DICOM Conformance Statement

AI-Rad Companion Prostate MR VA5x

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SIEMENS Healthineers

1 Overview

AI-Rad Companion Prostate MR 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 Prostate MR:

- 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).
- Generate result objects DICOM RT Structure Set (RTSS) format, Secondary Capture report, DICOM Structured Report and MR Burnt-in contours.
- 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 Prostate MR conforms to the DICOM Standard [2] and supports the network services through teamplay DICOM Hub and teamplay Receiver 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- This DICOM Conformance Statement is applicable for **AI-Rad Companion Prostate MR** of version VA5x and later until superseded by a more recent document applicable to a more recent version.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)	
SOP Classes created by AI-Rad Companion Prostate MR					
		Create	**Send**	**Store**	**Display**
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No[1]	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No[1]	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No[1]	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No[1]	Yes	Yes

[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	1.3.12.2.1107.5.8.21

Implementation Version Name	AI-Rad Companion

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3 Introduction

3.1 Revision History

Version	Date	Change
R1.0	24/03/2023	Released after implementing review comments.
R0.1	16/03/2023	Initial Version for VA5x

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 Prostate MR** 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 Prostate MR** 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
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
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
RTSS	Radiotherapy Structure Set

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 teamplay DICOM Hub and teamplay Receiver [1] for further information on the provided networking capabilities for AI-Rad Companion Prostate MR.

AI-Rad Companion Prostate MR only supports subset of transfer syntaxes supported by teamplay and the following table lists the supported transfer syntaxes.

Table 4: Supported Transfer Syntaxes

Abstract Syntax		Transfer Syntax		FSC	FSR	Role	Extension Negotiation
SOP Classes	**SOP Class UID**	**Name List**	**UID List**				
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	No	Yes	SCP/ SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	No	Yes		
		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		
		JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	No	Yes		
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	No	Yes	SCP/ SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	No	Yes		
		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		
		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	Implicit VR Little Endian	1.2.840.10008.1.2	No	Yes	SCP/ SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	No	Yes		
		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		
		JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	No	Yes		
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	No	No	SCP/ SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	No	No		
		Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No		
		JPEG Lossless	1.2.840.10008.1.2.4.70	No	No		
		JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	No	No		

5 Media Interchange

AI-Rad Companion Prostate MR 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 Prostate MR

AI-Rad Companion Prostate MR 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 SCS (Special Character Sets) 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 ← → (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in GB18030 ← → (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in ISO 2022 ← → (0008,0005) contains ISO_IR 192
- An attribute value is encoded in ISO 2022 ← → (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 Prostate MR 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 Prostate MR 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 RT Structure Set Storage

Table 9: RT Structure Set IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient Module	Table 10	ALWAYS
Study	General Study Module	Table 11	ALWAYS
	Patient Study Module	Table 12	ALWAYS
Series	RT Series Module	Table 13	ALWAYS
Frame of Reference	Frame of Reference Module	Table 14	ALWAYS
Equipment	General Equipment Module	Table 15	ALWAYS
Structure Set	Structure Set Module	Table 16	ALWAYS
	ROI Contour Module	Table 17	ALWAYS
	RT ROI Observations Module	Table 18	ALWAYS
	Approval Module	Table 19	ALWAYS
	SOP Common Module	Table 20	ALWAYS

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 10 lists all Attributes that are supported in the Patient Module.

Table 10: Patient Module

Attribute	Tag	Source	Value	Presence	Comments
Patient`s Name	(0010,0010)	AUTO	Copied from source image	ALWAYS	
Patient ID	(0010,0020)	AUTO	Copied from source image	ALWAYS	
Patient`s Birth Date	(0010,0030)	AUTO	Copied from source image	VNAP	
Patient`s Sex	(0010,0040)	AUTO	Copied from source image	VNAP	
Issuer of Patient ID	(0010, 0021)	AUTO	Copied from source image	VNAP	

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

Table 11: General Study Module

Attribute	Tag	Source	Value	Presence	Comments
Study Date	(0008,0020)	AUTO	Copied from source image	ALWAYS	
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	ALWAYS	

