DICOM Conformance Statement

Application Annex:

Ultrasound Analysis Package (QLAB) on Xcelera R3.2L1 SP2

PHILIPS

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1. Introduction

This DICOM Conformance Statement annex is applicable to the Ultrasound Analysis Package (QLAB) on Xcelera R3.2L1 SP2 hosting platform. In general the Ultrasound Analysis Package (QLAB) is the user environment for viewing and analyzing Ultrasound images.

The following analysis packages are offered by the Ultrasound Analysis Package (licensing might be applicable):
- Intima media Thickness Quantification analysis (IMT)
- Region of Interest Quantification analysis (ROI)
- Strain Quantification analysis (SQ)
- Tissue Motion Quantification Advanced analysis (CMQ)
- 3D Quantification analysis (3DQ)
- 3D Quantification Advanced analysis (3DQA)
- Mitral Valve Quantification analysis (MVQ)

Note: MVQ requires data created with the "x7-2t" TEE transducer of iE33.

1.1.   Revision History

The revision history below provides dates and differences among individual document versions.

Table 1: Revision History

Document Version	Date of Issue	Status	Description
00	02-January-2012	Final version	Initial version

1.2.   Terminology

DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
UID	Unique Identifier
VR	Value Representation

2. Data Specifications

2.1.   Supported IOD's

This section specifies each IOD accepted and / or created by Ultrasound Analysis Package (QLAB).

ACCEPTED   The applicable IOD is accepted for storage in the repository of the hosting platform and supported for import in
                  Ultrasound Analysis Package (QLAB) for viewing and analysis.
CREATED   The Ultrasound Analysis Package (QLAB) supports generation of derived data by using the applicable IOD and is
                  able to store this data in the repository of the hosting platform.

Table 2: Supported IOD's

IOD		Support	
Name	**UID**	**ACCEPTED**	**CREATED**
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	No
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	No
Philips Private iE33 3D NEO Presentation State Subpage Storage	1.3.46.670589.2.5.1.1	Yes	No
Philips Private SONOS 7500 Live 3D Frustrum Storage	1.2.840.113543.6.6.1.3.1001	Yes	No
Philips Private SONOS 7500 Live 3D Cartesian Storage	1.2.840.113543.6.6.1.3.1002	Yes	Yes

2.1.1.   Acceptance Criteria

This section specifies the acceptance criteria applied by Ultrasound Analysis Package (QLAB) to which a dataset should adhere before it can be imported into the application. This can be criteria on the highest level (e.g. data from a certain manufacturer or system model) or certain DICOM attributes mandatory to be present into the dataset holding a specific value. In case one or more Philips private attributes are required, then a list of supported Philips system models will be mentioned.

Table 3: Accepted system models

Manufacturer	Modality	System Model Name(s)
Philips	US	SONOS, HD6, HD7, HD11, HD15, iE33, iU22, CX50

Table 4: Accepted transfer syntaxes per IOD

IOD	
Name	**UID**
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Philips Private iE33 3D NEO Presentation State Subpage Storage	1.3.46.670589.2.5.1.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Philips Private SONOS 7500 Live 3D Frustrum Storage	1.2.840.113543.6.6.1.3.1001
Philips Private SONOS 7500 Live 3D Cartesian Storage	1.2.840.113543.6.6.1.3.1002

Table 5: Accepted attribute values

Attribute Name	Attribute Number	Values / Comments
Not applicable	Not applicable	Not applicable

Note: Private 3D bulk information is required to activate volume related analysis packages (e.g. 3DQ and 3DQA) on QLAB.

2.1.2.   Contents of Created IOD's

Note that the Creation of Philips Private SONOS 7500 Live 3D Cartesian Storage (1.2.840.113543.6.6.1.3.1002) data requires a separate license.

This section specifies in detail the attribute contents of created data objects. Attributes are grouped together by its corresponding module as specified by DICOM standard. Philips private attributes are excluded for specification.

