DICOM Conformance Statement

Humphrey® Field Analyzer - HFA™ 3 Series

Version 1.5

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1 Conformance Statement Overview

For the Intended Use / Indications for Use, see the Humphrey Field Analyzer 3 Instructions for Use.

The HFA3 Series uses FORUM® to store patient and exam data. Data analysis and report generation can be performed on either HFA3 or Glaucoma Workplace. The HFA3 Series instrument operates as an Acquisition Modality AE.

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

Table 1-1 Network Services Supported

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Raw Data Storage	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	Yes	No
Ophthalmic Visual Field Static Perimetry Measurements Storage	No [1)]	No [1)]
Encapsulated PDF Storage	Yes	No
Workflow Management		
Verification	Yes	Yes
Storage Commitment Push Model SOP Class	Yes	No
Modality Worklist Information Model - FIND	Yes	No
Query / Retrieve		
Patient Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – FIND	Yes	No
Study Root Query/Retrieve Information Model – MOVE	Yes	No

1) In local database mode (without DICOM Connectivity) HFA3 offers the function to export OPV IOD's to a local file path only.

The SOP Classes are categorized as follows:

Table 1-2 UID Values

UID Value	UID Name	Category
1.2.840.10008.1.1	Verification	Workflow Management
1.2.840.10008.1.20.1	Storage Commitment Push Model SOP Class	Workflow Management
1.2.840.10008.5.1.4.1.1.66	Raw Data Storage	Transfer
1.2.840.10008.5.1.4.1.1.77.1.5.1	Ophthalmic Photography 8 Bit Image Storage	Transfer
1.2.840.10008.5.1.4.1.1.80.1	Ophthalmic Visual Field Static Perimetry Measurements Storage	Transfer
1.2.840.10008.5.1.4.1.1.104.1	Encapsulated PDF Storage	Transfer
1.2.840.10008.5.1.4.1.2.1.1	Patient Root Query/Retrieve Information Model - FIND	Query/Retrieve
1.2.840.10008.5.1.4.1.2.2.1	Study Root Query/Retrieve Information Model – FIND	Query/Retrieve
1.2.840.10008.5.1.4.1.2.2.2	Study Root Query/Retrieve Information Model – MOVE	Query/Retrieve

1.2.840.10008.5.1.4.31	Modality Worklist Information Model - FIND	Workflow Management

The HFA3 does not support Media Interchange.

2 Table of Contents

3 Introduction

3.1 Revision History

Table 3-3 Revision History

Document Version	Date	Author	Changes
I	2019-01-28	Buck Cunningham	Update for HFA3 1.5 Allow service user to configure specific character set. Added SITA Faster and 24-2C
II	2020-01-22	Buck Cunningham	4.2.1.1: Added footnotes to table to clarify when RAW, OP and EPDF IODs are available from HFA3

3.2 Audience

This document is written for the people that need to understand how HFA3 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.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between HFA3 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.

3.4 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.

Abstract Syntax

the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class.

Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

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.

Application Context

the specification of the type of communication used between Application Entities.

Example: DICOM network protocol.

Association

a network communication channel set up between Application Entities.

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.

Media Application Profile

the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

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.

Negotiation

first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

Network Integration Manager (NIM)

Software component that handles DICOM for Carl Zeiss Meditec, Inc. Ophthalmic systems.

Presentation Context

the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

Protocol Data Unit (PDU)

a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Query Key

A input value for a query process. Query Keys denote the set of DICOM tags that are sent from the SCU to SCP and thus control the query result.

Security Profile

a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP)

role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User).

Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU)

role of an Application Entity that uses a DICOM network service; typically, a client.

Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

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.

Visual Field Test

A visual field test is an eye examination that can detect dysfunction in central and peripheral vision which may be caused by various medical conditions such as glaucoma, stroke, brain tumors or other neurological deficits.

3.5 Abbreviations

Table 3-4 Abbreviations used in this document

Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
ANAP	Attribute is not always present - applicable for type 3 attributes
APP	Application
AUTO	Automatically generated, cannot be modified by the operator
BRQ	Broad Query mode of Modality Worklist Query
CONFIG	Configurable parameter
CZM	Carl Zeiss Meditec
DEF	Default Value
DICOM	Digital Imaging and Communications in Medicine
ELE	Explicit Little Endian

EPDF	Encapsulated PDF
ILE	Implicit Little Endian
HFA	Humphrey Field Analyzer
IM	Information Model
IOD	Information Object Definition
JPG-1	JPEG Coding Process 1 transfer syntax; JPEG Baseline; ISO 10918-1
MWL	Modality Worklist
NIM	Network Integration Manager (a software component that handles DICOM for Carl Zeiss Meditec, Inc. Ophthalmic systems)
OD	Oculus Dexter, the right eye
OP	Ophthalmic Photography 8 Bit Image
OPV	Ophthalmic Visual Field Static Perimetry Measurements
OS	Oculus Sinister, the left eye
OU	Oculus Uterque, both eyes
PL	Pick list
PLD	Pick list item details
RNG	Range of values
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.
SRQ	Study Root Query
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

3.6 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/)

Integrating the Healthcare Enterprise (IHE) EYECARE Technical Framework, rev 3.7, 2010 (available free at http://www.ihe.net/Technical_Framework/index.cfm

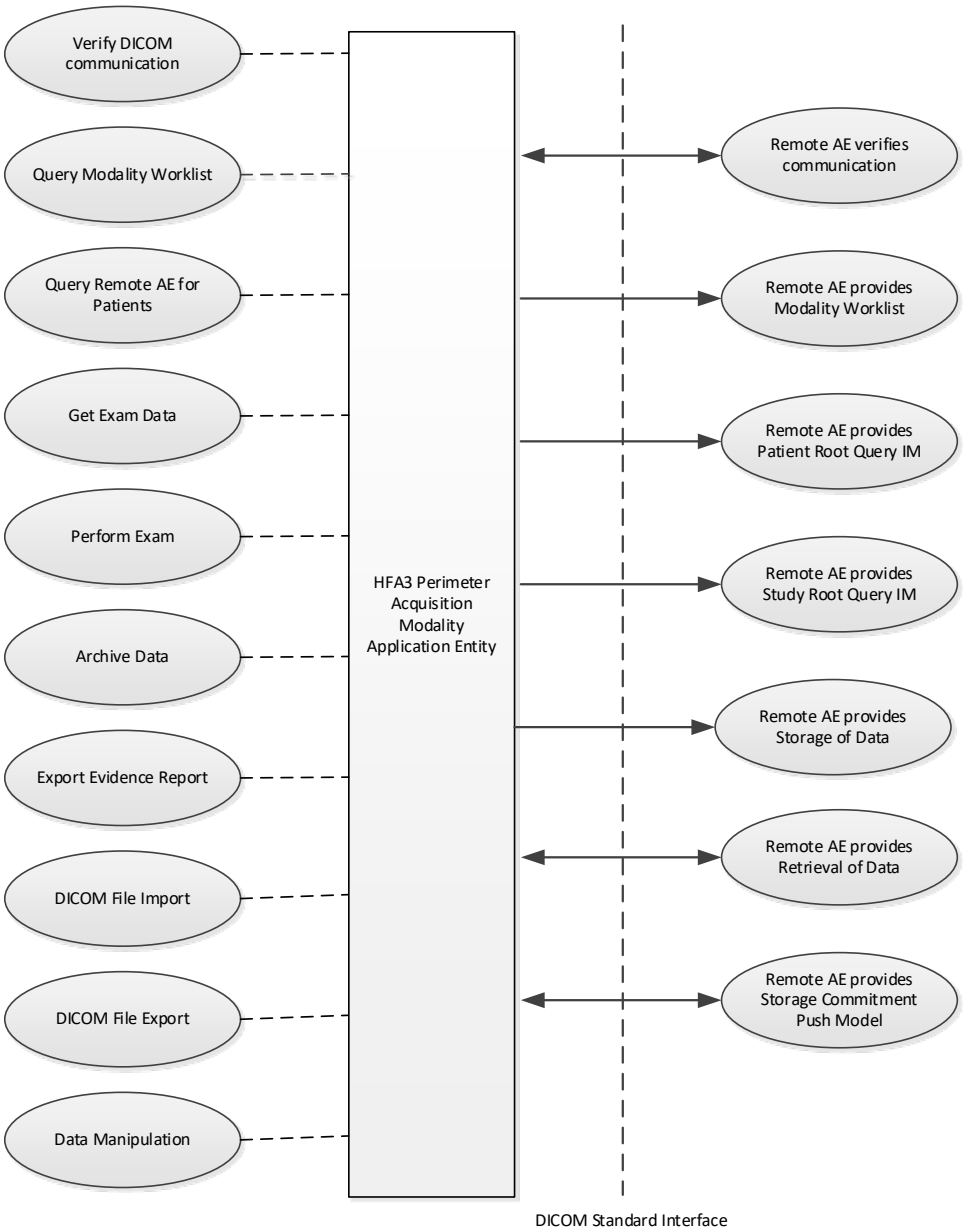
DICOM Conformance Statements for FORUM and Glaucoma Workplace, (available at http://www.zeiss.com/dicom)

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Figure 4-1 Functional Overview



Note: HFA3 complies with the DICOM standard. In addition to generating evidence reports from HFA acquisition modality, the reports can also be created from Glaucoma Workplace. This requires the presence of FORUM Archive and Glaucoma Workplace for full functionality. Please refer to the respective DICOM conformance statements (mentioned in the references) when you assess the DICOM behavior of HFA3.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of HFA3

For the Intended Use / Indications for Use, see the Humphrey Field Analyzer 3 Instructions for Use.

The HFA3 Application Software allows to:

- query modality work list
- query patients
- query studies (in local database mode)
- export exam data and eye field of view images
- export evidence reports
- retrieve last exam data/patient prescription for selected patient

The HFA3 Application Software AE uses several DICOM Services as a Service Class User.

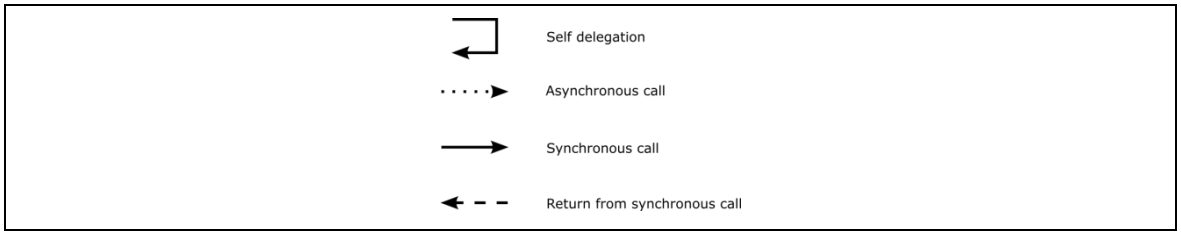
- Verification
- Modality Worklist Information Model – FIND
- Patient Root Query/Retrieve Information Model – FIND
- Study Root Query/Retrieve Information Model – FIND
- Study Root Query/Retrieve Information Model – MOVE
- RAW Data Storage
- Ophthalmic Photography 8 Bit Image Storage
- Encapsulated PDF Storage
- Storage Commitment Push Model

HFA3 acts as a service class provider when:

- performing a verification of the configured AEs. The result of this verification contains information about the supported SOP Classes and Transfer Syntaxes.
- retrieving last exam (RAW Data Storage).

4.1.3 Sequencing of Real-World Activities

To realize the real world activities, the different entities work together. The sequence diagrams shall depict the intended workflow.



The diagrams use slightly modified UML symbols. The asynchronous call is not depicted as suggested in UML. Some objects do have more than one dashed line. It symbolizes more than one thread.

4.1.3.1 HFA3 Acquisition Modality Activities

Query Modality Worklist

When the patient arrives at the HFA3 the operator queries the worklist. The user can invoke this by simply selecting the “Today” Tab in the main view which lists all worklist items scheduled today and all completed examinations for today for this instrument (identified by the HFA3 AE Title) and Scheduled procedure step start date from today. For more specific worklist queries and a detailed view on the scheduled procedures the “Advanced” and then “Scheduled Patients” tab can be used.

The “Today” tab will display the first procedure for the patient. When the patient has more than one procedures scheduled, the software shows a list box containing Accession numbers. The operator can change the selection to display other procedures.

In either way the operator can select the patient from the result list to proceed with data acquisition. According to the transferred data HFA3 creates an entry in the local database.

The HFA3 supports only a 1:1 relationship between Requested Procedure and Scheduled Procedure Step. If the Requested Procedure contains more than one Scheduled Procedure Step the first Scheduled Procedure Step will be taken when the user starts the test by selecting the “Next” button.

To determine in which order multiple scheduled procedure steps will be processed HFA3 software sorts the accession numbers of the procedure steps in alphabetical order and selects the first one from this list.

Query Remote AE for patients

When the patient arrives at the HFA3 the operator can search patients stored at a remote AE. This can be done by using the “Quick search” in the main screen or by using “Advanced” and then the “All Patients” for a more detailed search. Any matching results will be listed in patient list.

This activity generates an unscheduled case.

The operator can then select the patient for data acquisition or analysis.

Perform Exam

When a patient or worklist item is selected, the operator selects a Perimetry exam type and chooses the appropriate test parameters and then performs a visual field test. Exam data will be acquired, and the Application Software allows the operator to review the visual field test data before permanently saving the exam results.

Archive Data

When the operator selects the “Save and Exit” button from the Results screen, the RAW Data and Ophthalmic Photography 8 Bit SOP Instances for the exam will be automatically sent to the configured storage provider.

After a configurable amount of time, the Application Software asks the configured Storage Commitment Provider to take over responsibility on data persistence for the data previously transferred by the “Archive data” activity. When storage is committed the data will be removed in the next shutdown routine.

This activity can be enabled/disabled via the End of Test automatic export option for FORUM Test Database.

Export Evidence Report

When the End of Test FORUM Test Database export option is OFF, the evidence report will be sent to the configured storage provider in the following two scenario:

- Automatic: At the end of an exam session. This activity can be enabled/disabled via the End of Test automatic export option for EPDF IOD.
- On Demand: The operator triggered report export function via the “DICOM EPDF” button.

After a configurable amount of time, the Application Software asks the configured Storage Commitment Provider to take over responsibility on data persistence for the data previously transferred by the “Export Evidence Report” activity.

Get Exam Data

When the End of Test FORUM Test Database export setting is ON, HFA3 automatically retrieves the last exam as RAW IOD for the selected patient. The test preparation screen is prepopulated with the available settings from the patient’s last exam if it exists.

DICOM File Import

This Activity is only available in the **local database mode**.

HFA3 allows user to import RAW and OP files in DICOM format. The Operator can trigger “File import” at any time if no other activity is in progress.

DICOM File Export

This Activity is only available in the **local database mode**.

Operator can trigger “File Export” to export:

Tests: RAW and OP Data.

Report: PDF and/or OPV Data. With a special license, HFA3 can be configured to export the OPV IOD to the local hard drive or portable media. OPV IOD’s are never sent via DICOM.

Data Manipulation

HFA3 supports the following data manipulation functions:

Reconcile Patient (Resolve Record Conflict):
Whenever a patient is brought into the HFA3 by Modality Worklist, Query-Retrieve or file Import, the demographic data is compared to existing patient data to find matches. Matches are considered to be ‘conflicts’, and marked as such on the user interface. The system requires the user to resolve patient conflicts before the patient may be used for examinations.

Delete Patient
The Delete Patient activity can either be invoked manually by the operator or triggered automatically by the software application. A patient is deleted from the HFA3’s local database by deleting all demography and exam data.

Delete Exam
For a given patient one or more selected exams may be deleted. The exam data is deleted from the HFA3’s local database only, leading systems are not notified of the deletion(s).

Reassign Exam
A single exam may be transferred from one patient to another. This feature allows to correct an operating error of collecting data under the wrong patient name. Any lead system is not notified of this reassignment.

4.1.3.2 Scheduled case with Acquisition Modality

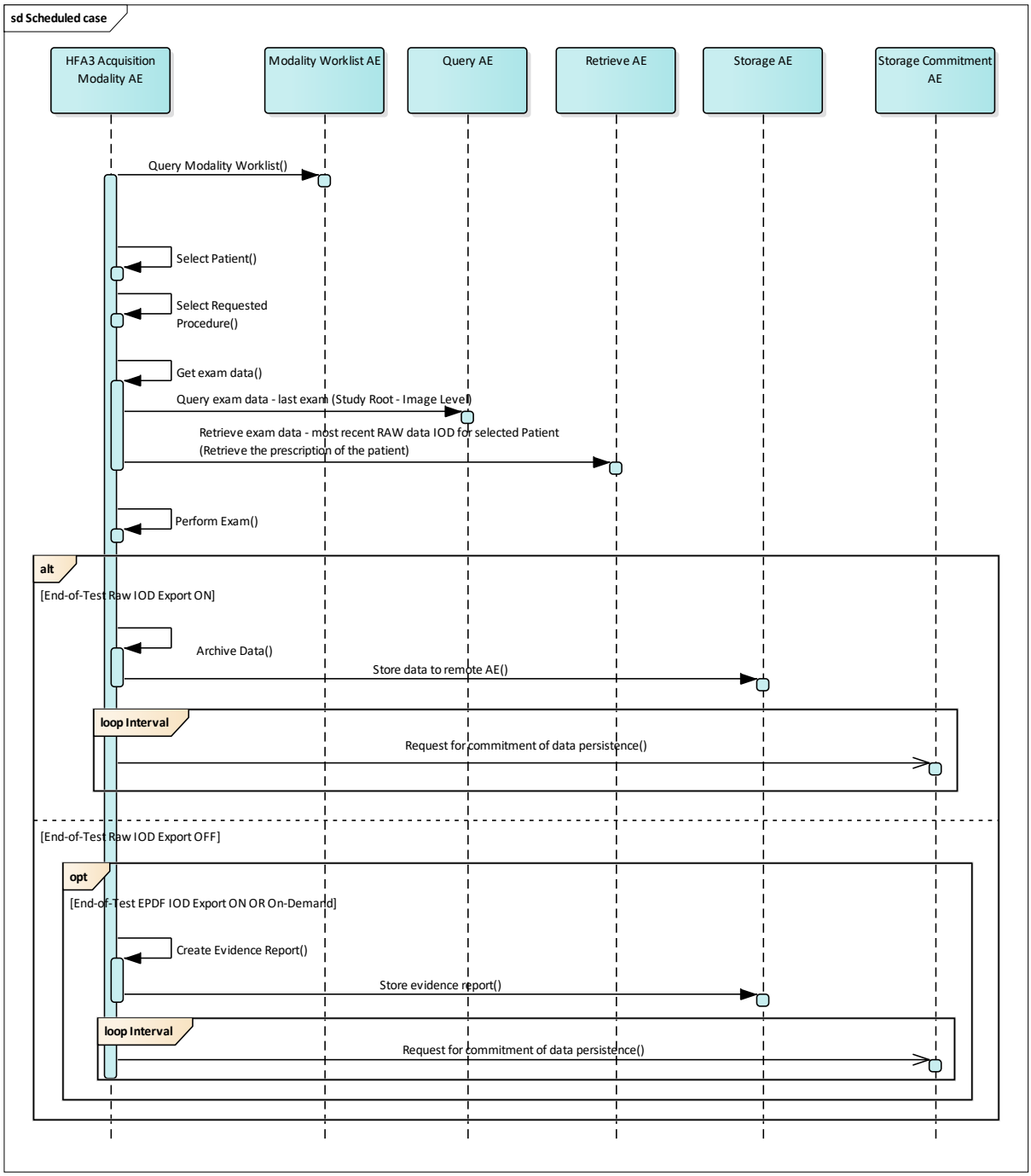
The normal case is that the patient arrives at the front desk. There can be two possibilities at this point:

- The examination can be scheduled on an instrument.
- The examination can be scheduled in advance and will be obtained by HFA3 via Modality Worklist query.

In either case all patient and study related information is available at the day the examination takes place. On the HFA3 these patients appear in the “Todays” list in the main screen. This information is used to take the examination. HFA3 queries the Archive Provider to obtain the most recent previous

exam for the patient to obtain the vision prescription information.

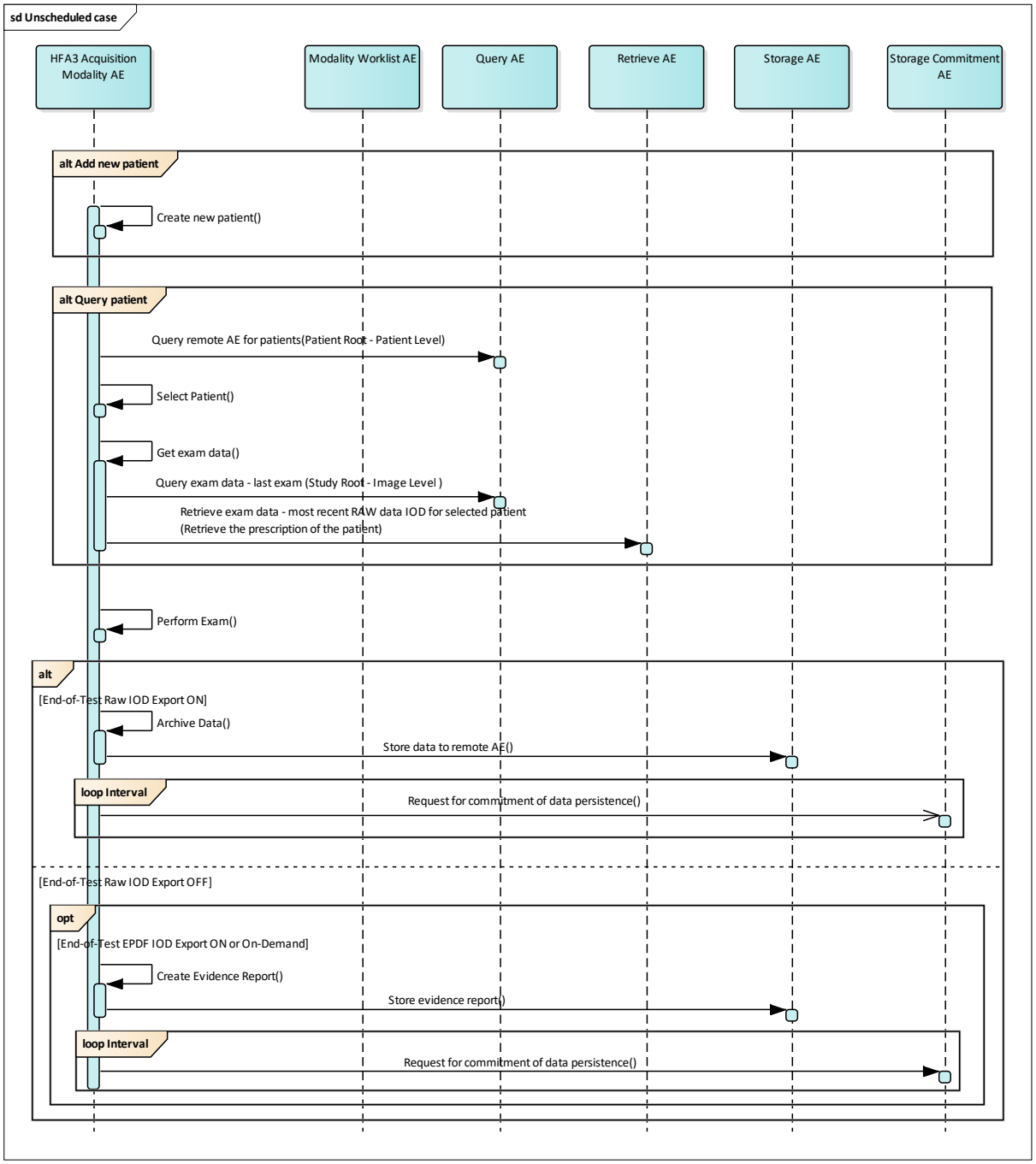
Figure 4-2 Scheduled Case



4.1.3.3 Unscheduled case

In the unscheduled case the patient arrives immediately at the instrument, so that the patient was not registered at the front desk or the software does not support DICOM modality worklist. Thus the examination is not scheduled in the Modality Worklist. One option the operator has is to type in search criteria which filters the “Today” section of the patient selection screen, but it also queries matching patient demographic from the DICOM Server and the local database and displays them in the “Search results” section of the patient selection screen. If the unscheduled patient is in the DICOM Server or the local database, the operator can select the patient from the “Search results” section for data acquisition.

Figure 4-3 Unscheduled Case



4.2 AE Specifications

4.2.1 HFA3 Humphrey Field Analyzer - HFA3 Series AE Specification

4.2.1.1 SOP Classes

This application entity provides Standard Conformance to the following SOP Classes:

Table 4-1 SOP Classes for HFA3 AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Yes [3)]	Yes [3)]
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes [3)]	No
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1	No [2)]	No [2)]
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes [4)]	No
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes [1)]	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes [1)]	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No

Note 1: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note 2: HFA3 does not transmit OPV IODs via DICOM. If enabled via license it will store OPV IODs to the local, external or network drive.

Note 3: Raw Data Storage and Ophthalmic Photography 8 Bit Image Storage are supported only when the HFA is connected to FORUM.

