Optos Vantage DICOM Conformance Statement

Company Name: **OPTOS**

Product Name: **V2 Vantage Software**

Version: **003**

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1 Conformance Statement Overview

The OPTOS Device and V2Vantage Software encode captured images within instances of the Media Storage SOP class. An AE can then transfer these encoded images using the DIMSE C-STORE service.

The OPTOS device and V2 Vantage software act as a Modality Worklist (MWL) SCU, i.e. it provides the necessary DICOM services to query and display worklist results from an information system.
For saving the acquired objects/images to a network storage device, it acts as a SCU for the DICOM **C-Store** functionality.

It also supports the **C-Echo** Verification Service for administration.

Note that the C-FIND service is only available with Daytona (P200T) Scanhead.

Table 1 provides a summary of the SOP classes that are supported by Optos device and V2 Vantage software.

Table 1: Network Services

SOP Class	User Of Service (SCU)	Provider of Service (SCP)
Transfer		
Ophthalmic Photography Image 8-bit Storage	Yes	No
Multi-frame True Colour Secondary Capture Image Storage	Yes	No
Workflow Management		
Modality Worklist	Yes	No
Administration		
Verification Service	Yes	No

Table 2 provides an overview of the Media Storage Application Profiles supported by the V2Vantage Software. Note that this functionality is not supported by the V2Vantage software.

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
*	No	No

2 Table of Contents

3 Introduction

3.1 Revision History

Table 3: Revision History

Revision	Date	Author	Notes
001	19th September 2011	Richard Munro	First edition.
002	05th February 2014	Anilasha Varkey Derek Cosgrove,	Updated to include support for Modality Worklist for Daytona (P200T) scanhead
003	05th August 2014	Steven Reid	Private DICOM tags for Proview and SWL added
003	12th December	Anilasha Varkey	Updated to indicate Contrast Bolus start time shall be encoded for FA and ICG images.

3.2 Audience

This document is written for the people that need to understand how the OPTOS Device and V2Vantage Software 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 the OPTOS V2Vantage Software 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 Terms and Definitions

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 empty (Type 2)
- Optional (Type 3)

There may be also 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.

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.

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.

C-ECHO - DICOM service used to verify end-to-end communications with a peer DICOM-service-user

C-STORE - DICOM service for storing objects, e.g. images

Modality Worklist - DICOM service to inform the modality of scheduled examinations

3.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist.

The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).

DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information). The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

3.6 Abbreviations

AE	Application Entity
AET	Application Entity Title
CD-R	Compact Disk Recordable
DICOM	Digital Imaging and Communications in Medicine
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IS	Information System (HIS, RIS, PACS within hospital)
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
JPEG	Joint Photographic Experts Group
LUT	Look-up Table
MWL	Modality Worklist

OP	Ophthalmic Photography
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VR	Value Representation
WSD	Workstation

3.7 References

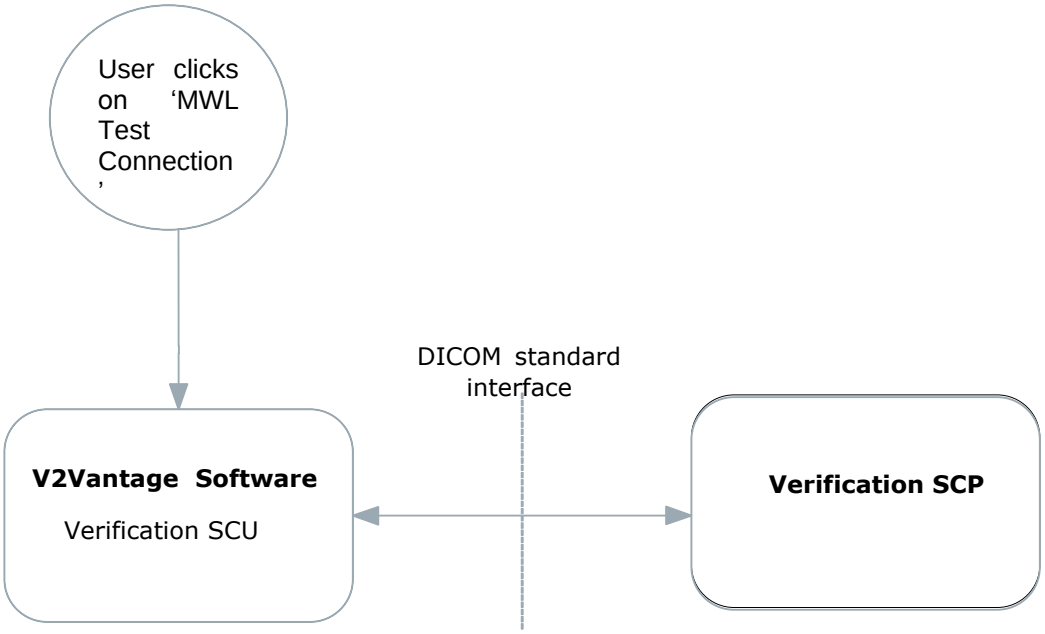
NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/

4 Networking

4.1 Implementation Model – Verification

4.1.1.1 **Application Data Flow Diagram**

The verification service class defines an application-level class of service, which allows verification of a remote DICOM node to respond to DICOM messages received via V2 Vantage software.
In Optos device and V2 Vantage software, the verification service is integrated to act as an SCU with all possible DICOM partners. A test user interface is available on the V2 Vantage admin application to test the configured partners (Modality Worklist SCP and C-Store SCP). The SCP will answer these responses with C-Echo replies. Note that the MWL functionality is available with Daytona (P200T) Scanhead only.



4.1.1.2 **Functional Definitions of AE's**

V2 Vantage software opens an association to an application on the remote DICOM node and sends a verification message (C-Echo Requests) to this partner. The partner will respond with C-Echo replies.

