DICOM Conformance Statement

IntraSight (SW v5.3.0)

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1. DICOM Conformance Statement Overview

IntraSight is an image acquisition modality.
The Intended medical applications of the IntraSight product are the following:

- The IVUS Modality is intended for the qualitative and quantitative evaluation of vascular morphology in the coronary arteries and vessels of the peripheral vasculature. It is also indicated as an adjunct to conventional angiographic procedures to provide an image of vessel lumen and wall structures.
- The FFR/iFR Modality is intended to be used in all blood vessels, including coronary and peripheral arteries, to measure intravascular blood pressure during diagnostic angiography and/or interventional procedures. The FFR/iFR Modality is intended to be used in conjunction with currently marketed pressure wires.

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)
- Store images to Media (DVD/Blu-ray).

Figure 1: Data Flow in a DICOM network

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

- 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
Transfer				
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	No	N/A
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No	N/A
Workflow Management				
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	N/A

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	No	No

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	28-Aug-2025	First version for IntraSight (SW v5.3.0)

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
TCP/IP	Transmission Control Protocol/Internet Protocol

Abbreviation/Term	Explanation
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 system DICOM feature incorporates the DICOM 3.0 standard for the store image functions. Images are transferred from the IntraSight (both IVUS and FM) system using standard network connections to be processed on a DICOM compatible storage device.

The IntraSight 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 default 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 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 incorporate the following functionality:

- The Verification as SCU real-world activity occurs when the user selects the Test connection dialog. A C-ECHO operation is performed on the currently selected remote DICOM Storage Server.
- Modality Worklist as SCU real-world activity occurs when the user selects the Search button located in the Worklist dialog. 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 cases in the IntraSight system Archive page and then initiates the Image Export function. Each image is transferred to the remote storage server in a separate DICOM Association. Images are transferred to the remote storage server, which is selected through the “Archive” button in the UI. The user can also select an alternate server in the UI.

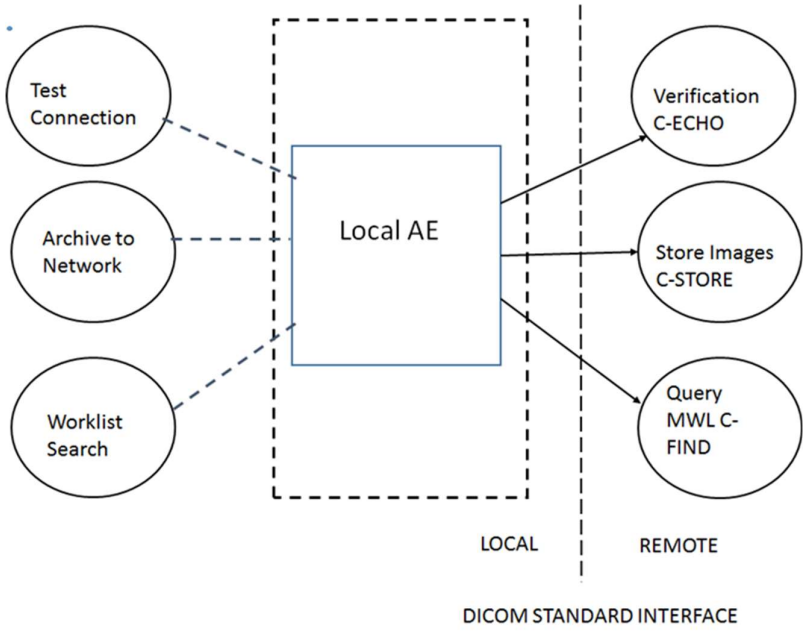

Figure 2: IntraSight application data flow diagram

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 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 the IVUS images and FM save frames 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 Storage AE will not try to initiate another association for this transfer automatically.

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.

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 system operations.

