

Caseaccess 1.0 DICOM Conformance Statement

1 Introduction

1.1 Integration and Features

The integration of medical devices may require functions that are beyond the scope of the DICOM standard. Consequently, using only the information provided by this Conformance Statement does not automatically guarantee interoperability. It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates our equipment with another.

Our equipment has been tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement. If the Conformance Statements of a third-party product indicates that successful information exchange should be possible, additional interoperability tests may be necessary to ensure interoperability. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional interoperability tests.

Mirada Medical is committed to adapt its equipment to future versions of the DICOM Standard as much as possible. In order to do so, we reserve the right to make changes to our products or to discontinue them. The user should ensure that any third-party provider, connecting to our equipment, also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into our equipment may lead to loss of connectivity.

Some of the features, described in this document are optional and may not be available in the product. For information on the user licensing please consult your sales representatives or the user documentation, supplied at the time of purchase.

1.2 Definitions

Term	Definition
Caseaccess	Caseaccess (the application to which this DCS is referring to)
DCS	DICOM Conformance Statement
PACS	Picture Archiving and Communication System. An information system which is able to store and archive medical data and radiology images in particular.

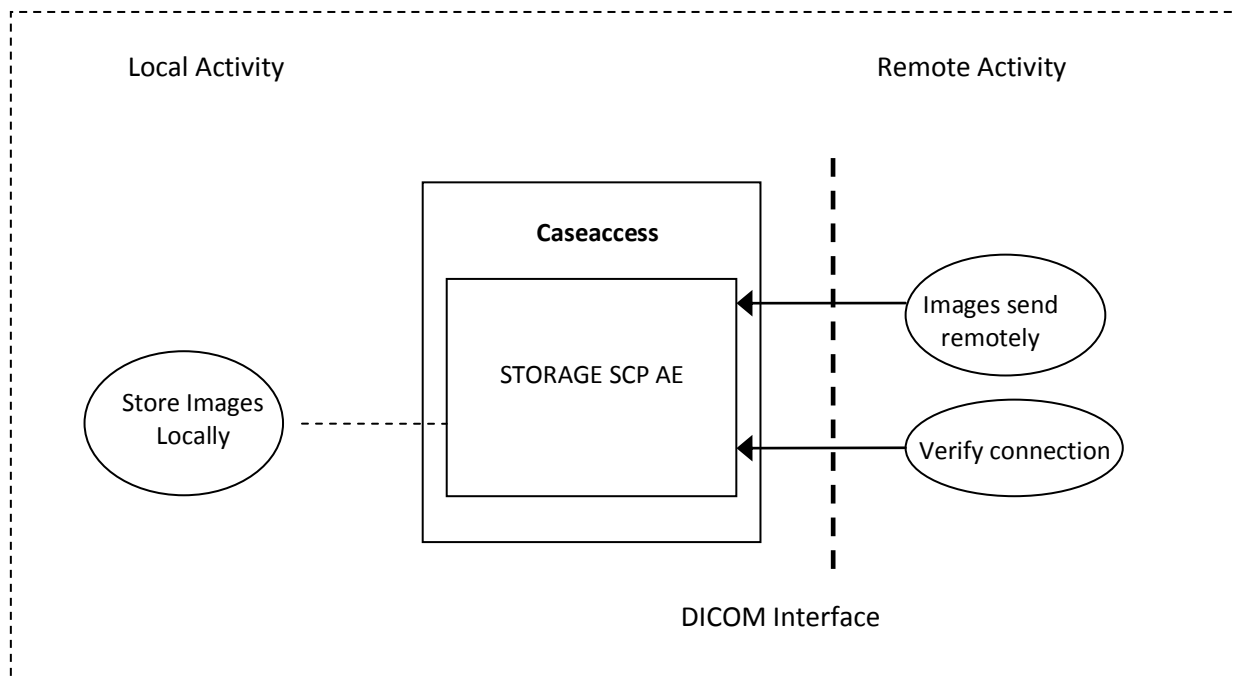
1.3 References

Reference	Document	Title
None		

2 NETWORKING

2.1 Implementation Model

2.1.1 Application Data Flow Diagram



2.1.2 Functional Definitions of AE's

Conceptually the network services may be modeled as the following Application Entities:

2.1.3 STORAGE-SCP AE

Caseaccess STORAGE SCP AE waits for another application to call and connect. The SCP will accept associations with the Presentation Contexts for SOP classes of the Storage Service Class. It will receive images on these Presentation Contexts and automatically import them into the Caseaccess data store.

2.1.4 Sequencing of Real-World Activities

User can query a remote image managing device, like PACS or any C-FIND SCP, for available composite instances. It then can request retrieval of such instances from these devices (C-MOVE SCPs) at any time.

Caseaccess receives and temporarily stores medical images, pushed to it from C-STORE SCUs, or retrieved from different modalities (C-MOVE SCPs).

