DICOM Conformance Statement

VISIQ 1.0.1

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1 DICOM Conformance Statement Overview

This document is the DICOM Conformance Statement for the Philips Medical Systems VISIQ 1.0.1. The VISIQ is a compact Ultrasound system.

It provides the following features:

- Verification of application level communication
- Storage of images on a remote DICOM system
- Storage of images per DICOM Media on USB

Table 1 Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Viewable
Name	UID			
Other				
Verification SOP Class	1.2.840.10008.1.1	Yes	No	No
Transfer				
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No	Yes
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	No	Yes

Table 2 Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
USB			
STD-GEN-USB-JPEG for Ultrasound images, compressed and uncompressed	Yes	Yes	No

2 Table of Contents

3 Introduction

3.1 Revision History

Table 3 Revision History

Document Version	Date of Issue	Status	Description
Rev A	30-October-2014	Approved	Final version

3.2 Audiences

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 analyse 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 assure 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 Definition, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
ANSI	American National Standard Institute
AP	Application Profile
BOT	Basic Offset Table
CD	Compact Disc
CD-R	CD-Recordable
CD-M	CD-Medical
CR	Computed Radiography
CT	Computed Tomography
DCR	Dynamic Cardio Review
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HIS	Hospital Information System
HL7	Health Level Seven
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
ISIS	Information System - Imaging System
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RT	Radiotherapy
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
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound Multi-frame
WLM	Worklist Management
XA	X-Ray Angiographic

3.5 References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 20 (NEMA PS 3.1- PS 3.20),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America
Internet: http://medical.nema.org/

Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2011) plus all the supplements and correction items that have been approved as Final Text.

4 Networking

4.1 Implementation model

4.1.1 Application Data Flow

The VISIQ1.0.1 system consists of one single application, the Storage Application Entity. The figure below shows the networking application data flow as a functional overview of the Storage AE.

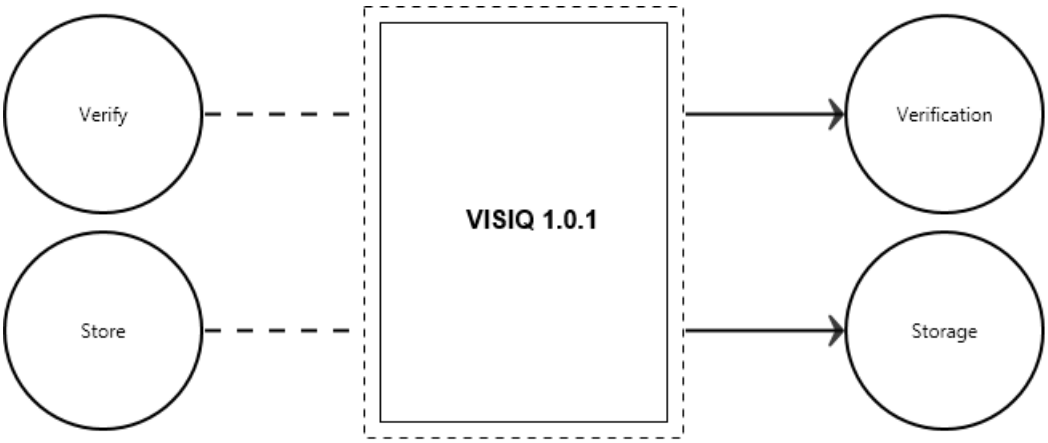

Figure 1 Application Data Flow Diagram

The VISIQ 1.0.1 system sends Images to one or more remote AEs. Acquisition of single frame images is associated with the local real-world activity “Freeze” and “Acquire” and the acquisition of Multiframe images is assocoated with local real world activty “Acquire” for save loops or clips. Sending or exporting of images depends on user configuration, either “Send as you go” as and when the image is acquired (or) ”Batch” when End Exam is pressed, (or) Manual.