Note 4: Encapsulated PDF Storage is only available when Raw Data Storage is disabled

4.2.1.2 Associations Policies

4.2.1.2.1 General

The DICOM standard Application Context Name for DICOM 3.0 is always proposed:

Table 4-2 DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations depends on the usage profile. At a certain point of time there might be active simultaneously:

- 1 association for Verification
- 1 association for Storage
- 1 association for Storage Commitment
- 1 association for Query/Retrieve - MOVE

- n associations for Modality Worklist - FIND, depending on whether search criteria are changed while a previous query is still active (no response yet)
- n associations for Query/Retrieve - FIND, depending on whether search criteria are changed while a previous query is still active (no response yet)

Table 4-3 Number of Associations as an Association Initiator for HFA3

Maximum number of simultaneous associations	50

Table 4-4 Number of Associations as an Association Acceptor for HFA3

Maximum number of simultaneous associations	50

4.2.1.2.3 Asynchronous Nature

HFA3 Application Software does not support asynchronous communication (multiple outstanding transactions over a single Association).

4.2.1.2.4 Implementation Identifying Information

Table 4-5 DICOM implementation class and version for HFA3

Implementation Class UID	1.2.276.0.75.2.5.20
Implementation Version Name	NIM-2.11

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify Communication

4.2.1.3.1.1 Description and Sequencing of Activities

This activity is available during the configuration phase. It facilitates the setup and management of the DICOM Application Entities.

The user can test the application level communication between instrument's software Application Entity and its peer DICOM Application Entities. During one test call, all peer DICOM Application Entities are contacted.

In the association request HFA3 Application Software proposes not only Verification SOP Class, but also all other SOP Classes as supported by the instrument's DICOM interface.

The association is established when the peer DICOM entity accepts the verification related presentation context. In a sub-sequent step a C-ECHO message is exchanged.

The results of the "Verify Communication" activity are shown to the user as success or failure. For e. g. a Storage Provider not only the Verification information is evaluated, but also the acceptance of the proposed presentation context comprising the respective Storage SOP Classes.

4.2.1.3.1.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Verification with Transfer Syntax ILE as SCU

Table 4-6 Proposed Presentation Contexts for Activity Verify Communication

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	None
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	None

Note[1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note[2]: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

Note: HFA3 in local database mode provides no DICOM connectivity. In this case the application can print pdf reports to a windows printer.

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The HFA3 Application Software provides standard conformance.

4.2.1.3.2 Activity – Query Modality Worklist

The worklist contains scheduling information for patients. Query Modality Worklist is used to search for the right scheduling information for this instrument. An operator has two options to perform this activity.

4.2.1.3.2.1 Description and Sequencing of Activities

Option "Todays Patients query"

In this case, the Application Software performs a query with predefined query keys. These keys can be included/excluded in/from the worklist query by settings on "Additional DICOM Settings". The applied query keys are:

Table 4-7 Modality Worklist Query for Today's Patients

Tag	Attribute Name	Description	Additional DICOM Settings
(0040,0100)	Scheduled Procedure Step Sequence		
>(0040,0001)	Scheduled Station Application Entity Title	Uses the value as configured for the HFA3 instrument.	Include/exclude with setting "Include AE Title".
>(0040,0002)	Scheduled procedure Step Start Date	Uses the date of today.	Include/exclude with setting "Include Today's Date".
>(0008,0060)	Modality	"OPV"	Include/exclude with setting "Include Modality".

All matching worklist items are subject to be imported into the local database.

This default query can be manually triggered by simply pressing the button in the header of the "Today" list. This default query is also triggered automatically in a configurable interval to keep the "Today" List up to date if option "Automatic MWL Update" is switched on.

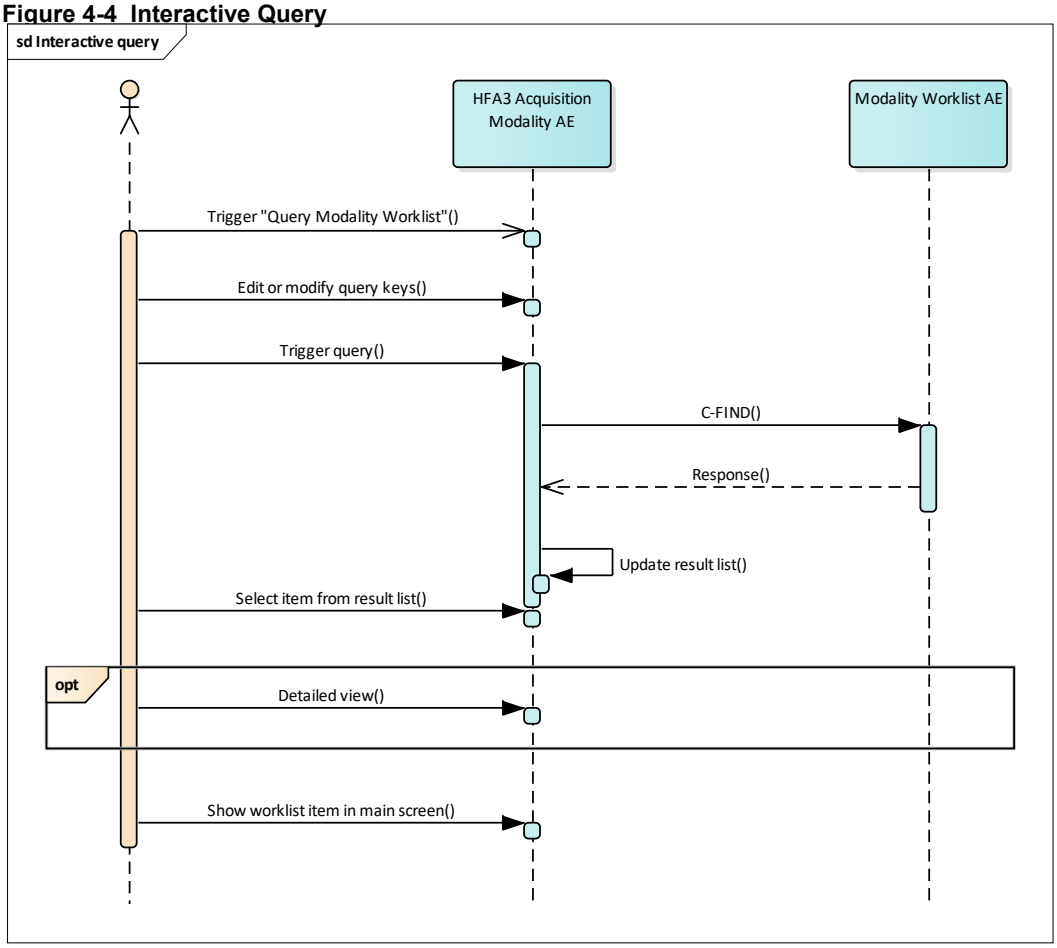
Option "Interactive query"

The query keys of the "Interactive query" can be modified by the operator. To invoke this the operator has to use "Advanced" in the main screen and use the tab "Scheduled Patients". This screen will provide all available search fields for the Modality Worklist search.

The operator can select the patient itself after the Modality Worklist search. In this case the patient will be added to the Today's Patients list and the operator can perform an unscheduled acquisition. No Requested Procedure – Scheduled Procedure Step information is added.

Alternatively the operator can display the Modality Worklist Details for a selected patient. In the Details screen the operator can select a Requested Procedure and add the patient to the Today's Patients list including the selected Requested Procedure information. (Scheduled Case)

Figure 4-4 Interactive Query



Trigger "Query Modality Worklist"

The activity "Query Modality Worklist" can be triggered by the operator at any time if no other activity is in progress. To invoke this the operator has to use "Advanced" in the main screen and use the tab "Scheduled Patients". It is meaningful to perform the query when the patient arrives at the modality. Then the worklist contains latest information.

Edit or modify query keys

The Modality Worklist query offers a GUI for interactive query. The "Station" is prefilled with the instrument AE title. All predefined values can be changed. The operator can change or fill in search criteria in the shown dialog. For instance, the incomplete patient name or the patient ID can be used.

Trigger query

The operator triggers the search after he filled in search criteria. The Application Software sends a DICOM C-FIND request, which contains the search criteria. The Application Software waits for the response from the partner Application Entity. Application Software will accept up to a configurable number of matches. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed. Despite this warning, the operator gets the (partial) result in the result-list.

After receiving the response, the pick-list is updated. The result-list provides the most important information for a quick overview (see section Table 4-11 for the supported set of tags).

The operator can start over, redefine query keys and trigger the query again. This can be performed as often as required, until the correct worklist item(s) are found.

The Application Software synchronize the local data model and query result information. If any synchronization problems appears the DICOM server is the leading system.

In general, the combination of patient id + patient id issuer is assumed to be unique for a patient. When the same patient id + patient id issuer is used for a different patient, the application will use the information coming from the DICOM server. When different patient id + patient id issuer presents, they will be treated as different patients and both are listed in the query results.

Select item in result-list

The operator can select one worklist item in the pick-list. The selected item becomes subject for a detailed view or it can be imported into the Application Software.

Activate detailed view

The detailed view allows a closer look to the currently selected worklist item. The operator can see more information about patient information and requested procedure.

Show worklist item in main screen

The operator can take over the selected procedure. The data is stored in the list of "Today". The Application does not persist this data yet. This is done when the instance is stored in the database.

After all that, the operator can start the examination of the patient and acquire scan data based on the Modality Worklist information (scheduled case).

4.2.1.3.2.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Modality Worklist Information Model - FIND" with Transfer Syntax ILE as SCU

Table 4-8 Proposed Presentation Contexts for Activity Query Modality Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	None

Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None

Note[1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note[2]: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist SOP Class

Table 4-9 Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Failure	Refused: Out of Resources	A700	Log message and display user alert message.
Failure	Identifier Does Not Match SOP Class	A900	Log message and display user alert message.
Failure	Unable to process	C000-CFFF	Log message and display user alert message.
Failure	Refused: SOP class not supported	0122	Log message and display user alert message.
Cancel	Matching terminated due to Cancel request	FE00	Log message
Success	Matching is complete	0000	The Software Application stops receiving worklist items. It finally updates the pick list.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and / or matching for this Identifier	FF01	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert message

Table 4-10 Modality Worklist C-FIND Communication Failure Behavior

Exception	Behavior
DIMSE response timeout	The Association is aborted using A-ABORT. The reason is written to the log file. A user alert message is displayed.
Network Timeout	The Application Software is unable to connect to the remote Application Entity. The reason is written to the log file. A user alert message is displayed.
Maximum Association Idle Time exceeded	The Artim timer expires and the socket is closed. The reason is written to the log file.

Table 4-11 Attributes involved in Modality Worklist C-FIND Request and Response

Tag	Tag Name	Query Keys Matching	Mandatory Query Keys Return	Imported	Displayed	Copied to SOP Instance
Scheduled Procedure Step (SPS)						
(0040,0100)	Scheduled Procedure Step Sequence		X			
>(0040,0001)	Scheduled Station Application Entity Title	BRQ, DEF	X		PLD	
>(0040,0002)	Scheduled Procedure Step Start Date	BRQ, DEF, SEL, RNG	X		PLD	
>(0040,0003)	Scheduled Procedure Step Start Time		X		PL, PLD	
>(0008,0060)	Modality	BRQ, SEL, DEF	X	X	PLD	
>(0040,0006)	Scheduled Performing Physicians Name					
>(0040,0007)	Scheduled Procedure Step Description		X[1]	X	PL, PLD	X
>(0040,0010)	Scheduled Station Name					
>(0040,0011)	Scheduled Procedure Step Location					
>(0040,0008)	Scheduled Protocol Code Sequence		X[1]	X		X
>>(0008,0100)	Code Value		X*	X		X
>>(0008,0102)	Coding Scheme Designator		X*	X		X
>>(0008,0103)	Coding Scheme Version			X		X
>>(0008,0104)	Code Meaning			X	PLD	X
>(0040,0012)	Pre-Medication					
>(0040,0009)	Scheduled Procedure Step ID		X	X		X
>(0032,1070)	Requested Contrast Agent					
>(0040,0020)	Scheduled Procedure Step Status					
Requested Procedure						
(0040,1001)	Requested Procedure ID	PBQ	X	X	PLD	X
(0032,1060)	Requested Procedure Description		X[2]	X	PL, PLD	X
(0032,1064)	Requested Procedure Code Sequence		X[2]	X		X
>(0008,0100)	Code Value		X*	X		X
>(0008,0102)	Coding Scheme Designator		X*	X		X
>(0008,0103)	Coding Scheme Version			X		X
>(0008,0104)	Code Meaning			X	PLD	X
(0020,000D)	Study Instance UID		X	X		X
(0008,1110)	Referenced Study Sequence			X		X

>(0008,1150)	Referenced SOP Class UID		X*	X		X
>(0008,1155)	Referenced SOP Instance UID		X*	X		X
(0040,1003)	Requested Procedure Priority					
(0040,1004)	Patient Transport Arrangements					
(0040,1400)	Requested Procedure Comments			X	PLD	
Imaging Service Request						
(0008,0050)	Accession Number	PBQ		X	PL, PLD	X
(0032,1032)	Requesting Physician					
(0008,0090)	Referring Physicians Name			X	PLD	X
Visit Identification						
(0038,0010)	Admission ID					
Visit Status						
(0038,0300)	Current Patient Location					
Visit Relationship						
(0008,1120)	Referenced Patient Sequence					
>(0008,1150)	Referenced SOP Class UID					
>(0008,1155)	Referenced SOP Instance UID					
Patient Identification						
(0010,0010)	Patients Name[1]	PBQ	X	X	PL, PLD, APP	X
(0010,0020)	Patients ID	PBQ	X	X	PL, PLD, APP	X
(0010,0021)	Issuer of Patient ID			X	PLD	X
(0010,1000)	Other Patient IDs			X		X
Patient Demographics						
(0010,0030)	Patients Birth Date			X	PL, PLD, APP	X
(0010,0040)	Patients Sex			X	PL, PLD, APP	X
(0010,1030)	Patients Weight					
(0040,3001)	Confidentiality Constraint on Patient Data Description					
(0010,2160)	Ethnic Group			X		X
(0010,4000)	Patients Comments			X		X
Patient Medical						
(0038,0500)	Patient State					
(0010,2110)	Allergies					
(0010,21C0)	Pregnancy Status					
(0010,2000)	Medical Alerts					
(0038,0050)	Special Needs					

Note [1]: If the multicomponent group name representation is enabled the name component group configured with Priority 1 is shown in the pick list and in the patient's details. The search string entered in patient's last name or first name is sent in the component group of the attribute (0010,0010)

Patient's Name which corresponds to the representation configured as Priority 1 (see section 4.4.2.1 for the setting of multicomponent group names).

Note [2]: Only patient's first name and last name are displayed in the GUI, but the entire name including all five components of all three component groups are imported and copied into the storage SOP Instance.

Note [3]: All attributes with grey background are by default excluded from the list of Modality Worklist C-FIND-RQ return keys. If needed they can get activated by service personnel.

Note [4]: All attributes with white background are by default included in the Modality Worklist C-FIND-RQ as return keys with the exception that sequences are sent zero-length (no sequence items included).

Values of column "Query Key":

PBQ

A tag that is marked with PBQ is used as query key in the Patient Based Query mode of the interactive Modality Worklist Query Dialog.

BRQ

A tag that is marked with BRQ is used as query key in the Broad Query mode of the interactive Modality Worklist Query Dialog.

DEF

A tag that is marked with DEF has a value assigned when the interactive Modality Worklist Query Dialog is shown the first time or when the Reset button is pushed.

Default values can get modified. The modifications will be stored for next use of Modality Worklist Query Dialog.

RNG

The operator can apply a range as value for the query key.

SEL

The operator can select a value from a given list of values.

Values of column "Mandatory Query Keys Return":

X

The tag shall be present in the Modality Worklist C-FIND response. If any required tag is missing the relevant Modality Worklist C-FIND response item (Scheduled Procedure Step) will be ignored and not imported by the application software.

X*

The tag shall be present in the Modality Worklist C-FIND response if its enclosing sequence is present. If any required tag is missing the relevant Modality Worklist C-FIND response item (Scheduled Procedure Step) will be ignored and not imported by the application software.

X[1]

Either the Scheduled Procedure Step Description (0040,0007) or the Scheduled Protocol Code Sequence (0040,0008) or both shall be present in the Modality Worklist C-FIND response.

X[2]

Either the Requested Procedure Description (0032,1060) or the Requested Procedure Code Sequence (0032,1064) or both shall be present in the Modality Worklist C-FIND response.

Values of column "Imported":

X

The value gets imported in the application. Thus this value may have influence in Information Objects which will be created as a result of the performed examination.

Values of column "Displayed":

PL

Values of this tag are instantly visible in the pick list.

PLD

Values of this tag are visible in the details dialog of the current selected pick list item.

APP

Values of this tag are visible in the application.

Values of column SOP Instance:

X

Values of marked tags will be stored in created SOP Instances. See section 8.1.3 "Attribute Mapping".

Following set of tags can be used as query key in the so called "**Patient Based Query**". The Patient Based Query is a working mode of the Modality Worklist Query Dialog.

Table 4-12 Modality Worklist query key details - Patient Based Query

Tag	Tag Name	Description
(0010,0010)	Patients Name[1]	The HFA3 Application Software supports family name and given name only. A "*" wildcard will automatically added at the end.
(0010,0020)	Patient ID	The operator can enter a string which conforms to the Value Representation LO.
(0008,0050)	Accession Number	The operator can enter a string which conforms to the Value Representation SH.
(0040,1001)	Requested Procedure ID	The operator can enter a string which conforms to the Value Representation SH.

Note [1]: If the multicomponent name representation is enabled than the name component what have been entered as query key (Alphabetic, Ideographic or Phonetic) will be always sent in the Alphabetic group of the C-Find-RQ (see section 4.4.2.1 for the setting of multicomponent group names).

Following set of tags can be used as query key in the so called "**Broad Query**". The Broad Query is a working mode of the Modality Worklist Query Dialog.

Table 4-13 Modality Worklist query key details - Broad Query

Tag	Tag Name	Description
(0040,0100)	Scheduled Procedure Step Sequence	This attribute is the container for the tags as listed below. The sequence contains one item.
>(0040,0002)	Scheduled Procedure Step Start Date	The default value is today's date. The operator can change the value to tomorrow, week and can even enter date ranges in the "Advanced" query. For "Today's patient" query this key is included when "Include Today's Date" is ON.
>(0008,0060)	Modality	The operator can change the value and select one value of a predefined set of values including an empty string. Possible values are "OAM", "OP", "OPM", "OPT", "OPV", "IOL" in the "Advanced" query. For "Today's patient" query this key is included when "Include Modality" is ON.
>(0040,0001)	Scheduled Station AE Title	Value set from the DICOM configuration user interface on HFA3

		For “Today’s patient” query this key is included when “Include AE Title” is ON.

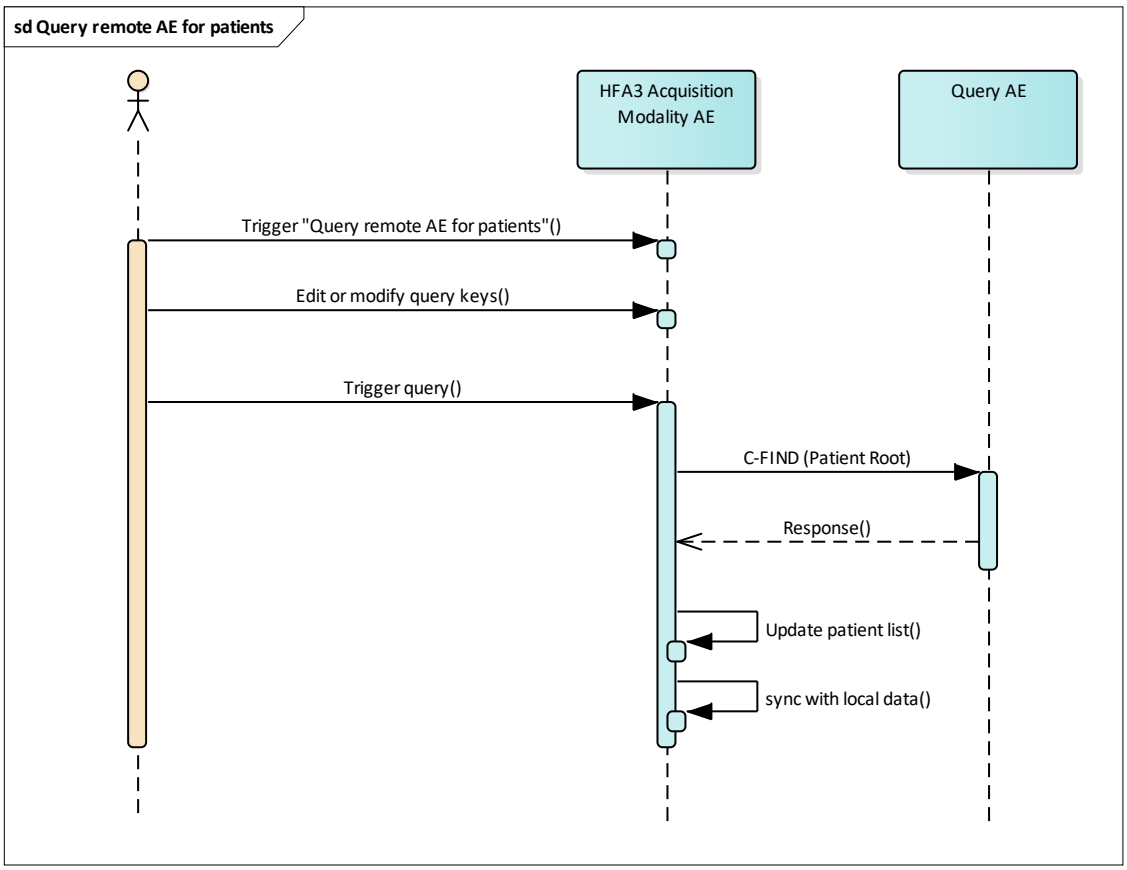
4.2.1.3.3 Activity - Query Remote AE for Patients

Query is used to get patient information and meta data of instances on a DICOM server.

4.2.1.3.3.1 Description and Sequencing of Activities

There are two ways for the user to trigger a query request. The “Quick search” in the main screen will search in “Patient Given Name”, “Patient Last Name”, “Patient ID” and “Patient Birth Date” in parallel. The second way is the “Advanced” search. The user can select this search by clicking the “Advanced” button in the main screen.

Figure 4-5 Query remote AE for patients



Trigger “Query remote AE for patients”

The activity “Query remote AE for patients and data” can be triggered by the operator by using the “Quick search” or change to the “Advanced Search – All Patients” screen.

Edit or modify query keys

The “Advanced” screen offers a GUI for interactive query. The operator can change or fill in search criteria in the shown search fields.

The top-most search field in the main screen is the “Quick search” field. Any value entered herein is applied to

(0010,0010) Patient’s Name – Family Name

(0010,0010) Patient’s Name – Given Name

(0010,0020) Patient ID

(0010,0030) Patient's Birth Date in DICOM date format.

and issued as three separate requests. In case Patient's Birth Date is entered a forth request will be triggered.

For more details on supported query keys see Table 4-22 Query Key Details.

Trigger query

The operator triggers the search after he or she filled in search criteria by either pressing the "Enter" key or click on the "Search" button. The Application Software sends a Patient Root based DICOM C-FIND request which contains the entered search criteria. The Application Software waits for the response from the Query AE and accepts up to a configurable number of matches. If the number of matches exceeds this limit, the Application Software shows an information about truncated search results and a request to apply more specific query keys. Despite this warning, the operator gets results in the pick-list.
After receiving the response, the patient pick-list is updated. The patient pick-list provides the most important information for a quick overview.

The operator can start over, redefine query keys and trigger the query again. This can be performed as often as required, until he or she finds the correct patient entry.

Important note: For this activity it is required that the SCP supports Patient Root Query/Retrieve SOP Class with Relational query model since HFA3 Application Software does not use Study Root Query/Retrieve SOP Class in this context nor does the Application Software support the Hierarchical Model.

4.2.1.3.3.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Patient Root Query/Retrieve Information Model - FIND" with Transfer Syntax ILE as SCU

Important note: For this activity it is required that the SCP supports the Relational query model since Application Software does not use the Hierarchical model.

Table 4-14 Proposed Presentation Contexts for Activity Query Remote AE for Patients

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None

Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	None
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	None

Note [1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note [2]: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

Table 4-15 Extended Negotiation as a SCU

SOP Class Name	SOP Class UID	Extended Negotiation
Patient Root Query/Retrieve IM – FIND	1.2.840.10008.5.1.4.1.2.1.1	See Note[1]
Study Root Query/Retrieve IM - FIND	1.2.840.10008.5.1.4.1.2.2.1	See Note[1]

Note[1]: Extended negotiation for relational-queries is offered. Relational-query support by the SCP is required for successful Patient or Study Root Queries issued by the HFA3 AE.

4.2.1.3.3.3 SOP Specific Conformance for Patient Root and Study Root Query/Retrieve SOP Class as SCU

Table 4-16 Query C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	behavior
Failure	Refused: Out of Resources	A700	Log message and display user alert.
Failure	Identifier does not match SOP Class	A900-A9FF	Log message and display user alert.
Failure	Unable to process	C000-CFFF	Log message and display user alert.
Failure	Refused: SOP class not supported	0122	Log message and display user alert
Cancel	Matching terminated due to Cancel request	FE00	Log Message
Success	Matching is complete – No final Identifier is supplied	0000	The Application Software processes the gathered search results and updates the pick list.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same	FF00	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed. If not, continues to receive the data.

	manner as Required Keys		
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and / or matching for this Identifier.	FF01	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed. If not, continues to receive the data.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert

Table 4-17 Query C-FIND Communication Failure Behavior

Exception	Behavior
DIMSE response timeout	The Association is aborted using A-ABORT. The reason is written to the log file. A user alert message is displayed.
Network Timeout	The Application Software is unable to connect to the remote Application Entity. The reason is written to the log file. A user alert message is displayed.
Maximum Association Idle Time exceeded	The Artim timer expires and the socket is closed. The reason is written to the log file.

