

TeraRecon Cardiac.Chambers.MR DICOM Conformance Statement

Version 1.0.0

Revision A

Chapter 1: Overview

The TeraRecon Cardiac.Chambers.MR Algorithm is a standalone image processing software device that can be deployed as a Microsoft Windows DLL on off-the-shelf hardware or as a containerized application (e.g., a Docker container) that runs on off-the-shelf hardware or on a cloud platform. Data and images are acquired via DICOM compliant imaging devices.

This medical device is intended to segment Cardiac chambers anatomical structures on MR scans and calculates results from adult patients that undergo Cardiac MR procedures.

The TeraRecon Cardiac.Chambers.MR Algorithm provides the results that can be delivered to the end-user through image viewers such as TeraRecon's Aquarius Intuition system, TeraRecon's Eureka AI Results Explorer, TeraRecon's Eureka Clinical AI Platform, or other image viewing systems like PACS that can support DICOM results generated by the TeraRecon Cardiac Chambers.MR Algorithm. TeraRecon Cardiac.Chambers.MR communicates with other machines with file-based communication.

1.1 Content and Transfer

TeraRecon Cardiac.Chambers.MR supports following Storage SOP Class.

Table 1.1: Storage SOP Classes

SOP Classes		Transfer Syntax	DIMSE Service		Media Services			Function			
			SCU	SCP	FSC	FSU	FSR	Create	Display	Process	Archive
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	U	N	N	N	N	Y	S	N	Y	N
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	U	N	N	Y	N	N	S	N	Y	N

Abbreviations

S: Standard SOP Class.

Y: Yes.

N: No.

U, LL, L, NI: Refer to Table 1.2

Table 1.2: Supported Transfer Syntaxes

Transfer Syntax Set	Transfer Syntax Name	Transfer Syntax UID
Lossless Compressed Transfer Syntax Set (LL)	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70
	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
	RLE Lossless	1.2.840.10008.1.2.5
Lossy Compressed Transfer Syntax Set (L)	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
	JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
Non-image Transfer Syntax Set (NI)	Implicit VR Little Endian	1.2.840.10008.1.2
	Explicit VR Little Endian	1.2.840.10008.1.2.1
Uncompressed Transfer Syntax Set (U)	Implicit VR Little Endian	1.2.840.10008.1.2
	Explicit VR Little Endian	1.2.840.10008.1.2.1

1.1.1 Structured Reporting Root Template IDs

N/A

1.2 Services

1.2.1 Verification

N/A

1.2.2 Storage

N/A

1.2.3 Workflow Management

N/A

1.2.4 Query / Retrieve

N/A

1.2.5 Printing

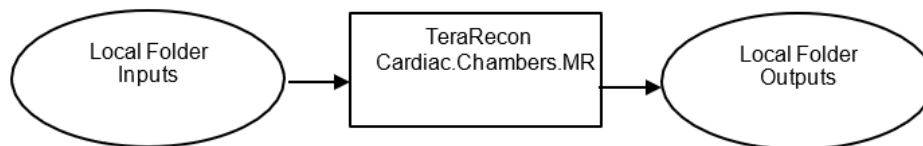
N/A

1.3 DICOM Web Services

N/A

1.4 Media Services

The following diagram provides information about TeraRecon Cardiac.Chambers.MR operation:



For application profile class STD-GEN, the following storage SOP classes are supported:

SOP Classes		Transfer Syntax	DIMSE Service		Media Services			Function			
			SCU	SCP	FSC	FSU	FSR	Create	Display	Process	Archive
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	U	N	N	N	N	Y	S	N	Y	N
Radiation Therapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	U	N	N	Y	N	N	S	N	Y	N

The transfer syntaxes listed below are supported for inputs reading:

Transfer Syntax Set	Transfer Syntax Name	Transfer Syntax UID
Uncompressed Transfer Syntax Set (U)	Implicit VR Little Endian	1.2.840.10008.1.2
	Explicit VR Little Endian	1.2.840.10008.1.2.1

The following transfer syntax is supported for outputs writing:

Transfer Syntax Set	Transfer Syntax Name	Transfer Syntax UID
Uncompressed Transfer Syntax Set (U)	Implicit VR Little Endian	1.2.840.10008.1.2

1.5 Real Time Video Service

N/A

1.6 De-identification Profiles

N/A

1.7 Specific Character Sets

Table 1.3: Supported Specific Character Sets

Defined term	IANA	Description
Single-Byte Character Sets without Code Extension		
ISO_IR 100	ISO-8859-1	Latin alphabet No. 1