Table 12 lists all Attributes that are supported in the Patient Study Module

Table 12: Patient Study Module

Attribute	Tag	Source	Value	Presence	Comments
Patient`s Age	(0010,1010)	AUTO	Copied from source image	VNAP	
Patient`s Size	(0010,1020)	AUTO	Copied from source image	VNAP	
Patient`s Weight	(0010,1030)	AUTO	Copied from source image	VNAP	

Table 13 lists all Attributes that are supported in the RT Series Module

Table 13: RT Series Module

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	

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	RTSTRUCT	ALWAYS	
Series Description	(0008,103E)	AUTO	StructureSet_<Series Date>_<Series Time>	ALWAYS	
Operators Name	(0008,1070)	AUTO	Name of the operator logged on to the system	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	Unique identifier of the series.	ALWAYS	
Series Number	(0020,0011)	AUTO	Unique identifier of the series.	ALWAYS	

Table 14 lists all Attributes that are supported in the Frame of Reference Module

Table 14: Frame of Reference Module

Attribute	Tag	Source	Value	Presence	Comments
Frame of Reference UID	(0020,0052)	AUTO	Copied from source image	ALWAYS	
Position Reference Indicator	(0020,1040)	AUTO		EMPTY	

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

Table 15: General Equipment Module

Attribute	Tag	Source	Value	Presence	Comments
Manufacturer	(0008,0070)	AUTO	Siemens Healthineers	ALWAYS	
Station Name	(0008,1010)	AUTO	Copied from input image	ALWAYS	
Manufacturer's Model Name	(0008,1090)	AUTO	AI-Rad Companion Prostate MR	ALWAYS	
Device Serial Number	(0018,1000)	AUTO	AI-Rad Companion system IVK number + teamplay serial number	ALWAYS	
Software Versions	(0018,1020)	AUTO	VXXXX where XXXX indicates the used version of Prostate MR. For Example:- VA50A.	ALWAYS	

Table 16 lists all Attributes that are supported in the Structure Set Module

Table 16: Structure Set Module

Attribute	Tag	Source	Value	Presence	Comments
Structure Set Label	(3006,0002)	AUTO	RTSS_PROSTATE	ALWAYS	
Structure Set Name	(3006,0004)	AUTO	RTSS_PROSTATE	ALWAYS	
Structure Set Date	(3006,0008)	AUTO	Creation date of Structure Set	ALWAYS	
Structure Set Time	(3006,0009)	AUTO	Creation time of Structure Set	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Referenced Frame of Reference Sequence	(3006,0010)	AUTO	Sequence describing Frames of Reference in which the ROIs are defined.	ALWAYS	
>Frame of Reference UID	(0020,0052)	AUTO	Copied from source image	ALWAYS	
>RT Referenced Study Sequence	(3006,0012)	AUTO	Sequence of Studies containing Series to be referenced.	ALWAYS	
>>Referenced SOP Class UID	(0008,1150)	AUTO	SOP class UID of the source image	ALWAYS	
>>Referenced SOP Instance UID	(0008,1155)	AUTO	SOP Instance UID of the source image	ALWAYS	
>>RT Referenced Series Sequence	(3006,0014)	AUTO	Sequence describing Series of images within the referenced Study that are used in defining the Structure Set.	ALWAYS	
>>>Series Instance UID	(0020,000E)	AUTO	Series instance UID of the source image	ALWAYS	
>>>Contour Image Sequence	(3006,0016)	AUTO	Sequence of Items describing images in a given Series used in defining the Structure Set. One or more Items shall be included in this Sequence.	ALWAYS	
>>>>Referenced SOP Class UID	(0008,1150)	AUTO	SOP class UID of all the images of the source series	ALWAYS	
>>>>Referenced SOP Instance UID	(0008,1155)	AUTO	SOP Instance UID of all the images of the source series	ALWAYS	
Structure Set ROI Sequence	(3006,0020)	AUTO	ROIs for current Structure Set. One or more Items shall be included in this Sequence.	ALWAYS	
>ROI Number	(3006,0022)	AUTO	Identification number of the ROI starting from 1. The value of ROI Number shall be unique within the Structure Set in which it is created.	ALWAYS	
>Referenced Frame of Reference UID	(3006,0024)	AUTO	Copied from source image	ALWAYS	
>ROI Name	(3006,0026)	USER	Name of the Findings i.e. Prostate, Lesion1, Lesion 2, etc., as updated by the user in the system	ALWAYS	
>ROI Generation Algorithm	(3006,0036)	AUTO	MANUAL	ALWAYS	