4.1.1.3 **Sequencing of Real-World Activities**

The user needs to define the IP address, port and AE titles of the communication partners in the configuration file in the V2 Vantage software. Once these are defined, user uses the V2 Admin application to open the 'Connections' dialog box. The user can then test the communication via the "Test MWL Connections" button. The communication result is shown in a message box.

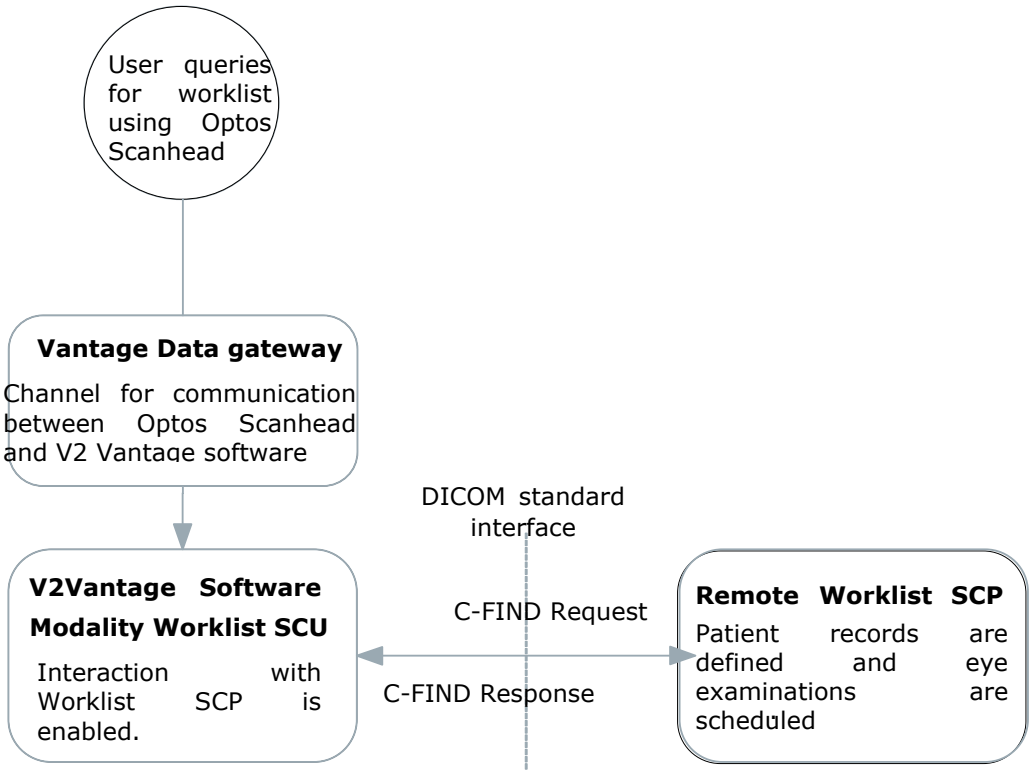
4.2 Implementation Model - Modality Worklist

4.2.1.1 **Application Data Flow Diagram**

The basic worklist service class defines an application-level class of service, which facilitates the transfer of worklist information from an information system to the imaging modality.
The worklist is queried by the AE and supplies the SCU (Optos device and V2 Vantage software) with the scheduled tasks that have to be performed on the modality. Optos Device and V2 Vantage software supports the worklist service in the role of a SCU.

Optos device and V2 Vantage software uses the data for creating worklist-based examinations and/or initiating an examination. The worklist data is stored in the V2 Vantage database.

Note that the MWL functionality is available with Daytona (P200T) Scanhead only.



4.2.1.2 **Functional Definitions of AE's**

The modality worklist SCU (Optos device and V2 Vantage software) requests the worklist SCP to perform a match to the keys specified in the C-FIND DIMSE service. The worklist SCP responds to the C-FIND query and sends scheduled imaging service requests and patient demographic

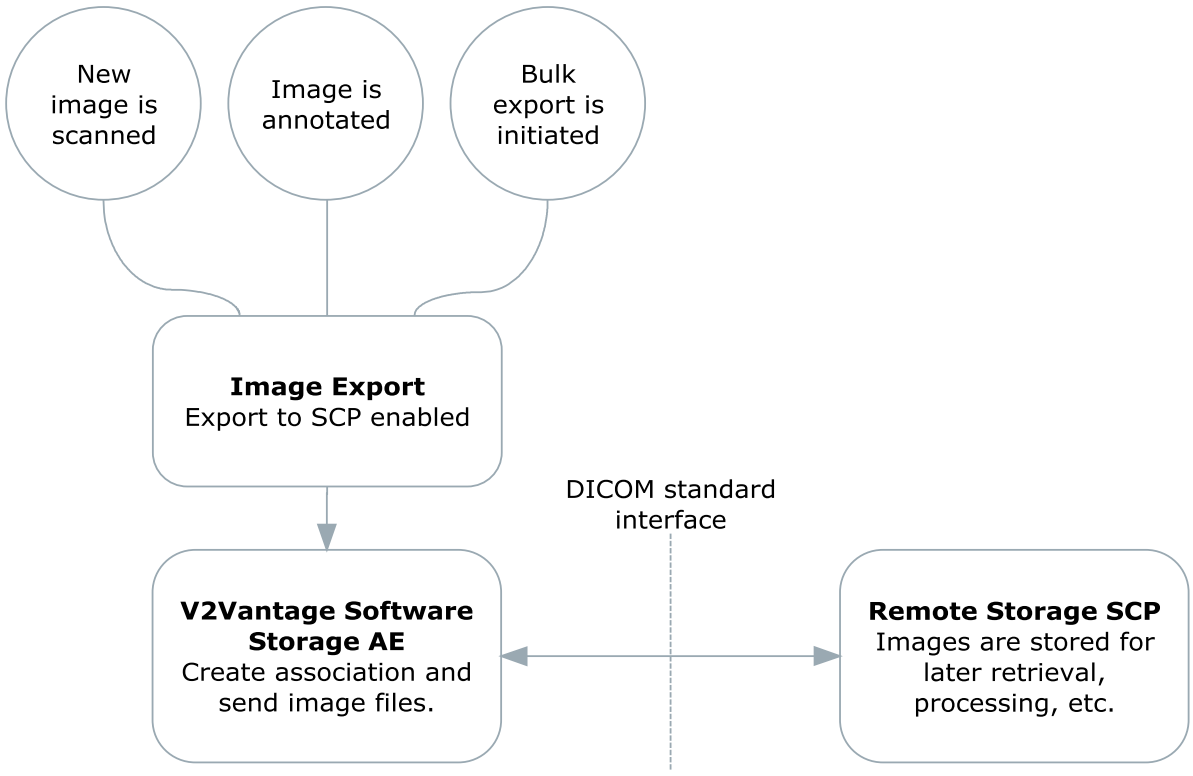
information from the information system to the modality.V2 Vantage software then sends the result from the C-FIND service to the Optos device to initiate the examination.