Table 4-18 PATIENT Level Keys for the Patient Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Mandatory Query Key Return	Imported	Displayed	Copied into SOP Instance
(0010,0010)	Patient's Name[1]	X		X	X	X
(0010,0020)	Patient ID	X	X	X	X	X
(0010,0021)	Issuer of Patient ID			X		X
(0010,0030)	Patient's Birth Date	RNG		X	X	X
(0010,0032)	Patient's Birth Time					
(0010,0040)	Patient's Sex			X	X	X
(0010,1000)	Other Patient IDs			X		X
(0010,2160)	Ethnic Group			X		X
(0010,4000)	Patient Comments			X		X

Note [1]: If the multicomponent group name representation is enabled the name component group configured with Priority 1 is shown in the pick list and in the patient's details. The search string entered in patient's last name or first name is sent in the component group of the attribute (0010,0010) Patient's Name which corresponds to the representation configured as Priority 1 (see section 4.4.2.1 for the setting of multicomponent group names).

Table 4-19 STUDY Level Keys for the Patient Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Mandatory Query Keys Return	Imported	Displayed	Copied into SOP Instance
(0008,0020)	Study Date					
(0008,0030)	Study Time					
(0008,0050)	Accession Number	X				
(0008,0061)	Modalities in Study					
(0008,0090)	Referring Physician's Name	X				
(0008,0090)	Study Description					
(0008,1080)	Admitting Diagnoses Description					
(0020,0010)	Study ID					
(0020,000D)	Study Instance UID					

Table 4-20 SERIES Level Keys for the Patient Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Mandatory Query Keys Return	Imported	Displayed	Copied into SOP Instance
(0008,0021)	Series Date					
(0008,0031)	Series Time					
(0008,0060)	Modality	SEL				
(0008,103E)	Series Description					
(0008,1050)	Performing Physician's Name					
(0008,1090)	Manufacturer's Model Name					
(0020,000E)	Series Instance UID					
(0020,0011)	Series Number					
(0020,0060)	Laterality					
(0040,0244)	Performed Procedure Step Start Date					
(0040,0245)	Performed Procedure Step Start Time					
(0040,0275)	Request Attributes Sequence					

Table 4-21 IMAGE Level Keys for the Patient Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Mandatory Query Keys Return	Imported	Displayed	Copied into SOP Instance
(0008,0008)	Image Type					
(0008,0012)	Instance Creation Date					
(0008,0013)	Instance Creation Time					
(0008,0016)	SOP Class UID					
(0008,0018)	SOP Instance UID					
(0008,002A)	Acquisition DateTime	RNG				
(0008,114A)	Referenced Instance Sequence					
>(0008,1150)	Referenced SOP Class UID					
>(0008,1155)	Referenced SOP Instance UID					
(0020,0013)	Instance Number					
(0020,0062)	Image Laterality					

Values of column "Query Key":

RNG

The operator can apply a range as value for the query key.

SEL

The operator can select a value from a given list of values.

X

The value is included in the query request if not empty.

AUTO

The value cannot be modified by the operator.

Values of column "Imported":

X

The value gets imported in the application. Thus this value may have influence in Information Objects which will be created as a result of the performed examination.

Values of column "Displayed":

X

Values of this tag are instantly visible in the pick list.

Values of column SOP Instance:

X

Values of marked tags will be stored in created SOP Instances. See section 8.1.3 "Attribute Mapping".

Table 4-22 Query Key Details

Tag	Tag Name	Description
(0010,0010)	Patient's Name[1]	The default value is empty string. Only family name, middle name and given name can be used as query keys. See Table 4-23 Query Key – Patient's Name - Wildcard Details for details. This is a DICOM Standard query key on Patient level.
(0010,0020)	Patient ID	The default value is empty string. The operator can enter each value that conforms to the Value Representation LO. This is a DICOM Standard query key on Patient level.
(0010,0030)	Patient's Birth Date	The default value is empty date. The operator can enter a specific value that conforms to the Value Representation DA. The operator can also select from a range of dates. This is a DICOM Optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0008,0050)	Accession Number	The default value is empty string. The operator can enter each value that conforms to the Value Representation SH. This is a DICOM Standard query key on Study level.
(0008,0090)	Referring Physician's Name[2]	The default value is empty string. Only family name can be used as query key.

		This is a DICOM Optional query key on Study level, thus the effect of this query key on the query depends on Service Provider implementation.
(0008,0060)	Modality	The default value is empty string. The operator can select from a list of pre-defined values and the application software will convert the selection to a value that conforms to the Value Representation CS. This is a DICOM Standard query key on Series level.

Note [1]: If the multicomponent group name representation is enabled the name component group which is defined as Priority 1 will contain the specified search string in the C-FIND-RQ data set.

Note [2]: The search string is always sent in the Alphabetic part of the multicomponent group name of the query key

Table 4-23 Query Key – Patient's Name - Wildcard Details

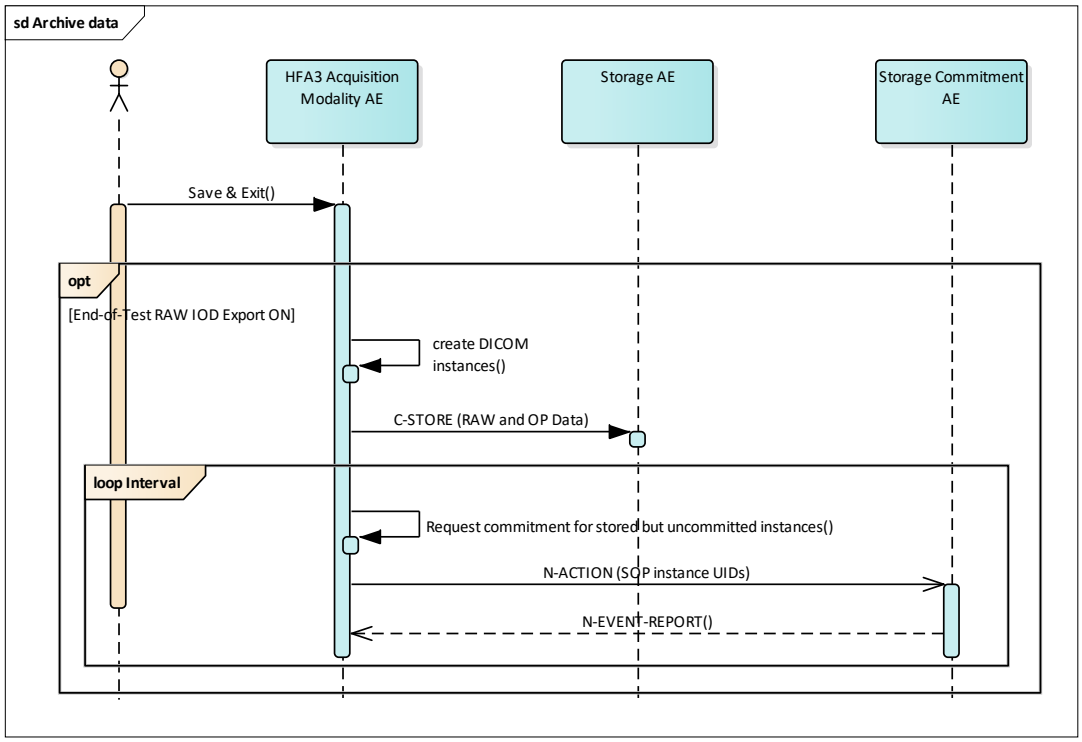
Multicomponent Group Name Representation		Search on Patient's Name – Search String entered in GUI: "Quincy"	Query Key – Value in Attribute (0010,0010) Patient's Name
Disabled		Last Name	Quincy*
		First Name	*^Quincy*
Enabled (see section 4.4.2.1 for the setting of multicomponent group names).	Priority 1 - Ideographic	Last Name	*=Quincy*
		First Name	*=*^Quincy*
	Priority 1 - Phonetic	Last Name	*=*=Quincy*
		First Name	*=*=*^Quincy*
	Priority 1 - Alphabetic	Last Name	Quincy*
		First Name	*^Quincy*

4.2.1.3.4 Activity – Archive Data

When the operator selects the "Save and Exit" button from the Results screen, the RAW Data and Ophthalmic Photography 8 Bit SOP Instances for the exam will be automatically sent to the configured storage provider. The activity can be enabled/disabled via the End of Test automatic export option for RAW IOD.

4.2.1.3.4.1 Description and Sequencing of Activities

Figure 4-6 Archive Data



Trigger "Save and Exit"

This activity can be triggered in the patient details by clicking on the "Save and Exit" button from the Results screen.

The saved exam is send via a RAW Data Storage and Ophthalmic Photography 8 Bit Image Storage to the configured storage provider.

Request commitment for stored but uncommitted instances

To verify that the data has been archived, the Application Software asks the configured Storage Commitment AE in a configurable interval to commit storage of instances.

The application will verify commitment of instances after a predefined interval.

Data that has been successfully archived and storage committed is subject to be deleted at shutdown.

4.2.1.3.4.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Raw Data Storage with Transfer Syntax ILE or ELE as SCU
- OP 8Bit Image Storage with Transfer Syntax JPG-1 as SCU
- Storage Commitment Push Model with Transfer Syntax ILE as SCU

Table 4-24 Proposed Presentation Contexts for Activity Archive Data

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None

Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes[1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	None
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None

Note [1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note [2]: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.4.3 SOP Specific Conformance for Storage SOP Classes

Table 4-25 Storage C-STORE Response Status Handling behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Refused: Out of Resources	A700-A7FF	Log message and retry c-store. If error persists then message to user.
Failure	Error: Data Set does not match SOP Class	A900-AFF	Log message and do not retry. Message to user.
Failure	Error: Cannot understand	C000-CFFF	Log message and do not retry. Message to user.
Failure	Refused: SOP class not supported	0122	Log message and show user alert.
Warning	Coercion of data Elements	B000	The Application Software logs this event.
Warning	Data Set does not match SOP Class	B007	The Application Software logs this event.
Warning	Elements Discarded	B006	The Application Software logs this event.
Success	Successful Storage	0000	None
Unknown	All other responses with unknown code	xxxx	Log message and do not retry. Message to user.

Table 4-26 C-STORE Communication Failure Behavior

Exception	Behavior
DIMSE response timeout	The Association is aborted using A-ABORT. The reason is written to the log file. A user alert message is displayed.
Network Timeout	The Application Software is unable to connect to the remote Application Entity. The reason is written to the log file. A user alert message is displayed.
Maximum Association Idle Time exceeded	The Artim timer expires and the socket is closed. The reason is written to the log file.

4.2.1.3.4.4 SOP Specific Conformance for Storage Commitment SOP Class

4.2.1.3.4.4.1 Storage Commitment Operations (N-ACTION)

The Application Software will request storage commitment for instances of the Raw Data and Ophthalmic Photography 8 Bit Image Storage if the Remote AE is configured as Storage Commitment Provider and a presentation context for the Storage Commitment Push Model has been accepted.

The Storage Commitment Request addresses at least one SOP Instance and at maximum 500 SOP instances.

The behavior of the Application Software when encountering status codes in a N-ACTION response is summarized in the table below:

Table 4-27 Storage Commitment N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Failure	Class-instance conflict	0119	Log message and display user alert.
Failure	Duplicate invocation	0210	Log message.
Failure	Invalid argument value	0115	Log message and display user alert.
Failure	Invalid SOP Instance	0117	Log message and display user alert.
Failure	Mistyped argument	0212	Log message and display user alert.
Failure	No such action	0123	Log message and display user alert.
Failure	No such argument	0114	Log message and display user alert.
Failure	No such SOP class	0118	Log message and display user alert.
Failure	No such SOP Instance	0112	Log message.
Failure	Processing failure	0110	Log message and display user alert.
Failure	Resource limitation	0213	Log message.
Failure	Unrecognized operation	0211	Log message and display user alert.

Success	Success	0000	The Application Software will wait for an incoming N-EVENT-REPORT.
Unknown	All other responses with unknown code meaning.	xxxx	Log message and display user alert.

4.2.1.3.4.4.2 Storage Commitment Communication Failure Behavior

Table 4-28 N-ACTION Communication Failure Behavior

Exception	Behavior
DIMSE response timeout	The Association is aborted using A-ABORT. The reason is written to the log file. A user alert message is displayed.
Network Timeout	The Application Software is unable to connect to the remote Application Entity. The reason is written to the log file. A user alert message is displayed.
Maximum Association Idle Time exceeded	The Artim timer expires and the socket is closed. The reason is written to the log file.

If the Application Software runs in a timeout or if the association is aborted by the provider or network layer, or if waiting duration for Storage Commitment N-EVENT-REPORT oversteps a configurable time limit then the related SOP Instance is considered as not being committed. Then the SOP Instance is subject of a future Storage Commitment service call. It will be included again within next call of this activity.

In addition to that, the Application Software writes the SOP Instance UID to the log file, together with the failure reason.

4.2.1.3.5 Activity – Export Evidence Report

When the End of Test FORUM Test Database export option is OFF, the application software creates a DICOM Encapsulated PDF object with generated report, and sent it to the configured Storage provider in the following scenario.

- Automatic: At the end of an exam session. This activity can be enabled/disabled via the End of Test automatic export option for EPDF IOD.
- On Demand: The operator triggered report export function via the software application.

4.2.1.3.5.1 Description and Sequencing of Activities

Figure 4-7 Export Evidence Report – Auto Export

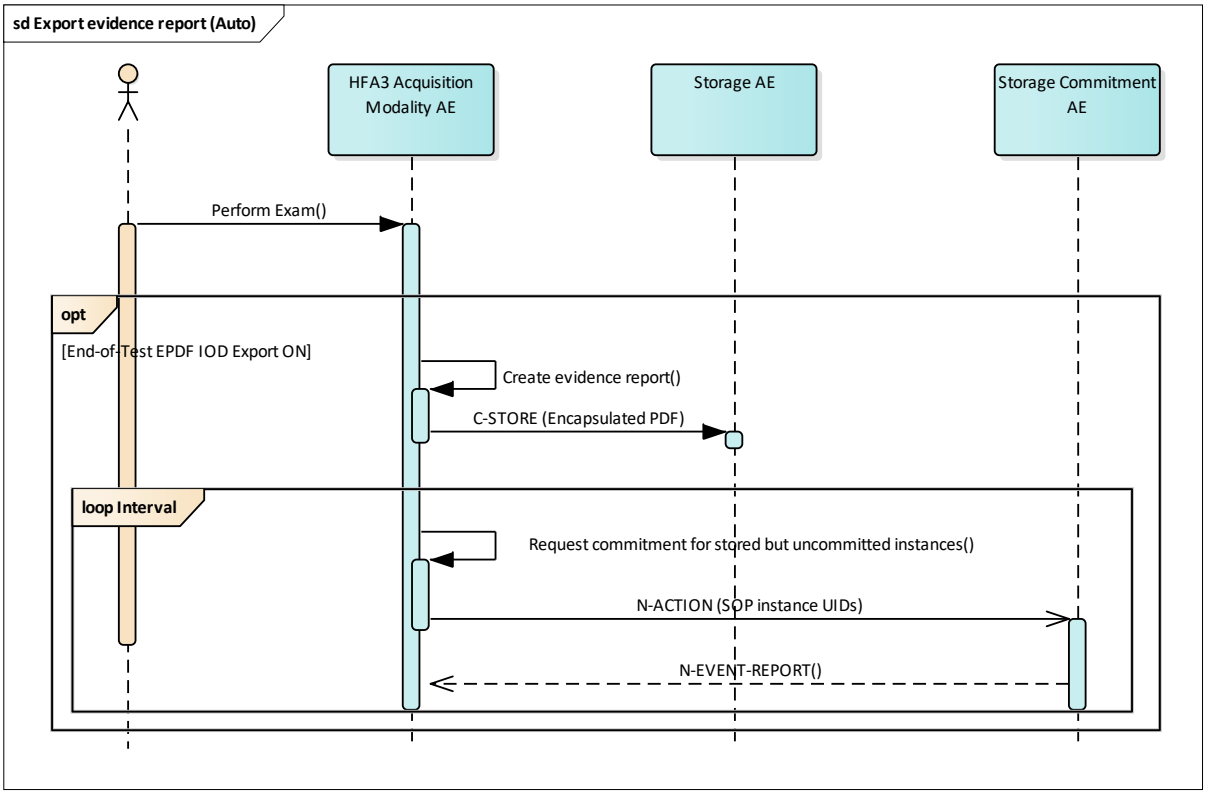
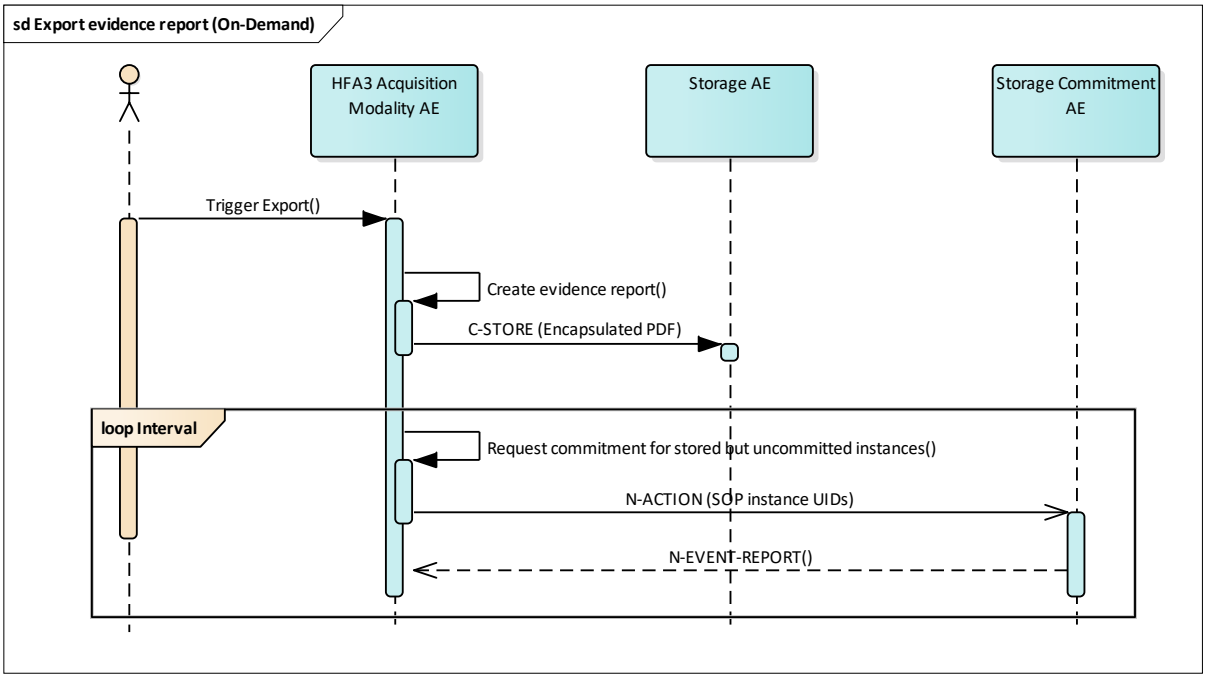


Figure 4-8 Export Evidence Report – Manual Export



Trigger Export

At any time the operator can create an evidence report. The Application Software sends evidence reports to the configured Storage Application Entity. A retry attempt will be made only if the previous attempt was a failure.

The created evidence report contains the information that was presented on screen when the operator triggered the export. The page orientation of the created report is portrait. Usually the evidence report contains one to three pages.

Request commitment for stored but uncommitted instances

To verify that the data has been archived, the Application Software asks the configured Storage Commitment AE in a configurable interval to commit storage of instances.

The application will verify commitment of instances after a predefined interval.

After the Storage Commitment confirms the successful storage, the evidence reports will be deleted from local storage.

4.2.1.3.5.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- Encapsulated PDF Storage Transfer Syntax ILE or ELE as SCU
- Storage Commitment Push Model with Transfer Syntax ILE as SCU

Table 4-29 Proposed Presentation Contexts for Activity Export Evidence Report

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Performed Procedure Step	3.1.2.3.3	ILE	1.2	SCU	None
Modality Performed Procedure Step Notification	3.1.2.3.5	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None

Note[1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note[2] : Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.5.3 SOP Specific Conformance for Storage SOP Classes

Please see section 4.2.1.3.4.3 for details.

4.2.1.3.5.4 SOP Specific Conformance for Storage Commitment SOP Class

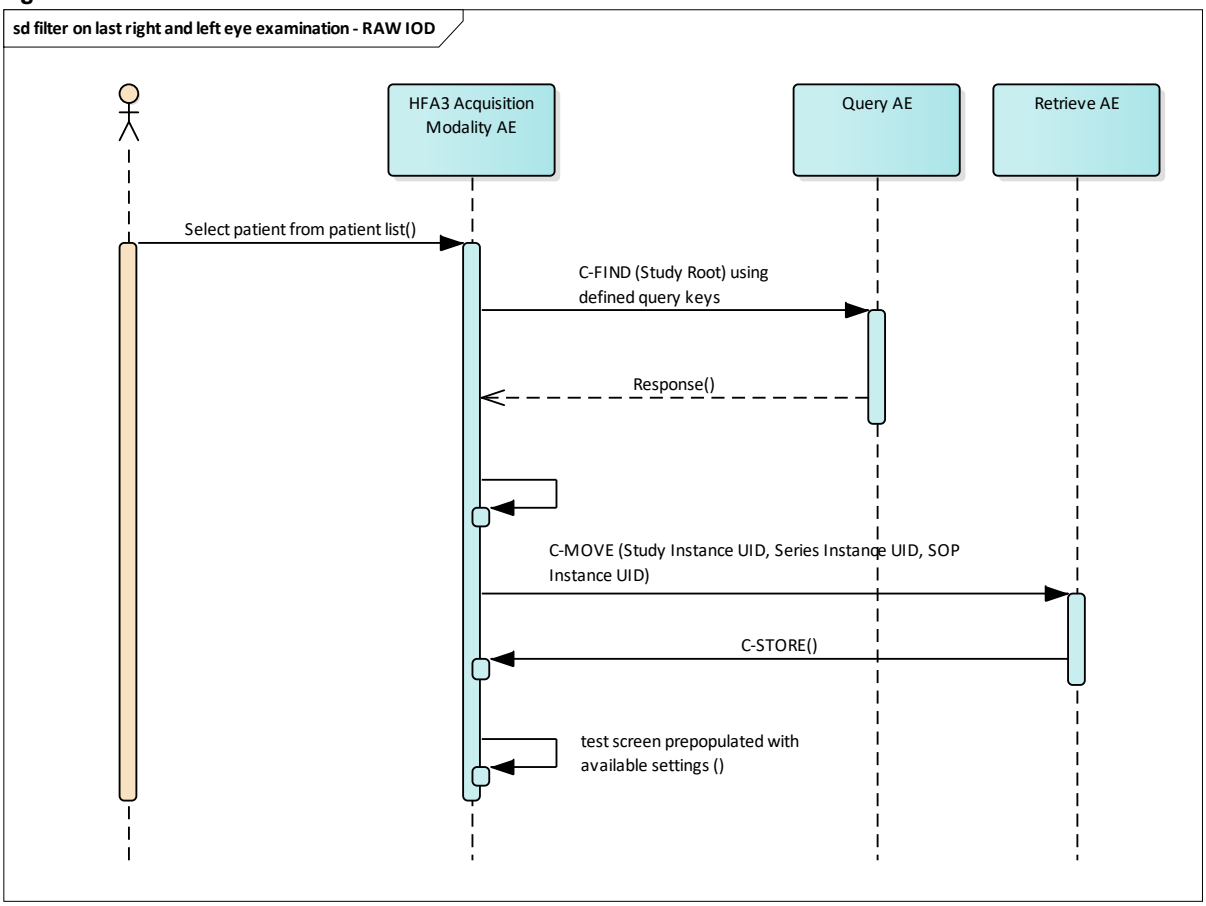
Please see section 4.2.1.3.5.4 for details.

4.2.1.3.6 Activity - Get Exam Data

When the user selects a patient, a Study Root Query is triggered to query for meta information of the most recent HFA exam. If a previous and most recent exam of the left and right eye was found for the selected patient, the HFA3 automatically retrieves the associated Raw Data Storage SOP instance(s) to obtain the vision prescription data for that patient. The activity is triggered only when End of Test automatic export option for FORUM Test Database is turned ON and EPDF export is OFF.

4.2.1.3.6.1 Description and Sequencing of Activities

Figure 4-9 Get last exam



Select patient from patient list

The operator can select one patient entry from the patient list. Once the item is selected the Application Software sends a DICOM C-FIND request using relational Study Root Query/Retrieve SOP Class on INSTANCE level. Within the DICOM C-FIND request all patient level return values from the previous Patient Root Query/Retrieve are used as query keys. Additionally it will use the SOP Class UID for RAW Data Storage and the modality (OPV) to get the exams (RAW Data Storage) from the selected patient in the DICOM C-FIND response. The result will be filtered

afterwards to get only the prescription information from the last examination for the left and right eye.