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
ANAPCV   The attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV   The attribute is present under specified condition – if present then it will not have any 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

2.1.2.1.   Comprehensive SR SOP Class

Table 6: IOD of Created Comprehensive SR SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	SR Document Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Document	SR Document General Module	ALWAYS
	SR Document Content Module	ALWAYS
Document	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes	ALWAYS

Table 7: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	-

Patient ID	0010,0020	LO		VNAP	COPY	-
Patient's Birth Date	0010,0030	DA		VNAP	COPY	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	COPY	-

Table 8: General Study Module

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

Table 9: SR Document Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS	SR	ALWAYS	AUTO	-
Referenced Performed Procedure Step Sequence	0008,1111	SQ		EMPTY	AUTO	EMPTY
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-

Table 10: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical System	ALWAYS	COPY	-
Manufacturer's Model Name	0008,1090	LO	QLAB	ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	-

Table 11: SR Document General Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	COPY	-
Performed Procedure Code Sequence	0040,A372	SQ		EMPTY	AUTO	-
Completion Flag	0040,A491	CS	PARTIAL	ALWAYS	AUTO	-
Verification Flag	0040,A493	CS	UNVERIFIED	ALWAYS	AUTO	-

Table 12: SR Document Content Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Value Type	0040,A040	CS	CONTAINER	ALWAYS	AUTO	-
Concept Name Code Sequence	0040,A043	SQ		ALWAYS	AUTO	-
>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
Concept Code Sequence	0040,A168	SQ		ALWAYS	AUTO	-
>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-

Continuity Of Content	0040,A050	CS			ALWAYS	AUTO	-
Content Template Sequence	0040,A504	SQ			ANAP	AUTO	-
>Mapping Resource	0008,0105	CS			ALWAYS	AUTO	
>Template Identifier	0040,DB00	CS			ALWAYS	AUTO	-
Content Sequence	0040,A730	SQ			ANAP	AUTO	-
>Relationship Type	0040,A010	CS	CONTAINS		ALWAYS	AUTO	-
>Value Type	0040,A040	CS			ALWAYS	AUTO	-
>Concept Name Code Sequence	0040,A043	SQ			ALWAYS	AUTO	-
>Continuity Of Content	0040,A050	CS	SEPARATE		ALWAYS	AUTO	-
>Value Type	0040,A040	CS			ALWAYS	AUTO	-

Table 13: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAPCV	AUTO	Required if expanded/replacement character set used
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.88.33	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

2.1.2.2.   Ultrasound Image Storage SOP Class

Table 14: IOD of Created Ultrasound Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
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	Image Pixel Module	ALWAYS
Image	US Image Module	ALWAYS
Image	VOI LUT Module	ALWAYS
Image	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes	ALWAYS

Table 15: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	COPY	-
Patient ID	0010,0020	LO		VNAP	COPY	-
Patient's Birth Date	0010,0030	DA		VNAP	COPY	-
Patient's Sex	0010,0040	CS	F, M, O	VNAP	COPY	-

Table 16: General Study Module

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

Table 17: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Modality	0008,0060	CS	US	ALWAYS	COPY	-
Series Description	0008,103E	LO		VNAP	AUTO	-
Protocol Name	0018,1030	LO		VNAP	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-

Table 18: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Manufacturer's Model Name	0008,1090	LO	QLAB	ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	-

Table 19: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Derivation Description	0008,2111	ST		ALWAYS	AUTO	-
Source Image Sequence	0008,2112	SQ		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Patient Orientation	0020,0020	CS		VNAP	AUTO	-
Burned In Annotation	0028,0301	CS	NO	ALWAYS	AUTO	-
Lossy Image Compression Ratio	0028,2112	DS		ALWAYS	AUTO	-

Table 20: 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	-
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	-

Table 21: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: DERIVED, Value 2: SECONDARY	ALWAYS	AUTO	-
Samples per Pixel	0028,0002	US	3	ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	YBR_FULL_422	ALWAYS	AUTO	-
Planar Configuration	0028,0006	US	0x0000	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	-

Lossy Image Compression	0028,2110	CS	01	ANAP	AUTO	Required if Lossy Compression has been performed on the image.

