DICOM Conformance Statement

IntraSight Plus

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1. DICOM Conformance Statement Overview

Intrasight Plus is an image acquisition modality.
The Intended medical application of the Intrasight Plus product is the following:

IntraSight Plus Integrated is a multi-modality, application-based platform providing a range of imaging and physiology tools. It can be used as a stand-alone system or integrated with a compatible interventional X-ray system.

IntraSight Plus Integrated provides qualitative and quantitative evaluation of vascular morphology in the coronary arteries and vessels of the peripheral vasculature in adult patients eligible for endovascular procedures. It is used to support conventional angiographic procedures, providing images of vessel lumen and wall structures.

It provides the following DICOM data exchange features: (see Figure 1):

- Query the RIS for a Modality Worklist (MWL)
- Transfer of DICOM Images to the Remote Node (PACS)
- Transfer DICOM Images from Remote Node(PACS) to Intrasight Plus
- Store images to Media (USB/DVD/CD).
- Print Images (Grayscale and Color) on a DICOM Printer

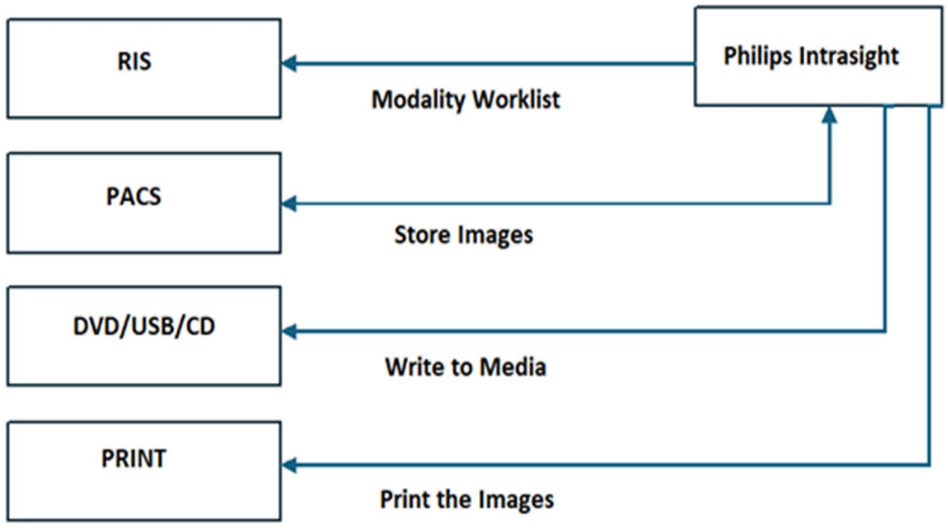

Figure 1: Data Flow in a DICOM network

Table 1 presents an overview of all supported by Intrasight Plus networking DICOM Service (SOP) Classes with roles (User/Provider), organized in two categories:

- Verification
- Print Management
- Query/Retrieve
- Transfer
- Workflow Management

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	**UID**			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	No	N/A
Print Management				
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	N/A
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	N/A
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	N/A
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	N/A
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	N/A
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No	N/A
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	N/A
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	N/A
>Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No	N/A
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	N/A
Query/Retrieve				
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No	N/A
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No	N/A
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	N/A
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No	N/A
Transfer				
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	N/A
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	N/A
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	N/A
Workflow Management				
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	N/A

Note: Philips IntraSight Plus can only import the data created by Philips Intrasight Plus system.

A table of Supported Media Storage Application Profiles (with roles) is provided.

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
DVD			
General Purpose DVD Interchange with JPEG (STD-GEN-DVD and STD-GEN-DVD-JPEG)	Yes	Yes	Yes
USB			
General Purpose USB Media Interchange with JPEG(STD-GEN-USB-JPEG)	Yes	Yes	Yes
CD			
General Purpose CD Media Interchange	Yes	Yes	Yes

Note: Philips IntraSight Plus can only read the media created by Philips Intrasight Plus system.

2. Contents

3. Introduction

The introduction specifies product and relevant disclaimers as well as any general information that the vendor feels is appropriate.

3.1. Revision History

The revision history provides dates and differences of the different releases.

Table 3: Revision History

Document Version	Date of Issue	Description of change
01	15-May-2025	First version for IntraSight Plus

3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to ensure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to

make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

Table 4: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
ACN	Application Context Name
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FM	IT uses iFR and FFR to measure the ratio of blood flow through the blockage w.r.t the blood flow distal to the blockage
FFR	Fractional Flow Reserve, a method of assessing ischemia in a coronary artery by calculating a pressure differential across a stenosis under hyperemic conditions
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
iFR	Instant Wave-Free Ratio, a method of assessing ischemia in a coronary artery by calculating a pressure differential in the wave-free period, without inducing hyperemia
IHE	Integrating the Healthcare Enterprise
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
ISO	International Organization for Standardization
IVUS	Intravascular Ultrasound, a method of imaging a blood vessel using ultrasound imaging
JPEG	Joint Photographic Experts Group
MWL	Modality Worklist Management
NEMA	National Electrical Manufacturers Association
NA	Not Applicable
PACS	Picture archiving and Communication System
PDU	Protocol Data Unit
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair

Abbreviation/Term	Explanation
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound Multi-frame
WLM	Worklist Management

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
National Electrical Manufacturers Association
1300 North 17th Street
Suite 900
Arlington, Virginia 22209
Internet: https://www.dicomstandard.org/current

4. Networking

This section contains the networking related services (vs. the media related ones).

4.1. Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

The Intrasight Plus system DICOM feature incorporates the DICOM 3.0 standard for the store image functions. Images are transferred from the Intrasight Plus system using standard network connections to be processed on a DICOM compatible storage device.

The Intrasight Plus system allows only one remote Worklist and multiple storage devices to be configured. Worklist is queried from the configured Worklist server.
Images are transferred to the configured remote DICOM Storage server or Query Retrieve from the configured remote DICOM Storage server.

After a successful Image Export operation, the transferred cases are marked as Archived and are subject to automatic deletion based on the configuration.

Verification status is obtained from storage servers using DICOM Verify (C-ECHO).

4.1.1. Application Data Flow

Intrasight Plus has one Application Entity in its implementation, namely Local Application Entity. Figure 2 shows the Networking application data flow as a functional overview of this application entity. On the left-hand side, the local Real-World Activities are presented, whereas on the right-hand side, the remote Real-World Activities are presented.

As depicted in Figure 2, the Intrasight Plus incorporates the following functionality:

- The Verification as SCU real-world activity occurs when the admin user clicks the Test connection button in configuration page. A C-ECHO operation is performed on the currently selected remote DICOM Storage Server.
- Modality Worklist as SCU real-world activity occurs 1) when the user selects the Search button located in the Worklist dialog 2) The system automatically executes the broadcast for querying. . A list of matching Worklist items are returned from the current selected Worklist server.
- Image Export real-world activity occurs when the user selects one or more studies in the Intrasight Plus system Archive page and then initiates the Image Export function. Each image is transferred to the remote storage server in a separate DICOM Association. . The user can also select an alternate server in the UI.

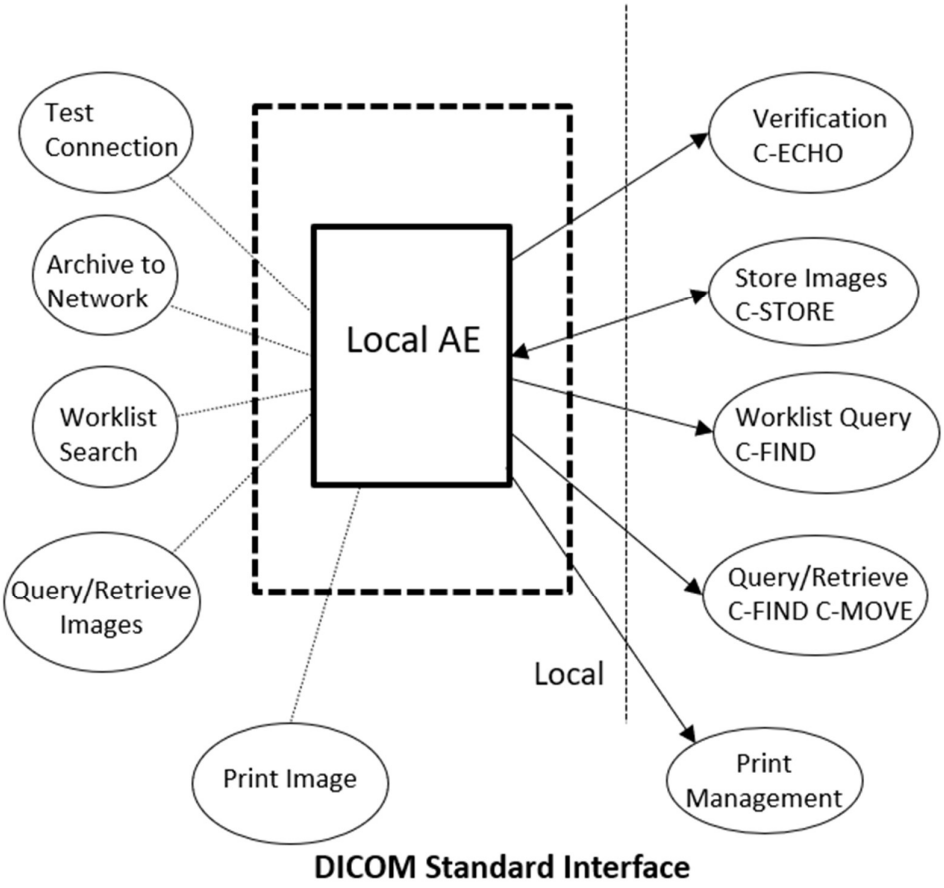

Figure 2: Intrasight Plus application data flow diagram

4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

4.1.2.1. Functional Definition of Local AE

Verification Service Class

The Local AE provides the verification service as SCU. The Intrasight Plus system sends an association request to the configured MWL and Remote systems. After accepting the association responds to the verification request and releases the association when requested.

Storage Service Class

The Local AE provides the Storage service as SCU. The Local AE stores IVUS images and FM save frames and XA Images to a remote storage server. An association request is sent to the remote storage AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, an error is reported to the user and the transfer fails. The Local AE will retry 3 times before aborting the job.

When performing a Storage Service Class (SCP), the Local AE will receive images and store them in the system's local database.

Basic Worklist Management Service Class

The Local AE provides the basic worklist as SCU. The Local AE queries the remote Modality Worklist server, worklist search attempts to download a list of Scheduled Procedure Steps from a remote Modality Worklist server. If the Local AE establishes an association to a worklist server, it will transfer all worklist items via the open Association. During receiving, the Worklist response items are counted and the query processing is canceled if the configurable maximum limit of items is exceeded. The results will be displayed in a list, which will be cleared with the next Worklist Search operation. Worklist query is initiated every time the Patient Information screen is accessed. All subsequent queries must be initiated manually by the user. The current Worklist is persisted between system power cycles to allow Worklist access in the event that a network connection is not available.

Print Management Service Class

The Intrasight Plus can perform the Print service as SCU (RWA Print Images), triggered by the operator. For each printed sheet, Intrasight Plus shall request an association with the selected remote SCP (i.e., a Print Server) for all applicable SOP classes of the applicable Print Management Meta SOP class. When the association is accepted, the Intrasight Plus shall send the Print requests including data from local database (the N-GET RQ message to get the printer status, the N-CREATE-RQ message to create the Film Session and the Film Box, the N-SET-RQ message to set the Image Box on the printer, finally, the N-ACTION-RQ message to give printer the command to print), receive the Print responses and act accordingly, and finally request for releasing the association. The Intrasight Plus can perform the Print service as SCU (RWA Get Printer Status), triggered by the operator in the service mode. The Intrasight Plus shall request an association with the selected remote SCP (Print Server) for the Printer SOP class. When the association is accepted, the Intrasight Plus shall send the N-GET request, receive the responses from the Print Server and act

Query Retrieve Service Class

The Intrasight Plus can perform the Query Retrieve service as SCU. The Intrasight Plus shall request an association. When the association is accepted, the Intrasight Plus shall send a Query/Retrieve request, receive the responses, and request for releasing the association.

4.1.3. Sequencing of Real World Activities

All real world activities that initiate communication to remote AE's operate synchronously with respect to each other and other Intrasight Plus system operations.

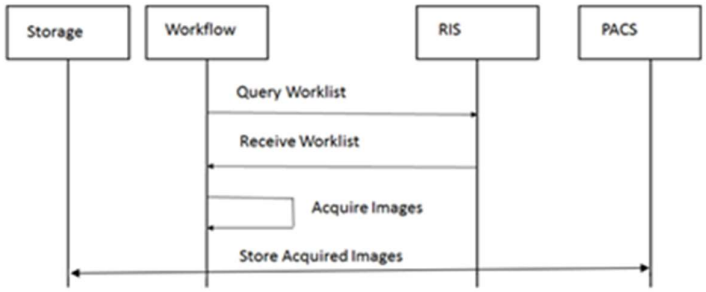

Figure 3: Intrasight Plus sequencing diagram

4.2. AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1. Local AE

Detail of this specific Application Entity is specified in this section.

4.2.1.1. SOP Classes

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

Table 5: SOP Classes for Local AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.1.2. Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1 General

The Intrasight Plus system uses TCP/IP. The Maximum Length PDU negotiation is included in all association establishment requests. The maximum length PDU offered for an association initiated by the Intrasight Plus system is 64234 bytes.

The following DICOM Application Context Name UID is proposed and recognized:

Table 6: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified here.

Table 7: Number of associations as an Association Initiator for Local AE

Description	Value
Maximum number of simultaneous associations	1

4.2.1.2.3 Asynchronous Nature

The Storage AE will not use asynchronous operations.

4.2.1.2.4 Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 8: DICOM Implementation Class and Version Name

Implementation Class UID	1.3.46.670589.59.1.6.0.0
Implementation Version Name	IS_6.0.0

4.2.1.2.5 Communication Failure Handling

The behavior of the AE during communication failure is summarized in below table.

Table 9: Communication Failure Behavior

Exception	Behavior
Timeout	The association is aborted using A-ABORT. The reason is logged and reported to the user.
Association aborted	The reason is logged and failure is reported to the user.
Association rejected	The reason is logged and failure is reported to the user.

4.2.1.3. Association Initiation Policy

The Local AE will open an association to the currently selected remote systems and worklist server device in response to the following real-world activities; Modality Worklist as SCU, Image Export and Verification as SCU.

The Application Entity will respond to a received Association rejection as shown in below table.

Table 10: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	Association reject is logged and connection is closed.
		2 - application-context-name-not supported	Association reject is logged and connection is closed.
		3 - calling-AE-title-not-recognized	Association reject is logged and connection is closed.
		7 - called-AE-title-not-recognized	Association reject is logged and connection is closed.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association reject is logged and connection is closed.

Result	Source	Reason/Diagnosis	Behavior
		2 - protocol-version-not-supported	Association reject is logged and connection is closed.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association reject is logged and connection is closed.
		2 - local-limit-exceeded	Association reject is logged and connection is closed.
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Association reject is logged and connection is closed.
		2 - application-context-name-not-supported	Association reject is logged and connection is closed.
		3 - calling-AE-title-not-recognized	Association reject is logged and connection is closed.
		7 - called-AE-title-not-recognized	Association reject is logged and connection is closed.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	Association reject is logged and connection is closed.
		2 - protocol-version-not-supported	Association reject is logged and connection is closed.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	Association reject is logged and connection is closed.
		2 - local-limit-exceeded	Association reject is logged and connection is closed.