The operator can select another entry from the patient list even when an active request is still in progress. In this case another request will be started in parallel and the results from the previous request will get finished.

Important note: For this activity it is required that the SCP supports the Relational query model since HFA3 Application Software does not use the Hierarchical model.

4.2.1.3.6.2 Proposed Presentation Contexts

Following presentation contexts are offered for each initiated association. During this activity the Application Software uses only

- "Study Root Q/R Information Model - FIND" with Transfer Syntax ILE as SCU
- "Study Root Q/R Information Model - MOVE" with Transfer Syntax ILE as SCU
- "Raw Data Storage" with Transfer Syntax ELE or ILE as SCP

Table 4-30 Proposed Presentation Contexts for Activity Get Exam Data

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	BOTH [2]	None
		ELE	1.2.1	BOTH [2]	None
Ophthalmic Photography 8 Bit Image Storage	5.1.4.1.1.77.1.5.1	JPG-1	1.2.4.50	SCU	None
Encapsulated PDF Storage	5.1.4.1.1.104.1	ILE	1.2	SCU	None
		ELE	1.2.1	SCU	None
Patient Root Query/Retrieve Information Model – FIND	5.1.4.1.2.1.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve Information Model - FIND	5.1.4.1.2.2.1	ILE	1.2	SCU	Yes [1]
Study Root Query/Retrieve IM - MOVE	5.1.4.1.2.2.2	ILE	1.2	SCU	None
Modality Worklist Information Model – FIND	5.1.4.31	ILE	1.2	SCU	None

Note [1]: C-FIND extended negotiation is offered. Relational-query support is required by the SCP.

Note [2]: Only acts as SCP when a C-Move-RQ was initiated first and this association is still open.

4.2.1.3.6.3 SOP Specific Conformance for Patient Root and Study Root Query/Retrieve SOP Class as SCU

Table 4-31 Query C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	behavior
Failure	Refused: Out of Resources	A700	Log message and display user alert.
Failure	Identifier does not match SOP Class	A900-A9FF	Log message and display user alert.
Failure	Unable to process	C000-CFFF	Log message and display user alert.
Failure	Refused: SOP class not supported	0122	Log message and display user alert
Cancel	Matching terminated due to Cancel request	FE00	Log Message
Success	Matching is complete – No final Identifier is supplied	0000	The Software Application stops receiving worklist items. It finally updates the pick list.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and / or matching for this Identifier.	FF01	Log message. The Application Software checks whether the number of received worklist items overstepped the configurable limit. If the number of received worklist items overstepped the limit, then the Application Software sends a C-CANCEL-RQ, then an A-RELEASE-RQ to the service provider and a message is displayed.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert

Table 4-32 Retrieve C-MOVE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	behavior
Failure	Refused: Out of Resources – Unable to calculate number of matches	A701	Log message and retry. If error persists display user alert
Failure	Refused: Out of Resources – Unable to	A702	Log message and retry. If error persists display user alert

Service Status	Further Meaning	Error Code	behavior
	perform sub-operations		
Failure	Refused: Move Destination unknown	A801	Log message and display user alert
Failure	Identifier does not match SOP Class	A900-A9FF	Log message and display user alert
Failure	Unable to Process	C000-CFFF	Log message and display user alert
Failure	Refused: SOP class not supported	0122	Log message and display user alert
Cancel	Sub-operations terminated due to Cancel Indication	FE00	Log message.
Warning	Sub-operations Complete – One or more Failures	B000	Log message.
Success	Matching is complete – No final Identifier is supplied	0000	The Application Software returns from this activity.
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Log message.
Unknown	All other responses with unknown code meaning	xxxx	Log message and display user alert

Table 4-33 C-FIND and C-MOVE Communication Failure Behavior

Exception	Behavior
DIMSE response timeout	The Association is aborted using A-ABORT. The reason is written to the log file. A user alert message is displayed.
Network Timeout	The Application Software is unable to connect to the remote Application Entity. The reason is written to the log file. A user alert message is displayed.
Maximum Association Idle Time exceeded	The Artim timer expires and the socket is closed. The reason is written to the log file.

Table 4-34 STUDY Level Keys for the Study Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Query Keys Return	Imported	Displayed	Copied into SOP Instance
(0010,0010)	Patient's Name [1]	AUTO		X		
(0010,0020)	Patient ID	AUTO		X		
(0010,0021)	Issuer of Patient ID	AUTO		X		
(0010,0030)	Patient's Birth Date	AUTO		X		
(0010,0032)	Patient's Birth Time					
(0010,0040)	Patient's Sex	AUTO		X		
(0010,1000)	Other Patient IDs					
(0010,2160)	Ethnic Group			X		
(0010,4000)	Patient Comments			X		
(0008,0020)	Study Date			X		
(0008,0030)	Study Time			X		
(0008,0050)	Accession Number			X		
(0008,0061)	Modalities in Study					
(0008,0090)	Referring Physician's Name			X		
(0008,1080)	Admitting Diagnoses Description					
(0020,0010)	Study ID			X		
(0020,000D)	Study Instance UID			X		
(0008,1030)	Study Description			X		

Note [1]: If the selected patient's name contains several component groups all available name component groups are also provided in the Study Root Query C-FIND-RQ data set (Alphabetic, Ideographic and Phonetic)

Table 4-35 SERIES Level Keys for the Study Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key Matching	Query Keys Return	Imported	Displayed	Copied into SOP Instance
(0008,0021)	Series Date			X		
(0008,0031)	Series Time			X		
(0008,0060)	Modality	AUTO		X		
(0020,0011)	Series Number			X		
(0020, 000E)	Series Instance UID			X		
(0008, 103E)	Series Description			X		
(0008,1050)	Performing Physician's Name			X		

(0008,1090)	Manufacturer's Model Name			X		
(0020,0060)	Laterality					
(0040,0244)	Performed Procedure Step Start Date			X		
(0040,0245)	Performed Procedure Step Start Time			X		
(0040,0275)	Request Attributes Sequence					

Table 4-36 IMAGE Level Keys for the Study Root Query/Retrieve Information Model (Query and Return Keys)

Tag	Tag Name	Query Key	Imported	Displayed	Copied into SOP Instance
(0008,0008)	Image Type				
(0008,0012)	Instance Creation Date				
(0008,0013)	Instance Creation Time				
(0008,0016)	SOP Class UID	AUTO	X		
(0008,0018)	SOP Instance UID		X		
(0008,002A)	Acquisition DateTime		X		
(0008,114A)	Referenced Instance Sequence				
>(0008,1150)	Referenced SOP Class UID				
>(0008,1155)	Referenced SOP Instance UID				
(0020,0013)	Instance Number		X		
(0008,0023)	Content Date		X		
(0020,0062)	Image Laterality		X		

Values of column "Query Key":

X

The value is included in the query request if not empty.

AUTO

The value cannot be modified by the operator.

Values of column "Imported":

X

The value gets imported in the application. Thus this value may have influence in Information Objects which will be created as a result of the performed examination.

Values of column "Displayed":

X

Values of this tag are instantly visible in the pick list.

Values of column SOP Instance:

X

Values of marked tags will be stored in created SOP Instances. See section 8.1.3 "Attribute Mapping".

Table 4-37 Query Key Details

Tag	Tag Name	Description
(0010,0010)	Patient's Name[1]	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient Root Query. This is a DICOM Standard query key on Patient level.
(0010,0020)	Patient ID	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient Root Query. The value conforms to the Value Representation LO. This is a DICOM standard query key on Patient level.
(0010,0021)	Issuer of Patient ID	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient root Query. This is a DICOM optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0010,0030)	Patient's Birth Date	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient Root Query. The value conforms to the Value Representation DA. This is a DICOM optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0010,0040)	Patient's Sex	This attribute is used as query key automatically when the operator selects a patient from the patient list and the application starts querying the remote AE for "Visits" and "Exams". The value assigned conforms to the value gathered from the previous Patient root Query. The value conforms to the Value Representation CS. This is a DICOM Optional query key on Patient level, thus the effect of this query key on the query depends on Service Provider implementation.
(0008,0060)	Modality	Value always "OPV"
(0008,0016)	SOP Class UID	Value: "1.2.840.10008.5.1.4.1.1.66" identifies RAW IOD.

Note [1]: If the selected patient's name contains several component groups all available name component groups are also provided in the Study Root Query C-Find-RQ data set (Alphabetic, Ideographic and Phonetic)

4.2.1.3.7 Activity – DICOM File Import

This Activity is only available in the **local database mode**. Therefore it has no effect on DICOM messaging.

The Operator can trigger "File import" at any time if no other activity is in progress.

During this activity, the Application Software imports scan data that has been created by the Application Software instances other than this instance. RAW Data objects and OP 8 Bit Image objects can be imported.

4.2.1.3.8 Activity – DICOM File Export

This Activity is only available in the **local database mode**. Therefore it has no effect on DICOM messaging.

With a special license the HFA3 can be configured to store the DICOM OPV IOD to the local hard drive. OPV IOD's are never sent via DICOM network communication.

The Operator can trigger "File Export" for Reports (PDF and/or DICOM OPV Data) or Tests (RAW Data and OP 8 Bit Images).

4.2.1.3.9 Activity – Data Manipulation

Reconcile Patient (Resolve Record Conflict)

Whenever a patient is brought into the HFA3 by File Import, the demographic data is compared to existing patient data to find matches. Matches are considered to be 'conflicts', and marked as such on the user interface. The system requires the user to resolve patient conflicts before the patient may be used for examinations.

Resolving conflicts entails moving the entire set of exam data from one to the other patient. The patient left with no exam data is deleted from the local database.

This feature is primarily used with leading systems that do not retain exam data, such as MWL Providers, and allows the leading system to specify patient demographic changes to the HFA3, while correctly organizing longitudinal data.

Delete Patient

The Delete Patient activity can either be invoked manually by the operator or triggered automatically by the software application. A patient is deleted from the HFA3's local database by deleting all demographic and exam data. Knowledge of this deletion is not forwarded to any leading system.

	HFA3 in Standalone Mode	HFA3 in Connected Mode
Manual Deletion	Patients can be deleted from the patient list. Deletion will be immediate.	Patients can be deleted from the patient list. Deletion will be immediate.
Automatic Deletion	Not available	The following activities will be performed during the shutdown process: **Delete Exam** If storage commitment is **enabled**, **committed** exams older than 14 days (ExamCacheTime default) will be deleted.

		If storage commitment is disabled, archived exams older than 14 days (ExamCacheTime default) will be deleted. **Delete Series** Series without any exams will be deleted **Delete Study** Studies without any series will be deleted **Delete Patient** Patients without any studies will be deleted

Manual invocation:

The operator can invoke this activity from the "Patient" screen by pressing the "Delete". Manually triggered deletion of data is performed immediately.

Automatic invocation:

Automatically triggered deletion is done as part of the Database Cleanup Activity which occurs during the shutdown process.

In case storage commitment is disabled, it will be performed for any exam older than 14 days (ExamCacheTime default) whose storage to a remote AE is successfully completed.

In case storage commitment is enabled, it will be performed for any exam older than 14 days (ExamCacheTime default) whose storage to a remote AE is successfully completed and committed.

Patient demographic data will only be deleted from the modality after all related storage instances have been successfully deleted.

Delete Exam

For a given patient one or more selected exams may be deleted. The exam data is deleted from the HFA3's local database only, leading systems are not notified of the deletion(s). The main reason for this function is to remove poorly performed exams.

Furthermore the software application provides configurable options (Settings → Network → Storage Commitment section) for automatic deletion of data in case of certain error conditions:

Delete Exam when "Instance not found"

When configured with Delete Exam, the affected instance, that cannot be found anymore on the remote AE, is flagged for deletion as soon as the Storage Commitment report contains a failure reason "instance not found" for this particular instance. The deletion of the instance happens on next shutdown

Re-Archive when "Instance not found":

When configured with Re-Archive, the affected instance is re-archived immediately when storage commitment reports a failure reason "Instance not found". New Storage Commitment will be requested in a future Storage Commitment call. In case the new Storage Commitment fails again it will be retried until the maximum number of retries (3 Storage Commitment calls) is reached.

Delete when "Failed Instances":

When the user hits the Delete Button all instances which are in Storage Commitment error status (any error or failure reason other than "Instance not found") will be marked for deletion when the maximum number of retries (3 Storage Commitment calls) is reached. Deletion happens on next shutdown.

Reset when "Failed Instances":

When the user hits the Reset Button all instances which are in Storage Commitment error status (any error or failure reason other than "Instance not found") will be marked as already archived, but not storage committed.

The status for these instances will be reset as if no storage commitment has been ever requested before. In a future Storage Commitment call the Application Software will request again storage commitment for these particular instances and retries any future failed storage commitment until the maximum number of retries (3 Storage Commitment calls) is reached.

Reassign Exam

A single exam may be transferred from one patient to another. This feature allows to correct an operating error of collecting data under the wrong patient name. Any lead system is not notified of this reassignment.

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity – Verify Communication

The activity can be performed from the network settings screen when an exam is not being performed.

4.2.1.4.1.1 Description and Sequencing of Activities

The Software AE responds to verification requests made by remote AEs.

4.2.1.4.1.2 Accepted Presentation Contexts

Table 4-38 Acceptable Presentation Contexts for HFA3 and Activity Verify Communication

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	… 1.1	ILE	… 1.2	BOTH	None

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.2 Activity – Archive Data

This chapter describes the aspect of association acceptance of the activity "Archive Data". The activity sends RAW Data and Ophthalmic Photography 8 Bit SOP Instances to configured storage provider and requests a storage commitment afterwards.

4.2.1.4.2.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by chapter “Activity - Archive Data".

4.2.1.4.2.2 Accepted Presentation Contexts

Table 4-39 Acceptable Presentation Contexts for HFA3 and Activity Archive Data

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.2.4 SOP Specific Conformance for Storage Commitment SOP Class

4.2.1.4.2.4.1 Storage Commitment Operations (N-EVENT-REPORT)

The Application Software is capable of receiving an N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push

The behavior of Application Software when receiving Event Types within the N-EVENT-REPORT is summarized in the table below.

Table 4-40 Storage Commitment N-EVENT-REPORT Request Failure Reasons

Service Status	Further Meaning	Failure Reason	Behavior
Failure	Processing Failure	0110	The SOP Instance is also considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.
Failure	No such object instance	0112	The SOP Instance is also considered as not being committed. The application will repeat the storage or delete the local instance based on a setting (see section 4.4.2.1 General Parameters). The default setting is to re-archive the exam. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.
Failure	Resource limitation	0213	The SOP Instance is also considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.
Failure	Referenced SOP Class not supported	0122	The application software writes the SOP Instance UID to the log file with the failure reason.
Failure	Class / Instance conflict	0119	The application software writes the SOP Instance UID to the log file with the failure reason.
Failure	Duplicate transaction UID	0131	The SOP Instance is also considered as not being committed. For a configurable amount of re-trials the SOP Instance is subject of a future Storage Commitment service request. It will be included again within next call of these activities. In addition, the application software writes the SOP Instance UID to the log file with the failure reason.

Unknown	All other responses with unknown code meaning	xxxx	Log message and retry storage commit for failed sop instance(s).

If the Application Software gets a N-EVENT-REPORT with failed instances, the behavior of the Application Software depends on the respective failure reason (see table above). In general retry means a retry for 2 times, no retry will set the error counter to maximum. A reset of the error counter is possible in the application settings screen.

4.2.1.4.3 Activity – Export Evidence Report

This chapter describes the aspect of association acceptance of the activity "Export Evidence Report". The activity sends Encapsulated PDF SOP Instances to the configured Storage provider.

4.2.1.4.3.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by chapter “Activity – Export Evidence Report".

4.2.1.4.3.2 Accepted Presentation Contexts

Table 4-41 Acceptable Presentation Contexts for HFA3 and Activity Export Evidence Report

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Storage Commitment Push Model	1.20.1	ILE	1.2	SCU	None

4.2.1.4.3.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.2.1.4.3.4 SOP Specific Conformance for Storage Commitment SOP Class

Please see section 4.2.1.4.2.4 for details.

4.2.1.4.4 Activity - Get Exam Data

This chapter describes the aspect of association acceptance of the activity “Get Exam Data”. The activity retrieves meta data of last HFA3 exam belonging to a selected patient.

4.2.1.4.4.1 Description and Sequencing of Activities

The description and sequencing of activities is covered by chapter “Activity – Get Exam Data”

4.2.1.4.4.2 Accepted Presentation Contexts

Table 4-42 Acceptable Presentation Contexts for HFA3 and Activity Get Exam Data

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID 1.2.840.10008. ...**	**Name List**	**UID List 1.2.840.10008. ...**		
Verification	1.1	ILE	1.2	BOTH	None
Raw Data Storage	5.1.4.1.1.66	ILE	1.2	SCP	None

		ELE	1.2.1	SCP	None

4.2.1.4.4.3 SOP Specific Conformance for Storage SOP Class as SCP

The Application Software AE provides standard conformance.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The physical network interface is not visible for the instrument application. The instrument application uses the communication stack as offered by the Operating System.

4.3.2 Additional Protocols

Both IP addresses and host names are supported and get resolved. Else no additional protocols are supported.

4.3.3 IPv4 and IPv6 Support

HFA3 software does only support IPv4 and does not support any IPv6 features.

4.4 Configuration

Local application entity and remote application entity information can be configured in the DICOM section of the software application's "Settings" dialog. This dialog does also allow the configuration of other DICOM related settings, like different timeouts, Modality Worklist and Patient Query item limits etc.

Institution related settings, like Institution Name and Address etc. can be set from the "General Settings" section of the "Settings" dialog.

4.4.1 AE Title/Presentation Address Mapping

The mapping from AE Title to TCP/IP addresses and ports is configurable and set at the time of installation by Installation Personnel.

4.4.1.1 Local AE Titles

The IP address can be configured to be set up manually or to be administered by the Operating System. The Application Entity Title as well as the port number is configurable.

Table 4-43 AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
HFA3 AE	"SCDEVICE"	11112

In case AutoConnect™ is enabled in both HFA3 and FORUM, the Local AE configuration is registered automatically in the FORUM AE Title Administration.

4.4.1.2 Remote AE Titles

The mapping of external AE Titles to TCP/IP addresses and ports is configurable. The HFA3 Application Software allows setting up a remote Application Entity for each service. For all Application Entities, the host name or IP, the Port and the Application Entity Title must be known.

Mapping of DICOM services to remote AE can be done either manually or by using the AutoConnect feature. In case AutoConnect is enabled in both HFA3 and FORUM, the configuration of the Remote Application Entities can be performed automatically using the AutoConnect button.

4.4.2 Parameters

4.4.2.1 General Parameters

The general parameters are shared for associations to any of the configured AE.

Table 4-44 Configuration Parameters

Parameter	Configurable (Yes/No)	Default Value
General Parameters		
DIMSE RSP Timeout	Yes (10 – 60 sec.)	20 sec
Network Timeout	Yes (5-20 sec.)	20 sec.
Max. Association Idle Time	Yes (10 – 60 sec.)	30 sec
TCP IP port	Yes (1-65535)	11112
Network log level	Yes (Debug, Info, Warning, Error)	Error
(0008,0080) Institution Name	Yes	EMPTY
(0008,1040) Institutional Department Name	Yes	EMPTY
(0008,0081) Institution Address	Yes	EMPTY
(0008,1010) Station Name	Yes	EMPTY
(0010,0021) Issuer of Patient ID	Yes	Serial Number + HFA3
AE Specific Parameters		
Number of simultaneous Associations	No	50
AE Title	Yes	“SCDEVICE”
Verification SCU Parameters		
C-ECHO Interval	No	No automatic C-ECHO
Modality Worklist SCU Parameters		
Maximum Query Responses (Modality Worklist IM, Patient Root Q/R Information Model and Study Root Q/R IM)	Yes (10-999)	200
Automatic MWL update	Yes	Enabled
Today’s Patient List Refresh Rate (Modality Worklist Polling Interval)	Yes (1-60 min)	5 min.
(0040,0001) Scheduled Station Application Entity Title (Today’s Patient Worklist Query)	Yes (include/exclude from query)	Value as configured for the HFA3 instrument
(0040,0002) Scheduled procedure Step Start Date	Yes (include/exclude from query)	Uses the date of today.
(0008,0060) Modality	Yes (include/exclude from query)	“OPV”
(0005, 0008) DICOM Specific Character Set[1]	Yes (by service personnel only)	None (HFA3 uses UTF-8)

Patient Root – SERIES Level Polling		
Patient Root Q/R and Study Root Q/R SCU Parameters		
Maximum Query Responses (Modality Worklist IM, Patient Root Q/R Information Model and Study Root Q/R IM)	Yes (10-999)	200
Extended Negotiation – relational query support negotiation (Patient Root Q/R Information Model and Study Root Q/R IM)	Yes (enabled, disabled)	Enabled
(0005, 0008) DICOM Specific Character Set[1]	Yes (by service personnel only)	None (HFA3 uses UTF-8)
Storage Commitment SCU Parameters		
The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).	-	-
Storage Commitment enable/disable	Yes	Enabled
reaction to “instance not found”	Yes (“delete Exam”, “re-archive”)	“re-archive”
Storage SCU Parameters		
End of Test FORUM Test Database Export (End of Test Settings→DICOM Output→FORUM Test Database)	Yes (enable/disable Raw IOD export)	OFF
End of Test EPDF IOD Export (End of Test Settings→DICOM Output→Export EPDF)	Yes (enable/disable EPDF IOD export)	OFF
(0005, 0008) DICOM Specific Character Set[1]	Yes (by service personnel only)	None (HFA3 uses UTF-8)
Storage SCP Parameters		
No specific configuration required The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		
Verification SCP Parameters		
No specific configuration required The configuration of port number and Application Entity Title are part of the Local Application Entity setup (see 4.4.1.1 Local AE Titles).		

Note [1]: DICOM Specific Character Set (Configuration settings available for Service user only)

Table 4-45 Specific Character Set

Parameter		**Default Value**
Available DICOM character set for Modality Worklist, Query, Retrieve, Storage		
Defined Term	**Description**	
None [1]		None
ISO_IR 100	Latin alphabet No. 1	
ISO_IR 101	Latin alphabet No. 2	
ISO_IR 109	Latin alphabet No. 3	
ISO_IR 110	Latin alphabet No. 4	

ISO_IR 148	Latin alphabet No. 5	
ISO_IR 144	Cyrillic	
ISO_IR 127	Arabic	
ISO_IR 126	Greek	
ISO_IR 138	Hebrew	
ISO_IR 13	Japanese	
ISO_IR 166	Thai	
GB18030	Chinese	
ISO_IR 192	Unicode in UTF-8	

Note [1]: Per default the HFA3 uses ISO_IR 192 (UTF-8), (Setting is “None”).

Please note, configured Character Set is always applied to corresponding DICOM requests. Regarding DICOM responses, it will only come into effect if the remote Service Provider does not send it.

Modification to the default settings is only recommended in case of integration issues which result in incorrect interpretation of transmitted characters. See chapter 6 Support of Character Sets for more information.

5 Media Interchange

Media Interchange is not scope of this document since Media Interchange is not supported by HFA3 Application Software.

6 Support of Character Sets

All application entities described in the previous chapters support UTF-8 character set per default.

A specific character set can be provided optionally and individually per remote Service Provider with the exception of the Storage Commitment service, where specific character set is not needed. Possible defined terms for the character set element are listed in Table 6-1 Supported Character Set. HFA3 does not support Code Extension techniques via configuration, so ISO 2022 standard cannot be used.

Table 6-1 Supported Character Set

Supported Specific Character Set	
Character Set Description	**Defined Term**
UTF-8 encoded Unicode	ISO_IR 192 (Default)
Latin alphabet No. 1	ISO_IR 100
Latin alphabet No. 2	ISO_IR 101
Latin alphabet No. 3	ISO_IR 109
Latin alphabet No. 4	ISO_IR 110
Latin alphabet No. 5	ISO_IR 148
Cyrillic	ISO_IR 144
Arabic	ISO_IR 127
Greek	ISO_IR 126
Hebrew	ISO_IR 138
Japanese	ISO_IR 13
Thai	ISO_IR 166
Chinese	GB18030

Please note, configured Character Set will only come into effect if the remote Service Provider does not send it in the DICOM response. The latter would be a violation of the DICOM standard which now can be corrected by service personnel via Character Set configuration.

Configuration of Specific Character Sets can only be performed by a Service User.

If Specific Character Set is missing in the request or response data set and no Character Set is configured (settings is “None”), the HFA3 uses ISO_IR 192 (UTF-8) as default.

Examples of when to use the optional configuration of specific character sets:

- A 3rd party MWL Provider sends responses with string values encoded in Latin alphabet No. 1 but does not provide corresponding Specific Character Set attribute. The MWL Character Set should be set to ISO_IR 100 to ensure a proper decoding of the data set.
- A 3rd party Storage/Query/Retrieve Provider does only support DICOM instances with Specific Character Set ISO_IR 100. The Storage/Query/Retrieve Character Set should be set to ISO_IR 100 to ensure a proper encoding of the DICOM data set.

Configuration of a Character Set is not needed if connected to FORUM Archive.

7 Security

The DICOM capabilities of the HFA3 Application Software do not support any specific security measures – but requires login credentials from any authorized user.