Table 22: VOI LUT Module

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

Table 23: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ANAP	AUTO	Required if expanded/replacement character set used
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.6.1	ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

2.1.2.3.   Ultrasound Multi-frame Image Storage SOP Class

Table 24: IOD of Created Ultrasound Multi-frame Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	CONDITIONAL
Image	Image Pixel Module	CONDITIONAL
Image	Cine Module	CONDITIONAL
Image	Multi-Frame Module	CONDITIONAL
Image	US Image Module	CONDITIONAL
Image	VOI LUT Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended Dicom and Private attributes	CONDITIONAL

Table 25: Patient Module

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

Table 26: General Study Module

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

Table 27: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ANAPCV	AUTO	-
Series Time	0008,0031	TM		ANAPCV	AUTO	-
Modality	0008,0060	CS	US	ALWAYS	AUTO	-
Series Description	0008,103E	LO		ANAPCV	AUTO	-
Protocol Name	0018,1030	LO		ANAPCV	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-

Table 28: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO	Philips Medical Systems	ALWAYS	AUTO	-
Manufacturer's Model Name	0008,1090	LO	QLAB	ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	-

Table 29: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Derivation Description	0008,2111	ST	QLAB Clip	ALWAYS	AUTO	-
Source Image Sequence	0008,2112	SQ		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1.2.840.10008.5.1.4.1.1.3.1	ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-
Patient Orientation	0020,0020	CS		VNAP	AUTO	-
Burned In Annotation	0028,0301	CS	NO	ALWAYS	AUTO	-
Lossy Image Compression Ratio	0028,2112	DS		ALWAYS	AUTO	-

Table 30: 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	-
Pixel Data	7FE0,0010	OW/OB		ALWAYS	AUTO	-

Table 31: Cine Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame Time Vector	0018,1065	DS		ALWAYS	AUTO	-

Table 32: 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	Value 1: 00181065	ALWAYS	AUTO	-

Table 33: US Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	Value 1: DERIVED, Value 2: SECONDARY	ALWAYS	AUTO	-
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS		ALWAYS	AUTO	-
Planar Configuration	0028,0006	US		ALWAYS	AUTO	-
Frame Increment Pointer	0028,0009	AT	0x00181065	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	0x0000	ALWAYS	AUTO	-
Lossy Image Compression	0028,2110	CS	01	ALWAYS	AUTO	-

Table 34: VOI LUT Module

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

Table 35: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO_IR 100	ALWAYS	AUTO	Required if expanded/replacement character set used
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	-

2.2. Standard Extended/Specialized/Private SOPs

Not applicable.

Table 36: List of created SOP Classes

SOP Class Name	SOP Class UID
Comprehensive SR SOP Class	1.2.840.10008.5.1.4.1.1.88.33
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Philips Private SONOS 7500 Live 3D Cartesian Storage	1.2.840.113543.6.6.1.3.1002

2.2.1. Standard Extended/Specialized/Private SOP Instance

2.2.1.1. Comprehensive SR SOP Class

Table 37: Extended DICOM and private attributes for Comprehensive SR SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Study Description	0008,1030	LO		ANAP	AUTO	-

Series Description	0008,103E	LO		EMPTY	AUTO	-
Protocol Name	0018,1030	LO		EMPTY	AUTO	-

2.2.1.2.   Ultrasound Image Storage SOP Class

Table 38: Extended DICOM and private attributes for Ultrasound Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	SYN	ALWAYS	AUTO	Synthetic Image.

2.2.1.3.   Ultrasound Multi-frame Image Storage SOP Class

Table 39: Extended DICOM and private attributes for Ultrasound Multi-frame Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS	SYN	ALWAYS	AUTO	-