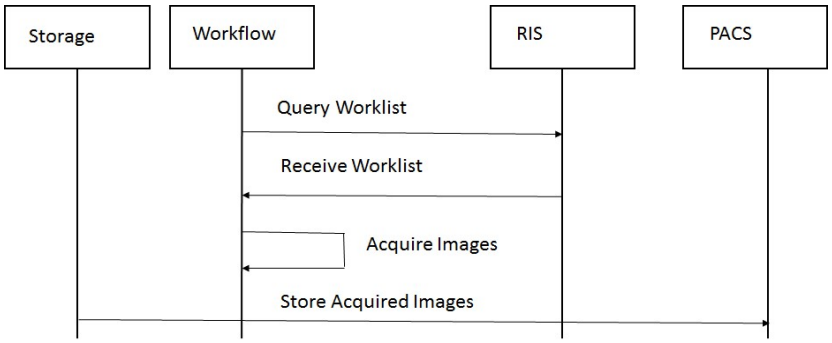

Figure 3: IntraSight sequencing diagram

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	No
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	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 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 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	1.3.46.670589.59.1.5.0.1
Implementation Version Name	IntraSight50

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.

Table 10: Response Status Handler Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The SCP has successfully returned all matching information
Refused	*	*	The reason is logged in application logs.

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

Table 11: 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.

Result	Source	Reason/Diagnosis	Behavior
		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.
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 12: 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.

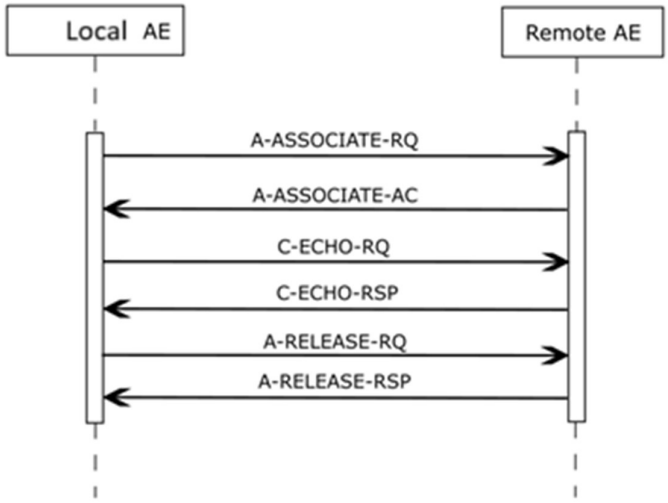

Figure 4: Real World Activity - Verification as SCU

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 13: 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 14: 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.

Table 15: 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.

4.2.1.3.2 (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 system Local AE opens an association with the remote AE (e.g. RIS).
2. The IntraSight 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 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.

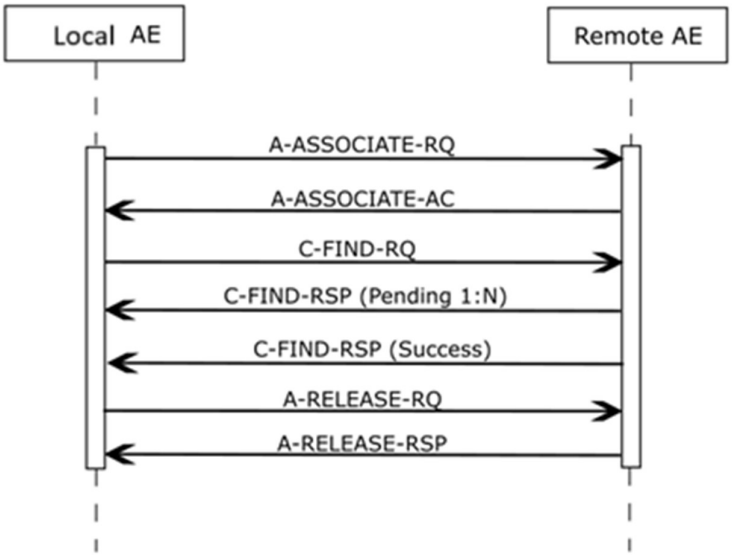

Figure 5: Real World Activity – Modality Worklist as SCU

- SUT displays 500 responses by default. However, the number of responses that can be displayed is configurable (Default Value is 500)
- When responses with missing mandatory attributes are received, SUT does not display any scheduled orders with missing mandatory attributes and an error message "The query returned incomplete results: Results are discarded due to invalid response from the WLM system, mandatory attributes are missing (patient/study/procedure)" will be shown in UI and shows the previous queried results.
- When responses with empty values for mandatory attributes are received, empty value for patient id & patient name are displayed. While trying to start the acquisition SUT shows a message to fill the empty fields.
- When Mandatory return key violation is sent in response, SUT does not display any scheduled orders with DICOM Violations.