4.1.2 Functional Definition of Application Entities

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

4.1.2.1 Functional Definition of Storage AE

A Network Store queue with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related queue’s Status is set to RETRY as displayed in the Job Manager. The user may select “Retry Job” to attempt re-send.. After the automatic retries have failed, the job is set to ERROR. The user may “Delete Job” and re-send manually. Deleting a job does not remove the data, as it is still present on the system. Only the request to transfer the data is removed. Once any communication issues have been resolved, “Retry Job” may be selected or if the jobs were deleted, they may be queued again from the Review/Local patient directory.

4.1.3 Sequencing of Real World Activities

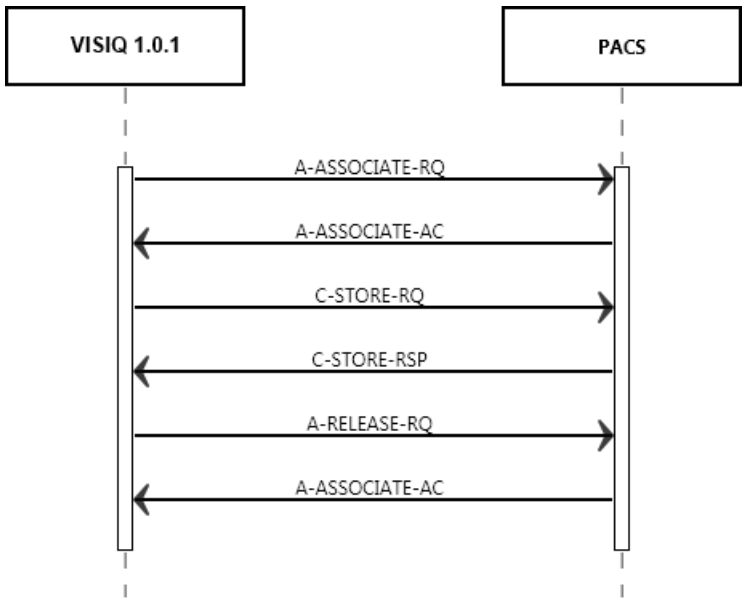

Figure 2 Sequencing of Real World Activity - Store

4.2 AE Specifications

4.2.1 AE Specification of Storage AE

4.2.1.1 SOP Classes

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

Table 5 SOP Classes for Application Entity Storage AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	No

4.2.1.2 Association Policies

4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 6 DICOM Application Context

Property	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The maximum number of simultaneous associations that this Application Entity supports as an initiator or acceptor is specified below.

Table 7 Maximum number of simultaneous associations

Property	Value
Maximum number of simultaneous associations	1

4.2.1.2.3 Asynchronous Nature

This application entity supports negotiation of multiple outstanding transactions, along with the maximum number of outstanding transactions supported.

Table 8 Asynchronous Nature

Property	Value
Maximum number of asynchronous outstanding transactions	1

4.2.1.2.4 Implementation Identifying Information

Table 9 Implementation Identifying Information

Property	Value
Implementation Class UID	1.3.46.670589.14.8000.100
Implementation Version Name	VISIQ_1.0.1

4.2.1.2.5 Communication Failure Handling

The behaviour of this application entity during communication failure is summarized in the table below.

Table 10 Communication Failure Behavior

Exception	Behaviour
Timeout	The association is aborted using A-ABORT and the command is marked failed. The reason is logged and reported to the user.
Association aborted	An A-ABORT is send and the association is closed.
Failed to connect	The failure to connect reason is logged and reported to the user, the activity is retried in the job viewer.

4.2.1.3 Association Initiation Policy

Images shall be sent from the selected studies from the Review/local patient directory. The studies can be manually selected and sent to the default PACS. If the C-STORE response from the remote application contains a status other than Success or Warning, the association is retried until switched to a failed state. The application entity will respond to a received association rejection as shown in the next table.

