DICOM Conformance Statement

EQ Mobile

Version 1.6, 1.7

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1 Conformance Statement Overview

EQ Mobile is a FORUM and cloud based software solution including a mobile app, intended for use to transfer data among physically separated network infrastructures for the use in ophthalmic surgery eye care. Based on defined interfaces, the software enables activities related to planning, display, transfer and storage of data via a secure online portal workflow.

Surgery Plans are imported to EQ Mobile as Surgery Planning DICOM files. This is the DICOM format that CALLISTO eye accepts via its WiFi interface. For IOL-Master Reports, the EQ Mobile FORUM Plugin will generate these DICOMs on its own.

After completion of the surgery, CALLISTO eye can transfer the surgery report to EQ Mobile. The surgery report is saved as a DICOM pdf-file in FORUM.

This DICOM Conformance Statement describes the structures of both DICOM files..

This document is structured as suggested in the DICOM Standard (PS 3.2: Conformance).

2 Table of Contents

3 Introduction

Revision History

Table 1 Revision History

Document Version	Date	Author	Changes
I	13.11.2020		Initial version

3.1 Audience

This document is written for the people that need to understand how EQ Mobile will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.2 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between EQ Mobile and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. 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 different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product 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.

3.3 Definitions and Terms

Informal definitions are provided for the following terms used in this Conformance Statement.

The DICOM Standard is the authoritative source for formal definitions of these terms.

Application Entity (AE)

An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title

The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

Attribute

A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements.

Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD)

The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C).

Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG)

A set of standardized image compression techniques, available for use by DICOM applications.

Module

A set of Attributes within an Information Object Definition that are logically related to each other.

Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Service/Object Pair (SOP) Class

The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification.

Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance

An information object; a specific occurrence of information exchanged in a SOP Class.

Examples: a specific x-ray image.

Tag

A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element.

Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax

The encoding used for exchange of DICOM information objects and messages.

Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID)

A globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier.

Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR)

The format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.4 Abbreviations

Table 2 Abbreviations used in this Document

Abbreviation	Definition
ANAP	Attribute is not always present - applicable for type 3 attributes
AE	Application Entity
AET	Application Entity Title
APP	Application
AUTO	Automatically generated, cannot be modified by the operator
CONFIG	Configurable parameter
CZM	Carl Zeiss Meditec
DEF	Default Value
DICOM	Digital Imaging and Communications in Medicine
IM	Information Model
IOD	Information Object Definition
OD	Oculus Dexter, the right eye
OS	Oculus Sinister, the left eye
OU	Oculus Uterque, both eyes
SCP	Service Class Provider
SCU	Service Class User
SEL	Selection from a list of values
SOP	Service Object Pair, union of a specific DICOM service and related IOD.
TCP/IP	Transmission Control Protocol / Internet Protocol
UID	Unique Identifier
USER	User input
VNAP	Value not always present (attribute sent zero length if no value is present) - applicable for type 2 and 2C attributes

3.5 References

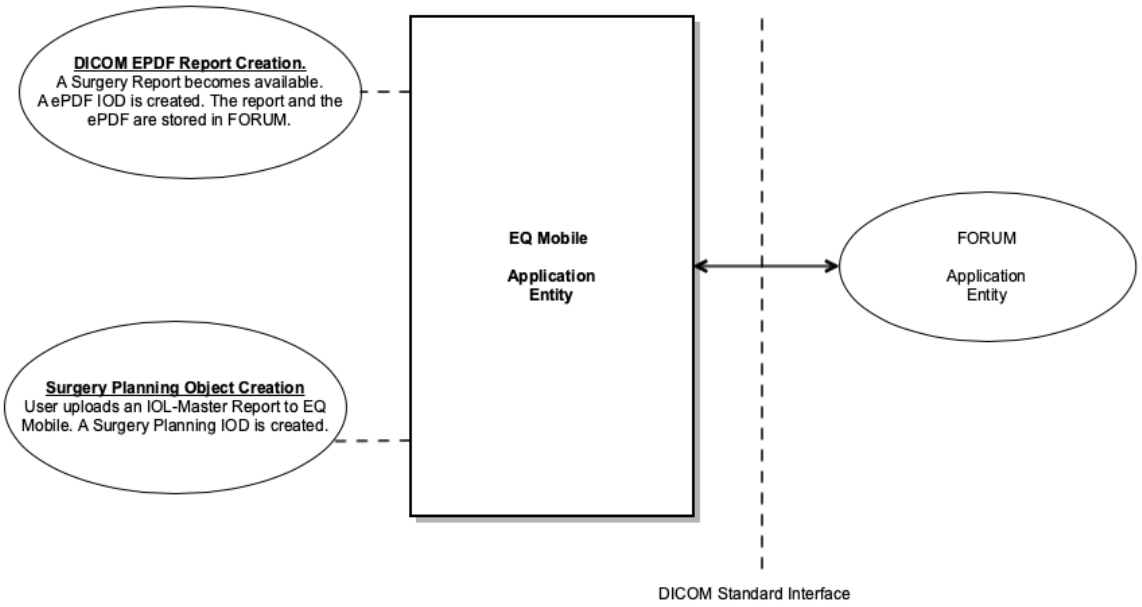
NEMA PS3 / ISO 12052, Digital Imaging and Communications in Medicine (DICOM) Standard, National Electrical Manufacturers Association, Rosslyn, VA, USA (available free at http://medical.nema.org/).