Image sets from different modalities or from the same modality can further be loaded into and processed by launching any of the integrated applications and displayed for analysis or

clinical review. The results from this processing can temporarily be stored and subsequently exported as standard objects to a remotely situated device, using the DICOM network protocol. For details of the export, refer to the relevant DICOM Conformance Statement for the integrated application.

It is assumed that the imported data is a valid DICOM data. If invalid data is allowed for import on Caseaccess, then it is marked as such and is not allowed for export by the integrated applications. It means Caseaccess may break an external workflow for any invalid data that has been imported.

User transactions from the Caseaccess user interfaces are automatically synchronised and sequenced with the data processing and network operations so consistency of data is guaranteed.

2.2 AE Specifications

2.2.1 STORAGE-SCP AE

2.2.1.1 SOP Classes

STORAGE-SCP provides Standard Conformance to the following SOP Classes:

Table 2.2.1-1

SOP CLASSES SUPPORTED BY STORAGE-SCP

SOP Class Name	SOP Class UID	SCU	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes

MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2	No	Yes
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1	No	Yes
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
XA/XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes

Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	No	Yes
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	No	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	No	Yes
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	No	Yes
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	No	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1	No	Yes
Autorefractometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2	No	Yes
Keratometry Measurements	1.2.840.10008.5.1.4.1.1.78.3	No	Yes

Storage			
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4	No	Yes
Visual Acuity Measurements Storage	1.2.840.10008.5.1.4.1.1.78.5	No	Yes
Spectacle Prescription Report Storage	1.2.840.10008.5.1.4.1.1.78.6	No	Yes
Macular Grid Thickness and Volume Report	1.2.840.10008.5.1.4.1.1.79.1	No	Yes
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	No	Yes
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Key Object Selection	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
Colon CAD SR	1.2.840.10008.5.1.4.1.1.88.69	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	No	Yes
Basic Structured Display Storage	1.2.840.10008.5.1.4.1.1.131	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	No	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	No	Yes
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	No	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	No	Yes

2.2.2 Association Policies

2.2.2.1 General

STORAGE-SCP accepts but never initiates associations.

Table 2.2.1-2
MAXIMUM PDU SIZE RECEIVED FOR STORAGE-SCP

Maximum PDU size received	0 (Unlimited)
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The default Maximum PDU Length Received is notified in the Associate-AC message as unlimited. Effectively it will be limited by the system. It is a configurable item and can be set to any number.

2.2.2.2 Number of Associations

Table 2.2.1-3
NUMBER OF ASSOCIATIONS FOR STORAGE-SCP

Maximum number of simultaneous associations	Unlimited
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2.2.2.3 Asynchronous Nature

STORAGE-SCP will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCP will not perform asynchronous operations window negotiation.

2.2.2.4 Implementation Identifying Information

Table 2.2.1-4
DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCP

Implementation Class UID	1.2.826.0.1.3680043.8.691.0.40
Implementation Version Name	as released

2.2.3 Association Initiation Policy

STORAGE-SCP does not initiate associations.

2.2.4 Association Acceptance Policy

When STORAGE-SCP accepts an association, it will respond to storage requests.

2.2.4.1 Activity – Receive Storage Request

2.2.4.1.1 Description and Sequencing of Activities

As instances are received they are copied to the local file system and a record inserted into the local database. If the received instance is a duplicate of a previously received instance, the new instance will be ignored.

2.2.4.1.2 Accepted Presentation Contexts

Table 2.2.1-5
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND RECEIVE STORAGE REQUEST

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 2.2.1-1.	See Table 2.2.1-1.	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	Little Endian Explicit VR	1.2.840.10008.1.2.1	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	Big Endian Explicit VR	1.2.840.10008.1.2.2	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	Deflated Little Endian Explicit VR	1.2.840.10008.1.2.1.99	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	Lossless JPEG Image Compression	1.2.840.10008.1.2.4.57	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	Lossless JPEG Image Compression with first-order prediction	1.2.840.10008.1.2.4.70	SCP	None
See Table 2.2.1-1.	See Table 2.2.1-1.	RLE Compression	1.2.840.10008.1.2.5	SCP	None

No extended negotiation is performed, though STORAGE-SCP:

is a Level 2 Storage SCP (Full – does not discard any data elements);

Does not support digital signatures;

Does not coerce any received data elements, though some may subsequently be coerced on export. by the integrated applications.

2.2.4.1.3 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Image Storage Service Classes.

In the case of a successful C-STORE operation the object has successfully been written to the local store. The stored SOP Instance can be accessed through the browser, and is kept until manually removed. If an image is received with the same SOP Instance UID (0008, 0018) as one that already exists in the local store, the new image will replace the old image.

The objects are not fully validated on receive. Some may subsequently fail to load for processing because of incompatibility to each other or to the particular algorithm selected by user. For details of the derivation process consult the user documentation of the integrated applications.

STORAGE-SCP will accept any Presentation Context for the supported SOP Classes.

STORAGE-SCP will behave as described in Table 2.2.1-6 when generating the C-STORE response command message.