Chapter 2: Table of Contents

Chapter 1 Overview	1-1
1.1 Content and Transfer.....	1-1
Abbreviations	1-2
1.1.1 Structured Reporting Root Template IDs.....	1-2
1.2 Services	1-2
1.2.1 Verification	1-2
1.2.2 Storage	1-2
1.2.3 Workflow Management	1-2
1.2.4 Query / Retrieve.....	1-3
1.2.5 Printing.....	1-3
1.3 DICOM Web Services.....	1-3
1.4 Media Services	1-3
1.5 Real Time Video Service	1-4
1.6 De-identification Profiles	1-4
1.7 Specific Character Sets	1-4
Chapter 2 Table of Contents	2-1
Chapter 3 Introduction	3-1
3.1 Revision History.....	3-1
3.2 Audience.....	3-1
3.3 Remarks	3-1
3.4 Terms and Definition.....	3-1
3.5 Abbreviation.....	3-2
3.6 References	3-2
Chapter 4 Implementation Model	4-1
4.1 Application Entities and Data Flow	4-1
4.1.1 Functional Definitions of ADS / AIS / AAS	4-1
4.1.2 AGS Network Related Functions	4-1
4.1.3 Sequencing Real World Activity.....	4-1
Chapter 5 Service and Interoperability Description	5-1
5.1 Mapping of Services to Application Entities.....	5-1
5.2 Supported DIMSE Services	5-1
5.2.1 Basic Worklist Management Service	5-1
5.2.2 Modality Performed Procedure Step Service.....	5-1
5.2.3 Unified Worklist and Procedure Step Service.....	5-1
5.2.4 Instance Availability Notification Service	5-1
5.2.5 Storage Service	5-1
5.2.6 Storage Commitment Service.....	5-1
5.2.6.1 SCU of the Storage Commitment SOP Class.....	5-1
5.2.6.2 SCP of the Storage Commitment SOP Class.....	5-1
5.2.7 Query/Retrieve Service Class.....	5-2
5.2.7.1 SCU of Q/R Information Model - Find SOP Class	5-2
5.2.7.2 SCU of Q/R Information Model – MOVE SOP Class	5-2

5.2.7.3 SCP of Q/R Information Model - Find SOP Class	5-2
5.2.7.4 SCP of Q/R Information Model - MOVE SOP Class	5-2
5.2.8 Print management Service	5-2
5.2.8.1 SCU of the Basic Grayscale Print Management Meta SOP Class - SCU	5-2
5.2.8.1.1 Basic Film Session SOP Class	5-2
5.2.8.1.2 Basic Film Box SOP Class	5-2
5.2.8.1.3 Basic Grayscale Image Box SOP Class	5-2
5.2.8.1.4 Printer SOP Class	5-2
5.2.8.2 SCU of the Basic Color Print Management Meta SOP Class	5-3
5.3 Supported DICOM Web Services	5-3
5.4 Media Service	5-3
5.4.1 File Set Creator (FSC)	5-3
5.4.2 File Set Reader (FSR)	5-3
5.4.3 File Set Updater (FSU)	5-4
5.5 Real Time Video	5-4
5.6 Cross Service Consideration	5-4
5.7 Specific Character Sets	5-4
Chapter 6 Configuration	6-1
6.1 General Configuration Parameters	6-1
6.2 Configuration of DIMSE Services	6-1
6.2.1 Basic Worklist Management Service Configuration	6-1
6.2.2 Modality Performed Procedure Step Service Configuration	6-1
6.2.3 Unified Worklist and Procedure Step Service Configuration	6-1
6.2.4 Instance Availability Notification Service Configuration	6-1
6.2.5 Storage Service Configuration	6-1
6.2.6 Storage Commitment Service Configuration	6-1
6.2.7 Query / Retrieve Service Configuration	6-1
6.2.8 Print Management Service Configuration	6-1
6.3 Configuration of DICOM Web Services	6-1
6.4 Configuration of Media Storage Service	6-2
6.5 Configuration of Real Time Video Service	6-2
6.6 Configuration of Audit Trail – Syslog	6-2
Chapter 7 Network and Media Communication Details	7-1
7.1 General	7-1
7.1.1 General Association Parameters	7-1
7.2 Specifications	7-1
7.2.1 Application Entity	7-1
7.2.2 Application Entity	7-2
7.3 Status Codes	7-2
7.3.1 General AE Communication and Failure Behavior and Handling	7-2
7.3.2 DIMSE Services	7-2
7.3.3 DICOM Web Services	7-3
Chapter 8 Security	8-1
8.1 Introduction	8-1

8.2 External Network Requirements	8-1
8.3 TCP Port Configuration.....	8-1
8.4 DICOM Security Profiles Support	8-1
8.4.1 Secure Use and User Identity Profiles.....	8-1
8.4.2 Secure Transport Connection Profiles.....	8-1
8.4.3 Media Storage Security Profiles	8-1
8.4.4 Attribute Confidentiality Profiles	8-1
8.4.5 Distal Signature Profiles	8-1
8.5 User Identity Negotiation Support.....	8-1
8.6 Web Service Security Features	8-1

Chapter 3: Introduction

3.1 Revision History

Following table provides revision history of this DICOM conformance statement:

Table 3.1: Revision History

Revision #	Description	Date of Release
1	Initial draft for TeraRecon Cardiac.Chambers.MR	05-Jan-2024

3.2 Audience

This DICOM conformance statement is intended for following audiences:

- Hospital staff or Customer
- System integrator of medical equipment
- DICOM Software engineer or designer
- Marketing or Sales personal with DICOM knowledge

3.3 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements.