4.2.1.3 **Sequencing of Real-World Activities**

In order to perform a worklist query, the user must search for the scheduled procedure using the search criteria (patient based query or broad query) on the Optos device. On clicking the “search” button, V2 Vantage software sends a C-FIND query with the search keys to the SCP. The matching results are then received by the Optos Device via the V2 Vantage software. The displayed results are based on the search keys entered in the query fields. After the task is completed, the user can perform a new query.

4.3 Implementation Model - Storage

4.3.1 Application Data Flow



4.3.2 Functional Definition of AE’s

4.3.2.1 Functional Definition of the Storage AE

There are three ways to initiate export to a Storage SCP. The first is to scan a new image, or set of images, on the Optos equipment, the second is to annotate an image using the Review application and the third is to export images using the Bulk Export application.

Assuming the system is correctly configured the Storage AE in the V2Vantage software will create an association with the designated Storage SCP and transfer the DICOM image files. This is performed

as a transparent process from the user's perspective; there is no user feedback to indicate that the transfer has occurred or any other status regarding the transfer. If a problem arises then the detail of the error is logged.

4.3.3 Sequencing of Real World Activities

The V2Vantage software implements only the Storage AE, so real-world activities are limited to the storing of images. There is, therefore, no scope for sequencing or interaction of separate AE's.

4.4 AE Specifications

4.4.1 Storage AE Specification

The V2Vantage software can be configured to store DICOM images to a PACS / storage system via the DIMSE C-STORE service.

4.4.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 4: SOP Classes For Storage AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification Service Class	1.2.840.10008.1.1	Yes	No
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Ophthalmic Photography 8-bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Multi-frame True Colour Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No

4.4.1.2 Association Policies

4.4.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is used:

Table 5: DICOM application context for Storage AE

Application Context Name	1.2.840.10008.3.1.1.1

The Application Entity Title, the port number, and the host name or net address get defined in the Vantage configuration file. Different configuration parameters (AE-title, port, address) can be configured for both the services – C-Store and Modality Worklist). However, only one storage partner and one worklist partner can be configured.

4.4.1.2.2 Number of Associations

The AE will attempt only one association establishment at a time for each SOP Class.

4.4.1.2.3 Asynchronous Nature

The AE does not operate asynchronously.

4.4.1.2.4 Implementation Identifying Information

Table 6: DICOM Implementation Class and Version for Storage AE

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

4.4.1.3 Association Initiation Policies

The AE will initiate an association as an SCU for the following DICOM services:

1. C-ECHO
2. C-FIND
3. C-STORE

The AE will initiate association for storage of following image types:

1. Ophthalmic Photography 8-bit Image Storage
2. Multi-frame True Colour Secondary Capture Image Storage

The AE will create an association for each DICOM file transferred. The association initiation is triggered by an image export, subject to software configuration.

4.4.1.3.1 Real-World Activity – for Verification

V2 Vantage software initiates an association for DICOM C-ECHO service.

4.4.1.3.1.1 Associated Real-World Activity – for Verification

The user can perform a verification test to the configured partner by using the V2 Vantage (administration application).

4.4.1.3.1.2 Proposed Presentation Contexts – for Verification

The presentation contexts that are proposed by Optos device and V2 Vantage software for the verification operation are specified as follows:

Table 7: Presentation Contexts for Verification

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID**		
Verification Service Class	1.2.840.10008.1.1	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None

4.4.1.3.2 Real-World Activity – for Modality Worklist

V2 Vantage software initiates an association for DICOM C-FIND service.

4.4.1.3.2.1 Associated Real-World Activity – for Modality Worklist

The user performs a modality worklist query from the Optos device which is sent to the SCP via the V2 Vantage software. When Optos device queries for new worklist entries, V2 Vantage software opens an association to the Modality Worklist SCP. After the association has been established, a C-Find request with possible matching values will be send to the SCP. Then the partner sends the matching worklist entries with C-Find responses to the Worklist SCU (via the V2 Vantage software).

4.4.1.3.2.2 **Proposed Presentation Contexts – for Modality Worklist**

The presentation contexts that are proposed by Optos device and V2 Vantage for the Modality Worklist C-Find operation are specified as follows: (Note that the MWL functionality is available with Daytona (P200T) Scanhead only).

Table 8: Presentation Contexts for Modality Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID**		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None

4.4.1.3.2.3 **SOP Specific Conformance for Modality Worklist**

The following Module descriptions contain the attributes, which are present in a C-FIND request message sent by the Optos Device and V2 Vantage software to a remote AE. The descriptions also specify the attributes that are copied into the images.
Unexpected attributes returned in a C-FIND response are ignored.