Table 11 Association Rejection Handling Behavior

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

4.2.1.3.1 (Real-World) Activity - Image Export

4.2.1.3.1.1 Description and Sequencing of Activities

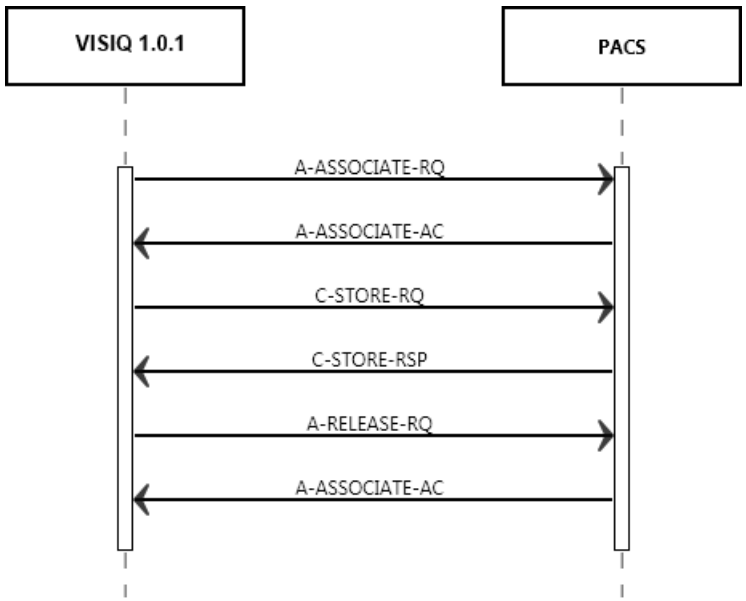

Figure 3 Image Export

The Storage Application Entity sends Images to one or two remote AEs to a single remote AE. Acquisition of images is associated with the local real-world activity “Freeze” then “Acquire” for single frame and “Acquire” for loops or clips. Sending or exporting of images can be performed manually.

4.2.1.3.1.2 Proposed Presentation Contexts

Table 12 Proposed Presentation Contexts for (Real-World) Activity Image Export

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None

4.2.1.3.1.3 SOP Specific Conformance for SOP Classes

4.2.1.3.2 (Real-World) Activity - Verification as SCU

4.2.1.3.2.1 Description and Sequencing of Activities

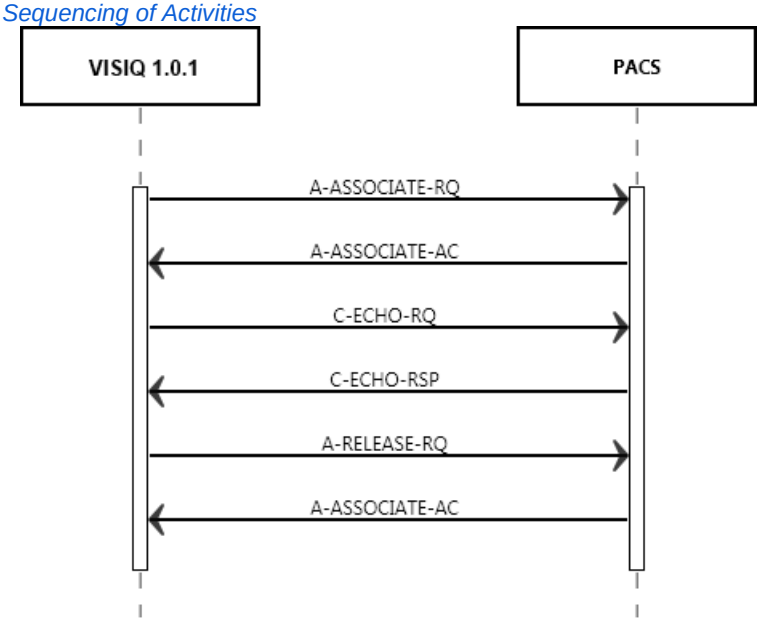

Figure 4 Verification as SCU

4.2.1.3.2.2 Proposed Presentation Contexts

Table 13 Proposed Presentation Contexts for (Real-World) Activity Verification as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian: Default Transfer Syntax for DICOM	1.2.840.10008.1.2	SCU	None

4.2.1.3.2.3 SOP Specific Conformance for SOP Classes

Not Applicable

4.2.1.3.2.3.1 SOP Specific Conformance for Verification SOP Class

Not Applicable

4.2.1.3.2.3.1.1 Dataset Specific Conformance for Verification SOP Class C-ECHO-SCU

Not Applicable

4.2.1.4 Association Acceptance Policy

The details regarding the response behaviour to status codes are provided in next table.

