DICOM CONFORMANCE STATEMENT

FOR

TE Air

ULTRASOUND SYSTEM

mindray 迈瑞

Version V1.0 2022-10-25

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1 Conformance Statement Overview

This document describes the conformance to the ACR-NEMA DICOM 3.0 Standard by the ultrasound system of TE Air. We specify ultrasound system generally refer to the products above in this document. The ultrasound system implements the necessary DICOM services to download worklists from an information system, save acquired Ultrasound (US) images to a network storage device. Table 1 provides an overview of the supported network services.

Table 1

NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer（Storage）		
Verification	Yes	No
Ultrasound Image Storage	Yes	No
Ultrasound Multi-frame Image Storage	Yes	No
Workflow Management		
Modality Worklist Information Model – Find	Yes	No

2 Table of Contents

3 Introduction

3.1 Review History

DOCUMENT VERSION	DATE OF ISSUE	DESCRIPTION
1.0	October.25,2022	Creation of the document

3.2 Audience

This document is intended for potential customers, system integrators of medical equipment, marketing staff interested in system functionality and software designers implementing DICOM interfaces. It is assumed that the readers of this document are familiar with the DICOM Standard and with the terminology and concept which are used in the Standard. If readers are unfamiliar with DICOM terminology they should read the DICOM Standard, prior to reading this DICOM Conformance Statement document.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Mindray Products and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is the first step towards assessing interconnectivity and interoperability between Mindray medical equipment and other DICOM conformant equipments.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.
- The DICOM standard will evolve to meet the user's growing requirements. Mindray is actively involved in the development of the DICOM standard,. Therefore, Mindray reserves the right to make changes to its products or to discontinue its delivery.
- The Ultrasound System follows the IHE SWF, PDI, ED Profiles.

3.4 Terms and Definitions

- **Abstract Syntax** – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
- **Application Context** – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.
- **Application Entity (AE)** – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
- **Application Entity Title** – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network. The Called AE Title defines the intended receiver of an Association. Nevertheless, the Calling AE Title defines the requestor of an Association.
- **Association** – a network communication channel set up between *Application Entities*.
- **Association Establishment** - an Association Establishment is the first phase of communication between two DICOM Application Entities. The AEs use the Association Establishment to negotiate how data will be encoded and the type of data to be exchanged.
- **Attribute** – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004).
- **DICOM File Format** - the DICOM File Format provides a means to encapsulate in a File the Data Set representing a SOP Instance related to a DICOM Information Object.
- **DICOM Message Service Element (DIMSE)** – a DIMSE defines the services and protocols utilized by an Application Entity to exchange messages.
- **File** - a File is an ordered string of zero or more bytes, where the first byte is at the beginning of the file and the last byte is at the end of the File. Files are identified by an unique File ID and may by written, read, or deleted.
- **File Meta Information** - the File Meta Information includes identifying information on the encapsulated Data Set. It is a mandatory header at the beginning of every DICOM File.
- **Information Object Definition (IOD)** - the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or

Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: Print Job IOD.

- **Joint Photographic Experts Group (JPEG)** – a set of standardized image compression techniques, available for use by DICOM applications.
- **Module** – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
- **Negotiation** – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.
- **Physical Media** - a piece of material with recording capabilities for streams of bits. Characteristics of a Physical Media include form factor, mechanical characteristics, recording properties and rules for recording and organizing bit streams in accessible structures.
- **Presentation Context** – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.
- **Protocol Data Unit (PDU)** – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
- **Security Profile** – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data
- **Service Class Provider (SCP)** – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
- **Service Class User (SCU)** – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)
- **Service/Object Pair (SOP) Class** – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
- **Service/Object Pair (SOP) Instance** – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.
- **Tag** – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID].
- **Transfer Syntax** – the encoding used for exchange of DICOM information objects

and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

- **Unique Identifier (UID)** – a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
- **Value Representation (VR)** – the format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Acronyms, Abbreviations, and Symbols

The following acronyms and abbreviations are used in this document.

AE	Application Entity
DICOM	Digital Imaging and Communications in Medicine
JPEG	Joint Photographic Experts Group
MODALITY	Ultrasound System
MWL	Modality Worklist
PACS	Picture Archiving and Communication System
SCU	Service Class User
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
VR	Value Representation
US	Ultrasound
UID	Unique Identifier

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

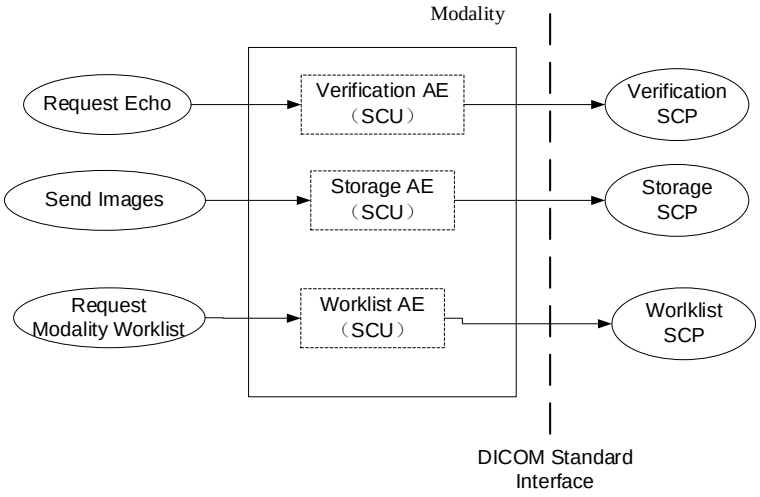

Figure 1

Implementation Model

This application entity provides a user interface, internal database and network listener that spawns additional threads as necessary to handle incoming connections.