The below tables should be read as follows:
Attribute Name: Attributes supported to build an HEDICOM integrated Modality Worklist
Request Identifier.
Tag: DICOM tag for this attribute.
Required for MWL: These attributes are required for Optos devices and V2 Vantage software to be configured with Modality Worklist. { Yes=required; No=Not required }
Mapped into The Image: Whether this data is mapped into subsequently acquired images
Notes: Clarification of this implementation's use/treatment of this attribute

SOP Common Module

Table 8: SOP Common Module Attributes

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Specific Character Set	(0008,0005)	Yes	Yes	

Scheduled Procedure Step Module

Table 8: Scheduled Procedure Step Module Attributes

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Scheduled Procedure Step Sequence	(0040,0100)	No	No	
> Scheduled Station AET	(0040,0001)	No	No	Optos Device and V2 Vantage software support Broad query

				using scheduled AE Title
> Scheduled Procedure Step Start Date	(0040,0002)	No	No	Optos Device and V2 Vantage software support Broad query using procedure start date
> Scheduled Procedure Step Start Time	(0040,0003)	No	No	Not used
> Modality	(0008,0060)	No	Yes	Matching is supported as follows: either no Modality is supplied (universal matching), or the scanner's Modality is supplied for matching; this is user defined.
> Scheduled Performing Physician's Name	(0040,0006)	No	No	Not used
> Scheduled Procedure Step Description	(0040,0007)	No	No	Not used
> Scheduled Station Name	(0040,0010)	No	No	Not used
> Scheduled Procedure Step Location	(0040,0011)	No	No	Not used
> Scheduled Protocol Code Sequence	(0040,0008)	No	No	Not used
> Pre-Medication	(0040,0012)	No	No	Not used
> Scheduled Procedure Step ID	(0040,0009)	No	No	Not used
> Requested Contrast Agent	(0032,1070)	No	No	Not used

Requested Procedure Module

Table 8: Requested Procedure Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Requested Procedure ID	(0040,1001)	No	No	Requested Procedure ID is displayed on the optos device screen
Requested Procedure Description	(0032,1060)	No	No	Not used
Study Instance UID	(0020,000D)	Yes	Yes	
Requested Procedure Priority	(0040,1003)	No	No	Not used
Referenced Study Sequence	(0008,1110)	No	No	Not used
Requested Procedure Code Sequence	(0032,1064)	No	No	Not used

Imaging Service Request Module

Table 8: Imaging Service Request Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Accession Number	(0008,0050)	Yes	Yes	Accession number is displayed on the optos device screen
Referring Physician's Name	(0008,0090)	Yes	Yes	Referring Physician's Name is displayed on the optos device screen

Visit Status Module

Table 8: Visit Status Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Current Patient Location	(0038,0300)	No	No	Not used

Visit Identification Module

Table 8: Visit Identification Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Admission ID	(0038,0010)	No	No	Not used
Institution Name	(0008,0080)	No	Yes	

Patient Identification Module

Table 8: Patient Identification Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Patient Name	(0010,0010)	Yes	Yes	Matching is supported as follows: either no Patient's Name is supplied; the patient's last (family) name specified on the scanner's screen is supplied, or the Patient's first name for matching; this is user defined. Wild card matching is implemented for leading and trailing characters. Patient

				name is displayed on the optos device screen
Patient ID	(0010,0020)	Yes	Yes	Wild card matching is implemented for leading and trailing characters. Patient ID is displayed on the optos device screen
Other Patient ID's	(0010,1000)	No	Yes	

Patient Demographic Module

Table 8: Patient Demographic Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Patient's Birth Date	(0010,0030)	Yes	Yes	Patient's Date of birth is displayed on the optos device screen
Patient's Sex	(0010,0040)	Yes	Yes	Patient's Sex is displayed on the optos device screen
Patient's Weight	(0010,1030)	No	No	Not used
Confidentiality constraint on patient data	(0040,3001)	No	No	Not used

Patient Medical Module

Table 8: Patient Demographic Module **Attributes**

Attribute Name	**Tag**	Required for MWL	Mapped into the image	Notes
Patient State	(0038,0500)	No	No	Not used
Pregnancy Status	(0010,21C0)	No	No	Not used
Medical Alerts	(0010,2000)	No	No	Not used
Allergies	(0010,2110)	No	No	Not used
Special Needs	(0038,0050)	No	No	Not used

4.4.1.3.3 Activity – Store images

V2 Vantage software initiates an association for DICOM C-STORE service.

4.4.1.3.3.1 Description and sequencing of activities

The ability to export DICOM images to a DICOM Store SCP is configurable. When configured to do so, the AE(V2 Vantage) will export images based on the following triggers:

- Immediate export of images at the point of capture
- Image export as part of a bulk export operation

- Automatic image export following annotation

When V2 Vantage works in a modality worklist environment, DICOM images are sent to the configured Dicom C-STORE SCP automatically at the point of capture.

4.4.1.3.3.2 Presentation Contexts

The Optos device and associated V2Vantage Software export files within which the Presentation Contexts are listed in Table 8. The AE has no fall-back implementation in the event that the Presentation Contexts are rejected by the SCP.

Table 8: Presentation Contexts for Store AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID**		
Ophthalmic Photography 8-Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Implicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 SV1)	1.2.840.10008.1.2.4.70		
		JPEG Lossy Compression Process 1	1.2.840.10008.1.2.4.50		
Multi-frame True Colour Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR, Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 SV1)	1.2.840.10008.1.2.4.70		
		JPEG Lossy Compression Process 1	1.2.840.10008.1.2.4.50		

4.4.1.3.3.3 SOP Specific Conformance for SOP Classes

The Storage AE does not use extended negotiation. In the event that a lossy image cannot be accepted by the SCP, the Storage AE will not attempt to reprocess the image or send it by any other form.

Table 9: DICOM Response Status Handling Behaviour

Service Status	Further Meaning	Error Code	Behaviour
Success	Success	0000	The SCP has received and stored the sent images. No message is presented to the user or logged.
*	*	Any other response	The storage process is terminated and, if not already aborted by the SCP, the association is aborted by the SCU. The detail of the reason for the failure is logged.

4.5 Network interfaces

4.5.1 Physical Network Interface

The V2Vantage software operates in a Microsoft Windows environment, and as such is not associated with any specific physical networking hardware.

