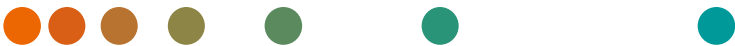


DICOM Conformance Statement

AI-Rad Companion Brain MR VA5x



1 Overview

AI-Rad Companion Brain 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.

AI-Rad Companion Brain MR:

- Displays images to a user (browser-based viewer application).
- Stores result DICOM data via teamplay DICOM Hub to one or several target DICOM node configured in teamplay DICOM Hub.

AI-Rad Companion Brain MR conforms to the DICOM Standard [2] and supports a subset of the storage SOP classes supported by teamplay DICOM Hub, as described in Table 1 - Network Services.

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

NOTE: This DICOM Conformance Statement is applicable for **AI-Rad Companion Brain MR** of version VA5x and later until superseded by a more recent document applicable to a more recent version.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)	
		Create	Send	Store	Display
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No ¹	No ¹	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	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
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No ¹	No ¹	No

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

Note:

- Colors superimposed algorithm results are encoded using MR Image Storage (1.2.840.10008.5.1.4.1.1.4) in the following result series
 - 1) <OriginalInputSeriesDescription>_Morpho_Deviation
 - 2) <OriginalInputSeriesDescription>_Morpho_Fused_Deviation
 - 3) <OriginalInputSeriesDescription>_Morpho_Label
 - 4) <OriginalInputSeriesDescription>_Morpho_Fused_Label
 - 5) <OriginalInputSeriesDescription>_WMH_Label
 - 6) <OriginalInputSeriesDescription>_WMH_Fused_Label
 - 7) <OriginalInputSeriesDescription>_WMH_ProgressionMap
 - 8) <OriginalInputSeriesDescription>_WMH_Fused_ProgressionMap
- The objects violating the MR Image Storage IOD using the following attribute values are
 - 1) (0028,0002) Samples per pixel as 3
 - 2) (0028,0004) Photometric Interpretation as "RGB"
 - 3) (0028,0100) Bits Allocated as 8

3. In Enhanced SR IOD, Device UID (0018, 1002) added as part of Contributing equipment sequence (0018,A001) is a violation of DICOM standard.This can be considered as standard extended SOP class UID. There is a request [Change request ID (DICOM CP2062) to add Device UID to the Contributing equipment sequence.

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
NOT APPLICABLE		

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	15/05/2023	First 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 Brain MR** and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [2]. 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 Brain 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
NEMA	National Electrical Manufacturers Association

O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
ROI	Region Of Interest
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
WMH	White Matter Hyperintensities

3.5 References

- [1] DICOM Conformance Statements of teamplay DICOM Hub – <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 Statement of teampay DICOM Hub [1] for further information on the provided networking capabilities for AI-Rad Companion Brain MR.

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

Table 4: Supported Transfer Syntaxes

Abstract Syntax		Transfer Syntax		Read	Create	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/S CU	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	Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No	SCP	None
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes	No	SCP	None

5 Media Interchange

AI-Rad Companion Brain MR is not providing any means for media interchange.

6 Transformations of DICOM to CDA

NOT APPLICABLE

7 Support of Extended Character Sets

7.1 Character sets for AI-Rad Companion Brain MR

AI-Rad Companion Brain 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 $\leftarrow \rightarrow$ (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 Brain 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.

9 Security

9.1 Security Profiles

AI-Rad Companion Brain MR does not support any specific security measures.

9.2 Association Level Security

It is possible to configure whether the SCP will only answer to known AETs or to any AET.