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 1 FORUM Archive - Functional Overview



See FORUM DICOM Conformance Statement.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of FORUM Application Entity

See FORUM DICOM Conformance Statement.

4.1.2.2 Functional Definition of EQ Mobile

EQ Mobile is a FORUM and cloud based software solution including a mobile app, intended for use to transfer data among physically separated network infrastructures for the use in ophthalmic surgery eye care. Based on defined interfaces, the software enables activities related to planning, display, transfer and storage of data via a secure online portal workflow.

After completion of the surgery, CALLISTO eye can transfer the surgery report to EQ Mobile.

The surgery report is saved as a DICOM pdf-file in FORUM.

4.1.3 Sequencing of Real-World Activities

See FORUM DICOM Conformance Statement.

4.1.3.1 EQ Mobile Activities

DICOM EPDF Report Creation

EQ Mobile creates DICOM Encapsulated PDF objects when the surgery report is exported from CALLISTO eye to EQ Mobile.

Surgery Planning Object Creation

EQ Mobile creates Surgery Planning Object when the user uploads the IOL Master Report.

4.2 AE Specifications

See FORUM DICOM Conformance Statement.

4.3 Network Interfaces

See FORUM DICOM Conformance Statement.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

See FORUM DICOM Conformance Statement for AE Title settings (local/remote) settings.

4.4.2 Parameters

4.4.2.1 General Parameters

See FORUM DICOM Conformance Statement.

5 Media Interchange

See FORUM DICOM Conformance Statement.

6 Support of Character Sets

6.1 Accepted Character Sets

See FORUM DICOM Conformance Statement.

6.2 Returned Character Sets

See FORUM DICOM Conformance Statement.

7 Security

See FORUM DICOM Conformance Statement.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instance(s)

Abbreviations used for Presence of Values (PoV):

VNAP

Value Not Always Present (attribute sent zero length if no value is present)

ANAP

Attribute is not always present

ALWAYS

Attribute is always present with a value

EMPTY

Attribute is sent without a value

Abbreviations used for Sources of Data (Source):

USER

The attribute value source is from User input

AUTO

The attribute value is generated automatically

CONFIG

The attribute value source is a configurable parameter

SRC

The attribute value is copied from the source data set

8.1.1.1 Encapsulated PDF Information Object Defintion

Table 3 Encapsulated PDF Information Object Defintion

IE	Module	References	Usage
Patient			
	Patient	Table Module "Patient"	ALWAYS
Study			
	GeneralStudy	Table Module "General Study"	ALWAYS
Series			
	EncapsulatedDocumentSeries	Table Module "Encapsulated Document Series"	ALWAYS
Equipment			
	GeneralEquipment	Table Module "General Equipment"	ALWAYS
	ScEquipment	Table Module "SC Equipment"	ALWAYS
EncapsulatedDocument			
	EncapsulatedDocument	Table Module "Encapsulated Document"	ALWAYS
	SopCommon	Table Module "Sop Common"	ALWAYS

	CzmNimInternal	Table Module "CZM NIM INTERNAL"	ALWAYS

8.1.1.2 Common Modules

Table 4 Module "Patient"

Attribute Name	Tag	VR	Value	PoV	Source
Patient's Name	(0010,0010)	PN	Patient's full name copied from source.	VNAP	SRC
Patient ID	(0010,0020)	LO	Patient ID copied from source.	ALWAYS	SRC
Issuer of Patient ID	(0010,0021)	LO	Identifier of the Assigning Authority copied from source.	ANAP	SRC
Patient's Birth Date	(0010,0030)	DA	Birth date of the patient copied from source.	VNAP	SRC
Patient's Sex	(0010,0040)	CS	Sex of the named patient copied from source.	VNAP	SRC
Other Patient IDs	(0010,1000)	LO	Other identification numbers used to identify the patient copied from source.	ANAP	SRC
Ethnic Group	(0010,2160)	SH	Ethnic group or race of the patient copied from source.	ANAP	SRC
Patient Comments	(0010,4000)	LT	User-defined additional information about the patient copied from source.	ANAP	SRC