The software uses the Windows TCP/IP stack from the host machine.

4.5.2 Additional Protocols

The software does not make use of any additional protocols.

4.5.3 IPv4 and IPv6 Support

The software supports IPv4. The software does not support IPv6.

Where configuration permits and IP address to be specified, that IP address must be specified as an IPv4 address.

4.6 Configuration

4.6.1 Storage – C-STORE

4.6.1.1 AE Title/Presentation Address Mapping

4.6.1.1.1 Local AE Titles

Table 10: AE Title Configuration Table

Application Enttiy	Default AE Title	Default TCP/IP Port
Storage SCU	OPTOS-EXPORT (configurable)	N/A

4.6.1.2 Remote AE Title / Presentation Address Mapping

4.6.1.2.1 Storage SCP

The default AE Title for the Storage SCP is ‘ANY-SCP’. This is configurable.

The TCP/IP connection parameters are also configurable. The default SCP host is ‘localhost’ and the default port number is 104.

4.6.1.3 Parameters

The following parameters are available:

Table 11: Configuration Parameters Table

Parameter	Configurable	Default Value
General enable / disable of the Store AE (ExportService_PACSTransferEnabled)	Yes	Disabled
Network name / IP address of the Store SCP	Yes	localhost

(ExportService_PACSAddress)		
TCP/IP port number for the Store SCP (ExportService_PACSPort)	Yes	104
Time-out waiting for acceptance of a TCP/IP message over the network. (ExportService_PACSTimeout)	Yes	5 seconds
Number of times to attempt a DIMSE C-STORE request. (ExportService_PACSAttempts)	Yes	3 attempts
Calling AP title. (ExportService_PACSCallingAPTitle)	Yes	OPTOS-EXPORT
Called AP title. (ExportService_PACSCalledAPTitle)	Yes	ANY-SCP

4.6.1 Query/Retrieve C-Find

4.6.1.1 AE Title/Presentation Address Mapping

4.6.1.1.1 Local AE Titles

Table 12: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Query/Retrieve SCU	`OPTOS-WRKQRY` (configurable)	N/A

4.6.1.2 Remote AE Title / Presentation Address Mapping

4.6.1.2.1 MWL SCP

The default AE Title for the MWL SCP is ‘MWL-SVR’. This is configurable.

The TCP/IP connection parameters are also configurable. The default SCP host is ‘localhost’ and the default port number is 104.

4.6.1.3 Parameters

The following parameters are available:

Table 13: Configuration Parameters Table

Parameter	Configurable	Default Value
(MWLIPAddress) - a string that lists the IP address of the MWL server	Yes	localhost
(MWLPort)- this parameter shall be a numeric value that lists the port number used for connecting to the MWL Server.	Yes	104
(MWLTimeout)- this parameter shall be a numeric value that lists the timeout in seconds for establishing connection to the MWL Server.	Yes	10 seconds
(MWLConnAttempts)- this parameter shall be a numeric value that lists the number of retries that the vantage server would attempt in order to establishing connection with the MWL	Yes	3 attempts

server.		
(MWLCallingAETitle) - this parameter shall be alphanumeric that lists the name/title used to identify the MWL server	Yes	OPTOS-WRKQRY
(MWLCalledAETitle) - this parameter shall be alphanumeric that lists the name/title used to identify the Vantage server	Yes	MWL-SVR
(MWLMaxRecords) - this paramters shall be a numeric value that defines the maximum limit of patient records that shall be passed to the Scanhead software after a C-Find query	Yes	100

5 Media Interchange

While the V2Vantage software generates DICOM image files that are fully compliant with their relevant SOPs, the Basic Directory IOD, defined in Media Interchange Application Profiles, is not implemented. This section of the specification is, therefore, not applicable.

6 Support for Extended Character Sets

6.1 Character sets in use

6.1.1 Ophthalmic Photography 8-Bit Image Storage

DICOM files containing Ophthalmic Photography 8-Bit Image Storage images do not have any specific character encoding applied, i.e. they use the default ISO-IR 6 character set, equivalent to 7-bit ASCII.

6.1.2 Multi-frame True Colour Secondary Capture Image Storage

DICOM files containing Multi-frame True Colour Secondary Capture Image Storage images will always have the ISO-IR 100 character set specified.

6.1.3 Translation to and from other character sets

The V2Vantage system does not translate to or from the above character sets.

6.1.4 Modality Worklist Information Model – FIND

Optos device and V2 VantageSoftware support ISO_IR 100 Latin-1 character set character set when integrating with the MWL server.

Records that contain unsupported character set shall be discarded if configured to do so and the software shall record the error in the log files.

7 Security

7.1 Conformance

The V2Vantage system does not claim conformance with the Secure Use Profiles listed in Part 15 of the DICOM specifications.

The software does implement a subset of the Basic Application Level Confidentiality Profile by providing the capability to de-identify specific attributes. The specific attributes are:

Table 14: De-identification Methods

Attribute	Tag reference	De-identification method
Patient's Name	(0010,0010)	Replaced with "XXXXX".
Patient ID	(0010,0020)	Replaced with "00000".
Patient's Birth Date	(0010,0030)	Replaced with "11111111" (i.e.11th November 1111 A.D.)
Patient's Sex	(0010,0040)	Replaced with "O", i.e. 'Other'.