It is assumed that HFA3 Application Software is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to HFA3 Application Software
- Firewall or router protections to ensure that the HFA3 Application Software only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))
- Customer provided Virus Scanner has been installed.
- Any USB memory drives have been pre-scanned before being inserted.

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 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instance(s)

Abbreviations used for presence of values:

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:

USER
The attribute value source is from User input

AUTO
The attribute value is generated automatically

MWL
The attribute value is the same as the value received using a DICOM service such as Modality Worklist.

CONFIG
The attribute value source is a configurable parameter

ACQUISITION
The sources of data come from data acquisition process. Include Image and data relate to Image

ANALYSIS
The sources of data come from data generate by application or add/edit/update by user when images are analyzed.

SRQ
The attribute value is same as the value received using a DICOM service such as Study Root Query.

SRC
The attribute value is only present if the source RAW data set did contain the attribute value. In some cases this only applies to imported raw data sets.

8.1.1.1 Ophthalmic Photography 8Bit Information Object Definition

IE	Ophthalmic Photography 8Bit IOD	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
	Ophthalmic Photography Series	ALWAYS
Frame Of Reference		
	Synchronization	ALWAYS
Equipment		
	General Equipment	ALWAYS
Image		
	Image Pixel	ALWAYS
	Multi-frame	ALWAYS
	Ophthalmic Photography Image	ALWAYS
	Ocular Region Imaged	ALWAYS
	Ophthalmic Photography Acquisition Parameters	ALWAYS
	Ophthalmic Photography Parameters	ALWAYS
	SOP Common	ALWAYS

Table 8-1 Ophthalmic Photography IOD - Module "Patient"

Ophthalmic Photography IOD - Module "Patient"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
(0010,0010)	2	PN	Patient's Name	Patient's full name.	VNAP	USER, MWL, SRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	USER, MWL, SRQ
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID. Note: Equivalent to HL7 v2 CX component 4 subcomponent 1.	ANAP	MWL, SRQ, CONFIG
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, SRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	MWL, USER, SRQ
(0010,0032)	3	TM	Patient's Birth Time	Birth time of the Patient.	ANAP	MWL, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	MWL, SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ

Table 8-2 Ophthalmic Photography IOD - Module "General Study"

Ophthalmic Photography IOD - Module "General Study"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.2.30.2.1 as DICOM root prefix for generated UIDs.	ALWAYS	AUTO, MWL
(0008,0020)	2	DA	Study Date	Date the Study started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. In scheduled case: Copied from Requested Procedure ID. For unscheduled case generated by System as "OPV_ yyyyMMdd"	ALWAYS	AUTO,MWL
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. For the scheduled case via MWL. For the unscheduled case empty.	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. Copied from Requested Procedure Description.	ANAP	MWL
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. One or more Items are permitted in this Sequence.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items are permitted in this Sequence.	ANAP	MWL
>(0008,0100)	1	SH	Code Value	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See Section 8.1.3 Attribute Mapping	ANAP	MWL

Ophthalmic Photography IOD - Module "General Study"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
>(0008,0104)	1	LO	Code Meaning	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL

Table 8-3 Ophthalmic Photography IOD - Module “General Series"

Ophthalmic Photography IOD - Module “General Series"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. “1.2.276.0.75.2.2.30.2.10” constant prefix for generated UIDs	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series. Set to “2”.	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right. L = left,“” = both eyes (Esterman Binocular, Binocular Kinetic) Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro or Measurement Laterality (0024,0113) at the Measurement level, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined. Note: 0020,0060 and 0020,0062 are always present.	ALWAYS	USER
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). Copied from Requested Procedure Description	ANAP	MWL
(0008,1070)	3	PN	Operators' Name	Name(s) of the operator(s) supporting the Series.	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. One or more Items are permitted in this sequence. Obtained from Worklist.	ANAP	MWL

Ophthalmic Photography IOD - Module “General Series"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ANAP	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	ANAP	MWL
>(0032,1064)	3	SQ	Requested Procedure Code Sequence	A sequence that conveys the Procedure Type of the requested procedure. Only a single Item is permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.3 Attribute Mapping.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.1.3 Attribute Mapping.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See Section 8.1.3 Attribute Mapping.	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.1.3 Attribute Mapping.	ALWAYS	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ANAP	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	ANAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. One or more Items are permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL

Ophthalmic Photography IOD - Module “General Series"						
Tag	**Type**	**VR**	**Name**	**Description**	**PoV**	**Source**
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See Section 8.1.3 Attribute Mapping	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. Copied from Requested Procedure Description	ANAP	MWL

Table 8-4 Ophthalmic Photography IOD - Module “Ophthalmic Photography Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	Source equipment that produced the Ophthalmic Photography Series. Enumerated Value: OP	ALWAYS	AUTO

Table 8-5 Ophthalmic Photography IOD - Module “Synchronization"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0200)	1	UI	Synchronization Frame of Reference UID	UID of common synchronization environment. See C.7.4.2.1.1. Value: 1.2.276.0.75.2.2.30.2.5.YYMMDDHHMMSSmmm.MACAddress.random_number	ALWAYS	AUTO
(0018,106A)	1	CS	Synchronization Trigger	Data acquisition synchronization with external equipment Enumerated Values: SOURCE - this equipment provides synchronization channel or trigger to other equipment EXTERNAL - this equipment receives synchronization channel or trigger from other equipment PASSTHRU - this equipment receives synchronization channel or trigger and forwards it NO TRIGGER - data acquisition not synchronized by common channel or trigger Always “NO TRIGGER”	ALWAYS	AUTO
(0018,1800)	1	CS	Acquisition Time Synchronized	Acquisition DateTime (0008,002A) synchronized with external time reference. Enumerated Values: Y, N See C.7.4.2.1.4 Always “N”	ALWAYS	AUTO

Table 8-6 Ophthalmic Photography IOD - Module “General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances. Always "Carl Zeiss Meditec”	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	ANAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer’s model name of the equipment that produced the composite instances. For HFA3: “HFA 3”	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer’s serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	Manufacturer’s designation of software version of the equipment that produced the composite instances. See NEMA PS3.3 Section C.7.5.1.1.3. Set to “1.5.x.y”	ALWAYS	AUTO
(0018,1200)	3	DA	Date of Last Calibration	Date when the image acquisition device calibration was last changed in any way. Multiple entries may be used for additional calibrations at other times. See NEMA PS3.3 C.7.5.1.1.1 for further explanation.	ALWAYS	AUTO
(0018,1201)	3	TM	Time of Last Calibration	Time when the image acquisition device calibration was last changed in any way. Multiple entries may be used. See NEMA PS3.3 C.7.5.1.1.1 for further explanation.	ALWAYS	AUTO

Table 8-7 Ophthalmic Photography IOD - Module “Image Pixel"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0010)	1	US	Rows	Number of rows in the image. Always 200	ALWAYS	AUTO
(0028,0011)	1	US	Columns	Number of columns in the image Always 200	ALWAYS	AUTO
(0028,0100)	1	US	Bits Allocated	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated. See PS 3.5 for further explanation. Always “8”	ALWAYS	AUTO
(0028,0101)	1	US	Bits Stored	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored. See PS 3.5 for further explanation. Always “8”	ALWAYS	AUTO
(0028,0102)	1	US	High Bit	Most significant bit for pixel sample data. Each sample shall have the same high bit. See PS 3.5 for further explanation. Always “7”	ALWAYS	AUTO
(7FE0,0010)	1C	OB|OW	Pixel Data	A data stream of the pixel samples that comprise the Image. See NEMA PS3.3 C.7.6.3.1.4 for further explanation. Required if Pixel Data Provider URL (0028,7FE0) is not present.	ALWAYS	AUTO

Table 8-8 Ophthalmic Photography IOD - Module “Cine"

Tag	Type	VR	Name	Description	PoV	Source
(0018,1063)	1C	DS	Frame Time	Nominal time (in msec) per individual frame. See C.7.6.5.1.1 for further explanation. Required if Frame Increment Pointer (0028,0009) points to Frame Time.	ALWAYS	AUTO

Table 8-9 Ophthalmic Photography IOD - Module “Multiframe"

Tag	Type	VR	Name	Description	PoV	Source
(0028,0008)	1	IS	Number of Frames	Number of frames in a Multi-frame Image. See C.7.6.6.1.1 for further explanation.	ALWAYS	AUTO
(0028,0009)	1	AT	Frame Increment Pointer	Contains the Data Element Tag of the attribute that is used as the frame increment in Multi-frame pixel data. See C.7.6.6.1.2 for further explanation. Always “00181063” which is intended to refer to Frame Time DICOM tag.	ALWAYS	AUTO

Table 8-10 Ophthalmic Photography IOD - Module “Ophthalmic Photography Image"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0008)	1	CS	Image Type	Image identification characteristics. See C.8.17.2.1.4 for specialization. Value 1: ORIGINAL Value 2: PRIMARY Value 3: <Not Present> Value 4: <Not Present>	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	A number that identifies this image. Value: “1”	ALWAYS	AUTO
(0028,0002)	1	US	Samples per Pixel	Number of samples (planes) in this image. Enumerated values: 1 or 3. See C.8.17.2.1.2 for further explanation. Value: “1”	ALWAYS	AUTO
(0028,0004)	1	CS	Photometric Interpretation	Specifies the intended interpretation of the pixel data. See section C.8.17.2.1.3 Always MONOCHROME2	ALWAYS	AUTO
(0028,0103)	1	US	Pixel Representation	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values: 0000H = unsigned integer. 0001H = 2's complement Enumerated value: 0	ALWAYS	AUTO
(0028,0006)	1C	US	Planar Configuration	Indicates whether the pixel data are sent color-by-plane or color-by-pixel. Required if Samples per Pixel (0028,0002) has a value greater than 1. Enumerated value shall be 0 (color-by-pixel).	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time the image pixel data creation started.	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date the image pixel data creation started.	ALWAYS	AUTO
(0008,002A)	1C	DT	Acquisition DateTime	The date and time that the acquisition of data started. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time Synchronized (0018,1800). Required if Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise.	ALWAYS	AUTO
(0028,2110)	1	CS	Lossy Image Compression	Specifies whether an Image has undergone lossy compression. Enumerated Values: 00 = Image has NOT been subjected to lossy compression. 01 = Image has been subjected to lossy compression. See C.7.6.1.1.5 “01” if image is compressed Value: 01	ALWAYS	AUTO
(0028,2112)	1C	DS	Lossy Image Compression Ratio	Describes the approximate lossy compression ratio(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied. Notes: 1. For example, a compression ratio of 30:1 would be described in this Attribute with a single value of 30. 2. For historical reasons, the lossy compression ratio should also be described in Derivation Description (0008,2111) Required if Lossy Image Compression (0028,2110) has a value of "01".	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0028,2114)	1C	CS	Lossy Image Compression Method	A label for the lossy compression method(s) that have been applied to this image. See C.7.6.1.1.5 for further explanation. May be multivalued if successive lossy compression steps have been applied; the value order shall correspond to the values of Lossy Image Compression Ratio (0028,2112). Required if Lossy Image Compression (0028,2110) has a value of "01". Note: For historical reasons, the lossy compression method should also be described in Derivation Description (0008,2111). Always “ISO_10918_1”	ALWAYS	AUTO
(2050,0020)	1C	CS	Presentation LUT Shape	Specifies an identity transformation for the Presentation LUT, such that the output of all grayscale transformations defined in the IOD containing this Module are defined to be P-Values. Enumerated Values: IDENTITY - output is in P-Values. Required if Photometric Interpretation (0028,0004) is MONOCHROME2	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	Indicates whether or not image contains sufficient burned in annotation to identify the patient and date the image was acquired. Enumerated Value: YES NO Value: NO	ALWAYS	AUTO

Table 8-11 Ophthalmic Photography IOD - Module “Ocular Region Imaged "

Tag	Type	VR	Name	Description	PoV	Source
(0020,0062)	1	CS	Image Laterality	Laterality of object imaged (as described in Anatomic Region Sequence (0008,2218)) examined. Enumerated Values: R = right eye L = left eye B = both left and right eye Shall be consistent with any laterality information contained in Primary Anatomic Structure Modifier Sequence (0008,2230), if present. Note: Laterality (0020,0060) is a Series level Attribute and must be the same for all Images in the Series. Since most Ophthalmic Photographic Image studies contain images of both eyes, the series level attribute will rarely be present. Note: 0020,0060 and 0020,0062 are always present.	ALWAYS	AUTO
(0008,2218)	1	SQ	Anatomic Region Sequence	Sequence that identifies the anatomic region of interest in this Instance (i.e. external anatomy, surface anatomy, or general region of the body). Only a single Item shall be included in this sequence.	ALWAYS	AUTO
>(0008,0100)	1	SH	Code Value	See Section 8.1. Always “T-AA000”	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2. Always “SRT”	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See Section 8.3. Always “Eye”	ALWAYS	AUTO

Table 8-12 Ophthalmic Photography IOD - Module “Ophthalmic Photography Acquisition Parameters "

Tag	Type	VR	Name	Description	PoV	Source
(0022,0005)	2	CS	Patient Eye Movement Commanded	Enumerated Values: YES NO Value: NO	ALWAYS	AUTO
(0022,001B)	2	SQ	Refractive State Sequence	The refractive state of the imaged eye at the time of acquisition. Zero or one Item shall be included in this sequence. Zero length means the refractive state was not measured.	EMPTY	AUTO
(0022,000A)	2	FL	Emmetropic Magnification	Emmetropic magnification value (dimensionless). Zero length means the emmetropic magnification was not measured.	EMPTY	AUTO
(0022,000B)	2	FL	intraocular Pressure	Value of intraocular pressure in mmHg. Zero length means the pressure was not measured	EMPTY	AUTO
(0022,000D)	2	CS	Pupil Dilated	Whether or not the patient’s pupils were pharmacologically dilated for this acquisition. Enumerated Values: YES NO If this tag is empty, no information is available.	EMPTY	AUTO

Table 8-13 Ophthalmic Photography IOD - Module “Ophthalmic Photographic Parameters "

Tag	Type	VR	Name	Description	PoV	Source
(0022,0015)	1	SQ	Acquisition Device Type Code Sequence	Describes the type of acquisition device. A single item shall be included in this sequence.	ALWAYS	AUTO
>(0008,0100)	1	SH	Code Value	See Section 8.1. Always “R-1021B”	ALWAYS	AUTO
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2. Always “SRT”	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See Section 8.3. Always “External Camera”	ALWAYS	AUTO
(0022,0016)	2	SQ	Illumination Type Code Sequence	Coded value for illumination. Zero or one item shall be included in this sequence.	EMPTY	AUTO
(0022,0017)	2	SQ	Light Path Filter Type Stack Code Sequence	Filters used in the light source path. Zero or more items may be included in this sequence.	EMPTY	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0022,0018)	2	SQ	Image Path Filter Type Stack Code Sequence	Describes stack of filters used in image path. Zero or more items shall be included in this sequence.	EMPTY	AUTO
(0022,0019)	2	SQ	Lenses Code Sequence	Lenses that were used during the image acquisition. Zero or more items shall be included in this sequence.	EMPTY	AUTO
(0018,7004)	2	CS	Detector Type	Type of detector used for creating this image. Defined terms: CCD = Charge Coupled Devices CMOS = Complementary Metal Oxide Semiconductor	EMPTY	AUTO

Table 8-14 Ophthalmic Photography IOD - Module "SOP Common "

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. "1.2.840.10008.5.1.4.1.1.77.1.5.1"	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. "1.2.276.0.75.2.2.30.2." constant prefix for generated UIDs	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO
(0018,A001)	3	SQ	Contributing Equipment Sequence	Sequence of Items containing descriptive attributes of related equipment which has contributed to the acquisition, creation or modification of the composite instance. One or more Items are permitted in this Sequence. See NEMA PS 3.3 C.12.1.1.5 for further explanation.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the related equipment is being reference. Only a single Item shall be included in this sequence. See NEMA PS 3.3 C.12.1.1.5 for further explanation.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Set to "109101"	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Set to "DCM"	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to "Acquisition Equipment"	ALWAYS	AUTO
>(0008,0070)	1	LO	Manufacturer	Manufacturer of the equipment that contributed to the composite instance. Always "Carl Zeiss Meditec"	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
>(0008,0080)	3	LO	Institution Name	Institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,0081)	3	ST	Institution Address	Address of the institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,1010)	3	SH	Station Name	User defined name identifying the machine that contributed to the composite instance.	ANAP	CONFIG
>(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that contributed to the composite instance. For HFA3: "Humphrey Field Analyzer 3"	ALWAYS	AUTO
>(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that contributed to the composite instance.	ALWAYS	AUTO
>(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of the software version of the equipment that contributed to the composite instance. See NEMA PS3.3 Section C.7.5.1.1.3.	ALWAYS	AUTO

8.1.1.2 Raw Data IOD Information Entities

IE	Module	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
Equipment		
	General Equipment	ALWAYS
Raw Data		
	Acquisition Context	ALWAYS – Zero items
	Raw Data	ALWAYS
	SOP Common	ALWAYS

Table 8-15 Raw Data IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	VNAP	USER, MWL, SRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	USER, MWL, SRQ
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID. Note: Equivalent to HL7 v2 CX component 4 subcomponent 1.	ANAP	MWL, SRQ, CONFIG
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	MWL, USER, SRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	MWL, USER, SRQ
(0010,0032)	3	TM	Patient's Birth Time	Birth time of the Patient.	ANAP	MWL, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	MWL, SRQ
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	MWL, SRQ

Table 8-16 Raw Data IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses "1.2.276.0.75.2.2.30.2.1 as DICOM root prefix for generated UIDs.	ALWAYS	AUTO, MWL
(0008,0020)	2	DA	Study Date	Date the Study started.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. In scheduled case: Copied from Requested Procedure ID. For the unscheduled case generated by System as "OPV_ yyyyMMdd"	ALWAYS	AUTO,MWL
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. For the scheduled case via MWL. For the unscheduled case empty.	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. In scheduled case copied from Requested Procedure Description.	ANAP	MWL
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. One or more Items are permitted in this Sequence.	ANAP	MWL
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class.	ALWAYS	MWL
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ALWAYS	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items are permitted in this Sequence.	ANAP	MWL
>(0008,0100)	1	SH	Code Value	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL

Tag	Type	VR	Name	Description	PoV	Source
>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See Section 8.1.3 Attribute Mapping	ANAP	MWL
>(0008,0104)	1	LO	Code Meaning	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL

Table 8-17 Raw Data IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
((0008,0060)	1	CS	Modality	Type of equipment that originally acquired the data used to create the images in this Series. See C.7.3.1.1.1 for Defined Terms. Set to “OPV”	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. “1.2.276.0.75.2.2.30.2.2” constant prefix for generated UIDs	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series. Set to “1”	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left, Use "" if Both Eyes (Esterman Binocular, Binocular Kinetic). Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro or Measurement Laterality (0024,0113) at the Measurement level, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined. Note: 0020,0060 and 0020,0062 are always present.	ALWAYS	AUTO
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO
(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). Copied from Requested Procedure Description	ANAP	MWL
(0008,1070)	3	PN	Operators' Name	Name(s) of the operator(s) supporting the Series.	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. One or more Items are permitted in this sequence.	ANAP	MWL

Tag	Type	VR	Name	Description	PoV	Source
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ANAP	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	ANAP	MWL
>(0032,1064)	3	SQ	Requested Procedure Code Sequence	A sequence that conveys the Procedure Type of the requested procedure. Only a single Item is permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3.	ALWAYS	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	ANAP	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	ANAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. One or more Items are permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL

Tag	Type	VR	Name	Description	PoV	Source
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. See Section 8.1.3 Attribute Mapping	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.1.3 Attribute Mapping	ALWAYS	MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO

Table 8-18 Raw Data IOD – Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances. Always "Carl Zeiss Meditec"	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	ANAP	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer's model name of the equipment that produced the composite instances. For HFA3: "HFA 3" For HFA IIi: "HFA II-i"	ALWAYS	AUTO
(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.	ALWAYS	AUTO
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. See NEMA PS3.3 Section C.7.5.1.1.3. - Set to "1.5.x.y"	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0018,1200)	3	DA	Date of Last Calibration	Date when the image acquisition device calibration was last changed in any way. Multiple entries may be used for additional calibrations at other times. See NEMA PS3.3 C.7.5.1.1.1 for further explanation. This value is used by HFA3, but not by HFA IIi.	ALWAYS	AUTO
(0018,1201)	3	TM	Time of Last Calibration	Time when the image acquisition device calibration was last changed in any way. Multiple entries may be used. See NEMA PS3.3 C.7.5.1.1.1 for further explanation. This value is used by HFA3, but not by HFA IIi.	ALWAYS	AUTO

Table 8-19 Raw Data IOD – Module "Acquisition Context"

Tag	Type	VR	Name	Description	PoV	Source
(0040,0555)	2	SQ	Acquisition Context Sequence	A sequence of Items that describes the conditions present during the acquisition of the data of the SOP Instance. Zero or more items shall be included in this sequence.	ALWAYS	EMPTY

Table 8-2 Raw Data IOD – Module "Raw Data"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	2	IS	Instance Number	A number that identifies this raw data. The value shall be unique within a series. Always "1" for CZM Perimetry.	ALWAYS	AUTO
(0008,0023)	1	DA	Content Date	The date the raw data creation was started.	ALWAYS	AUTO
(0008,0033)	1	TM	Content Time	The time the raw data creation was started.	ALWAYS	AUTO
(0008,002A)	3	DT	Acquisition Datetime	The date and time that the acquisition of data started. Note: The synchronization of this time with an external clock is specified in the synchronization Module in Acquisition Time synchronized (0018,1800).	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
(0008,9123)	1	UI	Creator-Version UID	Unique identification of the equipment and version of the software that has created the Raw Data information. The UID allows one to avoid attempting to interpret raw data with an unknown format. Shall be generated on export from the Perimetry root UID and the software version. The Perimetry root UID is 1.2.276.0.75.2.2.30.2. For the HFA IIi and below it will be the root UID and the software version (e.g. 1.2.276.0.75.2.2.30.2.5.1.1). For Santa Cruz it will be the root UID.6.100.<model number>.<software version> (e.g. 1.2.276.0.75.2.2.30.2.6.100.800.1.0.0.386). For HFA3 version 1.2: 1.2.276.0.75.2.2.30.2.6.100.800.1.2.x.y For HFA3 version 1.3: 1.2.276.0.75.2.2.30.2.6.100.800.1.3.x.y For HFA3 version 1.4: 1.2.276.0.75.2.2.30.2.6.100.800.1.4.x.y For HFA3 version 1.5: 1.2.276.0.75.2.2.30.2.6.100.800.1.5.x.y	ALWAYS	AUTO
(0008,114A)	3	SQ	Referenced Instance Sequence	Other Instances significantly related to this Instance. One or more Items are permitted in this Sequence. Reference to the Ophthalmic Photography 8 Bit IOD instance	ANAP	AUTO
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. The OP 8 bit SOP class: 1.2.840.10008.5.1.4.1.1.77.1.5.1	ANAP	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance.	ANAP	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the reference is made. Only a single Item shall be included in this sequence. See C.7.6.16.2.5.1.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	See Section 8.1. Value: “122400”	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2. Value: “DCM”	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3. Value: “Simultaneously Acquired”	ALWAYS	AUTO

Table 8-21 Raw Data IOD - Module "Sop Common”

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. Always “1.2.840.10008.5.1.4.1.1.66”	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. “1.2.276.0.75.2.2.30.2.3” constant prefix for generated UIDs	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. Always “ISO_IR 192” for UTF-8 encoded Unicode.	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created.	ALWAYS	AUTO
(0018,A001)	3	SQ	Contributing Equipment Sequence	Sequence of Items containing descriptive attributes of related equipment which has contributed to the acquisition, creation or modification of the composite instance. One or more Items are permitted in this Sequence. See C.12.1.1.5 for further explanation.	VNAP	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the related equipment is being reference. Only a single Item shall be included in this sequence. See C.12.1.1.5 for further explanation.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Set to “109101”	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Set to “DCM”	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to “Acquisition Equipment”	ALWAYS	AUTO
>(0008,0070)	1	LO	Manufacturer	Manufacturer of the equipment that contributed to the composite instance. Always "Carl Zeiss Meditec”	ALWAYS	AUTO
>(0008,0080)	3	LO	Institution Name	Institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,1010)	3	SH	Station Name	User defined name identifying the machine that contributed to the composite instance.	ANAP	CONFIG
>(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer’s model name of the equipment that contributed to the composite instance.	ALWAYS	AUTO

Tag	Type	VR	Name	Description	PoV	Source
>(0018,1000)	3	LO	Device Serial Number	Manufacturer's serial number of the equipment that contributed to the composite instance.	ALWAYS	AUTO
>(0018,A002)	3	DT	Contribution Date Time	The Date & Time when the equipment contributed to the composite instance. Set to Acquisition Datetime (0008,002A)	ALWAYS	AUTO
>(0018,A003)	3	ST	Contribution Description	Description of the contribution the equipment made to the composite instance. Set to "Acquisition Equipment"	ALWAYS	AUTO

8.1.1.3 Ophthalmic Visual Field Static Perimetry Measurements Information Object Definition

Table 8-22 Ophthalmic Visual Field Static Perimetry Measurements Information Object Definition

IE	Module	Usage
Patient		
	Patient	ALWAYS
Study		
	General Study	ALWAYS
Series		
	General Series	ALWAYS
	Visual Field Static Perimetry Measurements Series	ALWAYS
Equipment		
	General Equipment	ALWAYS
	Enhanced General Equipment	ALWAYS
Measurements		
	Visual Field Static Perimetry Test Parameters	ALWAYS
	Visual Field Static Perimetry Test Reliability	ALWAYS
	Visual Field Static Perimetry Test Measurements	ALWAYS
	Visual Field Static Perimetry Test Results	ALWAYS
	Ophthalmic Patient Clinical Information And Test Lens Parameters	ALWAYS
	Sop Common	ALWAYS
	Czm Ophthalmic Visual Field Static Perimetry Measurements Extension	ALWAYS

Note: Attributes what are only in scheduled mode are only copied over to the OPV IOD in case the previously imported RAW IOD had this attributes set.