Table 17 lists all Attributes that are supported in the ROI Contour Module

Table 17: ROI Contour Module

Attribute	Tag	Source	Value	Presence	Comments
ROI Contour Sequence	(3006,0039)	AUTO	Sequence of Contour Sequences defining ROIs. One or more Items may be possible in this Sequence.	ALWAYS	
>ROI Display Color	(3006,002A)	AUTO	RGB triplet color representation for both prostate and lesions.	ALWAYS	
>Contour Sequence	(3006,0040)	AUTO	Sequence of Contours defining ROI. One or more Items may be possible in this Sequence.	ALWAYS	
>>Contour Image Sequence	(3006,0016)	AUTO	Sequence of images containing the contour.	ALWAYS	
>>>Referenced SOP Class UID	(0008,1150)	AUTO	SOP class UID of the image having the Contour Data	ALWAYS	
>>>Referenced SOP Instance UID	(0008,1155)	AUTO	SOP Instance UID of the image having the Contour Data.	ALWAYS	
>>Contour Geometric Type	(3006,0042)	AUTO	CLOSED_PLANAR	ALWAYS	
>>Number of Contour Points	(3006,0046)	AUTO	Number of points in Contour Data (3006,0050)	ALWAYS	
>>Contour Number	(3006,0048)	AUTO	Identification number of the contour starting from 1. The value of Contour Number shall be unique within the Contour Sequence in which it is defined.	ALWAYS	
>>Contour Data	(3006,0050)	AUTO	Sequence of (x,y,z) triplets defining a contour which is result of the algorithm/modified by the user.	ALWAYS	
>Referenced ROI Number	(3006,0084)	AUTO	Uniquely identifies the referenced ROI described in the Structure Set ROI Sequence	ALWAYS	

Table 18 lists all Attributes that are supported in the RT ROI Observations Module

Table 18: RT ROI Observations Module

Attribute	Tag	Source	Value	Presence	Comments
RT ROI Observations Sequence	(3006,0080)	AUTO	Sequence of observations related to ROIs	ALWAYS	
>Observation Number	(3006,0082)	AUTO	Identification number of the Observation. The value of Observation Number shall be	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
			unique within the RT ROI Observations Sequence		
>Referenced ROI Number	(3006,0084)	AUTO	Uniquely identifies the referenced ROI described in the Structure Set ROI Sequence.	ALWAYS	
>RT ROI Identification Code Sequence	(3006,0086)	AUTO	Sequence containing Code used to identify ROI.	ALWAYS	
>RT ROI Interpreted Type	(3006,00A4)	AUTO	ORGAN	ALWAYS	
>ROI Interpreter	(3006,00A6)	AUTO		ALWAYS	

Table 19 lists all Attributes that are supported in the Approval Module

Table 19: Approval Module

Attribute	Tag	Source	Value	Presence	Comments
Approval Status	(300E,0002)	AUTO	UNAPPROVED	ALWAYS	

Table 20 lists all Attributes that are supported in the SOP Common Module

Table 20: 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	RT Structure Set - 1.2.840.10008.5.1.4.1.1.481.3 Secondary Capture - 1.2.840.10008.5.1.4.1.1.7 DICOM SR- 1.2.840.10008.5.1.4.1.1.88.33	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 DICOM Structured Report

Table 21: Structured Report IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 10	ALWAYS