9.3 Application Level Security

NOT APPLICABLE

10 Annexes

The tables in these section uses 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

10.1 IOD Contents

10.1.1 Created SOP Instances

10.1.1.1 Enhanced SR

Table 9: Enhanced SR IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 10	ALWAYS
Study	General Study	Table 11	ALWAYS
	Patient Study	Table 12	ALWAYS
Series	SR Document Series	Table 13	ALWAYS
Equipment	General Equipment	Table 14	ALWAYS
Document	SR Document General	Table 15	ALWAYS
	SR Document Content	Table 16	ALWAYS
	SOP Common	Table 17	ALWAYS

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	

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

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	

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

Table 13: 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	2012	ALWAYS	
Series Date	(0008,0021)	AUTO	Date the Series started.	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Series Time	(0008,0031)	AUTO	Time the Series started.	ALWAYS	
Protocol Name	(0018, 1030)	AUTO	Copied from source image	ALWAYS	
Series Description	(0018, 103E)	AUTO	Description of the SR series Example values Morpho_WMH_SR Morpho_SR WMH_SR	ALWAYS	
Referenced Performed Procedure Step Sequence	(0008,1111)	AUTO		EMPTY	

Table 14 lists all Attributes that are supported in the General Equipment Module

Table 14: 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 Brain MR	ALWAYS	
Device Serial Number	(0018,1000)	AUTO	9999999	ALWAYS	
Software Versions	(0018,1020)	AUTO	VXXXX where XXXX indicates the used version of AI-Rad Companion Brain MR. For Example: - VA50A.	ALWAYS	

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

Table 15: 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	
Performed Procedure Code Sequence	(0040,A372)	AUTO		ALWAYS	
> Code Value	(0008,0100)	AUTO	24590-2	ALWAYS	
> Coding Scheme Designator	(0008,0102)	AUTO	LN	ALWAYS	LOINC code

Attribute	Tag	Source	Value	Presence	Comments
> Coding Scheme Version	(0008,0103)	AUTO	Brain MRI	ALWAYS	
Current Requested Procedure Evidence Sequence	(0040,A375)	AUTO		ALWAYS	
> Study Instance UID	(0020,000D)	AUTO	Study instance UID of the referenced study	ALWAYS	
> Referenced Series Sequence	(0008,1115)	AUTO		ALWAYS	
>> Series Instance UID	(0020,000E)	AUTO	Series instance UID of the referenced series	ALWAYS	
>> Referenced SOP Sequence	(0008,1199)	AUTO		ALWAYS	
>>> Referenced SOP Class UID	(0008,1150)	AUTO	SOP Class UID of the referenced Instance	ALWAYS	
>>> Referenced SOP Instance UID	(0008,1155)	AUTO	SOP Instance UID of the referenced Instance	ALWAYS	

Table 16 lists all Attributes that are supported in the SR Document Content Module

Table 16: SR Document Content Module

Attribute	Tag	Source	Value	Presence	Comments
Value Type	(0040,A040)	AUTO	CONTAINER	ALWAYS	
Concept Name Code Sequence	(0040,A043)	AUTO		ALWAYS	
> Code Value	(0008,0100)	AUTO	126000	ALWAYS	
> Coding Scheme Designator	(0008,0102)	AUTO	DCM	ALWAYS	
> Code Meaning	(0008,0104)	AUTO	Imaging Measurement Report	ALWAYS	
Content Sequence	(0040,A730)	AUTO		ALWAYS	

Refer to **Table 36** for details regarding SR document content module.

Table 17 lists all Attributes that are supported in the SOP Common Module

Table 17: SOP Common Module

Attribute	Tag	Source	Value	Presence	Comments
Specific Character Set	(0008,0005)	AUTO	ISO_IR 192	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	SOP Class UID of the respective DICOM Object	ALWAYS	
SOP Instance UID	(0008,0018)	AUTO	Unique Identifier of the instance	ALWAYS	
Timezone Offset from UTC	(0008,0201)	AUTO	Copied from the original image. If not present then it is +0000	ALWAYS	
Instance Number	(0020,0013)	AUTO	A number that identifies this Composite object instance.	ALWAYS	

10.1.1.2 Secondary Capture Report

Table 18: Secondary Capture IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 10	ALWAYS
Study	General Study	Table 11	ALWAYS
	Patient Study	Table 12	ALWAYS
Series	General Series	Table 19	ALWAYS
Equipment	General Equipment	Table 14	ALWAYS
	SC Equipment	Table 20	ALWAYS
Image	General Image	Table 21	ALWAYS
	Image Pixel	Table 22	ALWAYS
	SC Image	Table 23	ALWAYS
	SOP Common	Table 17	ALWAYS

Table 19 lists all Attributes that are supported in the General Series IOD Module