8 Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

Abbreviations used for the Usage field in the tables are:

VNAP Value Not Always Present (attribute sent zero length if no value is present)
ANAP Attribute Not Always Present
ALWAYS Always present with a value
COND Attribute presence depends on the value of other attributes
EMPTY Attribute is sent without a value

Abbreviations used for the source of the data values are:

USER the attribute value source is from User input
AUTO the attribute value is generated automatically
CONFIG the attribute value source is a configurable parameter

8.1.1.1 Ophthalmic Photography 8-Bit Image IOD

Table 15: IOD of Created Ophthalmic Photography 8-Bit Image Instances

IE	Module	Reference
Patient	Patient	Table 17
Study	General Study	Table 18
Series	General Series	Table 19
	Ophthalmic Photography Series	Table 20
Frame Of Reference	Synchronization	Table 21
Equipment	General Equipment	Table 22
Image	General Image	Table 23
	Image Pixel	Table 24
	Enhanced Contrast /Bolus	Table 25
	Cine	Table 26
	Multi-frame	Table 27
	Ophthalmic Photography Image	Table 28
	Ocular Region Imaged	Table 29
	Ophthalmic Photography Acquisition Parameters	Table 30
	Ophthalmic Photographic Parameters	Table 31
	Performed Procedure Step Information	Table 32

IE	Module	Reference
	SOP Common	Table 33

8.1.1.2 Multi-frame True Colour Secondary Capture Image Storage

Table 16: IOD of Created Multi-frame True Colour Secondary Capture Image Storage Instances

IE	Module	Reference
Patient	Patient	Table 34
Study	General Study	Table 35
Series	General Series	Table 36
Equipment	SC Equipment	Table 37
Image	General Image	Table 38
	Image Pixel	Table 39
	Multi-Frame	Table 40
	SC Multi-frame Image	Table 41
	SOP Common	Table 42

8.1.1.3 Ophthalmic Photography 8-Bit Image Modules

The following modules are used in generated Ophthalmic Photography 8-Bit Image instances.

Table 17: Patient Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Patient's Name	(0010,0010)	PN	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input	VNAP	MWL / USER
Patient ID	(0010,0020)	LO	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input, or system-generated.	ALWAYS	MWL / USER / AUTO
Patient's Birth Date	(0010,0030)	DA	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input	ALWAYS	MWL / USER
Patient's Sex	(0010,0040)	CS	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input	ALWAYS	MWL / USER
Other Patient IDs	(0010,1000)	LO	If object is based on a	ANAP	MWL

			Modality Worklist order and the value in the order is not empty, the value comes from MWL.		

Table 18: General Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Study Instance UID	(0020,000D)	UI	If object is based on a Modality Worklist order the value comes from MWL, otherwise generated by Export Service.	ALWAYS	MWL / AUTO
Study Date	(0008,0020)	DA	Generated by device.	ALWAYS	AUTO
Study Time	(0008,0030)	TM	Generated by device.	VNAP	AUTO
Referring Physician's Name	(0008,0090)	PN	If object is based on a Modality Worklist order the value comes from MWL, otherwise User Name of Device Operator.	ALWAYS	MWL / USER
Study ID	(0020,0010)	SH	If object is based on a Modality Worklist order the value comes from MWL, otherwise generated by Export Service.	ALWAYS	MWL / AUTO
Accession Number	(0008,0050)	SH	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL, otherwise Zero Length.	VNAP	MWL / AUTO
Study Description	(0008,1030)	LO	"Generic Eye Procedure 200 R"	ALWAYS	CONFIG

Table 19: General Series Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Modality	(0008,0060)	CS	"OP"	ALWAYS	CONFIG
Series Instance UID	(0020,000E)	UI	Generated by Export Service.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Taken from configuration.	VNAP	CONFIG
Laterality	(0020,0060)	CS	"L" or "R" Attribute presence is dependent on configuration.	ANAP	AUTO
Series Description	(0008,103E)	LO	Taken from configuration.	ANAP	CONFIG
Body Part Examined	(0018,0015)	CS	"EYE"	ALWAYS	CONFIG

Table 20: Ophthalmic Photography Series Module of Create SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Modality	(0008,0060)	CS	“OP”	ALWAYS	CONFIG

Table 21: Synchronisation Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Synchronization Trigger	(0018,106A)	CS	“NO TRIGGER”	ALWAYS	CONFIG
Acquisition Time Synchronized	(0018,1800)	CS	“N”	ALWAYS	CONFIG
Synchronization Frame Of Reference UID	(0020,0200)	UI	1.2.840.10008.15.1.1	ALWAYS	CONFIG

Table 22: General Equipment Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Manufacturer	(0008,0070)	LO	“OPTOS”	ALWAYS	CONFIG
Institution Name	(0008,0080)	LO	Entered by user in Admin Application.	ALWAYS	CONFIG
Station Name	(0008,1010)	SH	Set by device.	ALWAYS	AUTO
Manufacturer’s Model Name	(0008,1090)	LO	“P200”, “P200MA”, “P200C”, “200TX”, “DAYTONA”	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	Set by device.	ALWAYS	AUTO
Software Version	(0018,1020)	LO	Set by V2 Vantage software	VNAP	AUTO

Table 23: General Image Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Derivation Description	(0008,2111)	ST	Only present if image is compressed. “Lossy Compression with JPEG baseline, IJG quality factor <Quality> Compression” or “Lossless JPEG Compression, selection value 1, point transform, 0 ”	VNAP	AUTO / USER
Source Image Sequence	(0008,2112)	SQ	Present if image is lossily compressed	VNAP	AUTO / USER
>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.4.1.1.77.1.5.1	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	<UID of compressed instance>	ALWAYS	AUTO
>Purpose Of Reference	(0040,A170)	SQ	N/A	ALWAYS	AUTO

Code Sequence					
>>Code Value	(0008,0100)	SH	121320	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	“DCM”	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	“Uncompressed Predecessor”	ALWAYS	AUTO
Derivation Code Sequence	(0008,9215)	SQ	Present if image is lossily compressed	VNAP	AUTO
>Code Value	(0008,0100)	SH	121327	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	“DCM”	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	“Full fidelity image”	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	“R\F”	ALWAYS	CONFIG
Image Comments	(0020,4000)	LT	Empty	VNAP	USER

Table 24: Image Pixel Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Rows	(0028,0010)	US	Rows in image	ALWAYS	AUTO
Columns	(0028,0011)	US	Columns in image	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB	Image Data	ALWAYS	USER