Table 8-23 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	VNAP	USER, SRC
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	USER, SRC
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID. Note: Equivalent to HL7 v2 CX component 4 subcomponent 1.	ANAP	SRC, CONFIG
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	ALWAYS	USER, SRC
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	USER, SRC
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	SRC
(0010,2160)	3	SH	Ethnic Group	Ethnic group or race of the patient.	ANAP	SRC
(0010,4000)	3	LT	Patient Comments	User-defined additional information about the patient.	ANAP	SRC

Table 8-24 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. The software copies the study instance UID from the source RAW Data set. In the unscheduled case, the software generates UID with “1.2.276.0.75.2.2.30.2.1 DICOM root prefix.	ALWAYS	SRC
(0008,0020)	2	DA	Study Date	Date the Study started. Copied from source Raw Data set.	ALWAYS	SRC
(0008,0030)	2	TM	Study Time	Time the Study started. Copied from source Raw Data set.	ALWAYS	SRC
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician Copied from source Raw Data set.	ANAP	SRC
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. Use Study ID from the source Raw Data exam, if present; otherwise use “OPV_ yyyyMMdd”	ALWAYS	AUTO,SRC
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. Copied from source Raw Data set.	VNAP	SRC
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed. Copied from source Raw Data set if value is available.	ANAP	SRC

Tag	Type	VR	Name	Description	PoV	Source
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. One or more Items are permitted in this Sequence. Copied from source Raw Data set.	ANAP	SRC
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. Copied from source Raw Data set.	ALWAYS	SRC
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance. Copied from source Raw Data set.	ALWAYS	SRC
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items are permitted in this Sequence. Copied from source Raw Data set.	ANAP	SRC
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. Copied from source Raw Data set.	ALWAYS	SRC
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. Copied from source Raw Data set.	ALWAYS	SRC
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. Copied from source Raw Data set.	VNAP	SRC
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. Copied from source Raw Data set.	ALWAYS	SRC

Table 8-25 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "General Series"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. Set to 1.2.276.0.75.2.2.30.2.12.yyyMMddHHmmss.<device serial number>	ALWAYS	AUTO
(0020,0011)	2	IS	Series Number	A number that identifies this Series.	ALWAYS	AUTO
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Enumerated Values: R = right L = left, Use "" if Both Eyes (Esterman Binocular, Binocular Kinetic). Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro or Measurement Laterality (0024,0113) at the Measurement level, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined. Note: 0020,0060 and 0020,0062 are always present.	ALWAYS	SRC
(0008,0021)	3	DA	Series Date	Date the Series started.	ALWAYS	AUTO

(0008,0031)	3	TM	Series Time	Time the Series started.	ALWAYS	AUTO
(0018,1030)	3	LO	Protocol Name	User-defined description of the conditions under which the Series was performed. Note: This attribute conveys series-specific protocol identification and may or may not be identical to the one presented in the Performed Protocol Code Sequence (0040,0260). Copied from the source Raw Data set.	ANAP	SRC
(0008,103E)	3	LO	Series Description	Description of the Series Set to “OPV”	ALWAYS	AUTO

Table 8-26 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Visual Field Static Perimetry Measurements Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	Type of equipment that originally acquired the data used to create the measurements in this Series. Enumerated Values: OPV See NEMA PS3.3 Section C.7.3.1.1.1 for further explanation. Set to: “OPV”	ALWAYS	AUTO
(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. One or more Items are permitted in this sequence. The values are copied from the source raw data set. Only available if the sequence is in the source.	ANAP	SRC
>(0040,1001)	1C	SH	Requested Procedure ID	Copied from the source Raw Data set.	ANAP	SRC
>(0032,1060)	3	LO	Requested Procedure Description	Copied from the source Raw Data set.	ANAP	SRC
>(0032,1064)	3	SQ	Requested Procedure Code Sequence	Copied from the source Raw Data set.	ANAP	SRC
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	SRC
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	SRC
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	SRC
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	SRC
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Copied from the source Raw Data set.	ANAP	SRC
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Copied from the source Raw Data set.	ANAP	SRC

Tag	Type	VR	Name	Description	PoV	Source
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Copied from the source Raw Data set.	ANAP	SRC
>>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1.	ALWAYS	SRC
>>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2.	ALWAYS	SRC
>>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	SRC
>>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3.	ALWAYS	SRC
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started. Copied from the source Raw Data set.	ALWAYS	SRC
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started. Copied from the source Raw Data set.	ALWAYS	SRC
(0040,0254)	3	LO	Performed Procedure Step Description	Institution-generated description or classification of the Procedure Step that was performed. Copied from the source Raw Data set.	ANAP	SRC
(0040,0260)	1	SQ	Performed Protocol Code Sequence	Sequence describing the Protocol performed for this Procedure Step. One or more Items are permitted in this sequence. Contains sequence items for Test Patterns and Test Strategy converted from Raw Data. Include elements from extended Context ID 4250 and 4251. See section 8.3 for details.	ALWAYS	SRC
>(0008,0100)	1	SH	Code Value	Extended Visual Field Static Perimetry Test Patterns: CID 4250 Extended Visual Field Static Perimetry Test Strategies: CID 4251 See section 8.3 for details.	ALWAYS	SRC
>(0008,0102)	1	SH	Coding Scheme Designator	Extended Visual Field Static Perimetry Test Patterns: CID 4250 Extended Visual Field Static Perimetry Test Strategies: CID 4251 See section 8.3 for details.	ALWAYS	SRC
>(0008,0104)	1	LO	Code Meaning	Extended Visual Field Static Perimetry Test Patterns: CID 4250 Extended Visual Field Static Perimetry Test Strategies: CID 4251 See section 8.3 for details.	ALWAYS	SRC
>(0040,0440)	1	SQ	Protocol Context Sequence	Sequence that specifies the context for the Performed Protocol Code Sequence Item. One or more Items are permitted in this sequence. Protocol Context Sequence (0040,0440) is used to provide whether the test in the Series were taken for screening or diagnostic purposes.	ALWAYS	SRC

Tag	Type	VR	Name	Description	PoV	Source
>>(0040,A040)	1	CS	Value Type	The type of the value encoded in this name-value Item. Defined Terms: DATETIME DATE TIME PNAME UIDREF TEXT CODE NUMERIC COMPOSITE IMAGE Set to “CODE”	ALWAYS	AUTO
>>(0040,A043)	1	SQ	Concept Name Code Sequence	Coded concept name of this name-value Item. Only a single Item shall be included in this Sequence.	ALWAYS	AUTO
>>>(0008,0100)	1	SH	Code Value	Screening: “R-42453” Diagnostic: “R-408C3”	ALWAYS	AUTO
>>>(0008,0102)	1	SH	Coding Scheme Designator	Set to “SRT”	ALWAYS	AUTO
>>>(0008,0104)	1	LO	Code Meaning	“Screening“ or “Diagnostic“ “Screening“ is for Suprathreshold exams and “Diagnostic“ is for Threshold exams.	ALWAYS	AUTO

Table 8-27 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the OPV instances is located.	ALWAYS	CONFIG
(0008,0081)	3	ST	Institution Address	Mailing address of the institution where the equipment that produced the OPV instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances. Station Name of the machine used for creating the OPV.	ALWAYS	CONFIG
(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that produced the OPV instances is located.	ANAP	CONFIG
(0018,1200)	3	DA	Date of Last Calibration	Date when the image acquisition device calibration was last changed in any way. Multiple entries may be used for additional calibrations at other times. See NEMA PS3.3 C.7.5.1.1.1 for further explanation.	ANAP	SRC
(0018,1201)	3	TM	Time of Last Calibration	Time when the image acquisition device calibration was last changed in any way. Multiple entries may be used. See NEMA PS3.3 C.7.5.1.1.1 for further explanation.	ANAP	SRC

Table 8-28 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Enhanced General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	1	LO	Manufacturer	Manufacturer of the equipment that produced the OPV instances. Set to: “Carl Zeiss Meditec”	ALWAYS	AUTO
(0008,1090)	1	LO	Manufacturer's Model Name	Manufacturer’s model name of the equipment that produced the OPV instances. Set to: “HFA 3”	ALWAYS	CONFIG
(0018,1000)	1	LO	Device Serial Number	Manufacturer’s serial number of the equipment that produced the OPV instances. Device serial number.	ALWAYS	CONFIG

(0018,1020)	1	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the OPV instances. See NEMA PS3.3 Section C.7.5.1.1.3. Software version creating this IOD. - Set to "1.5.x.y"	ALWAYS	CONFIG

Table 8-29 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Visual Field Static Perimetry Test Parameters"

Tag	Type	VR	Name	Description	PoV	Source
(0024,0010)	1	FL	Visual Field Horizontal Extent	The maximum horizontal angular subtend (diameter or width) of the tested visual field, in degrees.	ALWAYS	SRC
(0024,0011)	1	FL	Visual Field Vertical Extent	The maximum vertical angular subtend (diameter or height) of the tested visual field, in degrees.	ALWAYS	SRC
(0024,0012)	1	CS	Visual Field Shape	The shape of the visual field tested. Defined Terms: RECTANGLE CIRCLE ELLIPSE Always set to "CIRCLE"	ALWAYS	AUTO
(0024,0016)	1C	SQ	Screening Test Mode Code Sequence	Mode used to determine how the starting luminance values and expected thresholds are chosen. Only a single Item shall be included in this sequence. Required if Content Item Modifier Sequence (0040,0441) within Performed Protocol Code Sequence (0040,0260) contains an item with the value (R-42453, SRT, "Screening"). May be present otherwise.	ANAP	SRC
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. Threshold Related (111839), Age Corrected (111838), Single Luminance (111840)	ALWAYS	SRC
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. Set to "DCM"	ALWAYS	AUTO
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. "Threshold Related", "Age Corrected" or "Single Luminance"	ALWAYS	SRC
(0024,0018)	1	FL	Maximum Stimulus Luminance	Maximum luminance of stimulus, in candelas per square meter (cd/m²). Calculated from values in the binary data in the raw data source.	ALWAYS	SRC
(0024,0020)	1	FL	Background Luminance	Background luminance of the device, in candelas per square meter (cd/m²). Note: This value is easily convertible to apostilb, which is used only in Perimetry and is not a standardized unit. Calculated from binary data in the raw data source	ALWAYS	SRC
(0024,0021)	1	SQ	Stimulus Color Code Sequence	Color of light stimulus presented to the patient. Only a single Item shall be included in this sequence. Extracted from binary data in the raw data source UseBlueYellow in applicable exams.	ALWAYS	SRC
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. Possible values are: "G-A11D" (Yellow)	ALWAYS	SRC

				“G-A12B” (White) “G-A11A” (Red) “G-A12F” (Blue) “G-A11E” (Green)		
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. Set to “SRT”	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	SRC
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. The according color: “YELLOW”, “WHITE”	ALWAYS	SRC
(0024,0024)	1	SQ	Background Illumination Color Code Sequence	Color of the background illumination of the visual field device. Only a single Item shall be included in this sequence. Extracted from binary data in the raw data source. UseBlueYellow in applicable exams.	ALWAYS	SRC
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. Possible values are: “G-A11D” (Yellow) “G-A12B” (White)	ALWAYS	SRC
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. Set to “SRT”	ALWAYS	AUTO
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	SRC
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. The according color: “WHITE”, ”YELLOW”	ALWAYS	SRC
(0024,0025)	1	FL	Stimulus Area	Area of light stimulus presented to the patient, in degrees squared. A calculated value of the surface area of the Goldman stimulus used in the test.	ALWAYS	SRC
(0024,0028)	1	FL	Stimulus Presentation Time	The duration of time that a light stimulus is presented to a patient per each individual test point, in milliseconds. Note: This time is the same for each stimulus presentation. Set to: 500ms for Esterman tests, 200 for all others.	ALWAYS	SRC

Table 8-30 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Visual Field Static Perimetry Test Reliability"

Tag	Type	VR	Name	Description	PoV	Source
(0024,0032)	1	SQ	Fixation Sequence	The patient’s gaze stability information during the visual field test. Only a single Item shall be included in this sequence. Fixation Monitor in applicable exam types.	ALWAYS	SRC

>(0024,0033)	1	SQ	Fixation Monitoring Code Sequence	The device strategy used to monitor the patient's fixation. One or more Items shall be included in this sequence. The device strategy used to monitor the patient's fixation.	ALWAYS	SRC
>>(0008,0100)	1	SH	Code Value	Set to: 111844 for Blind Spot Monitoring 111843 for Automated Optical R-40775 for NONE	ALWAYS	SRC
>>(0008,0102)	1	SH	Coding Scheme Designator	“DCM”, “SRT” for NONE	ALWAYS	SRC
>>(0008,0103)	1C	SH	Coding Scheme Version	Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	SRC
>>(0008,0104)	1	LO	Code Meaning	Set to: Blind Spot Monitoring, Automated Optical or NONE.	ALWAYS	SRC
>(0024,0035)	1C	US	Fixation Checked Quantity	The number of times that the patient’s gaze fixation is checked. Required if Fixation Monitoring Code Sequence (0024,0033) contains an item with the value (111844, DCM, "Blind Spot Monitoring") or (111845, DCM, "Macular Fixation Testing"). May be present otherwise. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0036)	1C	US	Patient Not Properly Fixated Quantity	The number of times the patient’s gaze is not properly fixated. Required if Fixation Monitoring Code Sequence (0024,0033) contains an item with the value (111844, DCM, "Blind Spot Monitoring") or (111845, DCM, "Macular Fixation Testing"). May be present otherwise. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0039)	1	CS	Excessive Fixation Losses Data Flag	Whether the device was able to determine excessive fixation losses. Enumerated Values: YES NO “YES” if blind spot monitoring is enabled, “NO” otherwise. Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0024,0040)	1C	CS	Excessive Fixation Losses	The number of fixation losses is outside of implementation-specific limits. Enumerated Values: YES NO Required if Excessive Fixation Losses Data Flag (0024,0039) is YES. The number of fixation losses is outside of implementation-specific limits. YES if losses > = 20%, NO otherwise. Condition: If Excessive Fixation Losses Data Flag is YES. Extracted from binary data in the raw data source	ANAP	SRC
(0024,0034)	1	SQ	Visual Field Catch Trial Sequence	The reliability of the patient’s responses to the visual field test. Only a single Item shall be included in this sequence.	ALWAYS	SRC
>(0024,0055)	1	CS	Catch Trials Data Flag	Whether catch trials data were performed. Enumerated Values: YES NO	ALWAYS	SRC

				Extracted from binary data in the raw data source		
>(0024,0048)	1C	US	Negative Catch Trials Quantity	Total number of times the patient's visual attention was tested using stimuli brighter than previously seen luminance (negative catch trials). Required if Catch Trials Data Flag (0024,0055) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0050)	1C	US	False Negatives Quantity	Total number of stimuli that were not seen by the patient but were previously seen at a lower luminance earlier in the visual field test (false negatives). Required if Catch Trials Data Flag (0024,0055) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0045)	1	CS	False Negatives Estimate Flag	Whether the device was able to estimates false negatives. Enumerated Values: YES NO YES if Test is a SITA Test. Extracted from binary data in the raw data source	ALWAYS	SRC
>(0024,0046)	1C	FL	False Negatives Estimate	Estimated percentage of all stimuli that were not seen by the patient but were previously seen at a lower luminance earlier in the visual field test (false negative responses), as percent. Required if False Negatives Estimate Flag (0024,0045) is YES. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0051)	1	CS	Excessive False Negatives Data Flag	Whether the device was able to determine excessive false negatives. Enumerated Values: YES NO YES if non-SITA Threshold test or Suprathreshold (Screening) test, NO if SITA test	ALWAYS	SRC
>(0024,0052)	1C	CS	Excessive False Negatives	The false negative estimate is outside of implementation-specific limits. Enumerated Values: YES NO Required if Excessive False Negatives Data Flag (0024,0051) is YES. If not SITA and FN Errors / FN Trials ›= 33% then YES. NO otherwise. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0056)	1C	US	Positive Catch Trials Quantity	The total number of times the device behaved as if it was going to present a visual stimulus but did not actually present the stimulus (positive catch trials). Required if Catch Trials Data Flag (0024,0055) is YES. Required if Catch Trials Data Flag (0024,0055) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0060)	1C	US	False Positives Quantity	The total number of patient responses that occurred at a time when no visual stimulus was present (false positive responses). Required if Catch Trials Data Flag (0024,0055) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0053)	1	CS	False Positives Estimate Flag	Whether the device was able to estimate false positives. Enumerated Values: YES NO YES if SITA test, NO otherwise Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0024,0054)	1C	FL	False Positives Estimate	Estimated percentage of all patient responses that occurred at a time when no visual stimulus was present (false positive responses), as percent.	ANAP	SRC

				Required if False Positives Estimate Flag (0024,0053) is YES. Extracted from binary data in the raw data source.		
>(0024,0061)	1	CS	Excessive False Positives Data Flag	Whether the device was able to determine excessive false positives. Enumerated Values: YES NO Always set to: YES.	ALWAYS	SRC
>(0024,0062)	1C	CS	Excessive False Positives	The false positive estimate is outside of implementation-specific limit. Enumerated Values: YES NO Required if Excessive False Positives Data Flag (0024,0061) is YES. If not SITA and FP Errors / FP Trials ›= 33% or if SITA and FP Estimate ›= 15% then YES. NO otherwise. Extracted from binary data in the raw data source.	ANAP	SRC
(0024,0069)	3	LO	Patient Reliability Indicator	Vendor implementation specific text to provide an analysis and/or summary of patient reliability indicator/indices. “*** Excessive High False Positives ***” if Excessive False Positives is YES. “*** Low Test Reliability ***” if Excessive False Negatives is YES or Excessive Fixation Losses is YES and the test was not a SITA-SWAP test.	ANAP	SRC

Table 8-31 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Visual Field Static Perimetry Test Measurements"

Tag	Type	VR	Name	Description	PoV	Source
(0024,0113)	1	CS	Measurement Laterality	Laterality of body part (eye) examined. See NEMA PS3.3 Section C.8.26.4.1.1 for further explanation. Enumerated Values: R = right L = left B = both left and right together Note: This Attribute is mandatory, in order to ensure that measurements may be positioned correctly relative to one another for display. Note: Laterality (0020,0060) is a Series level Attribute and must be the same for all Measurements in the Series, hence it must be absent if multiple instances from different eyes are encoded.	ALWAYS	SRC
(0024,0037)	1	CS	Presented Visual Stimuli Data Flag	Whether the device was able to determine presented visual stimuli. Enumerated Values: YES NO Always set to “NO”	ALWAYS	AUTO
(0024,0088)	1	FL	Visual Field Test Duration	Total time the visual field machine was actively presenting visual stimuli to patient, in seconds. Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0086)	1	CS	Foveal Sensitivity Measured	Whether foveal sensitivity was measured. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0087)	1C	FL	Foveal Sensitivity	Foveal Sensitivity is the reciprocal of foveal threshold (1/foveal threshold), in dB. Foveal Threshold is the minimum amount of luminance increment on a uniform background that can be detected by the patient at coordinates 0,0 (relative to the center of the patient’s fixation). See NEMA PS3.3 Section C.8.26.4.1.2 for further explanation.	ANAP	SRC

				Required if the value for Foveal Sensitivity Measured (0024,0086) is YES. Extracted from binary data in the raw data source		
(0024,0117)	1	CS	Foveal Point Normative Data Flag	Existence of normative data base for the foveal point sensitivity. Enumerated Values: YES NO This is YES if the test qualifies for a Single Field Analysis report. Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0118)	1C	FL	Foveal Point Probability Value	The percentile of the foveal point sensitivity within an age corrected normal visual field, in percent. Required if the value for Foveal Sensitivity Measured (0024,0086) is YES and Foveal Point Normative Data Flag (0024,0117) is YES. Extracted from binary data in the raw data source	ANAP	SRC
(0024,0120)	1	CS	Screening Baseline Measured	Whether visual field screening baseline was measured. Enumerated Values: YES NO Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0122)	1C	SQ	Screening Baseline Measured Sequence	Information about the starting luminance screening values. One or more Items shall be included in this sequence. Required if the value for Screening Baseline Measured (0024,0120) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>(0024,0124)	1	CS	Screening Baseline Type	Method used to determine starting luminance screening values. Enumerated Values: CENTRAL PERIPHERAL Extracted from binary data in the raw data source	ALWAYS	SRC
>(0024,0126)	1	FL	Screening Baseline Value	Visual Field screening baseline value, in dB. Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0106)	1	CS	Blind Spot Localized	Whether the blind spot was measured. Enumerated Values: YES NO Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0107)	1C	FL	Blind Spot X-Coordinate	The horizontal coordinate of the patient's blind spot relative to the center of the patient's fixation, in degrees, such that toward the right is positive. Required if the value for Blind Spot Localized (0024,0106) is YES. See NEMA PS3.3 Section C.8.26.4.1.3 for further explanation. Extracted from binary data in the raw data source	ANAP	SRC
(0024,0108)	1C	FL	Blind Spot Y-Coordinate	The vertical coordinate of the patient's blind spot relative to the center of the patient fixation, in degrees, such that up is positive. Required if the value for Blind Spot Localized (0024,0106) is YES. See NEMA PS3.3 Section C.8.26.4.1.3 for further explanation. Extracted from binary data in the raw data source	ANAP	SRC
(0024,0105)	1	FL	Minimum Sensitivity Value	The minimum sensitivity value generated by the equipment used for this visual field test, in dB. Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0057)	1	CS	Test Point Normals Data Flag	Existence of normative data base for this set of test points. Enumerated Values: YES NO YES if the tests qualifies for a Single Field Analysis report.	ALWAYS	SRC

				Extracted from binary data in the raw data source		
(0024,0058)	1C	SQ	Test Point Normals Sequence	Normative data base used for this test sequence. Only a single Item shall be included in this sequence. Required if Test Point Normals Data Flag (0024,0057) is YES.	ANAP	AUTO
>(0024,0306)	1	LO	Data Set Name	The name assigned to the data set. Set to: “HFA test point normative data”	ALWAYS	AUTO
>(0024,0307)	1	LO	Data Set Version	The software version identifier assigned to the data set. Set to: “1.0”	ALWAYS	AUTO
>(0024,0308)	1	LO	Data Set Source	Source of the data set e.g. the name of the manufacturer, researcher, university, etc. Set to: “CZMI”	ALWAYS	AUTO
(0024,0065)	1C	SQ	Age Corrected Sensitivity Deviation Algorithm Sequence	Software algorithm used to provide the probability that the age corrected sensitivity deviation values at each test point belong to a normal visual field. Only a single Item shall be included in this sequence. Required if Test Point Normals Data Flag (0024,0057) is YES.	ANAP	AUTO
>(0066,002F)	1	SQ	Algorithm Family Code Sequence	The family of algorithm(s) that best describes the software algorithm used. Only a single item shall be included in this sequence.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Set to: "PERIMETRY"	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: "99CZM_PERIMETRY"	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to: "CZM Perimetry Algorithms"	ALWAYS	AUTO
>(0066,0036)	1	LO	Algorithm Name	The name assigned by a manufacturer to a specific software algorithm. Set to: “Total Deviation”	ALWAYS	AUTO
>(0066,0031)	1	LO	Algorithm Version	The software version identifier assigned by a manufacturer to a specific software algorithm. Set to: “1.0”	ALWAYS	AUTO
(0024,0067)	1C	SQ	Generalized Defect Sensitivity Deviation Algorithm Sequence	Software algorithm used to provide the probability that the sensitivity deviation values at each test point belong to a normal visual field. Only a single Item shall be included in this sequence. Required if Test Point Normals Data Flag (0024,0057) is YES.	ANAP	AUTO
>(0066,002F)	1	SQ	Algorithm Family Code Sequence	The family of algorithm(s) that best describes the software algorithm used. Only a single item shall be included in this sequence.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Set to: "PERIMETRY"	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: "99CZM_PERIMETRY"	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to: "CZM Perimetry Algorithms"	ALWAYS	AUTO
>(0066,0036)	1	LO	Algorithm Name	The name assigned by a manufacturer to a specific software algorithm. Set to: “Pattern Deviation”	ALWAYS	AUTO
>(0066,0031)	1	LO	Algorithm Version	The software version identifier assigned by a manufacturer to a specific software algorithm.	ALWAYS	AUTO