Table 14 Status Response

Service Status	Error Code	Further Meaning	Behaviour
Success	0000	Confirmation	The SCP has successfully responded to the verification request.
Refused	A700	Out of Resources	Device Status is set to: Not Verified
Failed	C000 – CFFF	Unable to Process	Same as “Refused” above

4.3 Network Interfaces

4.3.1 Physical and Wireless Network Interfaces

The System provides only DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 of the standard.

TCP/IP is the only protocol stack supported.

The VISIQ 1.0.1 system supports WiFi network interface.

- IEEE 802.11b/g/n

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 Additional Protocols

4.3.3 IPv4 and IPv6 Support

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

An important installation issue is the translation from AE title to presentation address. How this is to be performed is described here.

4.4.1.1 Local AE Titles

The local AE title mapping and configuration are specified as:

Table 15 AE Title Configuration

Application Entity	Default AE Title
Storage	<System hostname>

4.4.1.2 Remote AE Title/Presentation Address Mapping

Not Applicable

4.4.1.2.1 Storage AE

4.4.2 Parameters

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

Table 16 Configuration Parameters

Parameter	Configurable	Default Value
General		
Time-out waiting for acceptance or rejection Response to an Association Open Request (Application Level timeout)	No	5 min
General DIMSE level time-out values (Verification, Storage)	No	30sec
Time-out for response to TCP/IP connect request. (Low-level timeout)		5 min
AE Specific Parameters		
System AE title	Yes	System hostname
Size constraint in maximum object size	No	-
Maximum PDU size the AE can send	No	16000
Association time-out SCU	No	5 min
Number of simultaneous associations by service and/or SOP class	No	1
SOP Class support	No	
Transfer Syntax support	No	1.2.840.10008.1.2 (ILE)

5 Media Interfaces

5.1 Implementation Model

The Media Application Entity exports Images to a removable storage medium. It is associated with the local real-world activity "Export" using the configured export selection parameters for selected patients' data (images).

5.1.1 Application Data Flow Diagram

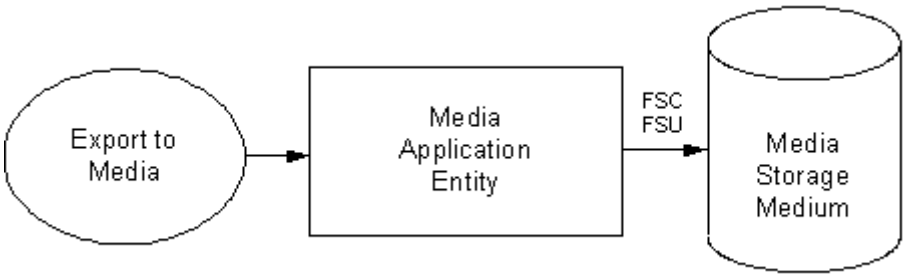

Figure 5 Application Data Flow Diagram

The Media Application Entity exports Images to a removable storage medium. It is associated with the local real-world activity "Export" using the configured export selection parameters for selected patients' data.

Table 17 Transfer syntaxes of Media supported by VISIQ 1.0.1

SOP class	Transfer Syntax Name	Transfer Syntax UID	Role
Ultrasound Multi-frame Image Storage SOP Class	RLE Lossless	1.2.840.10008.1.2.5	SCU
Ultrasound Image Storage SOP Class	RLE Lossless	1.2.840.10008.1.2.5	

5.1.2 Functional Definition of AEs

Using "Export" will pass the currently selected patients' exams or individually selected images to the Media Application Entity. The contents of each export job will be written to the selected media destination. The size of the selected media is used to determine and display the number of media required for the export. When a device is filled to capacity, the system will prompt the user for addition media and continue.

5.1.3 Sequencing of Real World Activities

At least one image must exist and be selected before the Media Application Entity can be invoked. The operator can insert new media at any time. The Media Application Entity will wait indefinitely for media to be inserted before starting to write to the device.