Study	General Study	Table 11**Error! R eference source not found.**	ALWAYS
	Patient Study	Table 12	ALWAYS
Series	SR Document Series	Table 22	ALWAYS
Equipment	General Equipment	Table 15	ALWAYS
Document	SR Document General	Table 23	ALWAYS
	SR Document Content	Table 24	ALWAYS
	SOP Common	Table 20	ALWAYS

Table 22 lists all Attributes that are supported in the SR Document Series Module

Table 22: 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	A number that identifies the Series.	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	ALWAYS	

Table 23 lists all Attributes that are supported in the SR Documents General Module

Table 23: SR Document General Module

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	Unique identifier	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	

Attribute	Tag	Source	Value	Presence	Comments
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	Unique code value	ALWAYS	
>Code value	(0008, 0100)	AUTO	126021	ALWAYS	
>Code Scheme Designator	(0008, 0102)	AUTO	DCM	ALWAYS	
>Code Meaning	(0008, 0103)	AUTO	Multiparametric MRI of prostate	ALWAYS	

Table 24 lists all Attributes that are supported in the SR Document Content Module

Table 24: SR Document Content Module

Please refer to **Table *35*: Imaging Measurement Report for DICOM SR** for details regarding SR document content module.

10.1.1.3 Secondary Capture Report

Table 25: Secondaty Capture IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient Module	Table 10	ALWAYS
Study	General Study Module	Table 11	ALWAYS
	Patient Study Module	Table 12	ALWAYS
Series	General Series Module	Table 26	ALWAYS
Equipment	General Equipment Module	Table 15	ALWAYS
	SC Equipment Module	Table 27	ALWAYS
Image	General Image Module	Table 28	ALWAYS
	Image Pixel Module	Table 29	ALWAYS
	SC Image Module	Table 30	ALWAYS
	SOP Common	Table 20	ALWAYS

Table 26 lists all Attributes that are supported in the General Series IOD Module

Table 26: 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	

Attribute	Tag	Source	Value	Presence	Comments
Series Description	(0008,103E)	AUTO	<Protocol Name>_REPORT	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	Copied from input image	ANAP	
Operators Name	(0008,1070)	AUTO	empty	ANAP	
Body Part Examined	(0018,0015)	AUTO	Copied from input image	ALWAYS	
Protocol Name	(0018,1030)	AUTO	Copied from input image	ALWAYS	
Patient Position	(0018,5100)	AUTO	Copied from input image	VNAP	
Series Instance UID	(0020,000E)	AUTO	Unique identifier of the series.	ALWAYS	
Series Number	(0020,0011)	AUTO	1	ALWAYS	
Performed Procedure Step Start Date	(0040,0244)	AUTO	<Study Date>	ALWAYS	
Performed Procedure Step Start Time	(0040,0245)	AUTO	<Study Time>	ALWAYS	
Performed Procedure Step Start ID	(0040,0253)	AUTO	0	ALWAYS	
Performed Procedure Step Description	(0040,0254)	AUTO	Copied from input image	ALWAYS	

Table 27 lists all Attributes that are supported in the SC Equipment IOD Module

Table 27: SC Equipment IOD Modules

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

Table 28 lists all Attributes that are supported in the General Image IOD Module

Table 28: General Image IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY\OTHER\REPORT	ALWAYS	
Content Date	(0008, 0023)	AUTO	Date when series is created	ALWAYS	
Content Time	(0008,0033)	AUTO	Time when series is created	ALWAYS	
Instance Number	(0020,0013)	AUTO	1	ALWAYS	
Patient Orientation	(0020,0020)	AUTO	Copied from input image	ANAP	

Table 29 lists all Attributes that are supported in the Image Pixel IOD Module

Table 29: Image pixel IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Samples per Pixel	(0028,0002)	AUTO	3	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	Copied from input image	ALWAYS	
Planar Configuration	(0028,0006)	AUTO	0	ALWAYS	
Rows	(0028,0010)	AUTO	1024	ALWAYS	
Columns	(0028,0011)	AUTO	1024	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 30 lists all Attributes that are supported in the SC Image IOD Module