The behavior of the AE on receiving an Association abort is summarized in below table.

Table 11: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	Abort is logged and connection is closed.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	Abort is logged and connection is closed.
	1 - unrecognized-PDU	Abort is logged and connection is closed.
	2 - unexpected-PDU	Abort is logged and connection is closed.
	4 - unrecognized-PDU-parameter	Abort is logged and connection is closed.
	5 - unexpected-PDU-parameter	Abort is logged and connection is closed.
	6 - invalid-PDU-parameter-value	Abort is logged and connection is closed.

4.2.1.3.1 (Real-World) Activity – Verification as SCU

4.2.1.3.1.1 Description and Sequencing of Activities

The Verification as SCU real-world activity will cause the Local AE to open associations with the current selected worklist server or remote systems using the test connection button.

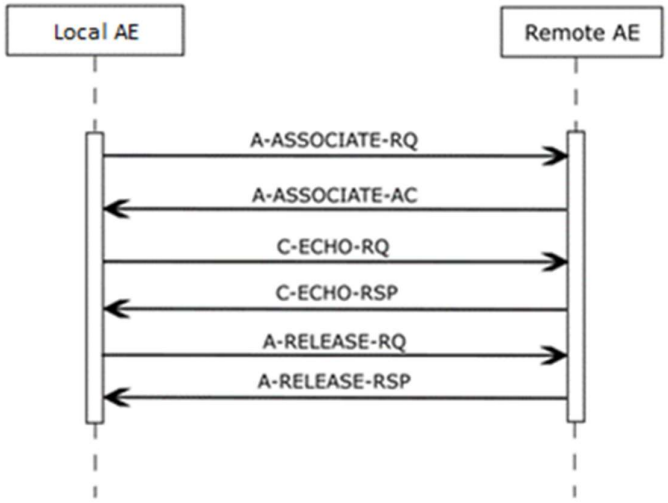

Figure 4: Real World Activity - Verification as SCU

4.2.1.3.1.2 Proposed Presentation Contexts

The presentation context proposed by the Local AE for Verification as SCU is defined in the below table.

Table 12: Proposed Presentation Contexts for (Real-World) Activity – Verification As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.1.3.1 Dataset Specific Conformance for Verification C-ECHO SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 13: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	No error codes are displayed to the user either for Success or failure. The codes are only available in trace files.

4.2.1.3.2 (Real-World) Activity – Modality Worklist as SCU

4.2.1.3.2.1 Description and Sequencing of Activities

The Modality Worklist real-world activity will cause the Local AE to open an association with the default worklist server.
A possible sequence of interactions between the Local AE and a remote AE is illustrated in the figure 5:

1. The Intrasight Plus system, Local AE opens an association with the remote AE (e.g. RIS).
2. The Intrasight Plus system, Local AE sends a C-FIND request to the remote AE (RIS) containing the Worklist Query attributes.
3. The remote AE (RIS) returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Remote AE (RIS) returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Remote AE (RIS) returns another C-FIND response with status Success indicating that no further matching Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query.
6. The Intrasight Plus system Local AE closes the association with the Remote AE (RIS).
7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.

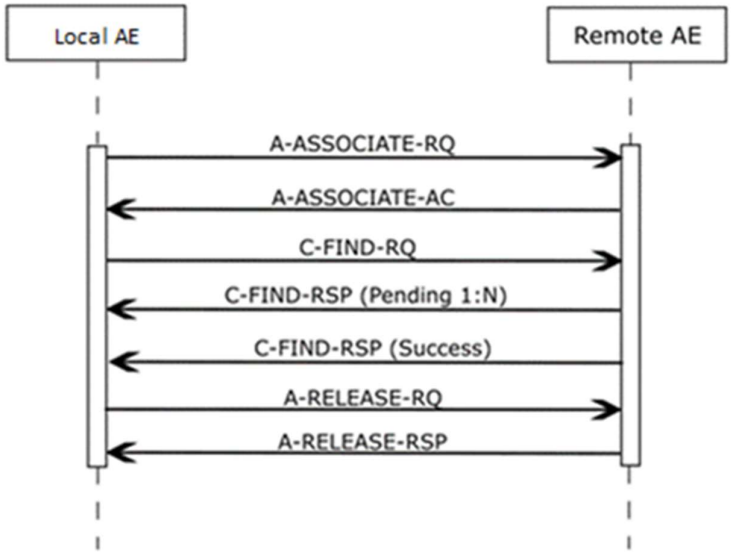

Figure 5: Real World Activity – Modality Worklist as SCU

- When responses with missing mandatory attribute values are received, SUT does not display any scheduled orders with missing mandatory attribute values and shows the indication message as no records found try modifying the attribute(s) and search again.
- When responses with empty values for mandatory attributes are received, empty value for patient id & patient name are displayed and no error message is displayed on the UI.
- When Mandatory return key violation is sent in response, SUT continued querying for further studies without any error.
- When responses with extra keys were received, SUT continued querying for further studies without any errors.
- While trying to perform the procedure which matches the SUT but not the SUT's scheduled station AE. System automatically picks up the same AE title and able to start the procedure on selecting that study.
- While trying to perform the procedure that was not scheduled, the system is able to perform the procedure.
- Created objects of the 2 scheduled procedures appear within a single study and is able to store .

4.2.1.3.2.2 Proposed Presentation Contexts

Each time an association is initiated, the Local AE proposes one presentation context to be used on that association. The presentation context proposed by the Worklist SCU AE defined in the table below.

Table 14: Proposed Presentation Contexts for (Real-World) Activity – Modality Worklist As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		

4.2.1.3.2.3 SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

Table 17 provides a description of the Intrasight Plus system Modality Worklist Request Identifier and specifies the attributes that are copied into the images. If Intrasight Plus receives a worklist entry with missing Type 1 tags or with tags that have invalid data, it ignores that worklist entry and does not save it in the list.
Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available).

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored.

4.2.1.3.2.3.1 Dataset Specific Conformance for Modality Worklist Information Model - FIND SOP Class C-FIND-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

The table below should be read as follows:

Attribute Name:	Attributes supported to build a Modality Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.
M:	Matching Keys for (automatic) Worklist Update.
R:	Return Keys. An “X” will indicate that Modality will supply this attribute as Return Key with zero length for Universal Matching.
Q:	Interactive Query Key. An “X” will indicate that this attribute as matching key can be used.
D:	Displayed Keys. An “X” indicates that this Worklist attribute is displayed to the user during a patient registration dialog.
IOD:	An “X” indicates that the value of this Worklist attribute will be used in the created Instances of this Performed Procedure Step.
Type of matching:	The following type of matching exists: Single Value Matching List of UID Matching Wild Card Matching Range Matching Sequence Matching Universal Matching

Table 15: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
SOP Common Module									
Specific Character Set	0008,0005	CS		X					
Patient Identification Module									
Other Patient IDs	0010,1000	LO		X					
Patient ID	0010,0020	LO	X	X	X	X	X	Single Value	
Patient's Name	0010,0010	PN	X	X	X	X	X	WildCard	
Issuer of Patient ID	0010,0021	Lo		X					
Patient Demographic Module									
Ethnic Group	0010,2160	SH		X					
Patient Comments	0010,4000	LT		X					
Patient's Birth Date	0010,0030	DA		X	X		X		
Patient's Sex	0010,0040	CS		X	X		X		
Patient's Size	0010,1020	DS		X					
Patient's Weight	0010,1030	DS		X		X			
Patient Medical Module									
Additional Patient History	0010,21B0	LT		X					
Allergies	0010,2110	LO		X		X			
Medical Alerts	0010,2000	LO		X		X			
Pregnancy Status	0010,21C0	US		X					
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Modality	0008,0060	CS	X	X		X		Single Value, Universal	May be set to either IVUS, XA, US or zero length (universal matching)
>Scheduled Performing Physician's Name	0040,0006	PN		X	X		X	Single Value	Copied to Performing Physician's Name.
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X		Copied to Request Attributes Code Sequence & Study Description.
>Scheduled Procedure Step ID	0040,0009	SH		X			X		Copied to Request Attributes Code Sequence.
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X		X		Single Value, Universal	Set to user specified date range: Today, 3 days, or All Dates (universal matching)
>Scheduled Procedure Step Start Time	0040,0003	TM		X					
>Scheduled Station AE Title	0040,0001	AE	X	X		X		Single Value, Universal	Set to either Intrasight Plus system AE Title or

									zero length (universal matching)
Requested Procedure Module									
Requested Procedure Description	0032,1060	LO		X		X			Copied to Study Description if SPS Description in not available
Requested Procedure ID	0040,1001	SH	X	X	X	X	X	Single Value	Copied to Request Attributes Code Sequence & Study ID
Study Instance UID	0020,000D	UI		X			X		
Referenced Study Sequence	0008,1110	SQ	X				X		Shall be absent when a procedure is unscheduled
Requested Procedure Code Sequence	0032,1064	SQ		X			X		Copied to Procedure Code Sequence.
Study Date	0008,0020	DA		X					
Study Time	0008,0030	TM		X					
Imaging Service Request Module									
Accession Number	0008,0050	SH	X	X	X	X	X	Single Value	
Referring Physician's Name	0008,0090	PN		X		X	X		
Visit Identification Module									
Institution Name	0008,0080	LO		X					
Institution Address	0008,0081	ST		X					
Visit Relationship Module									
Referenced Patient Sequence	0008,1120	SQ		X					

Note: Specific Character Set (0008,0005) is not sent in the query request with a value for Chinese character set (GB18030)

4.2.1.3.2.4 Patient Based Modality Worklist Query Attributes

The values for the attributes listed in below table may be entered in the Worklist dialog to facilitate Patient Based Modality Worklist queries. Corresponding values from the Patient Information dialog are copied into the query fields when the Worklist dialog is entered. Valid data must be entered in at least one Patient Based query field if universal matching is used for all Broad query parameters.

Table 16: Patient Based Query Attributes

Attribute Name	Tag	Description
Patient's Name	0010,0010	A wildcard "*" is appended to the end of each component of the structured Patient Name to facilitate matching with both structured and unstructured Patient Names
Patient ID	0010,0020	Single Value Matching only
Requested Procedure ID	0040,1001	Single Value Matching only
Accession Number	0008,0050	Single Value Matching only

4.2.1.3.2.5 Broad Modality Worklist Query Attributes

The attributes listed in table below may be configured in the Worklist dialog to facilitate Broad Modality Worklist queries. Changes made to these Broad query parameters persist between power cycles.

Table 17: Broad Query Attributes

Attribute Name	Tag	Description
Modality	0008,0060	May be configured to use either IVUS, XA, US, CT, MR or zero length (universal matching).
Scheduled Station AE Title	0040,0001	May be configured to use either Intrasight Plus system Local AE Title or zero length (universal matching). The Intrasight Plus system Worklist SCU AE Title is configured in the DICOM / Networking configuration dialog.
Scheduled Procedure Step Start Date	0040,0002	May be configured to use the following date ranges: - Today - 3 Days (yesterday, today and tomorrow) - All dates (universal matching)

Table 18: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The SCP has completed the matches. Worklist items are available for display.
Failure	A700	Out of resources	The Worklist items are not available for display in the UI and in the UI its displayed as as no records found try modifying the attribute(s) and search again and the Error status is logged in the application log.
	A900	Identifier does not match SOP class	The Worklist items are not available for display in the UI and in the UI its displayed as as no records found try modifying the attribute(s) and search again and the Error status is logged in the application log.
	C001	Unable to process	The Worklist items are not available for display in the UI and in the UI its displayed as as no records found try modifying the attribute(s) and search again and the Error status is logged in the application log.
	0122	SOP Class Not Supported	The Worklist items are not available for display in the UI and in the UI its displayed as as no records found try modifying the attribute(s) and search again and the Error status is logged in the application log.
Cancel	FE00	Matching terminated due to cancel request	The query may be cancelled by the user, or due to the maximum number of Worklist results being exceeded. Worklist items received prior to the cancel are available for display and further processing. The Association is closed and the Worklist query is marked as incomplete. The status is logged.
Pending	FF00	Matching is continuing	The Worklist item contained in the Identifier is collected for later display or further processing.

Service Status	Error Code	Further Meaning	Behavior
	FF01	Matching is continuing – Current match is supplied and any optional keys were supported in the same matter as required keys	The Worklist item contained in the Identifier is collected for display or further processing. The status meaning is logged only once for each C-FIND operation

4.2.1.3.3 (Real-World) Activity – Storage as SCU (Image Export)

4.2.1.3.3.1 Description and Sequencing of Activities

The Image Export real-world activity will cause the Local AE to open an association with the current selected remote storage server. The default network storage node is selected in DIOCM configuration settings. Archive dialog provide a mechanism to send to any other network node configured other than the default network node. In the Intrasight Plus system Archive page, the user can select one or more images (Studies) for transfer to a single DICOM Storage destination. A separate association is opened for each Study/Series transferred. If the Study/Series contains multiple images, then multiple C-STORE requests will be issued over the same association and it also opens a new association for each image.

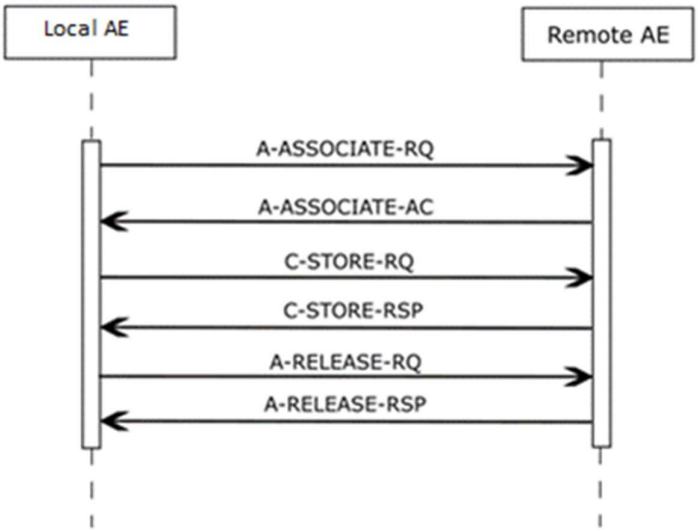

Figure 6: Real World Activity – Storage as SCU (Image Export)

4.2.1.3.3.2 Proposed Presentation Contexts

Each time an association is initiated, the Local AE proposes one presentation contexts to be used on that association. The presentation context proposed by the Local AE is defined in below table.

Table 19: Proposed Presentation Contexts for (Real-World) Activity – Storage As SCU (Image Export)

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage*	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		JPEG Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.57		
		JPEG Lossless, Nonhierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70		
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Lossless, Nonhierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70		

*Note: Secondary Capture Image Storage SOP Class is proposed during an association request. It is used to store all manual and automatic screenshots as well as all series items for IFR, FFR, DD, QCA/VE.

4.2.1.3.3.3 SOP Specific Conformance for Storage SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

4.2.1.3.3.3.1 Dataset Specific Conformance C-STORE-RQ

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 20: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	Continue without user notification
Error	A7xx	Out of Resources	Failure message is displayed. The codes are only available in trace/merge files.
	A9xx	Data Set does not match SOP Class	Failure message is displayed. The codes are only available in trace/merge files.
	Cxxx	Cannot understand	Failure message is displayed. The codes are only available in trace/merge files.
	0210	Duplicate Invocation	Failure message is displayed. The codes are only available in trace/merge files
	0117	Invalid Object Instance	Failure message is displayed. The codes are only available in trace/merge files
	0212	Mistyped Argument	Failure message is displayed. The codes are only available in trace/merge files
Warning	0107	Attribute List Error	Failure message is displayed. The codes are only available in trace/merge files

Service Status	Error Code	Further Meaning	Behavior
	B000	Coercion of data elements	Failure message is displayed. The codes are only available in trace/merge files.
	B007	Data set does not match SOP class	Failure message is displayed. The codes are only available in trace/merge files.
	B006	Elements discarded	Failure message is displayed. The codes are only available in trace/merge files.

