0008,0021)	AUTO	Date when series is created	ALWAYS	
Series Time	(0008,0031)	AUTO	Time when series is created	ALWAYS	
Modality	(0008,0060)	AUTO	OT	ALWAYS	
Series Description	(0008,103E)	AUTO	AI-Rad Companion-Results	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	Unique identifier of the series.	ALWAYS	
Series Number	(0020,0011)	AUTO	Set to high value	ALWAYS	

Table 16 lists all Attributes that are supported in the SC Equipment IOD Module

Table 16: SC Equipment IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Conversion Type	(0008,0064)	AUTO	WSD	ALWAYS	

Table 17 lists all Attributes that are supported in the General Image IOD Module

Table 17: General Image IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY	ALWAYS	
Content Date	(0008, 0023)	AUTO	Date when series is created	ALWAYS	
Content Time	(0008,0033)	AUTO	Time when series is created	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	0	ALWAYS	
Patient Orientation	(0020,0020)	AUTO	Copied from input image	ANAP	

Table 18 lists all Attributes that are supported in the Image Pixel IOD Module

Table 18: Image pixel IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	3	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	RGB	ALWAYS	
Planar Configuration	(0028,0006)	AUTO	0	ALWAYS	
Rows	(0028,0010)	AUTO	Variable	ALWAYS	
Columns	(0028,0011)	AUTO	Variable	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	8	ALWAYS	
Bits Stored	(0028,0101)	AUTO	8	ALWAYS	
High Bit	(0028,0102)	AUTO	7	ALWAYS	
Pixel Representation	(0028,0103)	AUTO	0	ALWAYS	
Pixel Data	(7FE0,0010)	AUTO	A data stream of the pixel samples that comprise the Image	ALWAYS	

Table 19 lists all Attributes that are supported in the SC Image IOD Module

Table 19: SC Image IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Pixel Spacing	(0028,0030)	AUTO	Copied from input image	ALWAYS	

10.1.1.3 DICOM Structured Report

Table 20: Structured Report IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 9	ALWAYS
Study	General Study	Table 10	ALWAYS
	Patient Study	Table 11	ALWAYS
Series	SR Document Series	Table 21	ALWAYS
Equipment	General Equipment	Table 12	ALWAYS
Document	SR Document General	Table 22	ALWAYS

	SR Document Content	Table 23	ALWAYS
	SOP Common	Table 13	ALWAYS

Table 21 lists all Attributes that are supported in the SR Document Series Module

Table 21: SR Document Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008, 0060)	AUTO	SR	ALWAYS	
Series Instance UID	(0020, 000E)	AUTO	Unique identifier of the Series	ALWAYS	
Series Number	(0020, 0011)	AUTO	6666	ALWAYS	
Series Date	(0008,0021)	AUTO	Date the Series started.	ALWAYS	
Series Time	(0008,0031)	AUTO	Time the Series started.	ALWAYS	
Protocol Name	(0018, 1030)	AUTO	Description of the conditions under which the Series was performed.	ALWAYS	
Series Description	(0018, 103E)	AUTO	Description of the series(Al-Rad Companion-SR)	ALWAYS	

Table 22 lists all Attributes that are supported in the SR Documents General Module

Table 22: SR Document General Module

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	1	ALWAYS	
Verification Flag	(0040, A493)	AUTO	Unverified	ALWAYS	
Completion Flag	(0040, A491)	AUTO	COMPLETE	ALWAYS	
Content Date	(0008,0023)	AUTO	The date the document content creation started.	ALWAYS	
Content Time	(0008,0033)	AUTO	The time the document content creation started.	ALWAYS	
Study Instance UID	(0020,000D)	AUTO	Unique identifier of the study	ALWAYS	Copied from input image
Accession Number	(0008,0050)	AUTO	Copied from input image	VNAP	
Performed Procedure Code Sequence	(0040, A372)	AUTO	(36554-4, LOINC, XR Chest Single view)	ALWAYS	

Table 23 lists all Attributes that are supported in the SR Document Content Module

Table 23: SR Document Content Module

10.1.1.4 Please refer to

10.1.1.5 Table 31: Imaging Measurement Report for DICOM SR for details regarding SR document content module.

10.1.1.6 DICOM Grayscale Softcopy Presentation State IOD

Table 24: DICOM Grayscale Softcopy Presentation State IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 9	ALWAYS
Study	General Study	Table 10	ALWAYS
	Patient Study	Table 11	ALWAYS
Series	General Series	Table 15	ALWAYS
	Presentation Series	Table 25	ALWAYS
Equipment	General Equipment	Table 12	ALWAYS
Presentation State	Presentation State Identification	Table 26	ALWAYS
	Presentation State Relationship	Table 27	ALWAYS
	Displayed Area	Table 28	ALWAYS
	Graphic Annotation	Table 29	ALWAYS
	SOP Common	Table 13	ALWAYS