Table 19: General Series IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	Type of equipment that originally acquired the data used to create the images in this Series. Value: MR	ALWAYS	
Series Instance UID	(0020,000E)	AUTO	Unique identifier of the series.	ALWAYS	
Series Number	(0020,0011)	AUTO	Label Map - 2001 Deviation Map - 2002 Fused Label Map SAGITAL - 2003 Fused Deviation Map SAGITAL - 2004 Distribution Map - 2009 Fused Distribution Map SAGITAL - 2010 Fused Progression Map SAGITAL - 2013 Progression Map - 2014 Fused Label Map CORONAL - 2015 Fused Label Map TRANSVERSAL - 2016 Fused Deviation Map CORONAL - 2017 Fused Deviation Map TRANSVERSAL - 2018 Fused Distribution Map CORONAL - 2019 Fused Distribution Map TRANSVERSAL - 2020 Fused Progression Map CORONAL - 2021 Fused Progression Map TRANSVERSAL – 2022 SC Report - 2005	ALWAYS	
Series Date	(0008,0021)	AUTO	Date when series is created	ALWAYS	
Series Time	(0008,0031)	AUTO	Time when series is created	ALWAYS	
Performing Physician's Name	(0008,1050)	AUTO	Copied from input image	ANAP	
Protocol Name	(0018,1030)	AUTO	Copied from input image	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Series Description	(0008,103E)	AUTO	<Protocol Name>_REPORT Values can be one of the below Morpho_WMh_SR Morpho_SR WMh_SR	ALWAYS	
Body Part Examined	(0018,0015)	AUTO	Copied from input image	ALWAYS	
Patient Position	(0018,5100)	AUTO	Copied from input image	VNAP	
Performed Procedure Step Start Date	(0040,0244)	AUTO	<Study Date>	ALWAYS	
Performed Procedure Step Start Time	(0040,0245)	AUTO	<Study Time>	ALWAYS	

Table 20 lists all Attributes that are supported in the SC Equipment IOD Module

Table 20: SC Equipment IOD Modules

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

Table 21 lists all Attributes that are supported in the General Image IOD Module

Table 21: General Image IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	A number that identifies this image. Which is a running number of the instance.	ALWAYS	
Patient Orientation	(0020,0020)	AUTO	Copied from input image	ANAP	
Content Date	(0008, 0023)	AUTO	Date when series is created	ALWAYS	
Content Time	(0008,0033)	AUTO	Time when series is created	ALWAYS	
Image Type	(0008,0008)	AUTO	The below values is applicable for both Morphometry and WMH. DERIVED\SECONDARY\OTHER\MORPHOREPORT\MORPHO	ALWAYS	

Table 22 lists all Attributes that are supported in the Image Pixel IOD Module

Table 22: 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 23 lists all Attributes that are supported in the SC Image IOD Module

Table 23: SC Image IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Date of Secondary Capture	(0018,1012)	AUTO	The date the Secondary Capture Image was captured.	ALWAYS	
Time of Secondary Capture	(0018,1014)	AUTO	The time the Secondary Capture Image was captured.	ALWAYS	
Pixel Spacing	(0028,0030)	AUTO	Copied from input image	ALWAYS	

10.1.1.3 Encapsulated PDF Storage

Table 24: Encapsulated PDF Storage IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 10	ALWAYS
Study	General Study	Table 11	ALWAYS
	Patient Study	Table 12	ALWAYS
Series	Encapsulated Document Series	Table 25	ALWAYS
Equipment	General Equipment	Table 14	ALWAYS
	SC Equipment	Table 20	ALWAYS
Encapsulated Document	Encapsulated Document	Table 26	ALWAYS
	SOP Common	Table 17	ALWAYS

Table 25 lists all Attributes that are supported in the Encapsulated Document Series IOD Module

Table 25: Encapsulated Document Series IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Modality	(0008,0060)	AUTO	DOC	ALWAYS	Document Type
Series Instance UID	(0020,000E)	AUTO	Unique identifier of the Series.	ALWAYS	
Series Number	(0020,0011)	AUTO	2006	ALWAYS	