8.1.1.3 Encapsulated PDF IOD Modules

Table 5 Module "General Study"

Attribute Name	Tag	VR	Value	PoV	Source
Study Instance UID	(0020,000D)	UI	Unique identifier for the Study copied from source.	ALWAYS	SRC
Study Date	(0008,0020)	DA	Date the Study started copied from source.	ALWAYS	SRC
Study Time	(0008,0030)	TM	Time the Study started copied from source.	ALWAYS	SRC
Referring Physician's Name	(0008,0090)	PN	Name of the patient's referring physician, copied from source	VNAP	SRC
Study ID	(0020,0010)	SH	Study ID copied from source.	VNAP	SRC
Accession Number	(0008,0050)	SH	Accession number copied from source.	VNAP	SRC
Study Description	(0008,1030)	LO	Study description copied from source.	ANAP	SRC
Procedure Code Sequence	(0008,1032)	SQ	Procedure code sequence copied from source.	ANAP	SRC

> Include 'Code Sequence Macro'.				ALWAYS	SRC

Table 6 Module "Encapsulated Document Series"

Attribute Name	Tag	VR	Value	PoV	Source
Modality	(0008,0060)	CS	Always “DOC”	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Unique identifier of the Series. Series Instance UID uses a constant prefix of "1.2.276.0.75.2.5.130.25.2.” followed by a date/time stamp and machine specific identifier.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	A number that identifies the Series. Always 1.	ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ	Request Attribute Series copied from source.	ANAP	SRC
> Requested Procedure Description	(0032,1060)	LO	Requested Procedure Description copied from source.	ANAP	SRC
> Scheduled Procedure Step ID	(0040,0009)	SH	Requested Procedure Step ID copied from source.	ANAP	SRC
> Scheduled Procedure Step Description	(0040,0007)	LO	Scheduled Procedure Step Description copied from source.	ANAP	SRC
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	Scheduled Protocol Code Sequence copied from source.	ANAP	SRC
Performed Procedure Step ID	(0040,0253)	SH	Performed Procedure Step ID, copied from source.	ANAP	SRC
Performed Procedure Step Start Date	(0040,0244)	DA	Date on which the Performed Procedure Step started, copied from source.	ALWAYS	SRC
Performed Procedure Step Start Time	(0040,0245)	TM	Time on which the Performed Procedure Step started, copied from source.	ALWAYS	SRC
Performed Procedure Step Description	(0040,0254)	LO	Description of the Performed Procedure Step copied from source	ALWAYS	SRC

Table 7 Module "General Equipment"

Attribute Name	Tag	VR	Value	PoV	Source
Manufacturer	(0008,0070)	LO	Always "Carl Zeiss Meditec"	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	Always "EQ Mobile"	ALWAYS	AUTO
Software Version(s)	(0018,1020)	LO	Multi valued: <EQ Mobile SW version>\<acquisition SW version>	ALWAYS	AUTO

Table 8 Module "SC Equipment"

Attribute Name	Tag	VR	Value	PoV	Source
Conversion Type	(0008,0064)	CS	Always "SYN" for Synthetic Image	ALWAYS	AUTO

Table 9 Module "Encapsulated Document"

Attribute Name	Tag	VR	Value	PoV	Source
Instance Number	(0020,0013)	IS	A number that identifies this SOP Instance. Always 1.	ALWAYS	AUTO
Content Date	(0008,0023)	DA	The date the document content creation was started.	ALWAYS	AUTO
Content Time	(0008,0033)	TM	The time the document content creation was started.	ALWAYS	AUTO
Acquisition Datetime	(0008,002A)	DT	Acquisition Datetime on which the original generation of the data in the document started, copied from source.	VNAP	SRC
Image Laterality	(0020,0062)	CS	Laterality of the body part that is the subject of the encapsulated document, copied from source. Enumerated Values: R = right, L = left	ALWAYS	SRC
Burned In Annotation	(0028,0301)	CS	Always "YES"	ALWAYS	AUTO
Source Instance Sequence	(0042,0013)	SQ		ALWAYS	AUTO
> Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of the CALLISTO Surgery Report Raw Data.	ALWAYS	SRC
> Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of the CALLISTO Surgery Report Raw Data	ALWAYS	SRC
Document Title	(0042,0010)	ST	Always: “CALLISTO eye Report”	ALWAYS	AUTO
MIME Type of Encapsulated Document	(0042,0012)	LO	Always "application/pdf"	ALWAYS	AUTO
Encapsulated Document	(0042,0011)	OB		ALWAYS	AUTO