5.2 AE Specifications

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

5.2.1 Media Storage Media - Specification

Table 18 AE Media Storage related Application Profiles, Real-World Activities and Roles

Supported Application Profile	Identifier	Real-World Activities	Roles
General Purpose USB Media Interchange with JPEG	STD-GEN-USB-JPEG	Update File-set	FSU
		Create File-set	FSC

5.2.1.1 File Meta Information for the Media Storage

Table 19 Implementation Identifying Information

Property	Value
Implementation Class UID	1.3.46.670589.14.8000.100
Implementation Version Name	VISIQ_1.0.1

5.2.1.2 Real World Activities

5.2.1.2.1 RWA - Read File-set

Not applicable

5.2.1.2.1.1 Media Storage Application Profile

Not applicable.

5.2.1.2.1.1.1 Options

Not applicable.

5.2.1.2.2 RWA - Create File-set

This Media Application Entity has a File-set Creator functionality which is described here.

Write Images

The Media Application Entity acts as an FSC using the interchange option when requested to export SOP Instances from the local database to media.

The contents of the export job will be written together with a corresponding DICOMDIR to media.

5.2.1.2.2.1 Media Storage Application Profile

5.2.1.2.2.1.1 Options

5.2.1.2.3 RWA - Update File-set

This Media Application Entity has a File-set Updater functionality which is described here.

Update Media

The Media Application Entity acts as an FSU using the interchange option when requested to export SOP Instances from the local database to media upon which DICOM data already resides.

The system user selects exams from the system's directory for transfer to media that already contains data. The DICOMDIR is updated allowing access to original and new data.

5.2.1.2.3.1 Media Storage Application Profile

Not applicable.

5.2.1.2.3.1.1 Options

5.3 Augmented and Private Application Profiles

Not applicable.

5.4 Media Configuration

6 Support of Character Sets

Table 20 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 100	G1	Supplementary set of ISO 8859
		-	ISO-IR 6	G0	ISO 646

7 Security

7.1 Security Profiles

Not applicable.

8 VISIQ

8.1 IOD Contents

8.1.1 Created SOP Instances

This section specifies each IOD created by this application and specifies the content for each IOD created (including private IODs).

For each attribute in the IOD the following information is supplied:

- Attribute name
- Tag
- VR – Value representation
- Value - specifies possible values
- Presence of value - specifies if attribute is always present or only under specific conditions
- Source of value - specifies the source of the value
- Comment - gives additional information on the attribute

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 21 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
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1

8.1.1.2 Ultrasound Multi-frame Image Storage SOP Class

Table 22 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	Cine Module	Always
	Multi-Frame Module	Always
	Palette Color Lookup Table Module	Conditional
	US Region Calibration Module	Always
	US Image Module	Always
	SOP Common Module	Always
	Module extended and additional attributes	Always

Table 23 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	AUTO, USER	
Patient ID	0010,0020	LO		VNAP	AUTO, USER	
Patient's Birth Date	0010,0030	DA		VNAP	USER	
Patient's Sex	0010,0040	CS		VNAP	USER	

Table 24 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	
Referring Physician's Name	0008,0090	PN		VNAP	USER	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH		VNAP	AUTO	

Table 25 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Performing Physicians' Name	0008,1050	PN		ANAP	USER	
Operators' Name	0008,1070	PN		ANAP	USER	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	
Laterality	0020,0060	CS		ANAP	AUTO	

Table 26 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO, FIXED	
Institution Name	0008,0080	LO	Philips Healthcare	ANAP	AUTO, FIXED	
Station Name	0008,1010	SH		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	

Table 27 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ANAP	CONFIG	
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ANAP	AUTO	
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	
Content Time	0008,0033	TM		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	