3.4 Terms and Definition

Terms and definitions used in this document are defined within the different parts of the DICOM standard.

3.5 Abbreviation

Abbreviations and terms are as follows:

AE	Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
DCS	DICOM Conformance Statement
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
ELE	Explicit VR Little Endian
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IANA	Internet Assigned Numbers Authority
ILE	Implicit VR Little Endian
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Standard Organization
NEMA	National Electrical Manufacturers Association
NTP	Network Time Protocol
PDU	Protocol Data Unit
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
U	Unique Key Attribute

3.6 References

[1] National Electrical Manufacturers Association (NEMA), Rosslyn, VA USA. PS3 / ISO 12052 Digital Imaging and Communications in Medicine (DICOM) Standard. <http://www.dicomstandard.org>.

Chapter 4: Implementation Model

4.1 Application Entities and Data Flow

TeraRecon Cardiac.Chambers.MR does not support Application Entities as it does not support network communication.

4.1.1 Functional Definitions of ADS / AIS / AAS

N/A

4.1.2 AGS Network Related Functions

N/A

4.1.3 Sequencing Real World Activity

N/A

Chapter 5: Service and Interoperability Description

5.1 Mapping of Services to Application Entities

N/A

5.2 Supported DIMSE Services

TeraRecon Cardiac.Chambers.MR does not support DIMSE Service.

5.2.1 Basic Worklist Management Service

N/A

5.2.2 Modality Performed Procedure Step Service

N/A

5.5.3 Unified Worklist and Procedure Step Service

N/A

5.5.4 Instance Availability Notification Service

N/A

5.2.5 Storage Service

5.2.5.1 SCU of the Storage SOP Classes

N/A

5.2.5.2 SCP of the Storage SOP Classes

N/A

5.2.6 Storage Commitment Service

TeraRecon Cardiac.Chambers.MR does not support storage commitment.

5.2.6.1 SCU of the Storage Commitment SOP Class

N/A

5.2.6.2 SCP of the Storage Commitment SOP Class

N/A

5.2.7 Query/Retrieve Service Class

N/A

5.2.7.1 SCU of Q/R Information Model - Find SOP Class

N/A

5.2.7.2 SCU of Q/R Information Model – MOVE SOP Class

N/A

5.2.7.3 SCP of Q/R Information Model - Find SOP Class

N/A

5.2.7.4 SCP of Q/R Information Model - MOVE SOP Class

N/A

5.2.8 Print management Service

TeraRecon Cardiac.Chambers.MR does not support printing.5.2.8.1 SCU of the Basic Grayscale Print Management Meta SOP Class - SCU

N/A

5.2.8.1 SCU of the Basic Grayscale Print Management Meta SOP Class - SCU

N/A

5.2.8.1.1 Basic Film Session SOP Class

N/A

5.2.8.1.2 Basic Film Box SOP Class

N/A

5.2.8.1.3 Basic Grayscale Image Box SOP Class

N/A

5.2.8.1.4 Printer SOP Class

N/A

5.2.8.2 SCU of the Basic Color Print Management Meta SOP Class

N/A

5.2.8.2.1 Basic Film Session SOP Class

See Section 5.2.8.1.1.

5.2.8.2.2 Basic Film Box SOP Class

See Section 5.2.8.1.2.

5.2.8.2.3 Basic Color Image Box SOP Class

See Section 5.2.8.1.3.

5.2.8.2.4 Printer SOP Class

See Section 5.2.8.1.4.

5.2.8.3 SCU of the Basic Annotation Box SOP Class

TeraRecon Cardiac.Chambers.MR does not support annotation position on the image.

5.2.8.4 SCU of the Print Job SOP Class

Refer to Table 5-17 for supported N-GET attribute.

5.2.8.5 SCU of the Presentation LUT SOP Class

N/A

5.2.8.6 SCU of the Printer Configuration Retrieval SOP Class

See Section 5.2.8.1.4.

TeraRecon Cardiac.Chambers.MR does not support SCP of Print.

5.3 Supported DICOM Web Services

N/A

5.4 Media Service

5.4.1 File Set Creator (FSC)

TeraRecon Cardiac.Chambers.MR supports FSC for Media Application Profiles listed in Section 1.4 with SOP Classes listed in Section 1.1.