Table 10 Module "Sop Common"

Attribute Name	Tag	VR	Value	PoV	Source
SOP Class UID	(0008,0016)	UI	Always "1.2.840.10008.5.1.4.1.1.104.1"	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Uniquely identifies the SOP Instance. SOP Instance UID uses a constant prefix of	ALWAYS	AUTO

			"1.2.276.0.75.2.5.130.25.3." followed by a date/time stamp and machine specific identifier.		

Table 11 Module "CZM-NIM-INTERNAL"

Attribute Name	Tag	VR	Value	PoV	Source
IOD name meta info	(2201,1000)	LT	Name of the Information Object Definition as specified by CZM-XML.	ALWAYS	AUTO
CZM-XML Version	(2201,1001)	LT	Version of the CZM-XML used to create this IOD.	ALWAYS	AUTO
Private module names and versions	(2201,1002)	LT	Names and versions of the private modules used in this IOD.	ALWAYS	AUTO

8.1.2 Usage of Attributes from Received IOD's

See FORUM DICOM Conformance Statement.

8.1.3 Attribute Mapping

See FORUM DICOM Conformance Statement for FORUM generated DICOM objects.

Table 12 Attribute Mapping from Source Raw Data IOD into EQ Mobile generated Encapsulated PDF IODs

Source Raw Data IOD	Encapsulated PDF IOD	Editable
SOP Class UID	Referenced SOP Class UID	No
SOP Instance UID	Referenced SOP Instance UID	No
Study Instance UID	Study Instance UID	No
Study Date	Study Date	No
Study Time	Study Time	No
Study ID	Study ID	No
Study Description	Study Description	No
Accession Number	Accession Number[1)]	No
Procedure Code Sequence	Procedure Code Sequence[1)]	No
Request Attributes Sequence > Requested Procedure ID	Request Attributes Sequence[1)] > Requested Procedure ID	No
Request Attributes Sequence > Requested Procedure Description	Request Attributes Sequence > Requested Procedure Description	No
Request Attributes Sequence > Scheduled Procedure Step Description	Request Attributes Sequence > Scheduled Procedure Step Description	No
Request Attributes Sequence > Scheduled Procedure Step ID	Request Attributes Sequence > Scheduled Procedure Step ID	No

Request Attributes Sequence > Scheduled Protocol Code Sequence	Request Attributes Sequence > Scheduled Protocol Code Sequence	No
Performed Procedure Step ID	Performed Procedure Step ID 1)	No
Performed Procedure Step Start Date	Performed Procedure Step Start Date 1)	No
Performed Procedure Step Start Time	Performed Procedure Step Start Time 1)	No
Performed Procedure Step Description	Performed Procedure Step Description 1)	No
Laterality	Image Laterality	No
Referring Physicians Name	Referring Physicians Name	No
Patients Name	Patients Name	No
Patient ID	Patient ID	No
Issuer of Patient ID	Issuer of Patient ID	No
Other Patient IDs	Other Patient IDs	No
Patients Birth Date	Patients Birth Date	No
Patients Sex	Patients Sex	No
Patient Comments	Patient Comments	No
Ethnic Group	Ethnic Group	No

1) Copied from latest source raw data set.

8.1.4 Coerced/Modified Fields

See FORUM DICOM Conformance Statement.

8.2 Data Dictionary of Private Attributes

The Private Attributes added to created SOP Instances are listed in the tables below.

Occurs in: ePDF SOP Instance

Table 13 Private Dictionary Group (2201,00xx) = “99CZM_NIM_INTERNAL_01”

Tag	Attribute Name	VR	VM
(2201,00xx)	Private Creator	LO	1
(2201,xx00)	Iod_name_meta_info	LT	1
(2201,xx01)	Czm_xml_version	LT	1
(2201,xx02)	private_module_names_and_versions	LT	1

8.3 Coded Terminology and Templates

8.3.1 Context Groups

Not applicable.

8.3.2 Template Specifications

Not applicable.

8.3.3 Private Code Definitions

Not applicable.

8.4 Greyscale Image Consistency

Not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes

Not applicable.

8.6 Private Transfer Syntaxes

No Private Transfer Syntax is supported.

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