4.2.1.3.4 (Real-World) Activity – FIND as SCU

4.2.1.3.4.1 Description and Sequencing of Activities

Operator is not able to directly/stop query a remote database. The system automatically queries for a patient when the history tab is selected.
An example sequencing of Activities is presented in Figure 7 .

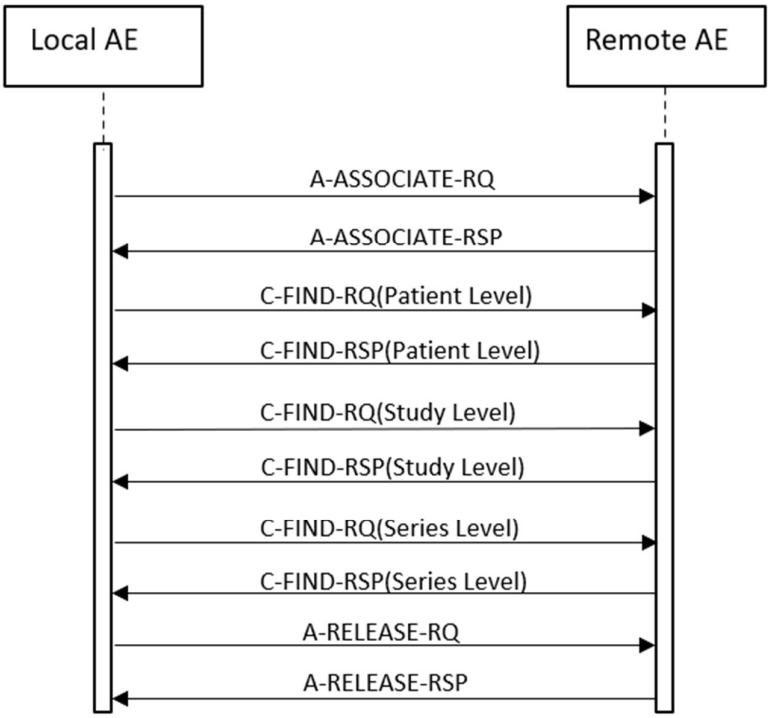

Figure 7: Data Flow Diagram – FIND as SCU

The clinical user may cancel the query to the Image Archive or Image Display. As a result, the System sends a C-FIND Cancel Request to the Image Archive or Image Display.

4.2.1.3.4.2 Proposed Presentation Contexts

Each time an association is initiated, the ACP AE proposes two presentation contexts to be used on that association. The presentation context proposed by the ACP AE for Find Remote Images is defined in Table 21.

Table 21: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

The implementation proposes each SOP Class only ones in the abstract syntax specifying all possible transfer syntaxes for that SOP Class. Due to the fact that the SCP has to react with a chosen transfer syntax, as the per SOP Class used transfer syntax is forced by the SCP.

4.2.1.3.4.3 SOP Specific Conformance for SOP Classes for Patient Root QR Information Model - FIND SOP Class

With the System one can query for Series of Images. Series of Images which have the same Study Instance UID (0020, 000D), Protocol Name (0018,1030), and Performing Physician's Name (0008,1050), will be presented as one query result. The System interprets this as one query result belonging to the same examination.

4.2.1.3.4.3.1 Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-SCU

In Table 22 the supported query keys for each query level are described. Universal matching is supported by default.

Table 22: Supported Query Keys for Patient Root Information Model

Patient Root Information Model				
Attribute Name	Tag	VR	Type Of Matching	Comment
Q/R Patient level				
Query/Retrieve Level	0008,0052	CS	SINGLE_VALUE	PATIENT,STUDY,SERIES
Specific Character Set	0008,0005	CS	SINGLE_VALUE	
Patient ID	0010,0020	LO	SINGLE_VALUE UNIVERSAL	
Patient's Name	0010,0010	PN	SINGLE_VALUE UNIVERSAL	
Q/R Study level				
Study Date	0008,0020	DA	SINGLE_VALUE UNIVERSAL	

Patient Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Study Time	0008,0030	TM	SINGLE_VALUE UNIVERSAL	
Accession Number	0008,0050	SH	SINGLE_VALUE UNIVERSAL	
Modalities in Study	0008,0061	CS	SINGLE_VALUE UNIVERSAL	
Referring Physician's Name	0008,0090	PN	SINGLE_VALUE UNIVERSAL	
Study Description	0008,1030	LO	SINGLE_VALUE UNIVERSAL	
Patient ID	0010,0020	LO	SINGLE_VALUE UNIVERSAL	
Study ID	0020,0010	SH	SINGLE_VALUE UNIVERSAL	
Study Instance UID	0020,000D	UI	SINGLE_VALUE UNIVERSAL	
Number Of Study Related Series	0020,1206	IS	SINGLE_VALUE UNIVERSAL	
Q/R Series level				
Series Date	0008,0021	DA	SINGLE_VALUE UNIVERSAL	
Series Time	0008,0031	TM	SINGLE_VALUE UNIVERSAL	
Modality	0008,0060	CS	SINGLE_VALUE UNIVERSAL	
Series Description	0008,103E	LO	SINGLE_VALUE UNIVERSAL	
Number Of Series Related Instances	0008,1050	PN	SINGLE_VALUE UNIVERSAL	
Study Instance UID	0020,000D	UI	SINGLE_VALUE UNIVERSAL	
Series Instance UID	0020,000E	UI	SINGLE_VALUE UNIVERSAL	
Series Number	0020,0011	IS	SINGLE_VALUE UNIVERSAL	
Number of Series Related Instances	0020,1209	IS	SINGLE_VALUE UNIVERSAL	
Performed Procedure Step Start Date	0040,0244	DA	SINGLE_VALUE UNIVERSAL	
Performed Procedure Step Start Time	0040,0245	TM	SINGLE_VALUE UNIVERSAL	

4.2.1.3.4.4 SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

The System provides standard conformance to this SOP class. The System AE does not generate queries containing optional keys and it does not generate relational queries.

4.2.1.3.4.4.1 Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

In table 23 the supported query keys for each query level are described. Universal matching is supported as default.

Table 23: Supported Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS	SINGLE_VALUE	STUDY, SERIES
Specific Character Set	0008,0005	CS	SINGLE_VALUE	
Q/R Study level				
Study Date	0008,0020	DA	SINGLE_VALUE UNIVERSAL	
Study Time	0008,0030	TM	SINGLE_VALUE UNIVERSAL	
Accession Number	0008,0050	SH	SINGLE_VALUE UNIVERSAL	
Modalities in Study	0008,0061	CS	SINGLE_VALUE UNIVERSAL	
Referring Physician's Name	0008,0090	PN	SINGLE_VALUE UNIVERSAL	
Patient's Name	0010,0010	PN	SINGLE_VALUE UNIVERSAL	
Study Description	0008,1030	LO	SINGLE_VALUE UNIVERSAL	
Patient ID	0010,0020	LO	SINGLE_VALUE UNIVERSAL	
Study ID	0020,0010	SH	SINGLE_VALUE UNIVERSAL	
Study Instance UID	0020,000D	UI	SINGLE_VALUE UNIVERSAL	
Number Of Study Related Series	0020,1206	IS	SINGLE_VALUE UNIVERSAL	
Study Description	0008,1030	LO	SINGLE_VALUE UNIVERSAL	
Number of Patient Related Studies	0020,1200	IS	SINGLE_VALUE	
Number of Patient Related Series	0020,1202	IS	SINGLE_VALUE	
Number of Patient Related Instances	0020,1204	IS	SINGLE_VALUE	
Number of Study Related Series	0020,1206	IS	SINGLE_VALUE	
Number of Study Related Instances	0020,1208	IS	SINGLE_VALUE	
Q/R Series level				
Series Date	0008,0021	DA	SINGLE_VALUE UNIVERSAL	

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Series Time	0008,0031	TM	SINGLE_VALUE UNIVERSAL	
Modality	0008,0060	CS	SINGLE_VALUE UNIVERSAL	
Series Description	0008,103E	LO	SINGLE_VALUE UNIVERSAL	
Number Of Series Related Instances	0008,1050	PN	SINGLE_VALUE UNIVERSAL	
Study Instance UID	0020,000D	UI	SINGLE_VALUE UNIVERSAL	
Series Instance UID	0020,000E	UI	SINGLE_VALUE UNIVERSAL	
Series Number	0020,0011	IS	SINGLE_VALUE UNIVERSAL	
Number of Series Related Instances	0020,1209	IS	SINGLE_VALUE UNIVERSAL	
Performed Procedure Step Start Date	0040,0244	DA	SINGLE_VALUE UNIVERSAL	
Performed Procedure Step Start Time	0040,0245	TM	SINGLE_VALUE UNIVERSAL	

The behavior of the System for status codes in C-FIND response is summarized in Table 24.

Table 24: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete - No final Identifier is supplied.	Stops with processing the C-Find Response(s) from the SCP. All results are displayed to the operator.
Refused	A700	Out of Resources	Stops with processing the C-Find Response(s) from the SCP. The reason is logged and the failure is reported to the user.
Failed	A900	Identifier Does Not Match SOP Class	Stops with processing the C-Find Response(s) from the SCP. The reason is logged and the failure is reported to the user.
	Cxxx	Unable to process	Stops with processing the C-Find Response(s) from the SCP. The reason is logged and the failure is reported to the user.
Cancel	FE00	Matching terminated due to Cancel Match request	Stops with processing the C-Find Response(s) from the SCP. Results already received up to that point are displayed to the operator.
Pending	FF00	Matches are continuing - Current Match is supported in the same manner as supplied and any Optional Keys were Required Keys.	Continues with processing of the C-Find Response(s) from the SCP

Service Status	Error Code	Further Meaning	Behavior
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier.	Continues with processing of the C-Find Response(s) from the SCP.
*	Any other status code	*	The association is aborted using A-ABORT. The reason is logged and the failure is reported to the user.

4.2.1.3.5 (Real-World) Activity – MOVE as SCU

4.2.1.3.5.1 Description and Sequencing of Activities

The request to move remote images is forwarded to the job queue. For each move job, one association towards the remote system is established, and C-MOVE requests are transmitted. Once the responses are received, the association is closed. An example of sequencing of activities is presented in Figure 8. C-MOVE requests are done on the series level.

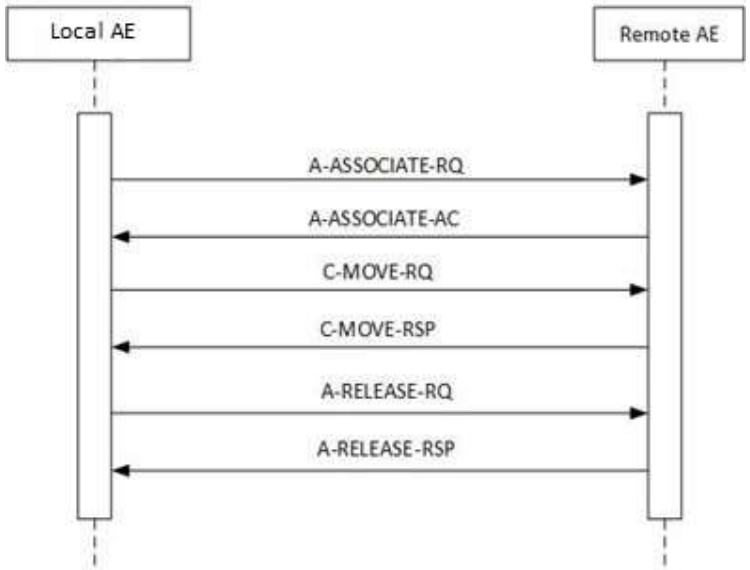

Figure 8: Sequencing of RWA Move Remote Images

The clinical user may cancel the move operation. As a result, the System Sends a C-MOVE Cancel Request to the Image Archive or Image Display.

4.2.1.3.5.2 Proposed Presentation Contexts

Each time an association is initiated, the ACP AE proposes two presentation contexts to be used on that association. The presentation context proposed by the ACP AE for Move Remote Images is defined in Table 25.

Table 25: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

The implementation proposes each SOP Class only ones in the abstract syntax specifying all possible transfer syntaxes for that SOP Class. Due to the fact that the SCP has to react with a chosen transfer syntax, the per SOP Class used transfer syntax is forced by the SCP

4.2.1.3.5.3 SOP Specific Conformance for SOP Classes

Selecting a query result can retrieve only whole examinations. It is not possible to retrieve information if Patient ID contains the sign "greater than" or "less than" (> or <).
A C-MOVE can be done with the keys presented in Table 26.

4.2.1.3.5.3.1 SOP Specific Conformance for Patient/Study Root QR Information Model - MOVE SOP Class

The System provides standard conformance to this SOP class.

4.2.1.3.5.3.1.1 Dataset Specific Conformance for Patient/Study Root QR Information Model - MOVE SOP Class C-MOVE-SCU

The identifiers for C-MOVE as SCU are listed in the Table 26.

Table 26: Identifiers for MOVE Patient/Study Root Information Model as SCU

Patient/Study Root Information Model			
Attribute Name	Tag	VR	Comment
Query/Retrieve Level	0008,0052	CS	Applied value: SERIES
Q/R Series level			
Patient ID	0010,0020	LO	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	

The DICOM C-MOVE Patient/Study Root Information Model Command Status Response Handling is shown in the Table 27.

Table 27: Status response for Patient/Study Root Information Model C-MOVE-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations Complete – No Failures	The move job is marked as completed. The association is released. Success is logged.
Refused	A701	Out of Resources – Unable to calculate number of matches	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A702	Out of Resources – Unable to perform sub operations	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A801	Move Destination Unknown	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Failed	A900	Identifier Does Not Match SOP Class	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	Cxxx	Unable to process	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as cancelled. The association is released. The reason is logged and reported to the user.
Warning	B000	Sub-operations Complete – One or more Failures	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
*	Any other status code	*	The association is aborted using A-ABORT. The reason is logged and the failure is reported to the user.

4.2.1.3.6 (Real-World) Activity – Print Management as SCU

4.2.1.3.6.1 Description and Sequencing of Activities

The operator can select images and request them to be printed on a printer (out of choice list of configured printers). Each request is forwarded to the job queue and processed as individual request to Print Images. The print job consists of data describing the images and graphics to be printed as well as the requested layout and other parameters. One print job on Intrasight Plus may result in a number of film sessions with the printer equal to the number of printed film sheets. Each film sheet within the print job is internally processed, converted to a STANDARD/1, 1 page and then an association towards the remote Print Server is established and the page image is sent to that Print Server. Once the transmission of the film sheet is completed, the association is closed. A sequence of interactions between the Intrasight Plus and a remote AE to print one film sheet is presented in Figure 9.