5.4.2 File Set Reader (FSR)

TeraRecon Cardiac.Chambers.MR supports FSR for Media Application Profiles listed in Section 1.4 with SOP Classes listed in Section 1.1.

5.4.3 File Set Updater (FSU)

N/A

5.5 Real Time Video

N/A

5.6 Cross Service Consideration

N/A

5.7 Specific Character Sets

TeraRecon Cardiac.Chambers.MR supports Specific Character Sets listed in Section 1.7.

Chapter 6: Configuration

TeraRecon Cardiac.Chambers.MR does not support DICOM network communication, no configuration is available,

6.1 General Configuration Parameters

N/A

6.2 Configuration of DIMSE Services

N/A

6.2.1 Basic Worklist Management Service Configuration

N/A

6.2.2 Modality Performed Procedure Step Service Configuration

N/A

6.2.3 Unified Worklist and Procedure Step Service Configuration

N/A

6.2.4 Instance Availability Notification Service Configuration

N/A

6.2.5 Storage Service Configuration

N/A

6.2.6 Storage Commitment Service Configuration

No additional configuration

6.2.7 Query / Retrieve Service Configuration

N/A

6.2.8 Print Management Service Configuration

N/A

6.3 Configuration of DICOM Web Services

N/A

6.4 Configuration of Media Storage Service

N/A

6.5 Configuration of Real Time Video Service

N/A

6.6 Configuration of Audit Trail – Syslog

N/A

Chapter 7: Network and Media Communication Details

7.1 General

TeraRecon Cardiac.Chambers.MR does not support network and media communication.

7.1.1 General Association Parameters

N/A

7.2 Specifications

No extended negotiation is supported in TeraRecon Cardiac.Chambers.MR.

7.2.1 Application Entity

7.2.1.1 Sequencing of Real-World Activities

N/A

7.2.1.2 Association Parameters

See Table 7-1.

7.2.1.3 Association Initiation

Real-world Activities - C-STORE SCU

N/A

7.2.1.4 Association Acceptance

Real-World Activity – C-ECHO SCP

N/A

Real-World Activity – C-STORE SCP

N/A

Real-World Activity – C-FIND and C-MOVE SCP

N/A

7.2.2 Application Entity

7.2.2.1 Sequencing of Real-World Activities

N/A

7.2.2.2 Association Parameters

See Table 7-1.

7.2.2.3 Association Initiation

7.2.2.3.1 Real-World Activity – C-FIND SCU

N/A

7.2.2.3.2 Real-World Activity – C-MOVE SCU

N/A

7.2.2.3.3 Real-World Activity – C-STORE SCU

N/A

7.2.2.4 Association Acceptance

7.2.2.4.1 Real-World Activity – C-STORE SCP

N/A

7.3 Status Codes

7.3.1 General AE Communication and Failure Behavior and Handling

7.3.1.1 Communication Failure Behavior as Association Initiator

N/A

7.3.1.2 Communication Failure Handling as Association Acceptor

N/A

7.3.2 DIMSE Services

7.3.2.1 Basic Worklist Management Service

N/A

7.3.2.2 Modality Performed Procedure Step Service

N/A

7.3.2.3 Unified Worklist and Procedure Step Service

N/A

7.3.2.4 Instance Availability Notification Service

N/A

7.3.2.5 Storage Service

N/A

7.3.2.6 Storage Commitment Service

N/A

7.3.2.7 Query / Retrieve Service**7.3.2.7.1 SCU of the Query / Retrieve FIND SOP Classes – C-FIND**

N/A

7.3.2.7.2 SCU of the Query / Retrieve MOVE SOP Classes – CMOVE

N/A

7.3.2.7.3 SCP of the Query / Retrieve FIND SOP Classes – C-FIND

N/A

7.3.2.7.4 SCP of the Query / Retrieve MOVE SOP Classes C-MOVE

N/A

7.3.2.8 Print Management Service

N/A

7.3.3 DICOM Web Services

N/A

Chapter 8: Security

8.1 Introduction

TeraRecon Cardiac.Chambers.MR does not support any specific security measures.

It is assumed that TeraRecon Cardiac.Chambers.MR are used within a secured environment.

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8.2 External Network Requirements

TeraRecon Cardiac.Chamber.MR does not use any network protocols.

8.3 TCP Port Configuration

N/A

8.4 DICOM Security Profiles Support

8.4.1 Secure Use and User Identity Profiles

N/A

8.4.2 Secure Transport Connection Profiles

N/A

8.4.3 Media Storage Security Profiles

N/A

8.4.4 Attribute Confidentiality Profiles

N/A

8.4.5 Distal Signature Profiles

N/A

8.5 User Identity Negotiation Support

N/A

8.6 Web Service Security Features

N/A