Table 26 lists all Attributes that are supported in the Encapsulated Document IOD Module

Table 26: Encapsulated Document IOD Modules

Attribute	Tag	Source	Value	Presence	Comments
Instance Number	(0020,0013)	AUTO	1	ALWAYS	
Content Date	(0008,0023)	AUTO	The date on which the document is generated	ALWAYS	
Content Time	(0008,0033)	AUTO	The time on which the document is generated	ALWAYS	
Acquisition DateTime	(0008,002A)	AUTO	The date and time on which the document is generated	EMPTY	
Burned In Annotation	(0028,0301)	AUTO	YES		
Document Title	(0042,0010)	AUTO		EMPTY	
Concept Name Code Sequence	(0040,A043)	AUTO		EMPTY	
MIME Type of Encapsulated Document	(0042,0012)	AUTO	application/pdf	ALWAYS	
Encapsulated Document	(0042,0011)	AUTO	Encapsulated Document stream	ALWAYS	

10.1.1.4 MR Image Storage

Table 27: MR Image Storage IOD Modules

Information Entity	Module	Reference	Presence of Module
Patient	Patient	Table 10	ALWAYS
Study	General Study	Table 11	ALWAYS
	Patient Study	Table 12	ALWAYS
Series	General Series	Table 19	ALWAYS
Frame of Reference	Frame of Reference	Table 28	ALWAYS
Equipment	General Equipment	Table 14	ALWAYS
Image	General Image	Table 21	ALWAYS
	Image Plane	Table 29	ALWAYS
	Image Pixel	Table 22	ALWAYS
	MR Image		ALWAYS
	SOP Common	Table 17	ALWAYS

Table 28: Frame of Reference Module Attributes

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

Table 29: Image Plane Module Attributes

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

Table 30: MR Image Module Attributes

Attribute	Tag	Source	Value	Presence	Comments
Image Type	(0008,0008)	AUTO	The value can be any one of the below based on the output image type <ul style="list-style-type: none"> DERIVED\SECONDARY\OTHER\DEV\MORPHO DERIVED\SECONDARY\OTHER\FUSEDMAP\MORPHO\CORONAL DERIVED\SECONDARY\OTHER\FUSEDMAP\MORPHO\SAGITTAL DERIVED\SECONDARY\OTHER\FUSEDMAP\MORPHO\TRANSVERSAL DERIVED\SECONDARY\OTHER\LABEL\MORPHO DERIVED\SECONDARY\OTHER\WMH\DISTRIBUTION_MAP DERIVED\SECONDARY\OTHER\WMH\FUSED_DM_WMH\CORONAL DERIVED\SECONDARY\OTHER\WMH\FUSED_DM_WMH\SAGITTAL DERIVED\SECONDARY\OTHER\WMH\FUSED_DM_WMH\TRANSVERSAL DERIVED\SECONDARY\OTHER\WMH\FUSED_PM_WMH\CORONAL DERIVED\SECONDARY\OTHER\WMH\FUSED_PM_WMH\SAGITTAL DERIVED\SECONDARY\OTHER\WMH\FUSED_PM_WMH\TRANSVERSAL DERIVED\SECONDARY\OTHER\WMH\PROGRESSION_MAP_WMH DERIVED\SECONDARY\OTHER\WMH\REGISTERED_FLAIR 	ALWAYS	
Samples per Pixel	(0028,0002)	AUTO	The value can be any one of the below based on the output image type <ul style="list-style-type: none"> 3 1 	ALWAYS	
Photometric Interpretation	(0028,0004)	AUTO	The value can be any one of the below based on the output image type <ul style="list-style-type: none"> RGB MONOCHROME2 	ALWAYS	
Bits Allocated	(0028,0100)	AUTO	The value can be any one of the below based on the output image type <ul style="list-style-type: none"> 8 16 	ALWAYS	

Attribute	Tag	Source	Value	Presence	Comments
Scan Options	(0018,0022)	AUTO		EMPTY	
MR Acquisition Type	(0018,0023)	AUTO	3D	ALWAYS	