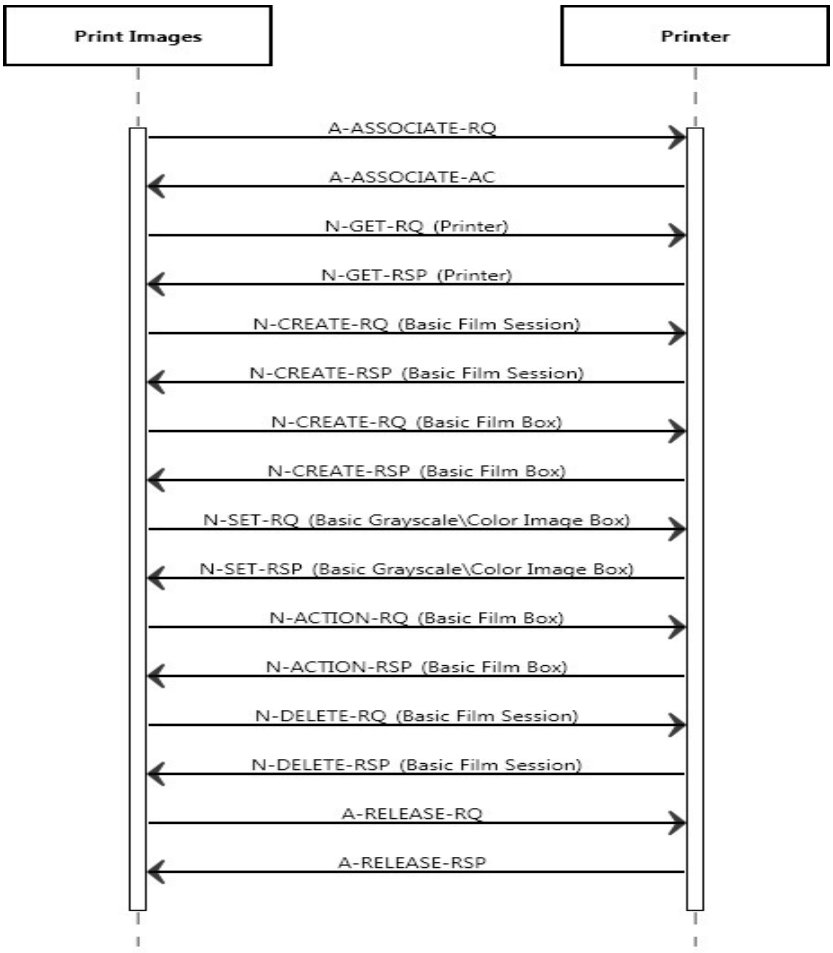

Figure 9: Sequencing of RWA Print Images

The following implementation remarks are important to achieve successful printing:

- Each film session will be in a single association with one or more film boxes and one or more film sheets
- The number of images per Film Box is one. The images to be printed on one film are rendered by the Intrasight Plus into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image). A rough indication is 20 Mbytes. One should take this into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).
- The Intrasight Plus will request for releasing the association when the print command is given (i.e. the N-ACTION Request). The association is not kept open for receiving N-EVENT-REPORTs of the Printer SOP Class.

Table 28: The Applied Order of Print Service Elements

Service Element of SOP Class	Description
N-GET of the Printer SOP Class	Purpose is to retrieve printer information.
N-CREATE of the Basic Film Session SOP Class	Specifies the DICOM Printer about some general presentation parameters, applicable for all films in the Film Session. Applied attributes are: Number of Copies, Print Priority, Medium Type, Film Destination
N-CREATE of the Basic Film Box SOP Class	Specifies the DICOM Printer about some general presentation parameters, applicable for all images in the Film Box. Applied attributes are: Film Orientation, Film Size ID, Magnification Type, Max. Density, Configuration Information, Trim.
N-SET of the Basic Grayscale Image Box SOP Class	Images to be printed. Applied attributes are: Polarity
N-ACTION of the Basic Film Box SOP Class	Triggers the DICOM Printer to print. This actual print action is done at film box level. No attributes are present.

Table 29: Media Services

Service Element of SOP Class	Description
N-EVENT-REPORT of the Printer SOP Class	When N-EVENT-REPORT is received, no printer status polling on a separate connection is executed.

4.2.1.3.6.2 Proposed Presentation Contexts

Each time an association is initiated, the Intrasight Plus proposes presentation contexts to be used on that association. The presentation contexts proposed by the Intrasight Plus for Print Images is defined in Table 30.

The implementation proposes the SOP Class only ones in the abstract syntax specifying all possible transfer syntaxes for that SOP Class. Due to the fact that the SCP has to react with a chosen transfer syntax, as per SOP Class used transfer syntax is forced by the SCP.

Table 30: Proposed Presentation Contexts for (Real-World) Activity – Print Management as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.6.3 SOP Specific Conformance for Basic Grayscale Print Management Meta SOP Class

The Intrasight Plus provides standard conformance to the Basic Grayscale Print Management Meta SOP Class. A description and the applied optional (i.e. non-mandatory attributes as Print SCU) attributes in these Service Elements are specified as well .Note that the Service Elements order is not specified by the DICOM standard. Intrasight Plus sends the N-DELETE request for the film session. Overlay, annotation (showing the values of some major identifying attributes) and shutter information is processed in the images sent to the printer, all the processing including annotations will be part of the image.

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their Corresponding behavior.

4.2.1.3.6.3.1 SOP Specific Conformance for Basic Film Session SOP Class for Basic Grayscale Print Meta

4.2.1.3.6.3.1.1 Dataset Specific Conformance for Basic Film Session SOP Class for Basic Grayscale Print Meta N-CREATE-SCU

Table 31: N-CREATE-RQ Dataset Specification

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Copies	2000,0010	IS	Between 1 and 100	ALWAYS	USER	
Print Priority	2000,0020	CS	MED	ALWAYS	AUTO	
Medium Type	2000,0030	CS	PAPER, BLUE FILM, CLEAR FILM	ALWAYS	USER	
Film Destination	2000,0040	CS	MAGAZINE, PROCESSOR	ALWAYS	AUTO	
Film Session Label	2000,0050	LO	Human readable label that identifies the film session	ANAP	AUTO	

The details regarding the response behavior to status codes are provided in 32.

Table 32: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0116	Attribute value Out of Range	The print job ends and the warning is logged in the trace logs/Merge logs.
	B600	Memory allocation not B600 A Data Set is returned with valid attributes/values. supported	The print job ends and the warning is logged in the trace logs/Merge logs.

Service Status	Error Code	Further Meaning	Behavior
Failure	0106	Invalid attribute value	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.3.1.2 Dataset Specific Conformance for Basic Film Session SOP Class for Basic Grayscale Print Meta N-DELETE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 33: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed Successfully	The print job continues.
Failure	0112	No Such SOP Instance	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.3.2 SOP Specific Conformance for Basic Film Box SOP Class for Basic Grayscale Print Meta

4.2.1.3.6.3.2.1 Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 34: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed successfully	The SCU has successfully returned all matching information
Failure	C602	Failed: Unable to create Print Job SOP Instance; print queue is full	Print job is failed and reason is recorded in logs.
Warning	B603	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	Print job is completed and warning reason is recorded in logs.

4.2.1.3.6.3.2.2 Dataset Specific Conformance for Basic Film Box SOP Class for Basic Grayscale Print Meta N-CREATE-SCU

The behavior of the Intrasight Plus for status codes in an N-CREATE response is summarized in the table 35.

Table 35: N-CREATE-RQ Dataset Specification

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Display Format	2010,0010	ST	STANDARD\1,1			
Workstation Format	2010,0010	ST	STANDARD\C,R, CUSTOM\i	ANAP	AUTO	
Film Orientation	2010,0040	CS	PORTRAIT, LANDSCAPE	ANAP	USER	
Film Size ID	2010,0050	CS	DICOM specifies a number of Defined Terms; more values are possible and is print configuration	ANAP	USER	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
			dependent.			
Border Density	2010,0100	CS	BLACK			
Magnification Type	2010,0060	CS	Normally sent out, however sometimes send out empty Because some DICOM printers are not able to handle (Value NONE for) this attribute. Applied value(s): NONE	ANAP	AUTO	
Max Density	2010,0130	US	Maximum density of the images on the film, expressed in hundredths of OD. If Max Density is higher than maximum printer density than Max Density is set to maximum printer density.	ANAP	AUTO	
Trim	2010,0140	CS	NO	ANAP	AUTO	
Configuration Information	2010,0150	ST	Contains a vendor specific Lookup- table (LUT); should be applied by the DICOM printer if LUT data is present.	ANAP	AUTO	
Illumination	2010,015E	US		ANAP		
Reflected Ambient Light	2010,0160	US		ANAP		
Referenced Film Session Sequence	2010,0500	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS		
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS		
Referenced Presentation LUT Sequence	2050,0500	SQ		ANAP	AUTO	

The details regarding the response behavior to status codes are provided in Table 36.

Table 36: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0116	Any warning	The print job continues and the warning is logged.
	B605	Requested Min Density or Max Density outside of printer's operating range.	The print job continues and the warning is logged in the trace logs/Merge logs.

Service Status	Error Code	Further Meaning	Behavior
Failure	C616	There is an existing film box that has not been printed and N-ACTION at the film session level is not supported.	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.3.3 SOP Specific Conformance for Basic Grayscale Image Box SOP Class for Basic Grayscale Print Meta

4.2.1.3.6.3.3.1 Dataset Specific Conformance for Basic Grayscale Image Box SOP Class for Basic Grayscale Print Meta N- SET-SCU

This application entity supports the attributes described in the Table 37.

Table 37: N-SET-RQ Dataset Specification

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS		
SOP Instance UID	0008,0018	UI		ALWAYS		
Image Box Position	2020,0010	US	1	ANAP	AUTO	
Polarity	2020,0020	CS	NORMAL	ANAP	AUTO	
Basic Grayscale Image Sequence	2020,0110	SQ		ANAP		
>Samples Per Pixel	0028,0002	US	1	ANAP	AUTO	
>Photometric Interpretation	0028,0004	CS	MONOCHROME2	ANAP	AUTO	
>Rows	0028,0010	US	Depending on the selected printer type and film size.	ANAP	AUTO	
>Columns	0028,0011	US	Depending on the selected printer type and film size.	ANAP	AUTO	
>Pixel Aspect Ratio	0028,0034	IS		ANAP		
>Bits Allocated	0028,0100	US	8 or 16	ANAP	AUTO	
>Bits Stored	0028,0101	US	8 or 12	ANAP	AUTO	
>High Bit	0028,0102	US	7 or 11	ANAP	AUTO	
>Pixel Representation	0028,0103	US	0X0000	ANAP	AUTO	
>Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	
Image Box Position	2020,0010	US		ALWAYS	AUTO	
Polarity	2020,0020	CS		ALWAYS	AUTO	
Basic Grayscale Image Sequence	2020,0110	SQ		ALWAYS	AUTO	

The details regarding the response behavior to status codes are provided in Table 38.

Table 38: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0107	Any warning	The print job continues, and the warning is logged.
	B60A	Image size or combined print Image Size is larger than the Image Box size.	The print job continues and the warning is logged in the trace logs/Merge logs.
	B609	Image size is larger than image box size, the image has been cropped to fit.	The print job continues and the warning is logged in the trace logs/Merge logs.
	B604	Image size is larger than image box size, the image has been demagnified.	The print job ends, and the warning is logged in the trace logs/Merge logs.
	B605	Requested Min Destiny or Max Destiny Outside of printer's operating range.	The print job continues and the warning is logged in the trace logs/Merge logs.
Failure	C603	Image Size is larger than the Image Box Size	The print job ends, and the warning is logged in the trace logs/Merge logs.
	C605	Insufficient memory in the printer to store the image	The print job ends, and the warning is logged in the trace logs/Merge logs.
	C613	Combined print Image Size is larger than the Image Box Size	The print job ends, and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.3.4 SOP Specific Conformance for Printer SOP Class for Basic Grayscale Print Meta

4.2.1.3.6.3.4.1 Dataset Specific Conformance for Printer SOP Class for Basic Grayscale Print Meta N-GET-SCU

This application entity supports the attributes described in the Table 39.

Table 39: N-GET-RQ Dataset Specification.

Attribute Name	Tag	VR		Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI			ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI			ALWAYS	AUTO	
Printer Status	2110,0010	CS			ANAP	AUTO	
Printer Status Info	2110,0020	CS			ANAP	AUTO	
Print Priority	2000,0020	CS			ALWAYS	AUTO	
Execution Status	2100,0020	CS			ALWAYS	AUTO	
Execution Status Info	2100,0030	CS			ALWAYS	AUTO	

4.2.1.3.6.3.4.2 Dataset Specific Conformance for Printer SOP Class for Basic Grayscale Print Meta N-EVENT-REPORT-SCP

This application entity supports the attributes described in the next table.

Table 40: N-EVENT-REPORT-RSP Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Printer Status	2110,0010	CS		ANAP	AUTO	
Printer Status Info	2110,0020	CS		ANAP	AUTO	

4.2.1.3.6.4 SOP Specific Conformance for Basic Color Print Management Meta SOP Class

The Intrasight Plus provides standard conformance to the Basic Color Print Management Meta SOP Class. A description and the applied optional (i.e. non-mandatory attributes as Print SCU) attributes in these Service Elements are specified as well. Note that the
Service Elements order is not specified by the DICOM standard. Intrasight Plus sends the N-DELETE request for the film session.
Overlay, annotation (showing the values of some major identifying attributes) and shutter information is processed in the images sent to the printer, all the processing including annotations will be part of the image.

4.2.1.3.6.4.1 SOP Specific Conformance for Basic Film Session SOP Class for Basic Color Print Meta

4.2.1.3.6.4.1.1 Dataset Specific Conformance for Basic Film Session SOP Class for Basic Color Print Meta N-CREATE-SCU

This application entity supports the attributes described in the Table 41.

Table 41: N-CREATE-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Copies	2000,0010	IS	Between 1 and 100	ALWAYS	USER	
Print Priority	2000,0020	CS	MED	ALWAYS	AUTO	
Medium Type	2000,0030	CS	PAPER, BLUE FILM, CLEAR FILM	ALWAYS	USER	
Film Destination	2000,0040	CS	MAGAZINE, PROCESSOR	ALWAYS	AUTO	
Film Session Label	2000,0050	LO	Human readable label that identifies the film session	ANAP	AUTO	

The details regarding the response behavior to status codes are provided in the Table 42.

Table 42: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0107	Any warning	The print job continues and the warning is logged.
	0116	Attribute value Out of Range	The print job ends and the warning is logged in the trace logs/Merge logs.
	B600	Memory allocation not Supported	The print job ends and the warning is logged in the trace logs/Merge logs.

Service Status	Error Code	Further Meaning	Behavior
Error	0106	Invalid attribute value	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.4.1.2 Dataset Specific Conformance for Basic Film Session SOP Class for Basic Color Print Meta N-DELETE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 43: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed successfully	The print job continues.
Failure	0112	No such SOP Instance	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.4.2 SOP Specific Conformance for Basic Film Box SOP Class for Basic Color Print Meta

4.2.1.3.6.4.2.1 Dataset Specific Conformance for Basic Film Box SOP Class for Basic Color Print Meta N-CREATE-SCU

The behavior of the Intrasight Plus for status codes in an N-CREATE response is summarized in Table 44.