				Set to: “1.0”		
(0024,0089)	1	SQ	Visual Field Test Point Sequence	Information for each test point in the visual field. One or more items shall be included in this sequence. The values of the test points are extracted from the binary data in the raw data source	ALWAYS	SRC
>(0024,0090)	1	FL	Visual Field Test Point X-Coordinate	The horizontal coordinate of a single test point relative to the center of the patient fixation, in degrees, such that toward the right is positive. The x coordinate of the test point, extracted from the binary data in the raw data source.	ALWAYS	SRC
>(0024,0091)	1	FL	Visual Field Test Point Y-Coordinate	The vertical coordinate of a single test point relative to the center of the patient fixation, in degrees, such that up is positive. The y coordinate of the test point, extracted from the binary data in the raw data source.	ALWAYS	SRC
>(0024,0093)	1	CS	Stimulus Results	Whether the patient saw a stimulus presented at a luminance other than maximum, a presentation at maximum luminance, or did not see any presented stimulus. Enumerated Values: SEEN = stimulus seen at a luminance value less than maximum NOT SEEN = stimulus not seen SEEN AT MAX = stimulus seen at the maximum luminance possible for the instrument Note: SEEN AT MAX is a value only relevant to Screening tests. Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0024,0094)	1C	FL	Sensitivity Value	If Stimulus Results (0024,0093) is SEEN then this value is the sensitivity, in dB. Required if Content Item Modifier Sequence (0040,0441) within Performed Protocol Code Sequence (0040,0260) contains an item with the value (R-408C3, SRT, "Diagnostic"). May be present otherwise. Note: If this is not present, refer to the attribute Minimum Sensitivity Value (0024,0105). Extracted from binary data in the raw data source, only available for threshold tests.	ANAP	SRC
>(0024,0095)	3	CS	Retest Stimulus Seen	Whether the retested stimulus presented was seen by the patient. Enumerated Values: YES NO The second threshold result, may only be available for non-SITA Threshold tests. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0096)	3	FL	Retest Sensitivity Value	If the Retest Stimulus Seen (0024,0095) is YES, then this value is the sensitivity, in dB. Note: If this is not present, refer to the attribute Minimum Sensitivity Value (0024,0105). Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0098)	3	FL	Quantified Defect	Difference between the expected and the determined sensitivity, each in dB. Note: This field is only useful when the sensitivity is quantified. Some examples include Test Strategy Code Sequence (0024,0015) with items providing values such as Quantity-Defects, 2LT-Dynamic, 2LT-Normal. Only for screening tests with strategy quantified defects. Extracted from binary data in the raw data source	ANAP	SRC

>(0024,0097)	1C	SQ	Visual Field Test Point Normals Sequence	Information about normal values for each visual field test point. One or more items shall be included in this sequence. Required if Test Point Normals Data Flag (0024,0057) is YES.	ANAP	SRC
>>(0024,0092)	1	FL	Age Corrected Sensitivity Deviation Value	Difference between the patient's local sensitivity and the age corrected normal sensitivity, in dB. Extracted from binary data in the raw data source	ALWAYS	SRC
>>(0024,0100)	1	FL	Age Corrected Sensitivity Deviation Probability Value	The percentile of the age corrected sensitivity deviation within the normal population of visual field, in percent. Extracted from binary data in the raw data source	ALWAYS	SRC
>>(0024,0102)	1	CS	Generalized Defect Corrected Sensitivity Deviation Flag	Whether generalized defect corrected data are available for this point. Enumerated Values: YES NO Set to: "YES"	ALWAYS	AUTO
>>(0024,0103)	1C	FL	Generalized Defect Corrected Sensitivity Deviation Value	The age corrected sensitivity deviation after correction for the Generalized Defect, in dB. Generalized defect is proportional to the loss in sensitivity shared by all points in the visual field. Required if Generalized Defect Corrected Sensitivity Deviation Flag (0024,0102) is YES. Extracted from binary data in the raw data source	ANAP	SRC
>>(0024,0104)	1C	FL	Generalized Defect Corrected Sensitivity Deviation Probability Value	The percentile of the generalized defect corrected sensitivity deviation within the normal population of visual field, in percent. Required if Generalized Defect Corrected Sensitivity Deviation Flag (0024,0102) is YES. Extracted from binary data in the raw data source	ANAP	SRC

Table 8-32 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Visual Field Static Perimetry Test Results"

Tag	Type	VR	Name	Description	PoV	Source
(0024,0070)	1C	FL	Visual Field Mean Sensitivity	Average sensitivity of the test points of the visual field, in dB. Required if Content Item Modifier Sequence (0040,0441) within the Performed Protocol Code Sequence (0040,0260) contains an item with the value (R-408C3, SRT, "Diagnostic"). May be present otherwise. Only available for Threshold tests. Extracted from binary data in the raw data source	ANAP	SRC
(0024,0063)	1	CS	Visual Field Test Normals Flag	Whether normals exist for this patient's results. Enumerated Values: YES NO Extracted from binary data in the raw data source	ALWAYS	SRC
(0024,0064)	1C	SQ	Results Normals Sequence	Information that represents the statistically normal results for patients from a referenced data base. Only a single Item shall be included in this sequence. Required if Visual Field Test Normals Flag (0024,0063) is YES.	ANAP	SRC
>(0024,0306)	1	LO	Data Set Name	The name assigned to the data set.	ALWAYS	AUTO
>(0024,0307)	1	LO	Data Set Version	The software version identifier assigned to the data set.	ALWAYS	SRC

>(0024,0308)	1	LO	Data Set Source	Source of the data set e.g. the name of the manufacturer, researcher, university, etc.	ALWAYS	SRC
>(0024,0066)	1	FL	Global Deviation From Normal	Weighted average deviation from the age corrected normal field, in dB. Extracted from binary data in the raw data source	ALWAYS	SRC
>(0024,0059)	1	CS	Global Deviation Probability Normals Flag	Whether normals exist for the global deviation probability. Enumerated Values: YES NO Extracted from binary data in the raw data source	ALWAYS	SRC
>(0024,0083)	1C	SQ	Global Deviation Probability Sequence	Probability value and software algorithm used to provide the normality for the global deviation. Only a single Item shall be included in this sequence. Required if Global Deviation Probability Normals Flag (0024,0059) is YES. Required if Global Deviation Probability Normals Flag (0024,0059) is YES.	ANAP	SRC
>>(0024,0071)	1	FL	Global Deviation Probability	The percentile of the Global Deviation from Normal (0024,0066) value within the normal population, in percent.0024 Extracted from binary data in the raw data source.	ANAP	SRC
>>(0066,002F)	1	SQ	Algorithm Family Code Sequence	The family of algorithm(s) that best describes the software algorithm used. Only a single item shall be included in this sequence.	ALWAYS	AUTO
>>>(0008,0100)	1	SH	Code Value	Set to: “PERIMETRY”	ALWAYS	AUTO
>>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: “99CZM_PERIMETRY”	ALWAYS	AUTO
>>>(0008,0104)	1	LO	Code Meaning	Set to: “CZM Perimetry Algorithms”	ALWAYS	AUTO
>>(0066,0036)	1	LO	Algorithm Name	The name assigned by a manufacturer to a specific software algorithm. Set to: “MD Probability”	ALWAYS	AUTO
>>(0066,0031)	1	LO	Algorithm Version	The software version identifier assigned by a manufacturer to a specific software algorithm. Set to: “1.0”	ALWAYS	AUTO
>(0024,0068)	1	FL	Localized Deviation from Normal	Weighted square root of loss variance, in dB. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0072)	1	CS	Local Deviation Probability Normals Flag	Whether normals exist for the local deviation probability. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0024,0085)	1C	SQ	Localized Deviation Probability Sequence	Probability value and software algorithm used to provide the normality for the local deviation. Only a single Item shall be included in this sequence. Required if Local Deviation Probability Normals Flag (0024,0072) is YES. Required if Local Deviation Probability Normals Flag (0024,0072) is YES. Currently not used.	ANAP	SRC
>>(0024,0073)	1	FL	Localized Deviation Probability	The0024 percentile of the Localized Deviation from Normal (0024,0068) value within the normal population, in percent.	ANAP	SRC

				Extracted from binary data in the raw data source.		
>>(0066,002F)	1	SQ	Algorithm Family Code Sequence	The family of algorithm(s) that best describes the software algorithm used. Only a single item shall be included in this sequence.	ALWAYS	AUTO
>>>(0008,0100)	1	SH	Code Value	Set to: “PERIMETRY”	ALWAYS	AUTO
>>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: “99CZM_PERIMETRY”	ALWAYS	AUTO
>>>(0008,0104)	1	LO	Code Meaning	Set to: “CZM Perimetry Algorithms”	ALWAYS	AUTO
>>(0066,0036)	1	LO	Algorithm Name	The name assigned by a manufacturer to a specific software algorithm. Set to: “PSD Probability”	ALWAYS	AUTO
>>(0066,0031)	1	LO	Algorithm Version	The software version identifier assigned by a manufacturer to a specific software algorithm. Set to: “1.0”	ALWAYS	AUTO
(0024,0074)	1	CS	Short Term Fluctuation Calculated	Whether the short term fluctuation was calculated. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0075)	1C	FL	Short Term Fluctuation	Average deviation of sensitivity for the repeated test locations, in dB. This is used to determine the consistency of the patient’s responses. Required if Short Term Fluctuation Calculated (0024,0074) is YES. Extracted from binary data in the raw data source.	ANAP	SRC
(0024,0076)	1	CS	Short Term Fluctuation Probability Calculated	Whether the short term fluctuation probability was calculated. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0077)	1C	FL	Short Term Fluctuation Probability	The percentile of the Short Term Fluctuation (0024,0075) value within the normal population, in percent. Required if Short Term Fluctuation Probability Calculated (0024,0076) is YES. Extracted from binary data in the raw data source.	ANAP	SRC
(0024,0078)	1	CS	Corrected Localized Deviation From Normal Calculated	Whether the corrected localized deviation from normal was calculated. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0079)	1C	FL	Corrected Localized Deviation From Normal	Weighted square root of loss variance corrected for short term fluctuation, in dB. Required if Corrected Localized Deviation From Normal Calculated (0024,0078) is YES. Extracted from binary data in the raw data source.	ANAP	SRC
(0024,0080)	1	CS	Corrected Localized Deviation From Normal Probability Calculated	Whether the corrected localized deviation from Normal probability was calculated. Enumerated Values: YES NO Extracted from binary data in the raw data source.	ALWAYS	SRC

(0024,0081)	1C	FL	Corrected Localized Deviation From Normal Probability	The percentile of the Corrected Localized Deviation From Normal (0024,0079) value within the normal population, in percent. Required if Corrected Localized Deviation From Normal Probability Calculated (0024,0080) is YES. Extracted from binary data in the raw data source.	ANAP	SRC
(0024,0320)	3	SQ	Visual Field Global Results Index Sequence	Information about various visual field indexes related to test results. One or more Items are permitted in this sequence. Values extracted from binary data in the raw data source	ANAP	SRC
>(0024,0325)	1	SQ	Data Observation Sequence	Information about various visual field global indexes. Only a single Item shall be included in this sequence.	ALWAYS	SRC
>>(0040,A040)	1	CS	Value Type	The type of the value encoded in this name-value Item. Defined Terms: DATETIME DATE TIME PNAME UIDREF TEXT CODE NUMERIC COMPOSITE IMAGE Set to: “NUMERIC”	ALWAYS	AUTO
>>(0040,A043)	1	SQ	Concept Name Code Sequence	Coded concept name of this name-value Item. Only a single Item shall be included in this Sequence.	ALWAYS	AUTO
>>>(0008,0100)	1	SH	Code Value	Set to: “111852”	ALWAYS	AUTO
>>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: “DCM”	ALWAYS	AUTO
>>>(0008,0104)	1	LO	Code Meaning	Set to: “Visual Field Index”	ALWAYS	AUTO
>>(0040,A30A)	1C	DS	Numeric Value	Numeric value for this name-value Item. Required if Value Type (0040,A040) is NUMERIC. Extracted from binary data in the raw data source. Valid values are 0% to 100%	ALWAYS	SRC
>>(0040,08EA)	1C	SQ	Measurement Units Code Sequence	Units of measurement for a numeric value in this name-value Item. Only a single Item shall be included in this Sequence. Required if Value Type (0040,A040) is NUMERIC. The CodeSequence for %	ALWAYS	SRC
>>>(0008,0100)	1	SH	Code Value	Set to: “%”	ALWAYS	AUTO
>>>(0008,0102)	1	SH	Coding Scheme Designator	Set to: “UCUM”	ALWAYS	AUTO
>>>(0008,0104)	1	LO	Code Meaning	Set to: “percent”	ALWAYS	AUTO
>(0024,0338)	1	CS	Index Normals Flag	Whether normative data exists for this index. Enumerated Values: YES NO Set to: “NO”	ALWAYS	AUTO

Table 8-33 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Ophthalmic Patient Clinical Information And Test Lens Parameters"

Tag	Type	VR	Name	Description	PoV	Source
(0024,0114)	1C	SQ	Ophthalmic Patient Clinical	Information used to represent a patient’s clinical parameters during an ophthalmic test. Only a single	ANAP	SRC

			Information Left Eye Sequence	Item shall be included in this sequence. Required if Measurement Laterality (0024,0113) is L or B.		
>(0024,0112)	2	SQ	Refractive Parameters Used on Patient Sequence	Refractive parameters used when performing visual field test. Zero or one Item shall be included in this sequence.	ALWAYS	SRC
>>(0022,0007)	1	FL	Spherical Lens Power	Sphere value in diopters. Extracted from binary data in the raw data source.	ALWAYS	SRC
>>(0022,0008)	1	FL	Cylinder Lens Power	Cylinder value in diopters. Extracted from binary data in the raw data source.	ALWAYS	SRC
>>(0022,0009)	1	FL	Cylinder Axis	Axis value in degrees. Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0046,0044)	2	FD	Pupil Size	The horizontal diameter measurement of the pupil, in mm. Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0022,000D)	2	CS	Pupil Dilated	The patient's pupils were pharmacologically dilated for this acquisition. Enumerated Values: YES, NO. If this tag is empty, no information is available.	EMPTY	AUTO
>(0022,000B)	3	FL	intraocular Pressure	Value of intraocular pressure in mmHg. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0110)	3	SQ	Visual Acuity Measurement Sequence	Measurements of a patient's visual acuity. Only a single Item is permitted in this sequence. Extracted from binary data in the raw data source.	ANAP	SRC
>>(0046,0137)	1	FD	Decimal Visual Acuity	A patient's visual acuity specified in decimal. The value is derived from two values in a fraction where the numerator of the fraction is the nominal distance to the chart that the patient is reading. The denominator represents the line of smallest optotypes of which the patient can see more than half. Notes: 1. Typical examples--reference standard is 1, severe vision loss is 0.1 2. See PS 3.17 Ophthalmic Refractive Reports Use Cases for guidance in converting Decimal Visual Acuity to other customarily used display notation such as 20/20 in the US and 6/6 in Britain. Extracted from binary data in the raw data source.	ALWAYS	SRC
(0024,0115)	1C	SQ	Ophthalmic Patient Clinical Information Right Eye Sequence	Information used to represent a patient's clinical parameters during an ophthalmic test. Only a single Item shall be included in this sequence. Required if Measurement Laterality (0024,0113) is R or B.	ANAP	SRC
>(0024,0112)	2	SQ	Refractive Parameters Used on Patient Sequence	Refractive parameters used when performing visual field test. Zero or one Item shall be included in this sequence.	ALWAYS	SRC
>>(0022,0007)	1	FL	Spherical Lens Power	Sphere value in diopters. Extracted from binary data in the raw data source.	ALWAYS	SRC
>>(0022,0008)	1	FL	Cylinder Lens Power	Cylinder value in diopters. Extracted from binary data in the raw data source.	ALWAYS	SRC
>>(0022,0009)	1	FL	Cylinder Axis	Axis value in degrees. Extracted from binary data in the raw data source.	ALWAYS	SRC

>(0046,0044)	2	FD	Pupil Size	The horizontal diameter measurement of the pupil, in mm. Extracted from binary data in the raw data source.	ALWAYS	SRC
>(0022,000D)	2	CS	Pupil Dilated	The patient's pupils were pharmacologically dilated for this acquisition. Enumerated Values: YES NO If this tag is empty, no information is available.	EMPTY	AUTO
>(0022,000B)	3	FL	intraocular Pressure	Value of intraocular pressure in mmHg. Extracted from binary data in the raw data source.	ANAP	SRC
>(0024,0110)	3	SQ	Visual Acuity Measurement Sequence	Measurements of a patient's visual acuity. Only a single Item is permitted in this sequence. Extracted from binary data in the raw data source.	ANAP	SRC
>>(0046,0137)	1	FD	Decimal Visual Acuity	A patient's visual acuity specified in decimal. The value is derived from two values in a fraction where the numerator of the fraction is the nominal distance to the chart that the patient is reading. The denominator represents the line of smallest optotypes of which the patient can see more than half. Notes: 1. Typical examples--reference standard is 1, severe vision loss is 0.1 2. See PS 3.17 Ophthalmic Refractive Reports Use Cases for guidance in converting Decimal Visual Acuity to other customarily used display notation such as 20/20 in the US and 6/6 in Britain. Extracted from binary data in the raw data source.	ANAP	SRC

Table 8-34 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Sop Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Set to: "1.2.840.10008.5.1.4.1.1.80.1"	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Newly created with UID root: 1.2.276.0.75.2.2.30.2	ALWAYS	AUTO
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. Set to: "ISO_IR 192" (Unicode encoding)	ANAP	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created. Set to current date.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created. Set to current time	ALWAYS	AUTO

Table 8-35 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Czm Ophthalmic Visual Field Static Perimetry Measurements Extension"

Tag	Type	VR	Name	Description	PoV	Source
(0008,114A)	3	SQ	Referenced Instance Sequence	This is a CZM specific extension. The referenced Instances are related to this Instance with a purpose for that reference. The sequence may contain zero, one or more items. Contains the reference to the raw data source.	ALWAYS	SRC
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. The source is always a raw IOD.	ALWAYS	AUTO

>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance. The instance UID of the raw instance containing the source data of this instance.	ALWAYS	SRC
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	The sequence shall contain one and may contain more items. The codes applied shall be CZM specific.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	. Set to: “RAW DATA SRC”	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	. Set to: "99CZM_PERIMETRY"	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to: "CZM Perimetry Source Exam".	ALWAYS	AUTO

8.1.1.4 Encapsulated Pdf Information Object Definition

Table 8-36 Encapsulated Pdf Information Object Definition

IE	Module	Usage
Patient		
	Patient	AWLAYS
Study		
	General Study	AWLAYS
Series		
	Encapsulated Document Series	AWLAYS
	Czm Encapsulated Pdf Series Extension	ALWAYS
	CZM HFA Series	AWLAYS
Equipment		
	General Equipment	AWLAYS
	Sc Equipment	AWLAYS
EncapsulatedDocument		
	Encapsulated Document	AWLAYS
	Sop Common	AWLAYS

Table 8-37 Encapsulated Pdf IOD - Module "Patient"

Tag	Type	VR	Name	Description	PoV	Source
(0010,0010)	2	PN	Patient's Name	Patient's full name.	VNAP	USER, MWL, SRQ
(0010,0020)	2	LO	Patient ID	Primary hospital identification number or code for the patient.	ALWAYS	USER, MWL, SRQ
(0010,0021)	3	LO	Issuer of Patient ID	Identifier of the Assigning Authority (system, organization, agency, or department) that issued the Patient ID. Note: Equivalent to HL7 v2 CX component 4 subcomponent 1.	ANAP	CONFIG, MWL, SRQ
(0010,0030)	2	DA	Patient's Birth Date	Birth date of the patient.	VNAP	USER, MWL, SRQ
(0010,0040)	2	CS	Patient's Sex	Sex of the named patient. Enumerated Values: M = male F = female O = other	VNAP	USER, MWL, SRQ
(0010,0032)	3	TM	Patient's Birth Time	Birth time of the Patient.	ANAP	MWL, SRQ
(0010,1000)	3	LO	Other Patient IDs	Other identification numbers or codes used to identify the patient.	ANAP	MWL, SRQ

Table 8-38 Encapsulated Pdf IOD - Module "General Study"

Tag	Type	VR	Name	Description	PoV	Source
(0020,000D)	1	UI	Study Instance UID	Unique identifier for the Study. Uses value as given by the Modality Worklist service in scheduled case. The software creates the UID in the unscheduled case. Then it uses “1.2.276.0.75.2.2.30.2.1 as DICOM root prefix for generated UIDs. The value is the same as study UID of the related raw data set.	ALWAYS	MWL, AUTO
(0008,0020)	2	DA	Study Date	Date the Study started. The value is the same as study date of the related raw data set.	ALWAYS	AUTO
(0008,0030)	2	TM	Study Time	Time the Study started. The value is the same as study time of the related raw data set.	ALWAYS	AUTO
(0008,0090)	2	PN	Referring Physician's Name	Name of the patient's referring physician Value does not exist in unscheduled case.	VNAP	MWL
(0020,0010)	2	SH	Study ID	User or equipment generated Study identifier. Generated by the system in the format of “OPV_” + “yyyyMMdd”	ALWAYS	AUTO
(0008,0050)	2	SH	Accession Number	A RIS generated number that identifies the order for the Study. For the scheduled case via MWL. For the unscheduled case empty.	VNAP	MWL
(0008,1030)	3	LO	Study Description	Institution-generated description or classification of the Study (component) performed.	ANAP	MWL

				Copied from Requested Procedure Description.		
(0008,1110)	3	SQ	Referenced Study Sequence	A sequence that provides reference to a Study SOP Class/Instance pair. Zero or more Items are permitted in this Sequence. Zero items for HFA3 (Notes: Purpose for this item: in case this study is part of a bigger study.)	ANAP	MWL
(0008,1032)	3	SQ	Procedure Code Sequence	A Sequence that conveys the type of procedure performed. One or more Items are permitted in this Sequence. May exist in Scheduled Case. Contains the value as given by the MWL item as value of Requested Procedure Code Sequence.	ANAP	MWL
>(0008,0100)	1	SH	Code Value	See NEMA PS3.3 Section 8.1. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ALWAYS	MWL
>(0008,0102)	1	SH	Coding Scheme Designator	See NEMA PS3.3 Section 8.2. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ALWAYS	MWL
>(0008,0103)	1C	SH	Coding Scheme Version	See NEMA PS3.3 Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ANAP	MWL
>(0008,0104)	1	LO	Code Meaning	See NEMA PS3.3 Section 8.3. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ALWAYS	MWL

Table 8-39 Encapsulated Pdf IOD - Module "Encapsulated Document Series"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0060)	1	CS	Modality	The modality appropriate for the encapsulated document. This Type definition shall override the definition in the SC Equipment Module. See NEMA PS3.3 Section C.7.3.1.1.1 for Defined Terms. Note: SR may be an appropriate value for an Encapsulated CDA document with a structured XML Body. Always “OPV”.	ALWAYS	AUTO
(0020,000E)	1	UI	Series Instance UID	Unique identifier of the Series. Root = 1.2.276.0.75.2.2.30.2.4 for non-GPA EPDF, 1.2.276.0.75.2.2.30.2.5 for SITA-Std GPA, 1.2.276.0.75.2.2.30.2.6 for SITA-Fast GPA, 1.2.276.0.75.2.2.30.2.14 for HFA3 1.4+ GPA	ALWAYS	AUTO
(0020,0011)	1	IS	Series Number	A number that identifies the Series. Always “1” since there is only one instance in a series.	ALWAYS	AUTO

(0040,0275)	3	SQ	Request Attributes Sequence	Sequence that contains attributes from the Imaging Service Request. One or more Items are permitted in this sequence. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ANAP	MWL
>(0040,1001)	1C	SH	Requested Procedure ID	Identifier that identifies the Requested Procedure in the Imaging Service Request. Required if procedure was scheduled. May be present otherwise. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value. Copied from MWL. See section 8.1.3 “Attribute Mapping”.	ALWAYS	MWL
>(0032,1060)	3	LO	Requested Procedure Description	Institution-generated administrative description or classification of Requested Procedure.	ANAP	MWL
>(0032,1064)	3	SQ	Requested Procedure Code Sequence	A sequence that conveys the Procedure Type of the requested procedure. Only a single Item is permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.	ALWAYS	MWL
>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3.	ALWAYS	MWL
>(0040,0009)	1C	SH	Scheduled Procedure Step ID	Identifier that identifies the Scheduled Procedure Step. Required if procedure was scheduled. Note: The condition is to allow the contents of this macro to be present (e.g., to convey the reason for the procedure, such as whether a mammogram is for screening or diagnostic purposes) even when the procedure step was not formally scheduled and a value for this identifier is unknown, rather than making up a dummy value.	VNAP	MWL
>(0040,0007)	3	LO	Scheduled Procedure Step Description	Institution-generated description or classification of the Scheduled Procedure Step to be performed.	ANAP	MWL
>(0040,0008)	3	SQ	Scheduled Protocol Code Sequence	Sequence describing the Scheduled Protocol following a specific coding scheme. One or more Items are permitted in this sequence.	ANAP	MWL
>>(0008,0100)	1	SH	Code Value	See Section 8.1.	ALWAYS	MWL

>>(0008,0102)	1	SH	Coding Scheme Designator	See Section 8.2.	ALWAYS	MWL
>>(0008,0103)	1C	SH	Coding Scheme Version	See Section 8.2. Required if the value of Coding Scheme Designator (0008,0102) is not sufficient to identify the Code Value (0008,0100) unambiguously. May be present otherwise.	ANAP	MWL
>>(0008,0104)	1	LO	Code Meaning	See Section 8.3.	ALWAYS	MWL
(0040,0244)	3	DA	Performed Procedure Step Start Date	Date on which the Performed Procedure Step started.	ALWAYS	AUTO
(0040,0245)	3	TM	Performed Procedure Step Start Time	Time on which the Performed Procedure Step started.	ALWAYS	AUTO