Table 30: SC Image IOD Modules

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

10.1.1.4 MR Burnt-in Images Report

Table 31 MR Image IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient Module	Table 10	ALWAYS
Study	General Study Module	Table 11	ALWAYS
	Patient Study Module	Table 12	ALWAYS
Series	General Series Module	Table 26	ALWAYS
Equipment	General Equipment Module	Table 15	ALWAYS
Image	General Image Module	Table 28	ALWAYS
	Image Plane Module	*Table 32*	ALWAYS
	Image Pixel Module	Table *29*	ALWAYS
	MR Image Module	*Table 33*	ALWAYS
	SOP Common	Table 20	ALWAYS

Table *32* lists all Attributes that are supported in the Image Plane Module

Table 32 Image Plane Module

Attribute	Tag	Source	Value	Presence	Comments
Pixel Spacing	(0028, 0030)	AUTO	Copied from input image	ALWAYS	
Image Orientation	(0028, 0037)	AUTO	Copied from input image	ALWAYS	
Image Position	(0028, 0032)	AUTO	Copied from input image	ALWAYS	
Slice Thickness	(0018, 0050)	AUTO	Copied from input image	ALWAYS	
Slice Location	(0020, 1041)	AUTO	Copied from input image	ALWAYS	

Table *33* lists all Attributes that are supported in the MR Image module

Table 33 MR Image Module

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	DERIVED\SECONDARY\OTHER\ MASKED	ALWAYS	
Samples per Pixel	(0028,0002)	AUTO	Copied from input image	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	Copied from input image	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	Copied from input image	ALWAYS	
Scanning Sequence	(0018,0020)	AUTO	Copied from input image	ALWAYS	
Sequence Variant	(0018,0021)	AUTO	Copied from input image	ALWAYS	
Scan Options	(0018,0022)	AUTO	Copied from input image	ALWAYS	
MR Acquisition Type	(0018,0023)	AUTO	Copied from input image	ALWAYS	
Repetition Time	(0018,0080)	AUTO	Copied from input image	ALWAYS	
Echo Time	(0018,0081)	AUTO	Copied from input image	ALWAYS	
Echo Train Length	(0018,0091)	AUTO	Copied from input image	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 34 lists all private attributes created by AI-Rad Companion Prostate MR which may be included in the generated instances

Table 34 Private Data Element Dictionary

Attribute	Private Owner Code	Name	VR	VM	Description
(0021, xx01)	SIEMENS MR SDR 01	CreatorIdentifier	LO	1	Character string
(0021, xx02)	SIEMENS MR SDR 01	ApplicationIdentifier	LO	1	Character string
(0021, xx01)	SIEMENS MR AIRC	glandVolume	FD	1	Floating point double value (ml)
(0021, xx02)	SIEMENS MR AIRC	psa	FD	1	Floating point double value (ng/ml)
(0021, xx03)	SIEMENS MR AIRC	psaDensity	FD	1	Floating point double value (ng/ml2)

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 35: Imaging Measurement Report for DICOM SR

Nesting Level	Relationship Type	Value Type	Concept Name	Values	TID
		CONTAINER	EV (126000, DCM, "Imaging Measurement Report")	Imaging Measurement Report	1500
>	CONTAINS	CODE	EV (111017, DCM, “CAD Processing and Findings Summary”)	All algorithms succeeded; with findings	4001
>	CONTAINS	CODE	EV (111064, DCM, “Summary of Detections”)	Succeeded, Partially Succeeded, Failed	4000
>>	INFERREDFROM	CONTAINER	EV (111063, DCM, “Successful Detections”)		4015
>>>	CONTAINS	CODE	EV (111022, DCM, “Detection Performed”)	(PROSTATEMR001, 99SHSAIRC, "AI-Rad Companion Prostate MR")	4017
>>>>	HAS PROPERTIES	TEXT	EV (111001, DCM, "Algorithm Name")	Prostate AI	4019
>>>>	HAS PROPERTIES	TEXT	EV (111003, DCM, "Algorithm Version")	Version of the algorithm with which the findings were found For example: VB60	4019