Table 44: N-CREATE-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Workstation Format	2010,0010	ST	STANDARD\C, R, CUSTOM\i	ALWAYS	AUTO	
Film Orientation	2010,0040	CS	PORTRAIT, LANDSCAPE	ALWAYS	USER	
Film Size ID	2010,0050	CS	DICOM specifies a number of Defined Terms; more values are possible and is print configuration dependent.	ALWAYS	USER	
Magnification Type	2010,0060	CS	Normally sent out, however sometimes send out empty Because some DICOM printers are not able to handle (Value NONE for) this attribute. Applied value(s): NONE	ALWAYS	AUTO	
Max Density	2010,0130	US	Maximum density of the images on the film,	ALWAYS	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
			expressed in hundredths of OD. If Max Density is higher than maximum printer density than Max Density is set to maximum printer density.			
Trim	2010,0140	CS	NO	ALWAYS	AUTO	
Configuration Information	2010,0150	ST	Contains a vendor specific Lookup-table (LUT); should be applied by the DICOM printer if LUT data is present.	ALWAYS	AUTO	
Reflected Ambient Light	2010,0160	US		VNAP		
Referenced Film Session Sequence	2010,0500	SQ	Parent Film Session	ALWAYS	AUTO	
>Referenced SOP Class UID	0008,1150	UI	1.2.840.10008.5.1.1.1	ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI	UID of Parent Film Session	ALWAYS	AUTO	
Referenced Image Box Sequence	2010,0510	SQ		ALWAYS		
Referenced Basic Annotation Box Sequence	2010,0520	SQ		VNAP		
Referenced Presentation LUT Sequence	2050,0500	SQ		VNAP		

The details regarding the response behavior to status codes are provided in the table 45.

Table 45: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0107	Any warning	The print job continues and the warning is logged.
	B605	Requested Min Destiny or Max Destiny Outside of printer's operating range	The print job continues and the warning is logged in the trace logs/Merge logs.
Failure	C616	There is an existing film box that has not been printed and N-ACTION at the film session level is not supported.	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.4.2.2 Dataset Specific Conformance for Basic Film Box SOP Class for Basic Color Print Meta N-ACTION-SCU

The behavior of the Intrasight Plus for status codes in an N-ACTION response is summarized in the table 46.

Table 46: N-ACTION-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	

4.2.1.3.6.4.3 SOP Specific Conformance for Basic Color Image Box SOP Class for Basic Color Print Meta

4.2.1.3.6.4.3.1 Dataset Specific Conformance for Basic Color Image Box SOP Class for Basic Color Print Meta N-SET-SCU

This application entity supports the attributes described in the Table 47.

Table 47: N-SET-RQ Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Image Box Position	2020,0010	US		ANAP	AUTO	
Polarity	2020,0020	CS		ANAP	AUTO	
Samples Per Pixel	0028,0002	US		ANAP	AUTO	
Photometric Interpretation	0028,0004	CS		ANAP	AUTO	
Rows	0028,0010	US		ANAP	AUTO	
Columns	0028,0011	US		ANAP	AUTO	
Pixel Aspect Ratio	0028,0034	IS		ANAP	AUTO	
Bits Allocated	0028,0100	US		ANAP	AUTO	
Bits Stored	0028,0101	US		ANAP	AUTO	
High Bit	0028,0102	US		ANAP	AUTO	
Pixel Representation	0028,0103	US		ANAP	AUTO	
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

The details regarding the response behavior to status codes are provided in the Table 48.

Table 48: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	0107	Any warning	The print job continues and the warning is logged.
	B604	Image size is larger than	The print job ends and the warning is logged in

Service Status	Error Code	Further Meaning	Behavior
		image box size, the image has been demagnified.	the trace logs/Merge logs.
	B609	Image size is larger than image box size, the image has been cropped to fit.	The print job continues and the warning is logged in the trace logs/Merge logs.
	B60A	Image size or combined print Image Size is larger than the Image Box size.	The print job continues and the warning is logged in the trace logs/Merge logs.
Failure	C613	Combined print Image Size is larger than the Image Box Size.	The print job ends and the warning is logged in the trace logs/Merge logs.
	C605	Insufficient memory in the printer to store the image	The print job ends and the warning is logged in the trace logs/Merge logs.
	C603	Image Size is larger than the Image Box Size	The print job ends and the warning is logged in the trace logs/Merge logs.

4.2.1.3.6.4.4 SOP Specific Conformance for Basic Color Image Box SOP Class for Basic Color Print Meta

4.2.1.3.6.4.4.1 Dataset Specific Conformance for Printer SOP Class for Basic Color Print Meta N-EVENT-REPORT-SCP

This application entity supports the attributes described in the Table 49.

Table 49: N-EVENT-REPORT-RSP Dataset Specification.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	

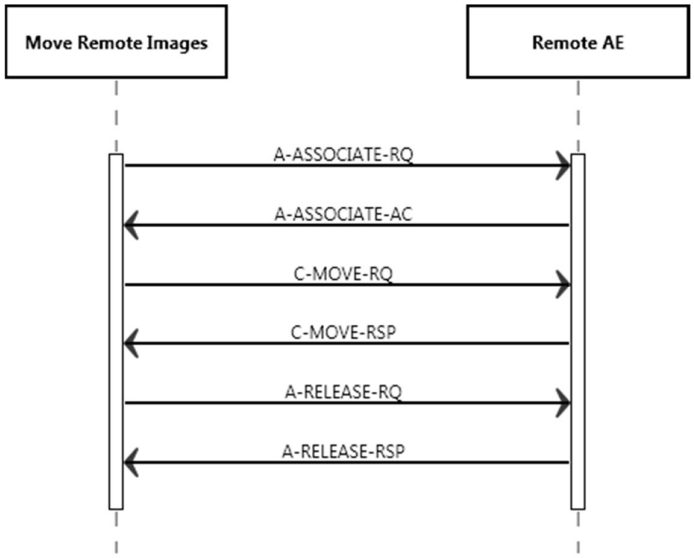

Figure 10: Sequencing of RWA

The clinical user may cancel the move operation. As a result, the Intrasight Plus Sends a C-MOVE Cancel Request to the PACS or Workstation.

4.2.1.4. Association Acceptance Policy

The Local AE shall accept associations from systems that wish to store images in the System database using the C-STORE command.

Table 50: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1-rejected-permanent	1-DICOM UL service-user	1-no-reason-given	Log entry
		2-application-context-name-not-supported	Log entry
		3-calling-AE-title-not-recognized	Log entry
		7-called- AE-title-not-recognized	Log entry
	2-DICOM UL service-provider (ACSE related function)	1-no-reason-given	Log entry
		2-no-reason-given	Log entry
	3-DICOM UL service-provider (Presentation related function)	1-temporary-congestion	Log entry
		2-local-limit-exceeded	Log entry
2-rejected-transient	1-DICOM UL service-user	1-no-reason-given	Log entry
		2-application-context-name-not-supported	Log entry
		3-calling-AE-title-not-recognized	Log entry
		7-called- AE-title-not-recognized	Log entry
	2-DICOM UL service-provider (ACSE related function)	1-no-reason-given	Log entry
		2-no-reason-given	Log entry
	3-DICOM UL service-provider (Presentation related function)	1-temporary-congestion	Log entry
		2-local-limit-exceeded	Log entry

The behavior of the Intrasight Plus during Abort Handling is summarized in Table 59.

Table 51: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 – DICOM UL service-user	0 – reason-not-specified	Log entry
2 – DICOM UL service-provider	0 – reason-not-specified	Log entry
	1 – unrecognized-PDU	Log entry
	2 – unexpected-PDU	Log entry
	4 – unrecognized-PDU-parameter	Log entry
	5 – unexpected-PDU-parameter	Log entry
	6 – invalid-PDU-parameter-value	Log entry

4.2.1.4.1 (Real-World) Activity – Image Import

4.2.1.4.1.1 Description and Sequencing of Activities

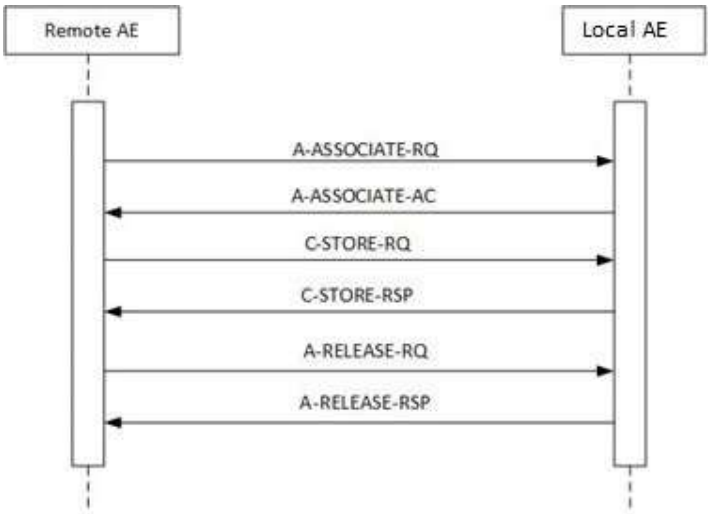

Figure 11: (Real World) Activity - Image Import.

When the same DICOM Object is exported to the Store SCP twice without any changes in the object, it will replace the existing study and the storage status is shown in the job viewer.

when SUT imports patient data which contains an illegal value for SOP Instance UID (prefix a numeric component with 0)., SUT is able to store the object.

4.2.1.4.1.2 Accepted Presentation Contexts

The presentation contexts are defined in the Table 52.

Table 52: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		Hierarchical, First-Order Prediction (Process 14),	1.2.840.10008.1.2.4.70		
		JPEG Lossless, Nonhierarchical (Processes 14	1.2.840.10008.1.2.4.57		
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		

The Local AE accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that the Local AE accepts multiple Proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes. There is no check for duplicate contexts and are therefore accepted.

4.2.1.4.1.3 SOP Specific Conformance for Storage SOP Classes

The LOCAL AE provides standard conformance to the error handling of image import. All error messages occur in a C-STORE response. It provides level 2 (full) conformance.

4.2.1.4.1.3.1 Dataset Specific Conformance for C-STORE-RSP

The behavior of the LOCAL AE for status codes in a C-STORE response is summarized in Table 53.

Table 53: Storage C-STORE Response Status Handling Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The images shall be stored in the System local database. Success shall be logged.
Refused	A700-A7FF	Out of Resources	The System local database is full – recovery from this condition is left to the SCU. The LOCAL AE shall send a notification, and abort the association. The failure reason is logged.
Error	A900	Data Set does not match SOP Class	SOP class of the image(s) does not match the negotiated abstract syntax. The LOCAL AE shall send a notification and abort the association. The failure reason is logged.
	C000	Cannot Understand	The image(s) cannot be parsed. The LOCAL AE shall send a notification and abort the association.

Service Status	Error Code	Further Meaning	Behavior
			The failure reason is logged.
Warning	B000	Coercion of Data Elements	The association is aborted using A-ABORT and the send job is marked as failed. The failure reason is logged.
	B006	Elements discarded	The association is aborted using A-ABORT and the send job is marked as failed. The failure reason is logged.
	B007	Data set does not match SOP class	The association is aborted using A-ABORT and the send job is marked as failed. The failure reason is logged.

4.2.1.4.1.4 Import limitations

The LOCAL AE has the following import limitations:

- Images with a non-square pixel matrix (e.g. 800x700) are ignored
- Images with a photometric interpretation other than monochrome (e.g RGB) are rejected.

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

Standard representations of IEEE 802.3 10BaseT/100BaseT (“twisted pair”) are supported.

The TCP/IP Stack as supported by the underlying Operating System.
The API is the WinSock 2 interface as supported by the underlying Operating System.

4.3.2. Communication Profiles

All Intrasight Plus system application entities utilize the DICOM 3.0 TCP/IP communication support as defined in PS3.8 (Part 8) of the DICOM 3.0 Standard.

4.3.3. TCP/IP Stack Supported

The TCP/IP protocol is used.

4.3.4. Additional Protocols

Not Applicable.

4.4. Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration are addressed in this section.

4.4.1. AE Title/Presentation Address Mapping

The Intrasight Plus system AE Title and networking parameters are configurable in DICOM/Network Configuration menu.

4.4.1.1. Local AE Titles

The local AE title mapping and configuration are specified as:

Table 54: AE Title configuration table

Application Entity	Default AE Title	Default TCP/IP Port
Local AE	Configurable	NA

4.4.1.2. Remote AE Title/Presentation Address Mapping

Every storage server device that the Intrasight Plus system is setup to communicate with has a set of parameters that are configurable in Intrasight Plus system DICOM/Network Configuration menu.

4.4.2. Parameters

The specification of important operational parameters, their default value and range (if configurable) are specified here.

Table 55: Configuration Parameters Table

Parameter	Configurable	Default Value
Remote Systems		
AE title	Yes	
Port number	Yes	
IP host name/address	Yes	
Network timeout	Yes	60
Quality	Yes	Medium
US Modality	Yes	Not checked Sets Modality (0008, 0060) attribute to US when checked. Otherwise set to IVUS. Also will remove all IVUS specific tags
Modality Worklist		
AE title	Yes	
Port number	Yes	
IP host name/address	Yes	
Network timeout	Yes	60
Default Modality	Yes	US
Auto query scheduled date	Yes	All dates
Scheduled-this system only	Yes	Not Selected
Max SPS results	Yes	500

Table 56: Compression Settings

Compression Setting	Photometric Interpretation	Transfer Syntax	Compression Ratio (approx.)
No Compression	PALETTE COLOR or RGB	ILE / ELE	NA
JPEG Medium Quality (Low Compression)	YBR_FULL_422	JPEG Baseline (Process 1)	9:1
JPEG Low Quality (High Compression)	YBR_FULL_422	JPEG Baseline (Process 1)	30:1

5. Media Interchange

5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

The Intrasight Plus system is a device that generates Intravascular Ultrasound images and FM images and more that can be saved to

DVD Optical Media: DVD-R (SL): 4.7 GB, DVD-R DL: 8.5 GB, DVD+R (SL): 4.7 GB, DVD+R DL: 8.5 GB, DVD: 4.7 GB and DVD: 4.7 GB media using DICOM standard protocols and definitions.
USB with bit locker.
The applications described refer to the Intrasight Plus system DICOM off-line media storage implementation acting as FSC for the specific application profiles and the related SOP Class instances.

When optical media is configured as primary archiving destination, the transferred studies are marked as Archived and are subject to automatic deletion.

5.1.1. Application Data Flow Diagram

The diagram in Figure 12 represents the relationship between the Intrasight Plus system's real-world activities (circles on the left), the local AE's built into Intrasight Plus system (boxes in the center), and the DICOM Exchange Media that the Intrasight Plus system creates.

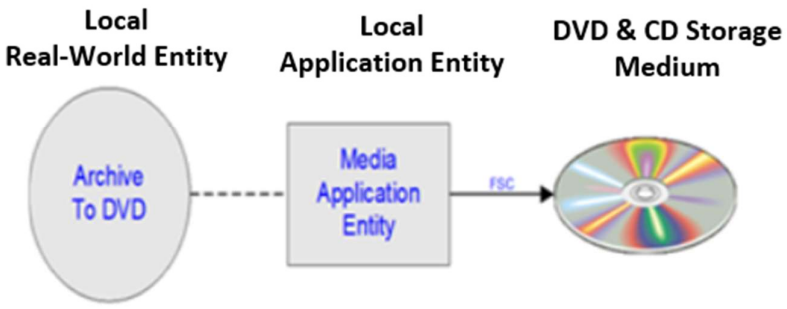

Figure 12: Media Interchange

5.1.2. Functional Definitions of AE's

This section contains the functional definition of each individual local Media Application Entity.

5.1.3. Sequencing of Real World Activities

Multiple cases may be archived to DVD Exchange Media at a time. The operator must insert a new (blank) DVD media before invocation of the "Archive to DVD" function. If no DVD media is available the Optical media option should be enabled in PSC, the inserted media is not DVD\Blu-ray, or the media is not blank, the export job cannot be started.

After the media has been created, an optional (configurable) verification step may be performed to ensure that data was successfully written to the media.