- When responses with extra keys are received, SUT continued querying for further studies without any errors.
- When responses with different AE Title is received, SUT shows a message to correct the AE title.
- When the SUT receives the responses with Scheduled Procedure that is not scheduled for the SUT, a popup is displayed to correct the scheduled station AE Title before proceeding for image acquisition.

4.2.1.3.2.2 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 Worklist SCU AE defined in below table.

Table 16: 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 16 provides a description of the IntraSight system Modality Worklist Request Identifier and specifies the attributes that are copied into the images. If IntraSight 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). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

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 types of matching exists: Single Value Matching

List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

Table 17: 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					
Patient Medical Module									
Additional Patient History	0010,21B0	LT		X					
Allergies	0010,2110	LO		X					
Medical Alerts	0010,2000	LO		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, CT, MR or zero length (universal matching)
>Scheduled Performing Physician's Name	0040,0006	PN		X	X		X		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		X			
>Scheduled Station AE Title	0040,0001	AE	X	X		X		Single Value, Universal	Set to either IntraSight system AE Title or zero length (universal matching)

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
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	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		
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					

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 18: 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 19: 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).

Attribute Name	Tag	Description
Scheduled Station AE Title	0040,0001	May be configured to use either IntraSight system Local AE Title or zero length (universal matching). The IntraSight 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 20: 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 Association is aborted using A-ABORT and the Worklist query is marked as incomplete. The status meaning is logged and the error is reported to the user.
	A900	Identifier does not match SOP class	The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and the error is reported to the user
	C001	Unable to process	The Association is aborted using A-ABORT and the Worklist query is marked as incomplete. The status meaning is logged and the error is reported to the user.
	0122	SOP Class Not Supported	The Association is aborted using A-ABORT and the Worklist query is marked as incomplete. The status meaning is logged and the error is reported to the user.
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.
	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
*	*	Any other status code.	The Association is aborted using A-ABORT and the Worklist is marked as incomplete. The status meaning is logged and the error is reported to the user.

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

Table 21: Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the Worklist query marked as incomplete. The reason is logged and reported to the user.

Exception	Behavior
Association aborted by the SCP or network layers	Worklist query marked as incomplete. The reason is logged and reported to the user.

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 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.

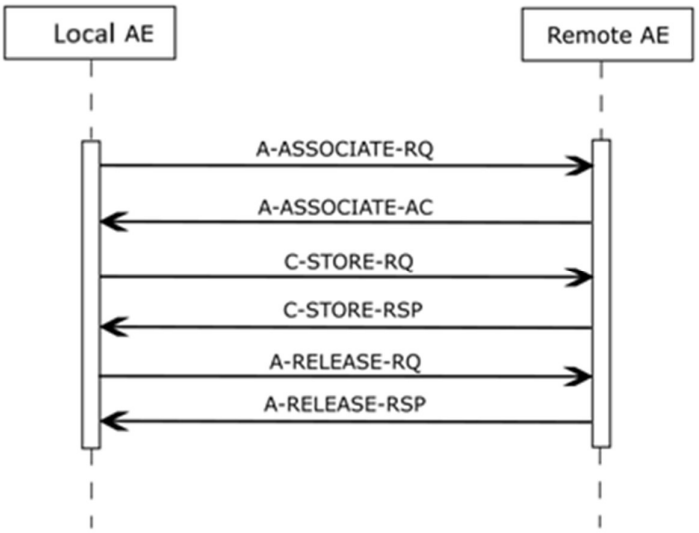

Figure 6: Real World Activity – Storage as SCU (Image Export)

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 22: 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		
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		

*Note: Secondary Capture Image Storage SOP Class is proposed during an association request. It is used to store the FM save frames.

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 23: 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
	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.

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

Table 24: 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.

4.2.1.4. Association Acceptance Policy

The Local AE does not accept associations.