Table 8-40 Encapsulated Pdf IOD - Module "Czm Encapsulated Pdf Series Extension"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0060)	2C	CS	Laterality	Laterality of (paired) body part examined. Enumerated Values: R = right, L = left, B = both Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. Note: Some IODs support Image Laterality (0020,0062) at the Image level or Frame Laterality(0020,9072) at the Frame level in the Frame Anatomy functional group macro, which can provide a more comprehensive mechanism for specifying the laterality of the body part(s) being examined. NOTE: Laterality for the Suprathreshold OU report is set to that of the exam initially selected when creating the report – if the first exam selected was right-eye exam, Laterality will be set to R; if the first exam selected was a left-eye exam, Laterality will be set to L.	AWLAYS	AUTO

Table 8-41 Encapsulated Pdf IOD - Module "General Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0070)	2	LO	Manufacturer	Manufacturer of the equipment that produced the composite instances. Always “Carl Zeiss Meditec”	ALWAYS	AUTO
(0008,0080)	3	LO	Institution Name	Institution where the equipment that produced the composite instances is located.	ANAP	CONFIG
(0008,1010)	3	SH	Station Name	User defined name identifying the machine that produced the composite instances.	ANAP	CONFIG
(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer’s model name of the equipment that produced the composite instances. Always “HFA 3”	ALWAYS	CONFIG
(0018,1000)	3	LO	Device Serial Number	Manufacturer’s serial number of the equipment that produced the composite instances. Note: This identifier corresponds to the device that actually created the images, such as a CR plate	ALWAYS	CONFIG

				reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate. Model & Serial number of the instrument that created this report. Ex: "860-12345"		
(0018,1020)	3	LO	Software Version(s)	Manufacturer's designation of software version of the equipment that produced the composite instances. See NEMA PS3.3 Section C.7.5.1.1.3. Software version of the instrument that created this report. - Set to "1.5.x.y"	ALWAYS	CONFIG
(0018,1200)	3	DA	Date of Last Calibration	Date when the image acquisition device calibration was last changed in any way. Multiple entries may be used for additional calibrations at other times. See C.7.5.1.1.1 for further explanation.	ALWAYS	CONFIG
(0018,1201)	3	TM	Time of Last Calibration	Time when the image acquisition device calibration was last changed in any way. Multiple entries may be used. See C.7.5.1.1.1 for further explanation.	ALWAYS	CONFIG

Table 8-42 Encapsulated Pdf IOD - Module "Sc Equipment"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0064)	1	CS	Conversion Type	Describes the kind of image conversion. Defined Terms : DV = Digitized Video DI = Digital Interface DF = Digitized Film WSD = Workstation SD = Scanned Document SI = Scanned Image DRW = Drawing SYN = Synthetic Image Always "SYN"	ALWAYS	AUTO

Table 8-43 Encapsulated Pdf IOD - Module "Encapsulated Document"

Tag	Type	VR	Name	Description	PoV	Source
(0020,0013)	1	IS	Instance Number	A number that identifies this SOP Instance. The value shall be unique within a series. Always "1" since HFA3 always re-create reports on the fly and there is always only one instance per series.	ALWAYS	AUTO
(0008,0023)	2	DA	Content Date	The date the document content creation was started. Date report was generated.	ALWAYS	AUTO
(0008,0033)	2	TM	Content Time	The time the document content creation was started. Time report was generated.	ALWAYS	AUTO
(0008,002A)	2	DT	Acquisition Datetime	The date and time that the original generation of the data in the document started. Date, Time of Most Recent Exam	ALWAYS	AUTO
(0028,0301)	1	CS	Burned In Annotation	Indicates whether or not the encapsulated document contains sufficient burned in annotation to identify the patient and date the data was acquired. Enumerated Values: YES NO	ALWAYS	AUTO

				Identification of patient and date as text in an encapsulated document (e.g., in an XML attribute or element) is equivalent to "burned in annotation". A de-identified document may use the value NO. Always “YES” since the PDF instance contains sufficient information to identify the patient.		
(0042,0013)	1C	SQ	Source Instance Sequence	A sequence that identifies the set of Instances that were used to derive the encapsulated document. One or more Items shall be included in this Sequence. Required if derived from one or more DICOM Instances. May be present otherwise. Contains always one or more sequence item, depending on the number of exams which has been involved for the creation of this evidence report. One for each exam is included in the report.	ALWAYS	AUTO
>(0008,1150)	1	UI	Referenced SOP Class UID	Uniquely identifies the referenced SOP Class. Always “1.2.840.10008.5.1.4.1.1.66” for the Raw Data SOP Class.	ALWAYS	AUTO
>(0008,1155)	1	UI	Referenced SOP Instance UID	Uniquely identifies the referenced SOP Instance. The value of the actual referenced SOP Instance.	ALWAYS	AUTO
(0042,0010)	2	ST	Document Title	The title of the document. Note: In the case of a PDF encapsulated document, this may be the value of the "Title" entry in the "Document Information Directory" as encoded in the PDF data. Empty for HFA3. See section 8.2.11 for the list defined document type.	ALWAYS	AUTO
(0040,A043)	2	SQ	Concept Name Code Sequence	A coded representation of the document title. Zero or one Item shall be included in this sequence. Zero items for HFA3	ALWAYS	AUTO
(0042,0012)	1	LO	MIME Type of Encapsulated Document	The type of the encapsulated document stream described using the MIME Media Type (see RFC 2046). Always “application/pdf”.	ALWAYS	AUTO
(0042,0011)	1	OB	Encapsulated Document	Encapsulated Document stream, containing a document encoded according to the MIME Type.		

Table 8-44 Encapsulated Pdf IOD - Module "Sop Common"

Tag	Type	VR	Name	Description	PoV	Source
(0008,0016)	1	UI	SOP Class UID	Uniquely identifies the SOP Class. See C.12.1.1.1 for further explanation. See also PS 3.4. Always “1.2.840.10008.5.1.4.1.1.104.1”	ALWAYS	AUTO
(0008,0018)	1	UI	SOP Instance UID	Uniquely identifies the SOP Instance. See C.12.1.1.1 for further explanation. See also PS 3.4. Auto-Generated. Root = 1.2.276.0.75.2.2.30.2.7 for non-GPA EPDF, 1.2.276.0.75.2.2.30.2. 8 for SITA-Std GPA,	ALWAYS	AUTO

				1.2.276.0.75.2.2.30.2.9 for SITA-Fast GPA, 1.2.276.0.75.2.2.30.2.15 for HFA3 1.4+ GPA		
(0008,0005)	1C	CS	Specific Character Set	Character Set that expands or replaces the Basic Graphic Set. Required if an expanded or replacement character set is used. See C.12.1.1.2 for Defined Terms. Always “ISO_IR 192” for UTF-8 encoded Unicode.	ALWAYS	AUTO
(0008,0012)	3	DA	Instance Creation Date	Date the SOP Instance was created. Date report was generated.	ALWAYS	AUTO
(0008,0013)	3	TM	Instance Creation Time	Time the SOP Instance was created. Time report was generated.	ALWAYS	AUTO
(0018,A001)	3	SQ	Contributing Equipment Sequence	Sequence of Items containing descriptive attributes of related equipment which has contributed to the acquisition, creation or modification of the composite instance. One or more Items are permitted in this Sequence. See NEMA PS3.3 C.12.1.1.5 for further explanation.	ALWAYS	AUTO
>(0040,A170)	1	SQ	Purpose of Reference Code Sequence	Describes the purpose for which the related equipment is being reference. Only a single Item shall be included in this sequence. See NEMA PS 3.3 C.12.1.1.5 for further explanation.	ALWAYS	AUTO
>>(0008,0100)	1	SH	Code Value	Set to “109101”	ALWAYS	AUTO
>>(0008,0102)	1	SH	Coding Scheme Designator	Set to “DCM”	ALWAYS	AUTO
>>(0008,0104)	1	LO	Code Meaning	Set to “Acquisition Equipment”	ALWAYS	AUTO
>(0008,0070)	1	LO	Manufacturer	Manufacturer of the equipment that contributed to the composite instance. Always “Carl Zeiss Meditec”	ALWAYS	AUTO
>(0008,0080)	3	LO	Institution Name	Institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,0081)	3	ST	Institution Address	Address of the institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,1010)	3	SH	Station Name	User defined name identifying the machine that contributed to the composite instance.	ANAP	CONFIG
>(0008,1040)	3	LO	Institutional Department Name	Department in the institution where the equipment that contributed to the composite instance is located.	ANAP	CONFIG
>(0008,1090)	3	LO	Manufacturer's Model Name	Manufacturer’s model name of the equipment that contributed to the composite instance. For HFA3: “Humphrey Field Analyzer 3”	ALWAYS	AUTO
>(0018,1000)	3	LO	Device Serial Number	Manufacturer’s serial number of the equipment that contributed to the composite instance.	ALWAYS	AUTO
>(0018,1020)	3	LO	Software Version(s)	Manufacturer’s designation of the software version of the equipment that contributed to	ALWAYS	AUTO

				the composite instance. See NEMA PS3.3 Section C.7.5.1.1.3.		

8.1.2 Usage of Attributes from Received IOD's

The HFA3 Application Software provides standard conformance. Please refer to Table 4-11 Attributes involved in Modality Worklist C-FIND Request and Response and chapter 4.2.1.3.3.3 **SOP Specific Conformance for Patient Root and Study Root Query/Retrieve SOP Class as SCU** for more information.

8.1.3 Attribute Mapping

In scheduled case, the following attributes are mapped from Modality Worklist to instances of Ophthalmic Photography 8 Bit IOD, Raw Data IOD, and Encapsulated Pdf IOD.

Table 8-3 Attribute Mapping

Modality Worklist		Instance IOD		Editable
(0010,0010)	Patient's Name	(0010,0010)	Patient's Name	No
(0010,0020)	Patient ID	(0010,0020)	Patient ID	No
(0010,0021)	Issuer of Patient ID	(0010,0021)	Issuer of Patient ID	No
(0010,1000)	Other Patient IDs	(0010,1000)	Other Patient IDs	No
(0010,0030)	Patient's Birth Date	(0010,0030)	Patient's Birth Date	No
(0010,0040)	Patient's Sex	(0010,0040)	Patient's Sex	No
(0010,2160)	Ethnic Group	(0010,2160)	Ethnic Group	No
(0010,4000)	Patient Comments	(0010,4000)	Patient Comments	No
(0008,0050)	Accession Number	(0008,0050)	Accession Number	No
(0008,0090)	Referring Physicians Name	(0008,0090)	Referring Physicians Name	No
(0040,1001)	Requested Procedure ID	(0040,0275)> (0040,1001)	Request Attributes Sequence > Requested Procedure ID	No
(0032,1060)	Requested Procedure Description	(0008,1030)	Study Description	No
		(0040,0275)> (0032,1060)	Request Attributes Sequence > Requested Procedure Description	No
		(0018,1030)	Protocol Name	No
		(0040,0254)	Performed Procedure Step Description	No
(0032,1064)	Requested Procedure Code Sequence	(0008,1032)	Procedure Code Sequence	No
>(0008,0100)	Code Value	>(0008,0100)	Code Value	No
>(0008,0102)	Coding Scheme Designator	>(0008,0102)	Coding Scheme Designator	No
>(0008,0103)	Coding Scheme Version	>(0008,0103)	Coding Scheme Version	No
>(0008,0104)	Code Meaning	>(0008,0104)	Code Meaning	No
(0020,000D)	Study Instance UID	(0020,000D)	Study Instance UID	No
(0008,1110)	Referenced Study Sequence	(0008,1110)	Referenced Study Sequence	No
>(0008,1150)	Referenced Sop Class UID	>(0008,1150)	Referenced Sop Class UID	No
>(0008,1155)	Referenced Sop Instance UID	>(0008,1155)	Referenced Sop Instance UID	No

(0040,0100)	Scheduled Procedure Step Sequence			No
>(0040,0007)	Scheduled Procedure Step Description	(0040,0275)> (0040,0007)	Request Attributes Sequence > Scheduled Procedure Step Description	No
>(0040,0008)	Scheduled Protocol Code Sequence	(0040,0275)> (0040,0008)	Request Attributes Sequence > Scheduled Protocol Code Sequence	No
>>(0008,0100)	Code Value	>(0008,0100)	Code Value	No
>>(0008,0102)	Coding Scheme Designator	>(0008,0102)	Coding Scheme Designator	No
>>(0008,0103)	Coding Scheme Version	>(0008,0103)	Coding Scheme Version	No
>>(0008,0104)	Code Meaning	>(0008,0104)	Code Meaning	No
>(0040,0009)	Scheduled Procedure Step ID	(0040,0275)> (0040,0009)	Request Attributes Sequence > Scheduled Procedure Step ID	No

8.1.4 Coerced/Modified Fields

Those Tags are listed in chapter 4.2.1.3.2 Activity – Query Modality Worklist.

Other attributes are lost and are not available in the HFA3 Application Software.

8.2 Data Dictionary of Private Attributes

The Private Attributes added to create SOP Instances are listed in the Tables below. HFA3 reserves blocks of private attributes in groups 2201, 22A1, 0301, 0303 and 7717.

Table 8-46 Private Dictionary Group (2201,00xx) = "99CZM_NIM_INTERNAL_01"

Occurs in: ALL IODs

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

Table 8-47 Private Dictionary Group (22A1,00xx) = "99CZM_SpecializedEncapsulatedDocument"

Occurs in: Encapsulated PDF IOD

Tag	Attribute Name	VR	VM
(22A1, 00xx)	Private Creator	LO	1
(22A1, xx01)	Document Type	LO	1

Table 8-48 Private Dictionary Group (0301,00xx) = "99CZM_Hfa_VisualField"

Occurs in: Raw Data IOD

Tag	Attribute Name	VR	VM
(0301,00xx)	Private Creator	LO	1
(0301,xx00)	test_type	US	1
(0301,xx01)	test_strategy	US	1
(0301,xx02)	test_pattern	US	1
(0301,xx03)	screening_mode	US	1
(0301,xx04)	stimulus_color	US	1
(0301,xx05)	stimulus_size	US	1
(0301,xx06)	blue_yellow	US	1
(0301,xx07)	pdb_version	US	1
(0301,xx08)	hfa_raw_data	OB	1
(0301,xx09)	kinetic_test_category	US	1
(0301,xx0a)	user_defined_pattern_name	LO	1
(0301,xx0b)	user_defined_pattern_id	LO	1
(0301,xx26)	pupil_diameter	FD	1
(0301,xx27)	trial_sphere_lens_power	FD	1
(0301,xx28)	trial_cylinder_lens_power	FD	1

(0301,xx29)	trial_cylinder_axis	FD	1
(0301,xx2a)	distance_sphere_lens_power	FD	1
(0301,xx2b)	distance_cylinder_lens_power	FD	1
(0301,xx2c)	distance_cylinder_axis	FD	1
(0301,xx2d)	visual_acuity	US	1
(0301,xx2e)	cup_disc_ratio_horizontal	FD	1
(0301,xx2f)	cup_disc_ratio_vertical	FD	1
(0301,xx30)	intraocular_pressure	US	1
(0301,xx31)	hfa_measurements_right_eye_sequence	SQ	1
(0301,xx32)	hfa_measurements_left_eye_sequence	SQ	1
(0301,xx33)	doctors_comments	LT	1
(0301,xx34)	chin_rest_location_x	FD	1
(0301,xx35)	chin_rest_location_y	FD	1
(0301,xx36)	user_profile_signature	LO	1
(0301,xx37)	user_profile_name	LO	1
(0301,xx38)	pupil_diameter_acqusition_mode	US	1
(0301,xx39)	report_type_sequence	SQ	1
(0301,xx3a)	report_type	US	1
(0301,xx3b)	screening_intensity	US	1
(0301,xx3c)	blind_spot_size	US	1
(0301,xx3d)	fixation_monitor	US	1
(0301,xx3e)	fixation_target	US	1
(0301,xx3f)	foveal_threshold	US	1
(0301,xx40)	fluctuation	US	1
(0301,xx41)	test_speed	US	1
(0301,xx42)	hfa_response_data	OB	1
(0301,xx43)	kinetic_scan_sequence	SQ	1
(0301,xx44)	scan_type	US	1
(0301,xx45)	isopter_identifier	US	1
(0301,xx46)	result_identifier	US	1
(0301,xx47)	scan_identifier	US	1
(0301,xx48)	begin_point_radius	FD	1
(0301,xx49)	begin_point_angle	FD	1
(0301,xx4a)	end_point_radius	FD	1
(0301,xx4b)	end_point_angle	FD	1

(0301,xx4c)	stop_point_radius	FD	1
(0301,xx4d)	stop_point_angle	FD	1
(0301,xx4e)	seen	US	1
(0301,xx4f)	retest	US	1
(0301,xx50)	stimulus_intensity	US	1
(0301,xx51)	scan_speed	US	1

Table 8-49 Private Dictionary Group (0303,00xx) = "99CZM_SantaCruz_Perimetry_8BitImage"

Occurs in: Ophthalmic Photography 8Bit IOD

Tag	Attribute Name	VR	VM
(0303,00xx)	Private Creator	LO	1
(0303,xx10)	verify_eye_metadata	SQ	1
(0303,xx11)	time_stamp	US	1
(0303,xx12)	question_number	US	1
(0303,xx13)	question_x_coordinate	SS	1
(0303,xx14)	question_y_coordinate	SS	1
(0303,xx15)	question_notes	SQ	1
(0303,xx16)	note	LO	1
(0303,xx17)	pupil_diameter	FD	1
(0303,xx18)	gaze_x_delta	US	1
(0303,xx19)	gaze_y_delta	US	1
(0303,xx1a)	gaze_status	US	1
(0303,xx1b)	image_checksum	LO	1
(0303,xx1c)	question_type	US	1

Table 8-50 Private Dictionary Group (7717,00xx) = "99CZM_HFA_EMR_2"

Occurs in: Encapsulated PDF IOD

Tag	Attribute Name	VR	VM
(7717,00xx)	Private Creator	LO	1
(7717,xx01)	Test Name	LO	1
(7717,xx 02)	Test Strategy	LO	1
(7717,xx 03)	Stimulus Size	CS	1
(7717,xx 04)	Stimulus Color	SH	1
(7717,xx 05)	Background State	SH	1
(7717,xx 06)	Foveal Result	CS	1
(7717,xx 07)	Screening Mode	LO	1
(7717,xx 08)	Fixation Trials	IS	1
(7717,xx 09)	Fixation Errors	IS	1

(7717,xx 10)	False Positive Percent	DS	1
(7717,xx 11)	False Positive Trials	IS	1
(7717,xx 12)	False Positive Errors	IS	1
(7717,xx 13)	False Negative Percent	DS	1
(7717,xx 14)	False Negative Trials	IS	1
(7717,xx 15)	False Negative Errors	IS	1
(7717,xx 16)	Mean Deviation	DS	1
(7717,xx 17)	Mean Deviation Probability	LO	1
(7717,xx 18)	Pattern Standard Deviation	DS	1
(7717,xx 19)	Pattern Standard Deviation Probability	LO	1
(7717,xx 20)	Short Term Fluctuation	DS	1
(7717,xx 21)	Corrected Pattern Standard Deviation	DS	1
(7717,xx 22)	Corrected Pattern Standard Deviation Probability	LO	1
(7717,xx 23)	Glaucoma Hemifield Test	LO	1
(7717,xx 24)	Fixation Monitor	LO	1
(7717,xx 25)	Fixation Target	LO	1
(7717,xx 26)	Pupil Diameter	DS	1
(7717,xx 27)	Sphere	DS	1
(7717,xx 28)	Cylinder	DS	1
(7717,xx 29)	Axis	IS	1
(7717,xx 30)	Visual Acuity	SH	1
(7717,xx 31)	Short Term Fluctuation Probability	LO	1
(7717,xx 32)	Test Date	DA	1
(7717,xx 33)	Test Time	TM	1
(7717,xx 34)	Visual Field Index	DS	1
(7717,xx 35)	Gpa Excluded Sequence	SQ	1
(7717,xx 36)	Class UID	UI	1
(7717,xx 37)	Instance UID	UI	1
(7717,xx 40)	VFM Sequence	SQ	1
(7717,xx 41)	Section Number	IS	1
(7717,xx 42)	Section Value	LO	1

8.3 Coded Terminology and Templates

In the scheduled case, HFA3 uses codes that are available via Modality Worklist. The Requested Procedure Code Sequence (0032,1064) and Scheduled Protocol Code Sequence (0040,0008) will be transmitted from MWL C-FIND response data set to instances of Ophthalmic Photography 8 Bit, Raw Data and EPDF IOD.

HFA3 uses (0066,002F) Algorithm Family Code Sequence with following codes to specify the family of algorithm(s) that best describes the software algorithm used.

Occurs in: Ophthalmic Visual Field Static Perimetry Measurements IOD

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning
PERIMETRY	99CZM_PERIMETRY	20140605	CZM Perimetry Algorithms

HFA3 uses (0040,A170) Purpose of Reference Code Sequence with the following codes to describes the purpose for which the reference is made.

Occurs in: Ophthalmic Visual Field Static Perimetry Measurements IOD

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning
RAW DATA SRC	99CZM_PERIMETRY	20140605	CZM Perimetry Source Exam

HFA3 uses (0040,0260) Performed Protocol Code Sequence with the following codes to specify test pattern and test strategy.

The DICOM Standard Context IDs 4250 and 4251 are extended.

Occurs in: Ophthalmic Visual Field Static Perimetry IOD

Extension of CID 4250 Visual Field Static Perimetry Test Patterns

Code Value	Coding Scheme Designator	Coding Scheme Version	Code Meaning
OPVTP100	99CZM	20140605	Visual Field Central 30-1 Threshold Test Pattern
OPVTP101	99CZM	20140605	Visual Field Peripheral 60-1 Threshold Test Pattern
OPVTP102	99CZM	20140605	Visual Field Temporal Crescent Threshold Test Pattern
OPVTP103	99CZM	20140605	Visual Field Neurological 20 Threshold Test Pattern
OPVTP104	99CZM	20140605	Visual Field Neurological 50 Threshold Test Pattern
OPVTP105	99CZM	20140605	Visual Field Nasal Step Threshold Test Pattern
OPVTP106	99CZM	20140605	Visual Field Central Armaly Screening Test Pattern
OPVTP107	99CZM	20140605	Visual Field Full Field Armaly Screening Test Pattern
OPVTP108	99CZM	20140605	Visual Field Central 80 Point Screening Test Pattern
OPVTP109	99CZM	20140605	Visual Field Central 166 Point Screening Test Pattern
OPVTP110	99CZM	20140605	Visual Field Full Field 246 Point Screening Test Pattern
OPVTP111	99CZM	20140605	Visual Field Auto Diagnostic Test Pattern
OPVTP112	99CZM	20140605	Visual Field Superior 64 Point Screening Test Pattern
OPVTP113	99CZM	20140605	Visual Field Nasal Step Screening Test Pattern
OPVTP114	99CZM	20140605	Visual Field Central 24-1 Threshold Test Pattern
OPVTP115	99CZM	20140605	Visual Field Blindengutachten Test Pattern
OPVTP116	99CZM	20140605	Visual Field Fuehrerscheingutachten Test Pattern

OPVTP117	99CZM	20140605	Visual Field Esterman Monocular Test Pattern
OPVTP118	99CZM	20140605	Visual Field Esterman Binocular Test Pattern
OPVTP119	99CZM	20140605	Visual Field Central 64 Point Screening Test Pattern
OPVTP120	99CZM	20140605	Visual Field Full Field 12 Point QA Test Pattern
OPVTP121	99CZM	20140605	Visual Field User Defined Threshold Test Pattern
OPVTP122	99CZM	20140605	Visual Field User Defined Screening Test Pattern
OPVTP123	99CZM	20140605	Visual Field Kinetic Test Pattern
OPVTP124	99CZM	20140605	Visual Field Full Field 135 Point Screening Test Pattern
OPVTP125	99CZM	20140605	Visual Field Superior 36 Point Screening Test Pattern
OPVTP126	99CZM	20140605	Visual Field Custom Screening Test Pattern
OPVTP127	99CZM	20140605	Visual Field Custom Threshold Test Pattern
OPVTP128	99CZM	20160921	Visual Field 24-2C Test Pattern

Occurs in: Ophthalmic Visual Field Static Perimetry IOD

Extension of CID 4251 Visual Field Static Perimetry Test Strategies

Code Value	Coding Scheme Designator	Version	Code Meaning
OPVTS100	99CZM	20140605	Visual Field Threshold Fast Test Strategy
OPVTS101	99CZM	20160921	Visual Field SITA-Faster Test Strategy [1)]

Note [1]: only available from version 1.4

HFA3 does not use templates.

8.4 Greyscale Image Consistency

Not applicable.

8.5 Standard Extended / Specialized/ Private SOP Classes

The following standard extensions are used in the IODs described in chapter 8.1.1 Created SOP Instance(s):

- Table 8-35 Ophthalmic Visual Field Static Perimetry Measurements IOD - Module "Czm Ophthalmic Visual Field Static Perimetry Measurements Extension"
- Table 8-40 Encapsulated Pdf IOD - Module "Czm Encapsulated Pdf Series Extension"

8.6 Private Transfer Syntaxes

No Private Transfer Syntax is supported.

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