The Intrasight Plus system implementation information written to the File Meta Header in each file is:

Table 57: DICOM Implementation Class and Version Name

Implementation Class UID	1.3.46.670589.59.1.6.0.0
Implementation Version Name	IS 6.0.0

5.2. AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

5.2.1. Media - Specification

The Intrasight Plus system Media Application Entity provides standard conformance to the DICOM Media Storage Service and File Format Class (PS 3.10) and the Media Storage Application Profile (PS 3.11).

The Intrasight Plus system Media Application Entity supports the Application Profiles listed in below table.

Table 58: Application Profiles, Activities, and Roles

Supported Application Profile	Identifier	Real-World Activities	Roles
General Purpose DVD Interchange with JPEG (STD-GEN-DVD and STD-GEN-DVD-JPEG)	STD-GEN-DVD	Create File-set	FSC
		Read File-set	FSR
		Update File-set	FSU
General Purpose USB Media Interchange with JPEG(STD-GEN-USB-JPEG)	STD-GEN-USB-JPEG	Create File-set	FSC
		Read File-set	FSR
		Update File-set	FSU
General Purpose CD Media Interchange	STD-GEN-CD	Create File-set	FSC
		Read File-set	FSR
		Update File-set	FSU

The Intrasight Plus system DVD Media AE supports the IOD'S, SOP classes and Transfer Syntaxes listed in below table.

Table 59: Supported IODS, SOP Classes and Transfer Syntaxes

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
DICOM Media Storage Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1
Ultrasound Multi-Frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless, Nonhierarchical, First-Order Prediction	1.2.840.10008.1.2.4.57
		JPEG Lossless, Nonhierarchical (Processes 14)	1.2.840.10008.1.2.4.70

5.2.1.1. File Meta Information for the media

Table below denotes the DICOM file meta attributes included in the DICOMDIR and Ultrasound Image and secondary capture objects (DICOM Part 10 files) that are created by the Intrasight Plus system. These attribute are stored in addition to the attributes listed in Table 113: Intrasight Plus Extended and Private Elements for US-MF SOP instances.

Table 60: DICOM Part 10 File Meta Information

Attribute Name	Tag	Notes
File Preamble	NA	All bytes are set to 00H
DICOM Prefix	N/A	Set to DICOM Prefix "DICM"

Attribute Name	Tag	Notes
File Meta Information Group Length	(0002,0000)	
File Meta Information Version	(0002,0001)	Set to 0001H
Media Storage SOP Class UID	(0002,0002)	1.2.840.10008.1.3.10
Media Storage SOP Instance UID	(0002,0003)	Intrasight Plus system generated UID
Transfer Syntax UID	(0002,0010)	Set to Explicit VR Little Endian 1.2.840.10008.1.2.1
Implementation Class UID	(0002,0012)	Set to "1.3.46.670589.59.1.6.0.0"
Implementation Version Name	(0002,0013)	Set to " IS 6.0.0 "

Table 61: DICOMDIR Attributes

Attribute Name	Tag	Type	Notes
File Set ID	0004,1130	2	
Offset of the First Directory Record of the Root Directory Entity	0004,1200	1	
Offset of the Last Directory Record of the Root Directory Entity	0004,1202	1	
File Set Consistency Flag	0004,1212	1	
Directory Record Sequence	0004,1220	2	
>Offset of the Next Directory Record	0004,1400	1	
>Record In-use Flag	0004,1410	1	
>Offset of Referenced Lower-Level Directory Entity	0004,1420	1	
>Directory Record Type	0004,1430	1	
>Referenced File ID	0004,1500	1C	
>Referenced SOP Class UID in File	0004,1510	1C	
>Referenced Transfer Syntax UID in File	0004,1512	1C	
Patient Keys			
Patient's Name	0010,0010	2	
Patient ID	0010,0020	1	
Patient Birth Date	0010,0030	3	
Patient Sex	0010,0040	3	
Study Keys			
Study Date	0008,0020	1	
Study Time	0008,0030	1	
Accession Number	0008,0050	2	
Study Description	0008,1030	2	
Study Instance UID	0020,000D	1C	
Study ID	0020,0010	1	
Series Keys			
Modality	0008,0060	1	
Series Instance UID	0020,000E	1	
Series Number	0020,0011	1	
Series Description	0008,103E	3	
Body Part Examined	0018,0015	3	
Protocol Name	0018,1030	3	
Image Keys			
Instance Number	0020,0013	1	
Image Type	0008,0008	3	

Attribute Name	Tag	Type	Notes
Instance Creation Date	0008,0012	3	
Instance Creation Time	0008,0013	3	
SOP Class UID	0008,0016	3	
SOP Instance UID	0008,0018	3	
Acquisition Date	0008,0022	3	
Acquisition Time	0008,0032	3	
Acquisition Number	0020,0012	3	
Rows	0028,0010	3	
Columns	0028,0011	3	

5.2.1.2. Real-World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

5.2.1.2.1 RWA - Create File-set

Create File set real-world activity occurs when the user selects a study in the Intrasight Plus system Archive menu and then initiates the Archive to DVD function. Multiple cases may be archived to a single DVD media at one time. The Intrasight Plus system's Media AE will act as a FSC using the Interchange option when storing images and data to DVD media.

5.2.1.2.1.1 Media Storage Application Profile

The Local AE supports the RWA - Create File-SET for the STD-GEN-CD and STD-GEN-DVD-JPEG , STD-GEN-USB-JPEG Application Profiles.

5.2.1.2.1.2 Application Profile Specific Conformance

There are no extensions or specializations.

5.2.1.2.2 RWA - Read File-set

The Media AE supports the FSR (File Set Reader) role to interchange stored data on DICOM media. (Display Directory and Read Image).

Display Directory:

When a database open action is initiated on the media then the Media AE acts as an FSR using the interchange option to read the DICOMDIR of the medium.
The Intrasight Plus will act as a FSR when reading the directory (DICOMDIR) of the medium. This allows the System Integrator to see the results in an overview of the patients, studies, series presentation states and images.

The Intrasight Plus will not access DICOM media when either:

- Patient ID is absent; or
- Study Instance UID has no value; or
- Series Instance UID has no value.

Read Images

The Intrasight Plus Media AE will act as a FSR when reading all images of the selected Examinations from DICOM media. Only images made on a Philips Intrasight Plus will be imported again; these imported images are to be used for reference only, it is not intended to export them again. Images without the Philips private attributes are not imported.

5.2.1.2.2.1 Media Storage Application Profile

The Local AE supports the RWA - Create File-SET for the STD-GEN-CD and STD-GEN-DVD-JPEG , STD-GEN-USB-JPEG Application Profiles.

5.2.1.2.2.1.1 Options

Display Directory

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series, and Image.

Read Image

The mandatory attributes of the DICOM images are required for the successfully storage of the images in the Intrasight Plus internal image database. For conformance see section 8.

5.2.1.2.3 RWA - Update File-set

This Media Application Entity supports the File-set Updater functionality (FSU) for USB only.

The Media AE supports the FSU role to interchange stored data on DICOM media (Write Image).

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series and Image.

When the medium contains a DICOM file-set then the Media AE acts as a FSU. Thus it can merge new objects into the existing file-set or can remove objects from that file-set.

5.2.1.2.3.1 Media Storage Application Profile

The Local AE supports the RWA - Create File-SET for the STD-GEN-CD and STD-GEN-DVD-JPEG , STD-GEN-USB-JPEG , STD-GEN-BD-JPEG Application Profiles.

The Media AE will act as a FSC or FSU when writing all images of the selected Examinations onto the DICOM media.

The Intrasight Plus Media AE will act as a FSC when writing all images of the selected Examinations to DICOM media. All Images made on an Intrasight Plus can be exported. This results in writing the patients, studies, series and images on the Intrasight Plus to the DICOM medium.

5.2.1.2.3.1.1 Options

The mandatory DICOM attributes are verified before accepting imported SOP instances.

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

Implementation remarks and restriction:

- When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
  - Patient ID;
  - Study ID;
  - Study Instance UID;
  - Series Number;
  - Series Instance UID;
  - Image Number;

- SOP Instance UID.

- The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.

5.3. Augmented and Private Application Profiles

Not applicable.

5.4. Media Configuration

The compression type used for DVD image storage can be configured through the System/DICOM/Archive menu or manually when user selects data for archiving..

- US Modality – Sets Modality (0008, 0060) attribute to US when checked. Otherwise set to IVUS for IVUS Modality or set to HD for FFR/IFR Modality.

6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 62: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
Japanese	ISO_IR 13	-	ISO-IR 14	G0	JIS X 0201: Romaji
		-	ISO-IR 13	G1	JIS X 0201: Katakana
	ISO 2022 IR 87	ESC 02/04 04/02	ISO-IR 87	G0	JIS X 0208: Kanji and Hiranga
	ISO_IR 159 (does not exist, keep for legacy)	-	ISO-IR 159	G0	JIS X 0212: Kanji
GB18030	GB18030	-	-	-	-

7. Security

7.1. Security Profiles

If configured Intrasight Plus System supports the following security measures:
Secure transport using TLS 1.0,
Secure transport using TLS 1.1,
Secure transport using TLS 1.2.

7.1.1. Security use Profiles

Not Applicable.

7.1.2. Security Transport Connection Profiles

Intrasight Plus supports BCP 195 TLS Secure Transport Connection Profile.

Table 63: Secure Transport Connections Profiles

Profile	Secured AE	Sender	Receiver
BCP195 TLS Secure Transport Connection	ALL	Y	Y

The System supports X.509 certificates. The following TLS Certification checks will be done (TLS Handshake).
The machine (either server or client) that will send its certificate will:

- Choose the certificate according to Common Name (CN) value in the Subject-field.
- This name is case-sensitive. All present certificates should have unique CN names.

The server verifies:

- That the client certificate is a X.509 certificate which is not tampered with
- That the client certificate is in the list of trusted certificates
- That the client certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
- That the client certificate has the correct purpose (at least the Client Authentication purpose)

The client verifies:

- That the server certificate is a X.509 certificate which is not tampered with
- That the server certificate is in the list of trusted certificates
- That the server certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
- That the server certificate has the correct purpose (at least Server Authentication purpose)

No verification is done on:

- Revocation of certificates
- Limiting the connection to a limited set of IP-addresses

Node authentication with or without encryption is only possible when both nodes have:

- An access to their own private keys
- An access to a copy of the certificate of the other node containing its public key

The System can only read certificates from the certificate stores of the HKEY_LOCAL_MACHINE registry key. It is the responsibility of the Hospital to setup and maintain the certificate stores. This includes the removal of revoked certificates and certificate updates prior to their expiration. Since neither X.500 directories, Lightweight Directory Access Protocol (LDAP) nor Certificate Revocation Lists (CRLs) are supported, the whole certificate chain needs to be replaced after a security breach.

The following figure 14 presents the message flow of TLS handshake supported.

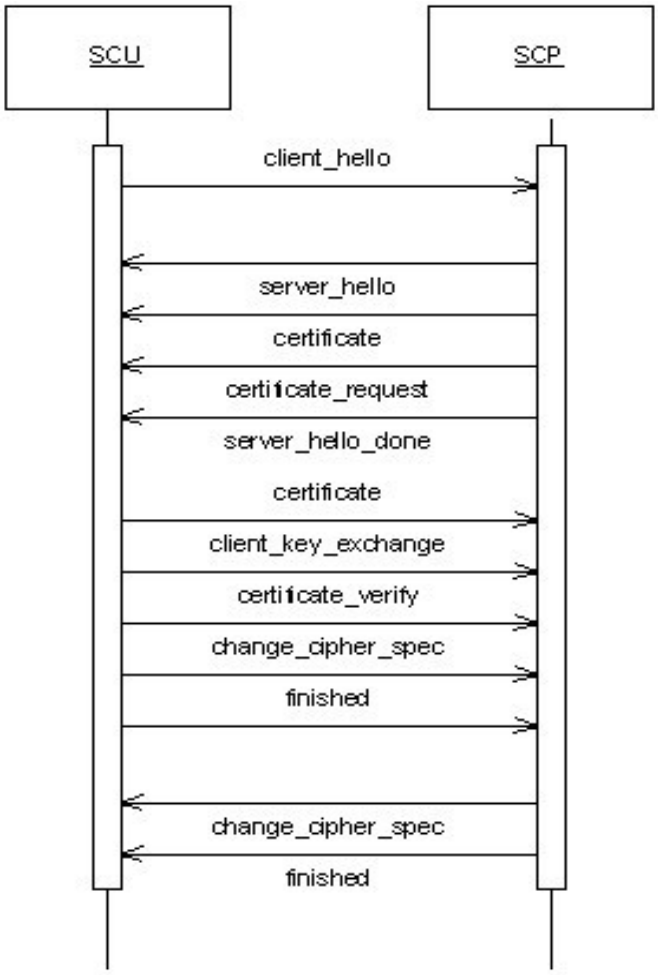

Figure 13: Message flow of TLS handshake

Secure communication is a "mode of operation" supported by the implementation of the DICOM Basic TLS Secure Transport Connection Profile [DICOM]. This functionality will be used by the nodes, which can authenticate each other before they exchange DICOM information. For secure communication the TLS protocol v1.0,1.1 &1.2 is used which provides message authentication, integrity, confidentiality, and replay protection. Confidentiality is optional and can be controlled by the encryption settings. The System may communicate using the following Cipher Suites:

Table 64: Secure Transport Connections and Cipher Suites

Profile	Cipher Suite
BCP 195 TLS Secure Transport Connection	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256

Profile	Cipher Suite
	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 TLS_DHE_RSA_WITH_AES_256_GCM_SHA384 TLS_DHE_RSA_WITH_AES_128_GCM_SHA256 TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384 TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA TLS_RSA_WITH_AES_256_GCM_SHA384 TLS_RSA_WITH_AES_128_GCM_SHA256 TLS_RSA_WITH_AES_256_CBC_SHA256 TLS_RSA_WITH_AES_128_CBC_SHA256 TLS_RSA_WITH_AES_256_CBC_SHA TLS_RSA_WITH_AES_128_CBC_SHA TLS_DHE_RSA_WITH_AES_256_CBC_SHA TLS_DHE_RSA_WITH_AES_128_CBC_SHA

Note: Below attributes of type 3 are not removed in the de-identified object

- (0008,1030) Study Description
- (0008,1050) Performing Physician's Name
- (0010,1000) Other Patient IDs
- (0010,1020) Patient's Size
- (0010,1030) Patient's Weight
- (0010,2000) Medical Alerts
- (0010,2110) Allergies
- (0010,2160) Ethnic Group
- (0010,21B0) Additional Patient History
- (0010,4000) Patient Comments
- (0040,0254) Performed Procedure Step Description
- (0040,0275) Request Attributes Sequence
- Series Description (0008,103E)
- Performed Procedure Step Start Date (0040,0244)
- Performed Procedure Step Start Time (0040,0245)
- Performed Procedure Step End Date (0040,0250)
- Performed Procedure Step End Time (0040,0251)
- Performed Procedure Step Description (0040,0254)
- Request Attributes Sequence (0040,0275)
- Institutional Departmental Name (0008,1040)
- Image Comments (0020,4000)
- Derivation Description (0008,2111)

  - Timezone Offset from UTC (0008,0201)
- Private attributes are retained in de-identification mode because they are necessary for the Intrasight system to reconstruct the original pixel information when imported back into the original system.
- The attributes “Deidentification Method Code Sequence (0012,0064)" or “Deidentification Method (0012,0063)" is not added to the De-identified object.
- The File Meta information such as Application Entity Titles, Presentation Addresses, implementation information, and private information are retained with original values.

7.1.3. Digital Signature Profiles

Not Applicable.