Table 25: Presentation Series Module

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008, 0060)	AUTO	PR	ALWAYS	

Table 26: Presentation State Identification

Attribute	Tag	Source	Value	Presence	Comments
Presentation Creation Date	(0070,0082)	AUTO	Date on which this presentation was created.	ALWAYS	
Presentation Creation Time	(0070,0083)	AUTO	Time at which this presentation was created.	ALWAYS	
Instance Number	(0020,0013)	AUTO	1	ALWAYS	
Content Label	(0070,0080)	AUTO	AIRC AI RESULTS	ALWAYS	
Content Description	(0070,0081)	AUTO	AIRC AI Results	ALWAYS	
Content Creator's Name	(0070,0084)	AUTO		EMPTY	

Table 27: Presentation State Relationship

Attribute	Tag	Source	Value	Presence	Comments
Referenced Series Sequence	(0008,1115)	AUTO		ALWAYS	
> Series Instance UID	(0020,000E)	AUTO	Unique identifier of a Series that is part of the Study defined by the Study Instance UID (0020,000D) in the enclosing data set.	ALWAYS	
> Referenced Image Sequence	(0008,1140)			ALWAYS	
>> Referenced SOP Class UID	(0008,1150)	AUTO	Uniquely identifies the referenced SOP Class.	ALWAYS	
>> Referenced SOP Instance UID	(0008,1155)	AUTO	Uniquely identifies the referenced SOP Instance.	ALWAYS	

Table 28: Displayed Area

Attribute	Tag	Source	Value	Presence	Comments
Displayed Area Selection Sequence	(0070,005A)	AUTO	sequence of Items each of which describes the displayed area selection for a group of images or frames.	ALWAYS	
>Displayed Area Top Left Hand Corner	(0070,0052)	AUTO	The top left (after spatial transformation) pixel in the referenced image to be displayed,	ALWAYS	
>Displayed Area Bottom Right Hand Corner	(0070,0053)	AUTO	The bottom right (after spatial transformation) pixel in the referenced image to be displayed,	ALWAYS	
>Presentation Size Mode	(0070,0100)	AUTO	SCALE TO FIT	ALWAYS	
>Presentation Pixel Spacing	(0070,0101)	AUTO	Physical distance between the center of each pixel in the referenced image.	ALWAYS	

Table 29: Graphic Annotation

Attribute	Tag	Source	Value	Presence	Comments
Graphic Annotation Sequence	(0070,0001)	AUTO		ALWAYS	
>Graphic Layer	(0070,0002)	AUTO	FINDINGS	ALWAYS	
>Text Object Sequence	(0070,0008)	AUTO		ALWAYS	
>>Bounding Box Annotation Units	(0070,0003)	AUTO		ALWAYS	
>>Anchor Point Annotation Units	(0070,0004)	AUTO		ALWAYS	
>>Unformatted Text Value	(0070,0006)	AUTO		ALWAYS	
>>Bounding Box Top Left Hand Corner	(0070,0010)	AUTO		ALWAYS	
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	AUTO		ALWAYS	
>>Bounding Box Text Horizontal Justification	(0070,0012)	AUTO	CENTER	ALWAYS	
>>Anchor Point	(0070,0014)	AUTO		ALWAYS	
>>Anchor Point Visibility	(0070,0015)	AUTO	Y	ALWAYS	
>Graphic Object Sequence	(0070,0009)	AUTO		ALWAYS	
>>Graphic Annotation Units	(0070,0005)	AUTO	PIXEL	ALWAYS	
>>Graphic Dimensions	(0070,0020)	AUTO	2	ALWAYS	
>>Number of Graphic Points	(0070,0021)	AUTO	Number of data points in this graphic.	ALWAYS	
>>Graphic Data	(0070,0022)	AUTO	Coordinates that specify this graphic annotation.	ALWAYS	
>>Graphic Type	(0070,0023)	AUTO	POLYLINE	ALWAYS	
>>Graphic Filled	(0070,0024)	AUTO	N	ALWAYS	
>Line Style Sequence	(0070,0232)	AUTO		ALWAYS	
>>Shadow Style	(0070,0244)	AUTO	NORMAL	ALWAYS	
>>Shadow Offset X	(0070,0245)	AUTO		ALWAYS	
>>Shadow Offset Y	(0070,0246)	AUTO		ALWAYS	
>>Shadow Color CIE Lab Value	(0070,0247)	AUTO		ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
>>Pattern On Color CIE Lab Value	(0070,0251)	AUTO		ALWAYS	
>>Line Thickness	(0070,0253)	AUTO		ALWAYS	
>>Line Dashing Style	(0070,0254)	AUTO		ALWAYS	
>>Shadow Opacity	(0070,0258)	AUTO		ALWAYS	
>>Pattern On Opacity	(0070,0284)	AUTO		ALWAYS	