Table 28 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	CONFIG	
Photometric Interpretation	0028,0004	CS		ALWAYS	CONFIG	
Rows	0028,0010	US		ALWAYS	CONFIG	
Columns	0028,0011	US		ALWAYS	CONFIG	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Red Palette Color Lookup Table Descriptor	0028,1101	US/SS		ANAP	CONFIG	
Green Palette Color Lookup Table Descriptor	0028,1102	US/SS		ANAP	CONFIG	
Blue Palette Color Lookup Table Descriptor	0028,1103	US/SS		ANAP	CONFIG	
Red Palette Color Lookup Table Data	0028,1201	OW		ANAP	CONFIG	
Green Palette Color Lookup Table Data	0028,1202	OW		ANAP	CONFIG	
Blue Palette Color Lookup Table Data	0028,1203	OW		ANAP	CONFIG	
Pixel Data	7FE0,0010	OB		ANAP	AUTO	

Table 29 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	
Effective Duration	0018,0072	DS		ANAP	AUTO	
Frame Time Vector	0018,1065	DS		ANAP	CONFIG	

Table 30 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	CONFIG	

Table 31 Palette Color Lookup Table Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Red Palette Color Lookup Table Descriptor	0028,1101	US/SS		ALWAYS	CONFIG	
Green Palette Color Lookup Table Descriptor	0028,1102	US/SS		ALWAYS	CONFIG	
Blue Palette Color Lookup Table Descriptor	0028,1103	US/SS		ALWAYS	CONFIG	
Red Palette Color Lookup Table Data	0028,1201	OW		ANAP	CONFIG	
Green Palette Color Lookup Table Data	0028,1202	OW		ANAP	CONFIG	
Blue Palette Color Lookup Table Data	0028,1203	OW		ANAP	CONFIG	

Table 32 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		ALWAYS	AUTO	
>Region Data Type	0018,6014	US		ALWAYS	AUTO	
>Region Flags	0018,6016	UL		ALWAYS	AUTO	
>Region Location Min x0	0018,6018	UL		ALWAYS	AUTO	
>Region Location Min y0	0018,601A	UL		ALWAYS	AUTO	
>Region Location Max x1	0018,601C	UL		ALWAYS	AUTO	
>Region Location Max y1	0018,601E	UL		ALWAYS	AUTO	
>Reference Pixel x0	0018,6020	SL		ANAP	AUTO	
>Reference Pixel y0	0018,6022	SL		ANAP	AUTO	
>Physical Units X Direction	0018,6024	US		ALWAYS	AUTO	
>Physical Units Y Direction	0018,6026	US		ALWAYS	AUTO	
>Ref. Pixel Physical Value X	0018,6028	FD		ANAP	AUTO	
>Ref. Pixel Physical Value Y	0018,602A	FD		ANAP	AUTO	
>Physical Delta X	0018,602C	FD		ALWAYS	AUTO	
>Physical Delta Y	0018,602E	FD		ALWAYS	AUTO	

Table 33 US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		VNAP	CONFIG	
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	
Transducer Data	0018,5010	LO		ANAP	AUTO	
Processing Function	0018,5020	LO		ANAP	AUTO	
Transducer Type	0018,6031	CS		ANAP	AUTO	
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Frame Increment Pointer	0028,0009	AT		ANAP	CONFIG	
Ultrasound Color Data Present	0028,0014	US		ANAP	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	

Table 34 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	AUTO	
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

Table 35 Module extended and additional attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Software Version(s)	0018,1020	LO		ANAP	AUTO	

8.1.1.3 Ultrasound Image Storage SOP Class

Table 36 SOP Class Modules

Information Entity	Module	Presence
Patient	Patient Module	Always
Study	General Study Module	Always
Series	General Series Module	Always
Equipment	General Equipment Module	Always
Image	General Image Module	Always
	Image Pixel Module	Always
	Palette Color Lookup Table Module	Always
	US Region Calibration Module	Always
	US Image Module	Always
	SOP Common Module	Always
	Module extended and additional attributes	Always

Table 37 Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	AUTO, USER	
Patient ID	0010,0020	LO		VNAP	AUTO, USER	
Patient's Birth Date	0010,0030	DA		VNAP	USER	
Patient's Sex	0010,0040	CS		VNAP	USER	