7.1.4. Media Storage Security Profiles

Not Applicable.

7.1.5. Attribute Confidentiality Profiles

Intrasight Plus conforms to the Basic Application Level Confidentiality Profile as de-identifier.
Below Table lists the protected attributes. The terms used to describe the replacement value can be read as follows:
Empty: The attribute will have a value of zero length.

Table 65: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	Replacement Value
SOP Instance UID	0008,0016	Generate and provide a new ID
Accession Number	0008,0050	Empty
Institution Name	0008,0080	Empty
Referring Physician’s Name	0008,0090	Empty
Station Name	0008,1010	Empty
Institutional Department Name	0008,1040	Empty
Performing Physicians’ Name	0008,1050	Empty
Referenced SOP Instance UID	0008,1155	Generate and provide a new ID
Patient’s Name	0010,0010	Assign user-specified value
Patient ID	0010,0020	Generate and provide a new ID
Patient’s Birth Date	0010,0030	Empty
Patient’s Sex	0010,0040	Empty
Patient’s Size	0010,1020	Value set to 0
Patient’s Weight	0010,1030	Value set to 0
Ethnic Group	0010,2160	Empty
Additional Patient’s History	0010,21B0	Empty
Patient Comments	0010,4000	Empty
Device Serial Number	0018,1000	Empty
Study Instance UID	0020,000D	Generate and provide a new ID
Series Instance UID	0020,000E	Generate and provide a new ID
Study ID	0020,0010	Make Empty

7.1.6. Network Address Management Profiles

Not Applicable.

7.1.7. Time Synchronization Profiles

System conforms to the IHE Consistent Time Profile. It is possible to synchronize time with the NTP Timeserver using Service Application. The NTP Timeserver is an element of Hospital Infrastructure.

7.1.8. Application Configuration Management Profiles

Not Applicable.

7.1.9. Audit Trail Profiles

The System can create audit messages according to the IHE Basic Security Integration Profile [IHE] to audit activities as actor secure node to detect non-compliant behavior in the enterprise, and to facilitate detection of improper creation, access, modification and deletion of Protected Health Information (PHI).

These messages may contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository according to the Syslog protocol [SYSLOG]:

Audit Event Trigger	Description	Audit message
User Authentication Event	Administrative actions create, modify, delete, query, and display	User Authentication
Query Information	A query has been initiated from SUT to a remote node.	Query
PHI-export	Any export of PHI to media.	Export
PHI-import	Any import of PHI from media.	Import
Instances-deleted	SOP Instances are deleted from a specific study. One event covers all instances deleted for the particular study.	DICOM Study Deleted
Security Alert	When software, security or networking configuration of the system is changed via the field service functionality.	Security Alert
Actor-start-stop	When SUT is started or is closed.	Application Activity
Audit Log Used	Generated when used clicks on the Audit log on the SUT.	Audit Log Used
Begin Transferring DICOM Instances	When C-Store operation is performed Begin Transferring DICOM Instances message is displayed.	Begin Transferring DICOM Instances
DICOM Instances Accessed	When the patient is created DICOM Instances Accessed message will be displayed.	DICOM Instances Accessed
Instances-Stored	Storage of SOP instances to a remote repository has been completed.	DICOM Instances Transferred
Patient-record-event	Patient record created, modified, or accessed.	Patient Record

If the central Audit Record Repository is not available, the audit trail record will be stored by the System *in* a local buffer. Once the central Audit Record Repository is available again, the content of that buffer will be transferred to the central Audit Record Repository. The time that is part of the audit message will be the local

time of the System. This time will be synchronized with a Time Server. The Time Server and central Audit Record Repository are elements of the Hospital infrastructure.

7.2. Association Level Security

Not Applicable.

7.3. Application Level Security

Not Applicable.

8. Annexes of application " Intrasight Plus "

8.1. IOD Contents

8.1.1. Created SOP Instance

This section specifies each IOD created by this application.
This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:

ALWAYS	The module is always present
CONDITIONAL	The module is used under specified condition

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
VNAP	The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	The attribute is present under specified condition – if present then it will always have a Value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard-coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

8.1.1.1. List of created SOP Classes

Table 66: List of created SOP Classes

SOP Class Name	SOP Class UID
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1

8.1.1.2. Ultrasound Multi-Frame Image Storage SOP Class

Table 67: IOD of Created Ultrasound Multi-frame Image Storage SOP Class

Information Entity	Module	Presence
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS

Information Entity	Module	Presence
Equipment	General Equipment Module	ALWAYS
Acquisition	General Acquisition Module	ALWAYS
Image	General Image Module	ALWAYS
	General Reference Module	CONDITIONAL
	Image Pixel Module	ALWAYS
	Cine Module	ALWAYS
	Multi-Frame Module	ALWAYS
	US Region Calibration Module	ALWAYS
	US Image Module	ALWAYS
	Synchronization Module	CONDITIONAL
	Frame Pointers Module	CONDITIONAL
	SOP Common Module	ALWAYS

Table 68: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER\MWL	-
Patient ID	0010,0020	LO		VNAP	ALWAYS	-
Patient's Birth Date	0010,0030	DA		VNAP	USER\MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER\MWL	-
Patient Comments	0010,4000	LT		ANAP	USER\MWL	-

Table 69: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	-
Study Time	0008,0030	TM		VNAP	AUTO	-
Accession Number	0008,0050	SH		VNAP	USER/MWL	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL	-
Study Description	0008,1030	LO		ANAP	USER/MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		VNAP	USER/MWL	-

Table 70: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	-
Series Time	0008,0031	TM		ANAP	AUTO	-
Modality	0008,0060	CS	IVUS	ALWAYS	AUTO	Value is US when checked. Otherwise set to IVUS.
Series Description	0008,103	LO		ANAP	USER/MWL	-
Performing Physicians' Name	0008,1050	PN		ANAP	USER/MWL	-
Operators' Name	0008,1070	PN		ANAP	AUTO	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	-
Performed Procedure Step End Date	0040,0250	DA		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-

Table 71: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	FIXED	-
Institution Name	0008,0080	LO		ANAP	USER	-
Station Name	0008,1010	SH		ANAP	USER	-
Manufacturer's Model Name	0008,1090	LO	IntraSight Plus	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ANAP	AUTO	-
Software Versions	0018,1020	LO	6.0.x.y	ALWAYS	AUTO	Where x and y are software build Number

Table 72: General Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAP	AUTO	-
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	-
Acquisition Time	0008,0032	TM		ANAP	AUTO	-

Table 73: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP	AUTO	These values change based on transfer syntax and save frames Value 1: Set to ORIGINAL for original uncompressed images. Set to DERIVED if image has been lossy Compressed. Value 2: Set to PRIMARY for images that were acquired during the case. Set to SECONDARY for images that have been created after the

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
						initial case ended (E.g. Retrieved and edited). Value 3: Always set to INTRAVASCULAR Value 4: Constructed as a modality bit map to describe the IVUS imaging sub modality: 0001 = Grayscale (2D Imaging) 0101 = ChromaFlo (2D Imaging with Color Power Mode) 0201 = VH (2D Imaging with Tissue Characterization)
Content Date	0008,0023	DA		VNAP	AUTO	-
Content Time	0008,0033	TM		VNAP	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Patient Orientation	0020,0020	CS		ANAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	USER/MWL	-
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	-
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	-
Lossy Image Compression Method	0028,2114	CS		ANAP	AUTO	-

Table 74: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	-
>Referenced SOP Class UID	0008,1150	DT		ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	TM		ALWAYS	AUTO	-
Derivation Description	0008,2111	ST		ANAP	AUTO	-

Table 75: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	Refer to table 64 for the value
Planar Configuration	0028,0006	US		ALWAYS	AUTO	Set to 0 = color-by-pixel
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Bits Stored	0028,0101	US	8	ALWAYS	AUTO	
High Bit	0028,0102	US	7	ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 76: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Start Trim	0008,2142	IS		ANAP	AUTO	-
Stop Trim	0008,2143	IS		ANAP	AUTO	-
Recommended Display Frame Rate	0008,2144	IS		ANAP	AUTO	-
Cine Rate	0018,0040	IS		ANAP	AUTO	-
Frame Time Vector	0018,1065	DS		ALWAYS	AUTO	-

Table 77: Multi-frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ALWAYS	AUTO	-
Frame Increment Pointer	0028,0009	AT	00181065	ALWAYS	AUTO	-

Table 78: US Region Calibration Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Sequence of Ultrasound Regions	0018,6011	SQ		ALWAYS	AUTO	-
> Region Spatial Format	0018,6012	US	1	ALWAYS	AUTO	-
> Region Data Type	0018,6014	US	1	ALWAYS	AUTO	-
>Region Flags	0018,6016	UL	2	ALWAYS	AUTO	-
> Region Location Min X0	0018,6018	UL	0	ALWAYS	AUTO	-
> Region Location Min Y0	0018,601A	UL	0	ALWAYS	AUTO	-
> Region Location Max X1	0018,601C	UL	511	ALWAYS	AUTO	-
> Region Location Max Y1	0018,601E	UL	511	ALWAYS	AUTO	-
> Physical Units X Direction	0018,6024	UL	3	ALWAYS	AUTO	-
>Physical	0018,6026	UL	3	ALWAYS	AUTO	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Units Y Direction						
>Physical Delta X	0018,602C	UL	0.00275590551181102	ALWAYS	AUTO	-
>Physical Delta Y	0018,602E	UL	0.00275590551181102	ALWAYS	AUTO	-

Table 79: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		VNAP	AUTO	These values change based on transfer syntax and save frames Value 1: Set to ORIGINAL for original uncompressed images. Set to DERIVED if image has been lossy compressed. Value 2: Set to PRIMARY for images that were acquired during the case. Set to SECONDARY for images that have been created after the initial case ended (E.g. Retrieved and edited). Value 3: Always set to INTRAVASCULAR Value 4: Constructed as a modality bit map to describe the IVUS imaging sub modality: 0001 = Grayscale (2D Imaging) 0101 = ChromaFlo (2D Imaging with Color Power Mode) 0201 = VH (2D Imaging with Tissue Characterization)
Transducer Data	0018,5010	LO		ANAP	AUTO	Catheter name, model and Serial number
Depth of Scan Field	0018,5050	IS		ANAP	AUTO	Set to 1/2 the grayscale image diameter
Transducer Type	0018,6031	CS	IV_PHASED	ANAP	AUTO	Set to IV_PHASED for IVUS phased array catheters or IV_ROT XTAL for single crystal rotational catheters
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	Refer to Table 64 for value.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Planar Configuration	0028,0006	US		ALWAYS	AUTO	-
Frame Increment Pointer	0028,0009	AT	00181065	ALWAYS	AUTO	-
Ultrasound Color Data Present	0028,0014	US		ANAP	AUTO	Set to 1 for ChromaFlo Images, otherwise 0
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		ALWAYS	AUTO	-
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	-
IVUS Acquisition	0018,3100	CS		ANAP	AUTO	Set to MOTOR_PULLBACK, MANUAL_PULLBACK for Video Loops, or SELECTIVE for still images. Only included if Modality (0008, 0060) is IVUS.

Table 80: Frame Pointers Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Numbers of Interest (FOI)	0028,6020	US		ANAP	AUTO	Below tags are included if bookmarks are used, Frame of interest type if set to “BOOKMARK”
Frame of Interest Description	0028,6022	LO		ANAP	AUTO	-
Frame of Interest Type	0028,6023	CS		ANAP	AUTO	-

Table 81: Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Synchronization Trigger	0018,106A	PN	NO TRIGGER	ALWAYS	AUTO	-
Acquisition Time Synchronized	0018,1800	CS	N	ALWAYS	AUTO	-
Synchronization Frame of Reference UID	0020,0200	UI	1.3.46.670589.59	ALWAYS	AUTO	-

Table 82: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	COPY	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	-
Instance Creation Time	0008,0013	TM		ANAP	AUTO	-
Instance Number	0020,0013	IS		ANAP	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.3.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Time zone Offset From UTC	0008,0201	SH		ANAP	AUTO	-

8.1.1.3. Secondary Capture Image Storage SOP Class

Table 83: IOD of Created Secondary Capture Image Storage SOP Class

Information Entity	Module	Presence
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
	SC Equipment Module	ALWAYS
Acquisition	General Acquisition Module	ALWAYS
Image	General Image Module	ALWAYS
	Image Pixel Module	ALWAYS
	SC Image Module	ALWAYS
	SOP Common Module	Always

Table 84: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER\MWL	-
Patient ID	0010,0020	LO		VNAP	ALWAYS	-
Patient's Birth Date	0010,0030	DA		VNAP	USER\MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER\MWL	-
Patient Comments	0010,4000	LT		ANAP	USER\MWL	-

Table 85: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	-
Study Time	0008,0030	TM		VNAP	AUTO	-
Accession Number	0008,0050	SH		VNAP	USER/MWL	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL	-
Study Description	0008,1030	LO		ANAP	USER/MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		VNAP	USER/MWL	-

Table 86: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	-
Series Time	0008,0031	TM		ANAP	AUTO	-
Modality	0008,0060	CS	HD	ALWAYS	AUTO	Can also be US if set on the system

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Description	0008,103	LO		ANAP	USER/MWL	-
Performing Physicians' Name	0008,1050	PN		ANAP	USER/MWL	-
Operators' Name	0008,1070	PN		ANAP	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	-
Performed Procedure Step End Date	0040,0250	DA		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-

Table 87: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	ALWAYS	FIXED	-
Institution Name	0008,0080	LO		ANAP	USER	-
Station Name	0008,1010	SH		ANAP	USER	-
Manufacturer's Model Name	0008,1090	LO	IntraSight Plus	ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ANAP	AUTO	-
Software Versions	0018,1020	LO	6.0.x.y	ALWAYS	AUTO	Where x and y are software build Number

Table 88: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	HD	ANAP	AUTO	Can be US also based on user input
Conversion Type	0008,0064	CS	DI	ALWAYS	AUTO	

Table 89: General Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAP	AUTO	-
Acquisition Time	0008,0032	TM		ANAP	AUTO	-

Table 90: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	ORIGINAL, PRIMARY	ANAP	AUTO	-
Content Date	0008,0023	DA		VNAP	AUTO	-
Content Time	0008,0033	TM		VNAP	AUTO	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Instance Number	0020,0013	IS		VNAP	AUTO	-
Patient Orientation	0020,0020	CS		ANAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	USER	-

Table 91: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	Refer to table 64 for the value
Planar Configuration	0028,0006	US		ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		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	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 92: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP	AUTO	-
Time of Secondary Capture	0018,1014	TM		ANAP	AUTO	-

Table 93: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	COPY	
Instance Creation Date	0008,0012	DA		ANAP	AUTO	-
Instance Creation Time	0008,0013	TM		ANAP	AUTO	-
Instance Number	0020,0013	IS		ANAP	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.7	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-
Time zone Offset From UTC	0008,0201	SH		ANAP	AUTO	-

8.1.1.4. X-Ray Angiographic Image Storage SOP Class

Table 94: SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS

Information Entity	Module	Presence
Image	General Image Module	ALWAYS
	General Reference Module	CONDITIONAL
	Image Pixel Module	ALWAYS
	Cine Module	ALWAYS
	Multi-Frame Module	ALWAYS
	Display Shutter Module	ALWAYS
	X-Ray Image Module	ALWAYS
	X-Ray Acquisition Module	ALWAYS
	XA Positioner Module	ALWAYS
	DX Detector Module	ALWAYS
	Modality LUT Module	CONDITIONAL
	VOI LUT Module	ALWAYS
	Curve Module	CONDITIONAL This is present only when ECG signals are present in the data
	SOP Common Module	ALWAYS