10.1.2 Usage of Attributes from Received IODs

N/A

10.1.3 Attribute Mapping

N/A

10.1.4 Coerced/Modified Fields

N/A

10.2 Data Dictionary of Private Attributes

Table 30 lists all private attributes created by AI-Rad Companion Chest X-ray which may be included in the generated instances

Table 30 Private Data Element Dictionary

Tag	Private Owner Code	Name	VR	VM	Description
(0015, xx10)	AI-Rad Companion Chest X-ray	Pneumothorax AI score	IS	1	Integer string between 1 to 10
(0015, xx11)	AI-Rad Companion Chest X-ray	Pleural Effusion AI score	IS	1	Integer string between 1 to 10
(0015, xx12)	AI-Rad Companion Chest X-ray	Lesions AI score	IS	1	Integer string between 1 to 10
(0015, xx13)	AI-Rad Companion Chest X-ray	Consolidation AI score	IS	1	Integer string between 1 to 10
(0015, xx14)	AI-Rad Companion Chest X-ray	Atelectasis AI score	IS	1	Integer string between 1 to 10
(0015, xx15)	AI-Rad Companion Chest X-ray	Abnormality indicator	IS	1	Integer string – 0 or 1: '1' if there is at least one finding abnormal, '0' otherwise.

10.3 Coded Terminology and Templates

10.3.1 Context Groups

N/A

10.3.2 Template Specifications

10.3.2.1 TID 1500 Imaging Measurement Report for DICOM SR

Table 31: Imaging Measurement Report for DICOM SR

Nesting Level	Relationship Type	Value Type	Concept Name	Values	TID
>	CONTAINS	Code	EV(111017,DCM,CAD Processing and Findings Summary)	(111242, DCM, All algorithms succeeded; with findings) OR (111241, DCM, All algorithms succeeded; without findings)	4001
>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>	CONTAINS	Code	EV (111064, DCM, "Summary of Detections")	(111222, DCM, Succeeded)	4000

>	INFERRED FROM	CONTAINER	EV (111063, DCM, "Successful Detections")		4015
>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>	CONTAINS	Code	EV (111022, DCM, "Detection Performed")	(CHESTXRAY001, 99SHSAIRC, AI-Rad Companion Chest X-ray) AND/OR (CHESTXRAY002, 99SHSAIRC, AI-Rad Companion Chest X-ray Endotracheal Tube)	4017
>>>	HAS PROPERTIES	TEXT	EV (111001, DCM, "Algorithm Name")	Assessment of AP view for 2 findings (Pneumothorax, Consolidation) Assessment of Endotracheal Tube OR Assessment of PA view for 5 findings (Pneumothorax, Pleural Effusion, Pulmonary Lesions, Consolidation, Atelectasis)	4019
>>>	HAS PROPERTIES	TEXT	EV (111003, DCM, "Algorithm Version")	Version of the algorithm where the findings were found For example: 10.0 or VA12A	4019
>>>	HAS PROPERTIES	IMAGE		Contains the reference to the original input image	401
		CONTAINER	EV (126000, DCM, "Imaging Measurement Report")		1500
>	CONTAINS	CONTAINER	EV (126010, DCM, "Imaging Measurements")		1500
>>	CONTAINS	CONTAINER	EV (125007, DCM, "Measurement Group")		1410
>>>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, "Tracking Identifier")	Lesion / PleuralEffusion / Pneumothorax / Consolidation / Atelectasis. If there are multiple findings of same category, they will be enumerated (Eg: Lesion 1, Lesion2 Lesion n.	1410
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, "Tracking Unique Identifier")	Uniquely generated	1410
>>>	CONTAINS	CODE	EV (121071, DCM, "Finding")	A coded representation of the finding, using Radlex codes, that can take one of the following values: <ul style="list-style-type: none"> • (RID28493, RADLEX, Atelectasis) • (RID34539, RADLEX, Pleural effusion) • (RID43255, RADLEX, Consolidation) • (RID38780, RADLEX, Lesion) • (RID5352, RADLEX, Pneumothorax) • (111241, DCM, All algorithms succeeded: without findings) • (RID5557, RADLEX, EndotrachealTube) • (RID1248, RADLEX, Carina) • (DCM, 121206, Distance) 	1410
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	CONTAINS	NUM	(DCM, 121206, Distance)	UNITS = EV(mm,UCUM,milimeter)	1410