Table 2.2.1-6
RESPONSE STATUS FOR STORAGE-SCP AND RECEIVE STORAGE REQUEST

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	The Composite SOP Instance was successfully received and stored in the system database. No complete IOD verification is performed
Refused	Out of Resources	A700	Indicates that there was not enough disk space to store the image. Error message is output to the Service Log. The SOP Instance will not be saved.
Error	Data Set does not match SOP Class	A900	Indicates that the Data Set does not encode a valid instance of the SOP Class specified. This status is returned if the DICOM Object stream can be successfully parsed but does not contain values for one or more mandatory Elements of the SOP Class. The STORAGE-SCP AE does not perform a comprehensive check, as it only checks a subset of required Elements. In addition, if the SOP Class is for a type of image but the SOP Instance does not contain values necessary for its display then this status is returned. Error message is output to the Service Log. The system can be configured to temporarily save such Data Sets in order to aid problem diagnosis.
	Cannot understand	C000	Indicates that the STORAGE-SCP AE cannot parse the Data Set into Elements or cannot further process the object. Error message is output to the Service Log. The system can be configured to temporarily save such Data Sets in order to aid problem diagnosis.
Warning	Coercion of Data Elements	B000	Not returned

2.2.4.1.4 SOP Specific Conformance to Verification SOP Class

See 2.2.4.2

2.2.4.2 Activity – Verify DICOM Connection

2.2.4.2.1 Description and Sequencing of Activities

An incoming C-ECHO message is received and responded with success.

2.2.4.2.2 Accepted Presentation Contexts

Table 2.2.1-7
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND VERIFY DICOM CONNECTION

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification 1.2.840.10008.1.1		DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	None
		Little Endian Explicit VR	1.2.840.10008.1.2.1	SCP	None
		Big Endian Explicit VR	1.2.840.10008.1.2.2	SCP	None
		Deflated Little Endian Explicit VR	1.2.840.10008.1.2.1.99	SCP	None
		Lossless JPEG Image Compression	1.2.840.10008.1.2.4.57	SCP	None
		Lossless JPEG Image Compression with first-order prediction	1.2.840.10008.1.2.4.70	SCP	None

2.2.4.2.3 SOP Specific Conformance to Verification SOP Class

The STORAGE SCP provides standard conformance. The following message attributes are supported in the response confirmation:

**Table 2.2.1-8
C-ECHO PPARAMETERS**

DIMSE-C Parameter Name	Req/Ind	Rsp/Conf	Comment
Message ID	M	-	Not present
Message ID Being Responded To	-	M	Same as "Message ID" in Req/Ind
Affected SOP Class UID	M	U(=)	Not present
Status	-	M	Always present

The following status codes are returned:

**Table 2.2.1-9
STORAGE-SCP AE C-STORE RESPONSE STATUS RETURN REASONS**

Service Status	Further Meaning	Error Code	Reason
Success	Success	0000	The C-ECHO message was received and responded successfully

2.3 Network Interfaces

2.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes; which is dependent on the underlying operating system and hardware.

2.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

2.4 Configuration

Configuration can be performed using the application user interface or by directly editing configuration files. Refer to the online help for specific details.

2.4.1 AE Title/Presentation Address Mapping

The mapping of the logical name by which remote AEs are described in the user interface to Called AE Titles as well as presentation address (hostname or IP address and port number) is configurable.

2.4.2 Parameters

The following parameters are configurable for the STORAGE SCP AE:

- AE Title
- Port
- Maximum PDU Length Received
- Timeouts

3 MEDIA INTERCHANGE

The application reads (Imports) and writes (Exports) Media Part 10 compliant file contents on any available media, supported by the system on which the application is deployed.

No DICOMDIR or any of the Media Interchange Profiles are supported.

4 SUPPORT OF CHARACTER SETS

No extended character sets are supported.

5 SECURITY

5.1 Security Profiles

None of the DICOM security profiles is supported. Security is achieved by other means.

5.2 Association level security

None supported.

Any Calling AE Titles and/or IP addresses may open an Association.

5.3 Application level security

None supported.

6 ANNEXES

6.1 IOD contents

6.1.1 Created SOP Instances

None

6.1.2 Usage of attributes from received IOD's

No SOP Class specific fields are required- usage is according to the DICOM standard.

The application makes use of the conventional identification attributes to distinguish patients, studies, series and instances. In particular, if two patients have the same value for Patient ID, they will be treated as the same in the browser.

6.1.3 Attribute Mapping

Not applicable.

6.1.4 Coerced/Modified Instances

None

6.2 Data Dictionaries

NA

6.3 Coded terminology

The value for Code Meaning will be displayed for all code sequences. No local lexicon is provided to look up alternative code meanings.

6.4 Grayscale Image Consistency

Calibration to the Grayscale Standard Display Function (GSDf) is outside of the scope of this document

6.5 Standard extended SOPs

None

6.6 Private SOPs

Private SOPs are outside of the scope of this document.

6.7 Private Transfer Syntaxes

None