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 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 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 25: 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 system is setup to communicate with has a set of parameters that are configurable in IntraSight 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 26: Configuration Parameters Table

Parameter	Configurable	Default Value
Remote Systems		
AE title	Yes	
Port number	Yes	
IP host name/address	Yes	

Parameter	Configurable	Default Value
Network timeout	Yes	15
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	15
Default Modality	Yes	US
Auto query scheduled date	Yes	All dates
Scheduled-this system only	Yes	Not Selected
Max SPS results	Yes	500

Table 27: 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 system is a device that generates Intravascular Ultrasound images and FM images that can be saved to
Blu-ray Optical Media: BD-R (SL): 25 GB, BD-R DL: 50 GB.
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-RW: 4.7 GB and DVD+RW: 4.7 GB media using DICOM standard protocols and definitions.
The applications described refer to the IntraSight system DICOM off-line media storage implementation acting as FSC for the specific application profiles and the related SOP Class instances.

After a successful Archive to DVD operation, the transferred cases are marked as Archived and are subject to automatic deletion.

5.1.1. Application Data Flow Diagram

The diagram in Figure 7 represents the relationship between the IntraSight system's real-world activities (circles on the left), the local AE's built into IntraSight system (boxes in the center), and the DICOM Exchange Media that the IntraSight system creates.

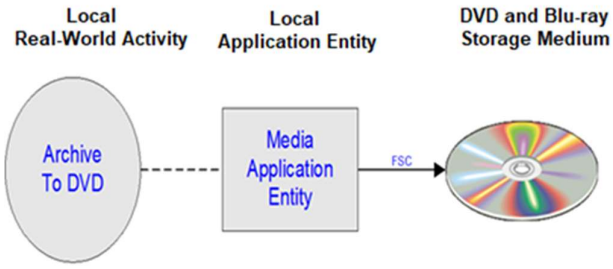

Figure 7: Media Interchange

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 have inserted 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.

The Archive to DVD Real-World Activity operates as a foreground task. No other IntraSight system functions are available while the media is being created.

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

Table 28: DICOM Implementation Class and Version Name

Implementation Class UID	1.3.46.670589.59.1.5.0.1
Implementation Version Name	IntraSight50

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

Table 29: Application Profiles, Activities, and Roles

Application Profile	Identifier	Real-World Activities	Roles	SC Option
Ultrasound	STD-US-SC-MF-DVD	Archive to DVD	FSC	Interchange
Secondary Capture (HD modality)	STD-GEN-DVD and STD-GEN-DVD-JPEG	Archive to DVD	FSC	Interchange

The IntraSight system DVD Media AE supports the IODS, SOP classes and Transfer Syntaxes listed in below table.

Table 30: 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

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 system. These attribute are stored in addition to the attributes listed in Table 63: IntraSight Extended and Private Elements for US-MF SOP instances.

Table 31: 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”
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 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 “1.3.46.670589.59.1.5.0.1”
Implementation Version Name	(0002,0013)	Set to “IntraSight50”

Table 32: 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	

Attribute Name	Tag	Type	Notes
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	
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 case in the IntraSight system Archive menu and then initiates the Archive to DVD and Blu-ray function. Multiple cases may be archived to a single DVD media at one time. The IntraSight 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 Application Profiles.

5.2.1.2.1.2 Application Profile Specific Conformance

There are no extensions or specializations.

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.

- US Modality – Sets Modality (0008, 0060) attribute to US when checked. Otherwise set to IVUS.

6. Support of Character Sets

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

Table 33: 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

7. Security

7.1. Security Profiles

7.1.1. Security use Profiles

Not Applicable.

7.1.2. Security Transport Connection Profiles

Not Applicable.

7.1.3. Digital Signature Profiles

Not Applicable.

7.1.4. Media Storage Security Profiles

Not Applicable.

7.1.5. Attribute Confidentiality Profiles

IntraSight 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 34: 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

Not Applicable.

7.1.8. Application Configuration Management Profiles

Not Applicable.

7.1.9. Audit Trail Profiles

Not Applicable.

7.2. Association Level Security

Not Applicable.

7.3. Application Level Security

Not Applicable.