>>>>	HAS PROPERTIES	IMAGE		Contains the reference to the original input image	4017
>	CONTAINS	CONTAINER	EV (126010, DCM, “Imaging Measurements”)		1500
>>	CONTAINS	CONTAINER	EV (125007, DCM, “Measurement Group”)		1411
>>>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, “Tracking Identifier”)	Prostate	1411
>>>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, “Tracking Unique Identifier”)		1411
>>>	HAS CONCEPT MOD	CODE	EV ("363698007", "SCT", "Finding Site")	(41216001, SCT, "Prostate")	
>>>	CONTAINS	IMAGE	EV ("130401", "DCM", "Visual explanation")	Reference image	1411
>>>	CONTAINS	NUM	EV ("C25335", "NCIt", "Volume")	Prostate gland volume; Units: ml	1402
>>>	CONTAINS	NUM	EV (“63476009”, “SCT”, “PSA”)	PSA value entered by user; Units:ng/ml	
>>>	CONTAINS	NUM	EV (LN, 15325-4, "PSA Density")	Computed PSA density; Units:ng/ml2	
>>>	CONTAINS	CODE	(“RID50294”, “RADLEX”, “PI-RADS Overall Assessment Category”)	Overall PI-RADS value ("RID50289", "RADLEX", "PI-RADS 1 - Very low"), ("RID50290", "RADLEX", "PI-RADS 2 - Low"), ("RID50291", "RADLEX", "PI-RADS 3 - Intermediate"), ("RID50292", "RADLEX", "PI-RADS 4 - High"), ("RID50293", "RADLEX", "PI-RADS 5 - Very high"), ("RID50322", "RADLEX", "PI-RADS X - Inadequate or absent")	4302
>>>	CONTAINS	CODE	("RID49482", "RADLEX", "category 3 actionable finding")	("RID49482", "RADLEX", "category 3 actionable finding") "RID50261", "RADLEX", "non-actionable finding")	
>>	CONTAINS	CONTAINER	EV (125007, DCM, “Measurement Group”)		1411
>>>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, “Tracking Identifier”)	Lesion N (1,2,.....n), repeated in case n lesions are detected.	1411
>>>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, “Tracking Unique Identifier”)		1411
>>>	CONTAINS	CODE	(121071, DCM, Finding)	(Finding, RID38780, "Lesion")	
>>>	HAS CONCEPT MOD	CODE	EV ("363698007", "SCT", "Finding Site")	Localization of the lesion, one of the following code: (716901006, SCT, "Central zone of Left half prostate"); (716900007, SCT, "Central zone of Right half prostate"); (716937001, SCT, "Left anterior apical peripheral zone of prostate"); (716931000, SCT, "Left anterior apical transition zone of prostate"); (716905002, SCT, "Left anterior basal peripheral zone of prostate"); (716897000, SCT, "Left anterior basal transition zone of prostate"); (716920008, SCT, "Left anterior middle peripheral zone of prostate"); (716914007, SCT, "Left anterior middle transition zone of prostate");	

				(716927006, SCT, "Left apical anterior fibromuscular stroma of prostate"); (716893001, SCT, "Left basal anterior fibromuscular stroma of prostate"); (716910003, SCT, "Left middle anterior fibromuscular stroma of prostate"); (716933002, SCT, "Left posterior apical transition zone of prostate"); (716899002, SCT, "Left posterior basal transition zone of prostate"); (716916009, SCT, "Left posterior middle transition zone of prostate"); (716939003, SCT, "Left posterolateral apical peripheral zone of prostate"); (716907005, SCT, "Left posterolateral basal peripheral zone of prostate"); (716922000, SCT, "Left posterolateral middle peripheral zone of prostate"); (716941002, SCT, "Left posteromedial apical peripheral zone of prostate"); (716924004, SCT, "Left posteromedial middle peripheral zone of prostate"); (716936005, SCT, "Right anterior apical peripheral zone of prostate"); (716930004, SCT, "Right anterior apical transition zone of prostate"); (716904003, SCT, "Right anterior basal peripheral zone of prostate"); (716896009, SCT, "Right anterior basal transition zone of prostate"); (716919002, SCT, "Right anterior middle peripheral zone of prostate"); (716913001, SCT, "Right anterior middle transition zone of prostate"); (716926002, SCT, "Right apical anterior fibromuscular stroma of prostate"); (716892006, SCT, "Right basal anterior fibromuscular stroma of prostate"); (716909008, SCT, "Right middle anterior fibromuscular stroma of prostate"); (716932007, SCT, "Right posterior apical transition zone of prostate"); (716898005, SCT, "Right posterior basal transition zone of prostate"); (716915008, SCT, "Right posterior middle transition zone of prostate"); (716938006, SCT, "Right posterolateral apical peripheral zone of prostate"); (716906001, SCT, "Right posterolateral basal peripheral zone of prostate"); (716921007, SCT, "Right posterolateral middle peripheral zone of prostate"); (716940001, SCT, "Right posteromedial apical peripheral zone of prostate");	