10.1.2 Usage of Attributes from Received IODs

NOT APPLICABLE

10.1.3 Attribute Mapping

NOT APPLICABLE

10.1.4 Coerced/Modified Fields

NOT APPLICABLE

10.2 Data Dictionary of Private Attributes

NOT APPLICABLE

10.3 Coded Terminology and Templates

10.3.1 Context Groups

Table 31: CID 7021. Measurement Report Document Titles

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	126000	Imaging Measurement Report

Table 32: CID 7000. Diagnostic Imaging Report Document Titles

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
LN	24590-2	Brain MRI

Table 33: CID 4030. CT, MR and PET Anatomy Imaged

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SCT	12738006	Brain
SCT	113305005	Cerebellum

Table 34: CID 7140. Brain Structures for Volumetric Measurements

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SCT	40146001	Cerebral Gray Matter

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	110701	White Matter T1 Hypointensity
SCT	11000004	Caudate nucleus
SCT	14738005	Globus pallidus
SCT	5366008	Hippocampus
99SHSAIRC	BRAINMR1004	The four ventricles of the brain
SCT	66720007	Lateral Ventricle
SCT	49841001	Third Ventricle
SCT	35918002	Fourth Ventricle
99SHSAIRC	BRAINMR1005	Gray matter of frontal lobe
99SHSAIRC	BRAINMR1006	Gray matter of parietal lobe
99SHSAIRC	BRAINMR1007	Gray matter of occipital lobe
99SHSAIRC	BRAINMR1008	Gray matter of temporal lobe
99SHSAIRC	BRAINMR1009	Cingulate gyrus
RADLEX	RID17001	White matter of frontal lobe
RADLEX	RID17004	White matter of parietal lobe
RADLEX	RID17010	White matter of occipital lobe
RADLEX	RID17007	White matter of temporal lobe
DCM	110702	White Matter T2 Hyperintensity
RADLEX	RID6384	Periventricular
99SHSAIRC	BRAINMR1010	Juxtacortical
RADLEX	RID6381	Infratentorial
99SHSAIRC	BRAINMR1011	Deep white matter

Table 35: CID 7153. CNS Segmentation Types

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SCT	389081007	Gray Matter
SCT	389080008	White Matter
SCT	65216001	Cerebrospinal Fluid
SCT	42695009	Thalamus
SCT	89278009	Putamen
SCT	36169008	Insula
SCT	61962009	Mesencephalon
RADLEX	RID6728	Pons
RADLEX	RID6681	Medulla Oblongata

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
SCT	88442005	Corpus Callosum
RADLEX	RID5720	New
SCT	260376009	Enlarged

10.3.2 Template Specifications

Table 36: TID 1500 Measurement Report for Comprehensive DICOM SR – AI-Rad Companion Brain MR

Nesting Level	Relationship Type	Value Type	Concept Name	Values	TID
		CONTAINER	EV (126000, DCM, "Imaging Measurement Report")	AI Rad Companion Brain MR	1500
>	CONTAINS	CODE	EV (111017, DCM, "CAD Processing and Findings Summary")	(111242, DCM, "All algorithms succeeded; with findings") (111244, DCM, "Not all algorithms succeeded; with findings") (111245, DCM, "No algorithms succeeded; without findings")	4001
>	CONTAINS	CODE	EV (111064, DCM, "Summary of Detections")	(111222, DCM, "Succeeded") (111223, DCM, "Partially Succeeded") (111224, DCM, "Failed")	4000
>>	INFERREDFROM	CONTAINER	EV (111063, DCM, "Successful Detections")		4015
>>	INFERREDFROM	CONTAINER	EV (111025, DCM, "Failed Detections")		4015
>>>	CONTAINS	CODE	EV (111022, DCM, "Detection Performed")	AI-Rad Companion Brain Morphometry, AI-Rad Companion White Matter Hyperintensities	4017
>	CONTAINS	CONTAINER	EV (126010, DCM, "Imaging Measurements")		1500
>	CONTAINS	CONTAINER	EV (C0034375, UMLS, "Qualitative Evaluations")		1500
>>	CONTAINS	CONTAINER	EV (125007, DCM, "Measurement Group")		1411
>>>	HAS OBS CONTEXT	TEXT	DT (112039, DCM, "Tracking Identifier")		1411
>>>	HAS OBS CONTEXT	UIDREF	EV (112040, DCM, "Tracking Unique Identifier")		1411
>>>	CONTAINS	UIDREF	EV (121232, DCM, "Source series for segmentation")		1411
>>>	HAS CONCEPT MOD	TEXT	EV (111001, DCM, "Algorithm Name")	Morphometry, WMH	4019
>>>	HAS CONCEPT MOD	TEXT	EV (111003, DCM, "Algorithm Version")	Algorithm Name: Morphometry Algorithm Version: 36.1 Algorithm Name: WMH Algorithm Version: 4.1.8	4019
>>>	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")	United States	1204