>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	HAS CONCEPT MOD	CODE	(SCT, 106233006, Topographical modifier)	(RID5557, RADLEX, Endotracheal Tube)	1410
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	HAS CONCEPT MOD	CODE	(SCT, 106233006, Topographical modifier)	(RID1248, RADLEX, Carina)	1410
>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	HAS CONCEPT MOD	CODE	EV ("363698007", "SCT", "Finding site")	("RID1301", RADLEX, "Lung")	1419
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	CONTAINS	SCOORD	EV (111030, DCM, "Image Region")		1410
>>>>	SELECTED FROM	IMAGE		Original image	1410
>>>	CONTAINS	NUM	(RID29, RADLEX, "Confidence")	UNITS = EV (1, UCUM, "no units")	1410
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>>	HAS CONCEPT MOD	TEXT	EV (111012, DCM, "Certainty of Finding")	VALUE = Confidence range (1 - low to 10 - high)	1410
>>>		UIDREF	Observation UID ³	Uniquely generated	SR IOD
>>>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	Detected View Position: AP/PA. AI results are auto generated and can be incomplete or incorrect. Assess original images for any decision. AI Confidence score should be always interpreted as the non-diagnostic likelihood of the findings	1410
>	HAS CONCEPT MOD	CODE	EV (121049, DCM, "Language of Content Item and Descendants")	(eng, "RFC5646", "English")	1204
>>	HAS CONCEPT MOD	CODE	EV (121046, DCM, "Country of Language")	(US, ISO3166_1, "United States")	1204
>	HAS OBS CONTEXT	CODE	EV (121005, DCM, "Observer Type")	(121007, DCM, "Device")	1002
>	HAS OBS CONTEXT	UIDREF	EV (121012, DCM, "Device Observer UID")	Same as Device UID (0018,1002)	1004
>	HAS OBS CONTEXT	TEXT	EV (121014, DCM, "Device Observer Manufacturer")	Same as Manufacturer (0008,0070)	1004
>	HAS OBS CONTEXT	TEXT	EV (121015, DCM, "Device Observer Model Name")	Same as Manufacturer's Model Name (0008,1090)	1004
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, "Procedure reported")	(36554-4, LOINC, XR Chest Single view)	1500
>	CONTAINS	CONTAINER	EV (111028, DCM, "Image Library")		1600
>>	CONTAINS	CONTAINER	EV (126200, DCM, "Image Library Group")		1600
>>>	CONTAINS	IMAGE		Contains 2 images - One for Original image/Secondary Capture image	1601

>>>	HAS ACQ CONTEXT	CODE	EV (121139, DCM, "Modality")	Digital Radiography (DX, DCM, Digital Radiography) / Computed Radiography (CR, DCM, Computed Tomography) / Other Modality (OT) (RID49585, RADLEX, Modality)	1602
>>>	HAS ACQ CONTEXT	CODE	EV (111060, DCM, "Study Date")	Copied from Original image	1602
>>>	HAS ACQ CONTEXT	CODE	EV (111061, DCM, "Study Time")	Copied from Original image	1602

Note:

- 1) TID 1410 is extended to include field EV (121106, DCM, "Comment")
- 2) TID 1410 is extended to include field EV (111012, DCM, "Certainty of Finding")
- 3) Observation UID (0040,A171) is attribute in the representation of that Content Item. Hence relationship type is empty.

10.3.3 Private Code definitions

The following tables list all private codes created by AI-Rad Companion Chest X-ray which may be included in the generated instances.

Table 32: Private Code definitions

Code Value	Code Meaning	Definition	Notes
CHESTXRAY001	AI-Rad Companion Chest X-ray		
CHESTXRAY002	AI-Rad Companion Chest Lines & Tubes		
CHESTXRAY003	Processing Algorithm		

The Coding Scheme Designator for all the above private codes is "99SHSAIRC"

10.4 Grayscale Image Consistency

N/A

10.5 Standard Extended / Specialized / Private SOP Classes

N/A

10.6 Private Transfer Syntaxes

N/A

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