				(716923005, SCT, "Right posteromedial middle peripheral zone of prostate")	
>>>	CONTAINS	IMAGE	("130401", "DCM", "Visual explanation")	Reference to explanatory image (slice showing the lesion)	
>>>	CONTAINS	NUM	EV (“81827009”, SCT, Diameter)	Diameter value detected by AI or user defined value. Unit: cm	
>>>>	INFERRED FROM	SCOORD		Graphic data (0070, 0022) and Graphic type (0070,0023) atrributes are added.	320
>>>	CONTAINS	CODE	EV (“RID50295”, RADLEX, PI-RADS Lesion Assessment Category)	PI-RADS assessment of the individual lesion, one of the following: (RID50296, RADLEX, "PI-RADS 1 - Very low (Lesion)"), ("RID50297", RADLEX, "PI-RADS 2 - Low (Lesion)"), ("RID50298", RADLEX, "PI-RADS 3 - Intermediate (Lesion)"), ("RID50299", RADLEX, "PI-RADS 4 - High (Lesion)"), ("RID50300", RADLEX, "PI-RADS 5 - Very high (Lesion)"), ("RID50323", RADLEX, "PI-RADS X - Inadequate or absent (Lesion)")	4306
>>>	CONTAINS	UIDREF	EV (121232, DCM, “Source series for segmentation”)		1411
>>>	CONTAINS	Text	EV (121106, DCM, “Comment”)		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”)	Device	1002
>	HAS OBS CONTEXT	UIDREF	EV (121012, DCM, “Device Observer UID”)		1004
>	HAS OBS CONTEXT	TEXT	EV (121014, DCM, “Device Observer Manufacturer”)	Siemens Healthineers	1004
>	HAS OBS CONTEXT	TEXT	EV (121015, DCM, “Device Observer Model Name”)	AI Rad Companion Prostate MR	1004
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, “Procedure reported”)	(126021, DCM, "Multiparametric MRI of Prostate")	1500
>	CONTAINS	CONTAINER	EV (111028, DCM, “Image Library”)		1600
>>	CONTAINS	CONTAINER	EV (126200, DCM, “Image Library Group”)		1600
>>>>	HAS ACQ CONTEXT	CODE	EV (121139, DCM, “Modality”)	(MR, DCM, "Magnetic Resonance")	1602
>>>>	HAS ACQ CONTEXT	DATE	EV (111060, DCM, “Study Date”)	Copied from input image	1602
>>>>	HAS ACQ CONTEXT	TIME	EV (111061, DCM, “Study Time”)	Copied from input image	1602

10.3.3 Private Code definitions

AI-Rad Companion Prostate MR uses the private coding scheme designator 99SHSAIRC_STRUCTCODE to identify Prostate assessment in the system.

10.4 Grayscale Image Consistency

N/A

10.5 Standard Extended / Specialized / Private SOP Classes

Comprehensive DICOM SR '1.2.840.10008.5.1.4.1.1.88.33' is extended by the following attribute.

Attribute	Tag	Source	Value	Presence	Comments
Operator's Name	(0008,1070)	AUTO	empty	ALWAYS	

10.6 Private Transfer Syntaxes

N/A

Index of Tables

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