Table 25: Enhanced Contrast / Bolus Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Contrast / Bolus Agent Sequence	(0018,0012)	SQ	Present if 4th field of image type is FA, otherwise attribute and sequence not present.	ANAP	AUTO
>Code Value	(0008,0100)	SH	“C-B02CC”	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	“Fluorescein”	ALWAYS	AUTO
>Contrast / Bolus Administration Route Sequence	(0018,0014)	SQ	N/A	ALWAYS	AUTO
>>Code Value	(0008,0100)	SH	“G-D101”	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	“Intravenous route”	ALWAYS	AUTO
>Contrast/Bolus Volume	(0018,1041)	DS	Zero length.	EMPTY	AUTO
>Contrast/Bolus Ingredient Concentration	(0018,1049)	DS	Zero length.	EMPTY	AUTO

Attribute Name	Tag	VR	Value	Usage	Source
>Contrast Bolus Agent Number	(0018,9337)	US	1	ALWAYS	AUTO
>Contrast/Bolus Ingredient Code Sequence	(0018,9338)	SQ	Zero Length.	EMPTY	AUTO
>Contrast Administration Profile Sequence	(0018,9340)	SQ	Zero Length	EMPTY	AUTO
>>Contrast Bolus Volume	(0018,1041)	DS	N/A	EMPTY	AUTO
>>Contrast Bolus Start Time	(0018,1042)	TM	Present for FA and ICG images. The timestamp includes hours, minutes, seconds and milliseconds (at least up to hundredth of milliseconds) in the format hhmmss.msec (dot separator is used to distinguish the milliseconds)	ALWAYS for FA and ICG images	AUTO
>>Contrast Bolus Stop Time	(0018,1043)	TM	N/A	EMPTY	AUTO

Table 26: Cine Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Frame Time	(0018,1063)	DS	0	ANAP	AUTO

Table 27: Multi-Frame Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Number Of Frames	(0028,0008)	IS	1	ALWAYS	AUTO
Frame Increment Pointer	(0028,0009)	AT	(0018,1063)	ALWAYS	AUTO

Table 28: Ophthalmic Photography Image Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Image Type	(0008,0008)	CS	Image Type String. 9 fields separated by a backslash ('\') with defined values for each field as follows:- **Field #1** *One of:* ORIGINAL DERIVED **Field #2** *One of:*	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Usage	Source
			PRIMARY SECONDARY **Field #3** *Empty field* **Field #4** *One of:* COLOR FA RED **Field #5 (category)** *One of:* OPTOMAP OPTOMAP FA OPTOMAP AF **Field #6 (device)** *One of:* P200 P200MA P200C P200TX DAYTONA **Field #7 (supplemental)** *One of:* PLUS PLUSREDUCED RESMAX CP PLUSRESMAX **Field #8: (stereo)** *Either empty field or:* STEREO **Field #9: (optimisation)** *Either empty field or:* OPTIMISED **Field #10: (projection)** *Either empty field or:* PROJECTED		
Content Date	(0008,0023)	DA	Date image pixel data creation started.	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time image pixel data creation started.	ALWAYS	AUTO
Acquisition Date/Time	(0008,002A)	DT	Date is set by device.	ANAP	AUTO
Instance Number	(0020,0013)	IS	1	ALWAYS	AUTO
Samples Per Pixel	(0028,0002)	US	1 (monochrome) or	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Usage	Source
			3 (composite).		
Samples Per Pixel Used	(0028,0003)	US	Not used (monochrome) or 2 (composite).	COND	AUTO
Photometric Interpretation	(0028,0004)	US	“MONOCHROME2” or “RGB”	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0 or 1	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Pixel spacing is mapped from device and image type.	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	US	“NO”	ALWAYS	CONFIG
Lossy Image Compression	(0028,2110)	CS	00 or 01	ANAP	USER
Lossy Image Compression Ratio	(0028,2112)	DS	Compression factor relative to original image.	ANAP	USER / AUTO
Lossy Image Compression Method	(0028,2114)	CS	0 or “ISO_10918_1”	ANAP	AUTO
Presentation LUT Shape	(2050, 0020)	CS	“IDENTITY”	ALWAYS	AUTO

Table 29: Ocular Region Imaged Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Anatomic Region Sequence	(0008,2218)	SQ	N/A	ALWAYS	AUTO
>Code Value	(0008,0100)	SH	“T-AA610”	ALWAYS	CONFIG
>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ALWAYS	CONFIG
>Code Meaning	(0008,0104)	LO	“Retina”	ALWAYS	CONFIG
Image Laterality	(0020,0062)	CS	“L” or ”R”	ALWAYS	AUTO

Table 30: Ophthalmic Photography Acquisition Parameters Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Patient Eye Movement Commanded	(0022,0005)	CS	“NO” or “YES”	ALWAYS	USER
Patient Eye Movement Command Code Sequence	(0022,0006)	SQ	Sequence only present if Patient Eye Movement Commanded attribute has	ANAP	AUTO

			value of “YES”		
>Code Value	(0008,0100)	SH	“R-404BF” or “R-404BC” or “R-404B6” or “R-404BD”	ANAP	USER
>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ANAP	AUTO
>Code Meaning	(0008,0104)	LO	“Upward gaze” or “Left gaze” or “Downgaze” or “Right gaze”	ANAP	USER
Refractive State Sequence	(0022,001B)	SQ	Zero-length	EMPTY	AUTO
Emmetropic Magnification	(0022,000A)	FL	N/A	EMPTY	AUTO
Intra Ocular Pressure	(0022,000B)	FL	N/A	EMPTY	AUTO
Pupil Dilated	(0022,000D)	FL	Taken from configuration.	VNAP	CONFIG