Table 95: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Patient Sequence	0008,1120	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
Patient's Name	0010,0010	PN		VNAP	MWL,USER	
Patient ID	0010,0020	LO		VNAP	MWL,USER	
Patient's Birth Date	0010,0030	DA		VNAP	MWL,USER	
Patient's Sex	0010,0040	CS		VNAP	MWL,USER	
Other Patient IDs	0010,1000	LO		ANAP	MWL,USER	
Ethnic Group	0010,2160	SH		ANAP	MWL,USER	
Patient Comments	0010,4000	LT		ANAP	MWL,USER	

Table 96: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	
Study Time	0008,0030	TM		VNAP	AUTO	
Accession Number	0008,0050	SH		VNAP	MWL	
Referring Physician's Name	0008,0090	PN	Patient's referring physician.	VNAP	MWL	
Study Description	0008,1030	LO	Based on configuration Study Description is:-not exported –based on	ANAP	AUTO,MWL	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
			schedule procedure step description(WLM) – based on requested procedure step description(WLM) – internal generated performed procedure description			
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL,AUTO	
>Code Value	0008,0100	SH		ALWAYS	MWL,AUTO	
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL,AUTO	
> Coding Scheme Version	0008,0103	SH		ALWAYS	MWL,AUTO	
>Code Meaning	0008,0104	LO		ALWAYS	MWL, AUTO	
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
Study Instance UID	0020,000D	UI		ALWAYS	MWL	
Study ID	0020,0010	SH		VNAP	MWL	In case Study ID is empty, accession number is used. If that is also empty then the system generates a value for it

Table 97: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Size	0010,1020	DS	In meters. When received from the MWL SCP, the value can still be modified.	ANAP	MWL,USER	
Patient's Weight	0010,1030	DS	In kilograms. When received from the MWL SCP, the value can still be modified.	ANAP	MWL,USER	
Medical Alerts	0010,2000	LO		ANAP	MWL	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Allergies	0010,2110	LO		ANAP	MWL	
Additional Patient History	0010,21B0	LT		ANAP	MWL	

Table 98: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAP	AUTO	
Series Time	0008,0031	TM		ANAP	AUTO	
Modality	0008,0060	CS	XA	ALWAYS	AUTO	
Series Description	0008,103E	LO		ANAP	AUTO	
Performing Physicians' Name	0008,1050	PN		ANAP	MWL, USER	
Operators' Name	0008,1070	PN		ANAP	MWL, USER	
Referenced Performed Procedure Step Sequence	0008,1111	SQ	Identifies the MPPS SOP Instance to which this image is related	ANAP	AUTO, MPPS	
>Referenced SOP Class UID	0008,1150	UI	MPPS SOP Class UID	ALWAYS	MWL	
>Referenced SOP Instance UID	0008,1155	UI	MPPS SOP Instance UID	ALWAYS	MWL	
Protocol Name	0018,1030	LO		ANAP	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Laterality	0020,0060	CS		EMPTY	AUTO	
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO,	
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO	
Performed Procedure Step End Date	0040,0250	DA		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	-
Performed Procedure Step ID	0040,0253	SH	Same as MPPS	ANAP	AUTO, USER	
Performed Procedure Step Description	0040,0254	LO	Same as MPPS	ANAP	AUTO, USER	
Request Attributes Sequence	0040,0275	SQ		ANAP	MWL	
>Accession Number	0008,0050	SH		ANAP	MWL	
>Issuer of Accession Number Sequence	0008,0051	SQ		ANAP	MWL	
>Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	
>>Referenced SOP Class	0008,1150	UI		ALWAYS	MWL	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
UID						
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MWL	
>Study Instance UID	0020,000D	UI		ANAP	MWL	
>Requested Procedure Description	0032,1060	LO		ANAP	MWL	
>Requested Procedure Code Sequence	0032,1064	SQ		ANAP	MWL	
>>Code Value	0008,0100	SH		ALWAYS	MWL	
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>>Code Meaning	0008,0104	LO		ALWAYS	MWL	
>>Context Identifier	0008,010F	CS		ANAP	MWL	
>>Context UID	0008,0117	UI		ANAP	MWL	
>Scheduled Procedure Step Description	0040,0007	LO		ANAP	MWL	
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL	
>>Code Value	0008,0100	SH		ALWAYS	MWL	
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>>Code Meaning	0008,0104	LO		ALWAYS	MWL	
>>Context Identifier	0008,010F	CS		ANAP	MWL	
>>Context UID	0008,0117	UI		ANAP	MWL	
>>Protocol Context Sequence	0040,0440	SQ		ANAP	MWL	
>>>Content Item Modifier Sequence	0040,0441	SQ		ANAP	MWL	
>>>>Value Type	0040,A040	CS		ALWAYS	MWL	
>>>>Concept Name Code Sequence	0040,A043	SQ		ALWAYS	MWL	
>>>>>Code Value	0008,0100	SH		ALWAYS	MWL	
>>>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>>>>>Code Meaning	0008,0104	LO		ALWAYS	MWL	
>>>Value Type	0040,A040	CS		ALWAYS	MWL	
>>>Concept Name Code Sequence	0040,A043	SQ		ALWAYS	MWL	
>>>>Code Value	0008,0100	SH		ALWAYS	MWL	
>>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>>>>Code Meaning	0008,0104	LO		ALWAYS	MWL	
>>>>Context Identifier	0008,010F	CS		ANAP	MWL	
>>>>Context UID	0008,0117	UI		ANAP	MWL	
>Scheduled Procedure Step ID	0040,0009	SH		ANAP	MWL	
>Reason for Requested	0040,100A	SQ		ANAP	MWL	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Procedure Code Sequence						
>>Code Value	0008,0100	SH		ALWAYS	MWL	
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL	
>>Code Meaning	0008,0104	LO		ALWAYS	MWL	
>>Context Identifier	0008,010F	CS		ANAP	MWL	
>>Context UID	0008,0117	UI		ANAP	MWL	
>Requested Procedure ID	0040,1001	SH		ALWAYS	MWL	

Table 99: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips	VNAP	AUTO	
Institution Name	0008,0080	LO		ANAP	AUTO	
Station Name	0008,1010	SH		ANAP	AUTO	
Institutional Department Name	0008,1040	LO		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO	IntraSight Plus	ANAP	AUTO	
Device Serial Number	0018,1000	LO		ANAP	AUTO	
Software Versions	0018,1020	LO	6.0.x.y	ANAP	AUTO	Where x and y are software build Number

Table 100: General Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	

Table 101: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Applied value(s):ORIGINAL or DERIVED(if subtraction has been processed into the image) Value 2: PRIMARY	ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
			Value 3: SINGLE PLANE (if the image is a single plane acquisition) BIPLANE A (if the image is the first plane of a Bi-plane acquisition) BIPLANE B (if the image is the second plane of a Bi-plane acquisition) Value 4: SINGLE A (if the image is derived from plane A of a biplane image and sent as a SINGLE PLANE image) SINGLE B (if the image is derived from plane B of a biplane image and sent as a SINGLE PLANE image)			
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	
Content Time	0008,0033	TM		ANAP	AUTO	
Irradiation Event UID	0008,3010	UI		ANAP	AUTO	
Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
Derivation Description	0008,2111	ST		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	AUTO	
Lossy Image	0028,2110	CS	00	ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Compression						

Table 102: General reference module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Description	0008,2111	ST		VNAP	AUTO	
Source Image Sequence	0008,2112	SQ		ANAP	AUTO	
> Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	Documentation of source images for derived images. This will be present only for Derived images.
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
>Referenced Frame Number	0008,1160	IS		ALWAYS	AUTO	

Table 103: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2: Upon import, only images with a photometric interpretation MONOCHROME1 or MONOCHROME2 are accepted.	ALWAYS	AUTO	
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		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	0000H	ALWAYS	AUTO	
Pixel Data	7FE0,0010	OW/OB		ANAP	AUTO	

Table 104: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Recommended Display Frame Rate	0008,2144	IS		ANAP	AUTO	
Cine Rate	0018,0040	IS		ANAP	AUTO	
Frame Time Vector	0018,1065	DS		ANAP	AUTO	
Frame Time	0018,1063	DS		ANAP	AUTO	Either frame time

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
						vector or Frame time will be present
Frame Delay	0018,1066	DS		ANAP	AUTO	

Table 105: Multi-Frame Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Number of Frames	0028,0008	IS		ALWAYS	AUTO	
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO	

Table 106: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Shape	0018,1600	CS	RECTANGULAR	ALWAYS	AUTO	
Shutter Left Vertical Edge	0018,1602	IS		ALWAYS	AUTO	
Shutter Right Vertical Edge	0018,1604	IS		ALWAYS	AUTO	
Shutter Upper Horizontal Edge	0018,1606	IS		ALWAYS	AUTO	
Shutter Lower Horizontal Edge	0018,1608	IS		ALWAYS	AUTO	

Table 107: X-Ray Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	AUTO	
Scan Options	0018,0022	CS		ANAP	AUTO	ROTA
Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2 Upon import, only images with a photometric interpretation MONOCHROME1 or MONOCHROME2 are accepted.	ALWAYS	AUTO	
Frame Increment Pointer	0028,0009	AT		ALWAYS	AUTO	
Bits Allocated	0028,0100	US	8 or 16 Note: For Snapshot function, this number is 8	ALWAYS	AUTO	
Bits Stored	0028,0101	US	8 or 12 Note: For Snapshot function, this number is 8	ALWAYS	AUTO	
High Bit	0028,0102	US	7	ALWAYS	AUTO	
Pixel Representation	0028,0103	US	0000H	ALWAYS	AUTO	
Pixel Intensity Relationship	0028,1040	CS		ALWAYS	AUTO	

Table 108: X-Ray Acquisition Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
KVP	0018,0060	DS		ALWAYS	AUTO	
Exposure Time	0018,1150	IS	Only sent if Exposure (0018, 1152) is not sent.	ANAP	AUTO	
X-Ray Tube Current	0018,1151	IS	Only sent if Exposure (0018, 1152) is not sent.	ANAP	AUTO	
Average Pulse Width	0018,1154	DS		ANAP	AUTO	
Exposure	0018,1152	IS	Only sent if Exposure Time (0018, 1150) and X-Ray Tube Current (0018, 1151) are not sent.	ANAP	AUTO	
Radiation Setting	0018,1155	CS		ALWAYS	AUTO	
Imager Pixel Spacing	0018,1164	DS		ANAP	AUTO	
X-Ray Tube Current in µA	0018,8151	DS		ANAP	AUTO	

Table 109: XA Positioner Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Distance Source to Detector	0018,1110	DS		ALWAYS	AUTO	
Distance Source to Patient	0018,1111	DS		ALWAYS	AUTO	
Positioner Primary Angle	0018,1510	DS		ALWAYS	AUTO	
Positioner Secondary Angle	0018,1511	DS		ALWAYS	AUTO	
Positioner Primary Angle Increment	0018,1520	DS	An array that contains the Positioner Primary Angle Increments between the n-th frame and the previous frame for a Multi-frame image.	ANAP	AUTO	
Positioner Secondary Angle Increment	0018,1521	DS	An array that contains the Positioner Secondary Angle Increments between the n-th frame and the previous frame	ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
			for a Multi-frame image.			

Table 110: DX Detector Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO	
Detector Type	0018,7004	CS		ANAP	AUTO	

Note: Modality LUT and pixel intensity “LOG” only when X-Ray Angiographic images are sent with unprocessed pixel data

-No Modality LUT and pixel intensity “LIN” when X-Ray Angiographic images are sent with processed pixel data.

Table 111: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS	128	ALWAYS	AUTO	
Window Width	0028,1051	DS	256	ALWAYS	AUTO	

Table 112: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	-	ANAP	AUTO	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.12.1	ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI	Generated by device	ALWAYS	AUTO	
Instance Number	0020,0013	IS		ALWAYS	AUTO	
Time zone Offset From UTC	0008,0201	SH				-

8.1.2. Usage of Attributes from Received IOD

Not Applicable.

8.1.3. Attribute Mapping

Not Applicable.

8.1.4. Coerced/Modified fields

Not applicable.

8.2. Data Dictionary of Private Attributes

Not Applicable.

8.3. Coded Terminology and Templates

Not Applicable.

8.4. Grayscale Image consistency

Not Applicable.

8.5. Standard Extended/Specialized/Private SOPs

The Intrasight Plus system extends the Ultrasound Multi-Frame Image IOD to include the attributes listed in table below.

Table 113: IntraSight Extended and Private Elements

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Pixel Spacing	0028,0030	DS		ANAP	AUTO	In millimeters
Philips Intrasight Plus Imaging DD 001	2027,0010	LO		ANAP	AUTO	-
Private Attribute	2027,1001	UN		ANAP	AUTO	
Private Attribute	2027,1003	UN		ANAP	AUTO	
Private Attribute	2027,1006	UN		ANAP	AUTO	
Private Attribute	2027,1007	UN		ANAP	AUTO	
Private Attribute	2027,1008	UN		ANAP	AUTO	
Private Attribute	2027,1012	UN		ANAP	AUTO	
Private Attribute	2027,1013	UN		ANAP	AUTO	
Private Attribute	2027,1016	UN		ANAP	AUTO	
Private Attribute	2027,1030	UN		ANAP	AUTO	
Private Creator Group	0029,0010	LO		ANAP	AUTO	Set to "PHILIPS INTRASIGHT-PCDE 2.x:
Pullback Rate	0029,1000	DS		ANAP	AUTO	Set to 0.5 or 1.0 mm/Second. Only Included if IVUS Acquisition is a Motorized Pullback.
B Gain	0029,1001	FD		ANAP	AUTO	In dB
B Persistence Index	0029,1002	US		ANAP	AUTO	-
B ROI Diameter	0029,1003	FD		ANAP	AUTO	In mm.
CF Sensitivity Index	0029,1004	US		ANAP	AUTO	Only included in ChromaFlo is on.
CF ROI Diameter	0029,1005	FD		ANAP	AUTO	In mm. Only included in ChromaFlo is on.
Frame Capture Interleave Rate	0029,1006	US		ANAP	AUTO	1 - 3
Ringdown Subtraction	0029,1007	US		ANAP	AUTO	0 = Disabled, 1 = Manual, 2 = Adaptive
Graticule Spacing	0029,1008	US		ANAP	AUTO	in mm.
Revo Enhanced Mode	0029,1009	US		ANAP	AUTO	0 = Not Used, 1 = OFF, 2 = MEDIUM, 3 = HIGH
Measurement Data	0029,1012	UT		ANAP	AUTO	XML encoded Measurement data. Only included if Modality (0008, 0060) is IVUS.
Annotation Data	0029,1013	UT		ANAP	AUTO	XML encoded Annotation data.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
						Only included if Modality (0008, 0060) is IVUS.
Still Image Number	0029,1015	US		ANAP	AUTO	Still Image number, from live or VL. Not included if image is a video loop.
Video Loop Number	0029,1016	US		ANAP	AUTO	VL number or source VL number for Still Images from VL. Not included if image is a still from live.
Catheter Boot Mode	0029,1030	SS		ANAP	AUTO	1 – 5

Pixel Spacing (0028, 0030) information is included to allow measurements on DICOM review stations that do not support Ultrasound Region of Calibration.

Note: The Intrasight Plus Extended and Private attributes are standard extended SOP Class attributes and are not part of the US Multi-Frame Image IOD. As such, these attributes are optional (Type 3), and their support is not required by SCPs.

8.6. Private Transfer Syntaxes

Not applicable.

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