8. Annexes of application "sample application"

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 35: 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

8.1.1.2. Ultrasound Multi-Frame Image Storage SOP Class

Table 36: 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
Equipment	General Equipment Module	ALWAYS
Acquisition	General Acquisition 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
	US Region Calibration Module	ALWAYS
	US Image Module	ALWAYS
	Synchronization Module	CONDITIONAL
	Frame Pointers Module	CONDITIONAL
	SOP Common Module	ALWAYS

Table 37: 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	USER/MWL	-
Patient ID	0010,0020	LO		VNAP	USER/MWL	-
Patient's Birth Date	0010,0030	DA		VNAP	USER/MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER/MWL	-
Other Patient IDs Sequence	0010,1002	SQ		ANAP	AUTO	
> Patient ID	0010,0020	LO		ALWAYS	AUTO	
> Issuer of Patient ID	0010,0021	LO		ANAP	AUTO	
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	USER/MWL	-

Table 38: 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 39: 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	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	IVUS	ALWAYS	AUTO	Value is US when checked. Otherwise set to IVUS.
Series Description	0008,103E	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 40: 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		ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ANAP	AUTO	-
Software Versions	0018,1020	LO	5.3.0.X	ALWAYS	AUTO	Where X is software build Number

Table 41: 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 42: 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

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
						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)
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 43: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Description	0008,2111	ST		ANAP	AUTO	-

Table 44: 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 27 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	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
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	
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	

Table 45: 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 46: 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 47: 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 Units Y Direction	0018,6026	UL	3	ALWAYS	AUTO	-
>Physical Delta X	0018,602C	UL	0.001953125	ALWAYS	AUTO	-
>Physical Delta Y	0018,602E	UL	0.001953125	ALWAYS	AUTO	-

Table 48: 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.

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
						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)
Acquisition Date Time	0008,002A	DT		ALWAYS	AUTO	-
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 27 for value.
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	MANUAL_PULLBACK	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 49: 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 50: Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Synchronization Trigger	0018,106A	CS	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 51: 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	-
Time zone Offset From UTC	0008,0201	SH		ANAP	AUTO	-

8.1.1.3. Secondary Capture Image Storage SOP Class

Table 52: 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
	General Reference Module	CONDITIONAL
	Image Pixel Module	ALWAYS
	SC Image Module	ALWAYS
	SOP Common Module	ALWAYS

Table 53: 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	USER/MWL	-
Patient ID	0010,0020	LO		VNAP	USER/MWL	-
Patient's Birth Date	0010,0030	DA		VNAP	USER/MWL	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	USER/MWL	-
Other Patient IDs Sequence	0010,1002	SQ		ANAP	AUTO	
> Patient ID	0010,0020	LO		ALWAYS	AUTO	
> Issuer of Patient ID	0010,0021	LO		ANAP	AUTO	
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	
Patient Comments	0010,4000	LT		ANAP	USER/MWL	-

Table 54: 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 Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Study ID	0020,0010	SH		VNAP	USER/MWL	-

Table 55: 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
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	0040,0250	DA		ANAP	AUTO	-

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Step End Date						
Performed Procedure Step End Time	0040,0251	TM		ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-

Table 56: 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		ALWAYS	AUTO	-
Device Serial Number	0018,1000	LO		ANAP	AUTO	-
Software Versions	0018,1020	LO	5.3.0.X	ALWAYS	AUTO	Where X is software build Number

Table 57: 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 58: 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 59: 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	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Patient Orientation	0020,0020	CS		ANAP	AUTO	-
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	
Lossy Image Compression Ratio	0028,2112	DS		ANAP	AUTO	
Lossy Image Compression	0028,2114	CS		ANAP	AUTO	

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Method						
Image Comments	0020,4000	LT		ANAP	USER	-

Table 60: General Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Description	0008,2111	ST		Derivation Description	AUTO	-

Table 61: 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 27 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 62: 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 63: 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	-

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

Table 64: 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 1.0 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	2027,1015	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 :
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	0029,1006	US		ANAP	AUTO	1 - 3

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rate						
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. 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 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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Internet: https://www.philips.com/dicom
Doc Id: 2097866
Date: 28-Aug-2025