Table 31: Ophthalmic Photographic Parameters Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Acquisition Device Type Code Sequence	(0022,0015)	SQ	N/A	ALWAYS	AUTO
>Code Value	(0008,0100)	SH	“A-00E8A”	ALWAYS	CONFIG
>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ALWAYS	CONFIG
>Code Meaning	(0008,0104)	LO	“Scanning Laser Ophthalmoscope”	ALWAYS	CONFIG
Illumination Type Code Sequence	(0022,0016)	SQ	Zero Length	EMPTY	AUTO
Light Path Filter type stack code sequence	(0022,0017)	SQ	Zero Length	EMPTY	AUTO
Image Path Filter type stack code sequence	(0022,0018)	SQ	Zero Length	EMPTY	AUTO
Lenses Code Sequence	(0022,0019)	SQ	Zero Length	EMPTY	AUTO
Refractive State Sequence	(0022,001B)	SQ	Zero Length	EMPTY	AUTO
Channel Description Code Sequence	(0022,001A)	SQ	Sequence of one or more of the following elements	ALWAYS	AUTO
>Code Value	(0008,0100)	SH	“GA-11A” or “GA-11E” or “GA-11F”.	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	“SRT”	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Usage	Source
>Code Meaning	(0008,0104)	LO	“Red”, “Green” or “Blue”	ALWAYS	AUTO
Detector Type	(0018,7004)	CS	Taken from configuration.	VNAP	CONFIG

Table 32: Performed Procedure Step Information Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Procedure Code Sequence	(0008,1032)	SQ	N/A	ALWAYS	AUTO
>Code Value	(0008,0100)	SH	“EYE-200”	ALWAYS	CONFIG
>Coding Scheme Designator	(0008,0102)	SH	“IHEDEMO”	ALWAYS	CONFIG
>Code Meaning	(0008,0104)	LO	“Generic Eye Procedure 200”	ALWAYS	CONFIG

Table 33: SOP Common Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Instance Creation Date	(0008,0012)	DA	Generated by system.	ALWAYS	AUTO
Instance Creation Time	(0008,0013)	TM	Generated by system.	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.77.1.5.1	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	System-generated UID.	ALWAYS	AUTO

8.1.1.4 Multi-frame True Colour Secondary Capture Image Storage Modules

The following modules are used in generated Multi-frame True Colour Secondary Capture Image instances.

Table 34: Patient Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Patient’s Name	(0010,0010)	PN	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input	VNAP	MWL/ USER
Patient ID	(0010,0020)	LO	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise from User Input, or system-generated.	ALWAYS	MWL/ USER / AUTO
Patient’s Birth Date	(0010,0030)	DA	If object is based on a Modality Worklist order and the value is not empty, the value comes from MWL otherwise From User Input	ALWAYS	MWL/ USER
Patient’s Sex	(0010,0040)	CS	If object is based on a		MWL/

			Modality Worklist order and the value is not empty, the value comes from MWL otherwise From User Input	ALWAYS	USER

Table 35: General Study Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Study Instance UID	(0020,000D)	UI	If object is based on a Modality Worklist order the value comes from MWL, otherwise Generated by Export Service.	ALWAYS	MWL/ AUTO
Study Date	(0008,0020)	DA	Generated by device.	ALWAYS	AUTO
Study Time	(0008,0030)	TM	Generated by device.	VNAP	AUTO
Referring Physician's Name	(0008,0090)	PN	If object is based on a Modality Worklist order the value comes from MWL, otherwise user Name of Device Operator.	ALWAYS	MWL/ USER
Study ID	(0020,0010)	SH	If object is based on a Modality Worklist order the value comes from MWL, otherwisegenerated by the export service	ALWAYS	MWL/ AUTO
Accession Number	(0008,0050)	SH	If object is based on a Modality Worklist order the value comes from MWL, otherwise Zero Length	VNAP	AUTO

Table 36: General Series Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Modality	(0008,0060)	CS	"OP"	ALWAYS	CONFIG
Series Instance UID	(0020,000E)	UI	Generated by Export Service.	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by Export Service.	VNAP	AUTO
Laterality	(0020,0060)	CS	"L" or "R" Attribute presence is dependent on configuration.	ANAP	AUTO

Table 37: SC Equipment Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Conversion Type	(0008,0064)	CS	"WSD"	ALWAYS	AUTO

Table 38: General Image Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Patient Orientation	(0020,0020)	CS	“R\F”	ALWAYS	CONFIG
Image Comments	(0020,4000)	LT	Comments entered using review application.	VNAP	USER

Table 39: Image Pixel Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Instance Number	(0020,0013)	IS	1	ALWAYS	AUTO
Samples Per Pixel	(0028,0002)	US	3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	US	“YBR_FULL_422”	ALWAYS	AUTO
Rows	(0028,0010)	US	Rows in image	ALWAYS	AUTO
Columns	(0028,0011)	US	Columns in image	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB	Image Data	ALWAYS	USER
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	00 or 01.	ANAP	USER
Lossy Image Compression Method	(0028,2114)	CS	0 or “ISO_10918_1”	ANAP	AUTO

Table 40: Multi-Frame Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Number Of Frames	(0028,0008)	IS	1	ALWAYS	AUTO

Table 41: SC Multi-frame Image Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Burned In Annotation	(0028,0301)	US	“NO”	ALWAYS	AUTO

Table 42: SOP Common Module of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Specific Character Set	(0008,0005)	CS	“ISO_IR 100”	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.7.4	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	System-generated UID.	ALWAYS	AUTO

8.2 Usage of Attributes from received IOD's

Not applicable.

8.3 Attribute Mapping

Not applicable.

8.4 Coerced / Modified Fields

Not applicable.

8.5 Data Dictionary of Private Attributes

Table 40: Private Data Elements of Created SOP Instances

Attribute Name	Tag	VR	Value	Usage	Source
Creator	(0021,0010)	LO	"OPTOS HEADER"	ALWAYS	AUTO
Proview	(0021,1000)	CS	"YES"/"NO"	ALWAYS	CONFIG
SWL	(0021,1001)	CS	"YES"/"NO"	ALWAYS	CONFIG

8.6 Coded terminology and Templates

Not Applicable.

8.7 Grayscale Image Consistency

Not applicable.

8.8 Standard/Extended/Specialized/Private SOP Classes

Not applicable.

8.9 Private Transfer Syntaxes

Not applicable