Nesting Level	Relationship Type	Value Type	Concept Name	Values	TID
>	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 Brain MR	1004
>	HAS CONCEPT MOD	CODE	EV (121058, DCM, "Procedure reported")	(24590-2, LN, MR Brain)	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")		1602
>>>>	HAS ACQ CONTEXT	TIME	EV (111061, DCM, "Study Time")		1602
>	HAS PROPERTIES	NUM	EV (121407, DCM, "Normal Range description")	(385524004, SCT, "Normal Range Lower Limit")	312
>	HAS PROPERTIES	NUM	EV (121407, DCM, "Normal Range description")	(371933006,SCT,"Normal Range Upper Limit")	312
>	HAS PROPERTIES	CODE	EV(121402, DCM, "Normality")		310
>	HAS PROPERTIES	TEXT	EV(121415, DCM, "Percentile Ranking of measurement")		310
>	CONTAINS	CODE	EV (363698007, SCT, "Finding Site")		300
>	CONTAINS	IMAGE	EV (130401, DCM, "Visual explanation")		1501
>	HAS CONCEPT MOD	CODE	EV(272741003,SCT, "Laterality")		300

10.3.3 Private Code definitions

The following tables list all private attributes created by AI-Rad Companion Brain MR which may be included in the generated instances.

Table 37: Private Coded Entry Attributes

Tag	Attribute	Source	Value Type	Presence	Comments
(0021, xxD0)	SIEMENS MR NEURO	AlgoVersion	LO	1	Character string
(0021, xxD1)	SIEMENS MR NEURO	NormativeRangePercentile	DS	1	A decimal string shall contain the characters range between 0-1
(0021, xxD3)	SIEMENS MR NEURO	LMBlendFactor	DS	1	A decimal string shall contain the characters range between 0-1
(0021, xxD4)	SIEMENS MR NEURO	DMBlendFactor	DS	1	A decimal string shall contain the characters range between 0-1
(0021, xx01)	SIEMENS MR SDR 01	CreatorIdentifier	LO	1	Character string
(0021, xx02)	SIEMENS MR SDR 01	ApplicationIdentifier	LO	1	Character string

Table 38: Private Code definitions

Code Value	Code Meaning	Definition	Notes
BRAINMR1001	Image quality analysis		
BRAINMR1002	Segmentation quality		
BRAINMR1003	WM Asymmetry quality		
BRAINMR1004	The four ventricles of the brain		
BRAINMR1005	Gray matter of frontal lobe		
BRAINMR1006	Gray matter of parietal lobe		
BRAINMR1007	Gray matter of occipital lobe		
BRAINMR1008	Gray matter of temporal lobe		
BRAINMR1009	Cingulate gyrus		
BRAINMR1010	Juxtacortical		
BRAINMR1011	Deep white matter		
BRAINMR1012	Not found		
BRAINMR1013	Review status by human		
BRAINMR1014	Severity		
BRAINMR1015	AI-Rad Companion Brain Morphometry		
BRAINMR1016	AI-Rad Companion White Matter Hyperintensities		
BRAINMR1017	WMH Failure Reason		
BRAINMR1018	Morphometry Failure Reason		

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

10.4 Grayscale Image Consistency

NOT APPLICABLE

10.5 Standard Extended / Specialized / Private SOP Classes

NOT APPLICABLE

10.6 Private Transfer Syntaxes

NOT APPLICABLE

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