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	
Referring Physician's Name	0008,0090	PN		VNAP	USER	
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	
Study ID	0020,0010	SH		VNAP	AUTO	

Table 39 General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	
Performing Physicians' Name	0008,1050	PN		ANAP	USER	
Operators' Name	0008,1070	PN		ANAP	USER	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		VNAP	AUTO	

Table 40 General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	VNAP	AUTO, FIXED	
Institution Name	0008,0080	LO	Philips Healthcare	ANAP	AUTO, FIXED	
Station Name	0008,1010	SH		ANAP	AUTO	
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	

Table 41 General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ANAP	AUTO	
Content Date	0008,0023	DA		ANAP	AUTO	
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	
Acquisition Time	0008,0032	TM		ANAP	AUTO	
Content Time	0008,0033	TM		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Patient Orientation	0020,0020	CS		ANAP	AUTO	

Table 42 Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Red Palette Color Lookup Table Descriptor	0028,1101	US/SS		ANAP	CONFIG	
Green Palette Color Lookup Table Descriptor	0028,1102	US/SS		ANAP	CONFIG	
Blue Palette Color Lookup Table Descriptor	0028,1103	US/SS		ANAP	CONFIG	
Red Palette Color Lookup Table Data	0028,1201	OW		ANAP	CONFIG	
Green Palette Color Lookup Table Data	0028,1202	OW		ANAP	CONFIG	
Blue Palette Color Lookup Table Data	0028,1203	OW		ANAP	CONFIG	
Pixel Data	7FE0,0010	OB		ANAP	AUTO	

Table 43 Palette Color Lookup Table Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Red Palette Color Lookup Table Descriptor	0028,1101	US/SS		ALWAYS	CONFIG	
Green Palette Color Lookup Table Descriptor	0028,1102	US/SS		ALWAYS	CONFIG	
Blue Palette Color Lookup Table Descriptor	0028,1103	US/SS		ALWAYS	CONFIG	
Red Palette Color Lookup Table Data	0028,1201	OW		ANAP	CONFIG	
Green Palette Color Lookup Table Data	0028,1202	OW		ANAP	CONFIG	
Blue Palette Color Lookup Table Data	0028,1203	OW		ANAP	CONFIG	

Table 44 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		ALWAYS	AUTO	
>Region Data Type	0018,6014	US		ALWAYS	AUTO	
>Region Flags	0018,6016	UL		ALWAYS	AUTO	
>Region Location Min x0	0018,6018	UL		ALWAYS	AUTO	
>Region Location Min y0	0018,601A	UL		ALWAYS	AUTO	
>Physical Units X Direction	0018,6024	US		ALWAYS	AUTO	
>Physical Units Y Direction	0018,6026	US		ALWAYS	AUTO	
>Ref. Pixel Physical Value X	0018,6028	FD		ANAP	AUTO	
>Ref. Pixel Physical Value Y	0018,602A	FD		ANAP	AUTO	
>Physical Delta X	0018,602C	FD		ALWAYS	AUTO	
>Physical Delta Y	0018,602E	FD		ALWAYS	AUTO	

Table 45 US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		VNAP	CONFIG	
Acquisition DateTime	0008,002A	DT		ANAP	AUTO	
Transducer Data	0018,5010	LO		ANAP	AUTO	
Processing Function	0018,5020	LO		ANAP	AUTO	
Transducer Type	0018,6031	CS		ANAP	AUTO	
Samples Per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Pixel Representation	0028,0103	US		ALWAYS	AUTO	
Lossy Image Compression	0028,2110	CS		ANAP	AUTO	

Table 46 SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	AUTO	
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

Table 47 Module extended and additional attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Software Version(s)	0018,1020	LO		ANAP	AUTO	

8.1.2 Usage of Attributes from Received IODs
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

8.3.1 Context Group
Not applicable.

8.3.2 Template Specifications
Not applicable.

8.3.3 Private Code Definitions
Not applicable.

8.4 Grayscale Image Consistency
Not applicable.

8.5 Standard/Extended/Specialized/Private SOP Classes
Not applicable.