Conceptually the network services may be modeled as the following AE's, however, in fact all the AE's share a single (configurable) AE Title:

- Verification AE (as SCU)
- Storage AE (as SCU)

- Worklist AE (as SCU)

4.1.2 Functional Definitions of AE's

4.1.2.1 Verification AE

The ultrasound system supports the Verification service as a SCU.

As a SCU, verification is activated when the verify button is selected on the dicom service configuration page where the verification results will also be showed to the user.

4.1.2.2 Storage AE

As a SCU, the Storage AE originates associations for the transfer of DICOM Ultrasound single frame images, multi-frame images to remote AE (selected from a pre-configured list)..

The system supports manual storage.

The operations for manual storage service are described below:

- Operation 1

Step 1: Select exams in the iStation Dialog.

Step 2: Press "Send Exam" and select DICOM Storage service SCPs.

Step 3: Send the selected exams to the DICOM Storage service SCPs.

- Operation 2

Step 1: Open the review dialog and select the images.

Step 2: Press "Send to" button and select Send to DICOM.

Step 3: Send the images to the DICOM Storage service SCPs.

4.1.2.3 Worklist AE

The Worklist AE is activated through the Worklist UI when the user selects a remote AE to query .The system supports manual query.

If more than one matching patients found, user can discover lists number on the UI. The user can also change query rules for another query, or for further filter in local database to locate the patients quickly.

4.1.3 Sequence of Real World Activities

All SCU activities are sequentially initiated in the user interface, and another activity may

not be initiated until the prior activity has completed.

4.2 AE Specifications

4.2.1 Modality AE

4.2.1.1 SOP Classes

The ultrasound system provides Standard Conformance to the following SOP Class:

Table 2
SOP Class for Modality AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Modality Worklist Information Model – Find	1.2.840.10008.5.1.4.31	Yes	No

4.2.1.2 Association Establishment Policies

4.2.1.2.1General

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

Table 3
DICOM Application Context for Modality AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2Number of Associations

The system initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list.

Table 4
Number of Associations as an Association Initiator

Maximum number of simultaneous associations	1

Table 5
Number of Associations as an Association Acceptor

Maximum number of simultaneous associations	1

4.2.1.2.3 Asynchronous Nature

The ultrasound system will only allow a single outstanding operation on an association.

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Request Echo

4.2.1.3.1.1 Description and Sequencing of Activities

The user can verify the existence of a DICOM server on the hospitals network, through a button in the 'DICOM Service' screen. When the user presses this button, the ultrasound system will initiate the association.

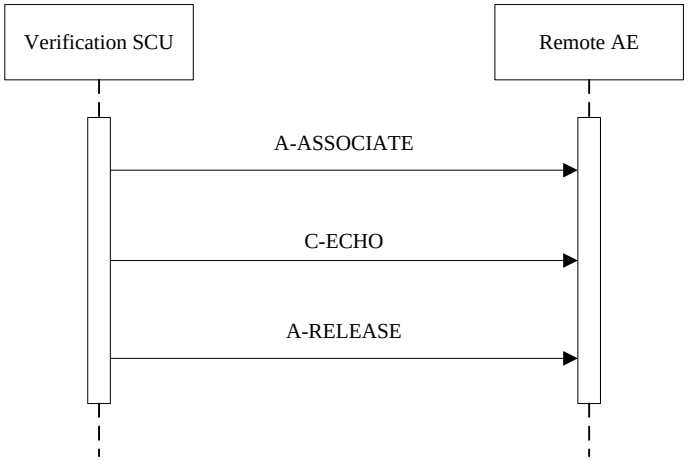

Figure 2
Sequencing of Activity – Send Echo Request

4.2.1.3.1.2 Proposed Presentation Contexts

The Verification AE (as SCU) supports the following Presentation Contexts for Verification.

Table 6
Presentation Contexts for Verification

PROPOSED PRESENTATION CONTEXTS					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

4.2.1.3.1.3 SOP Specific Conformance

It summarizes the behavior of Ultrasound System when receiving status codes in a C-ECHO response.

Table 7

Verification C-Echo Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior (as SCU)
Success	Success	0000	Device Status is set to: Verify Successful
Refused	Out of Resources	A7XX	Device Status is set to: Verify Failed
Failed	Unable to process	CXXX	Device Status is set to: Verify Failed
*	*	Any other status code	Device Status is set to: Verify Failed

4.2.1.3.2 Activity – Store images

4.2.1.3.2.1 Description and Sequencing of Activities

For each exam, image selected from the user interface to be transferred, an attempt will be made to transfer it to the selected remote AE. When the storage fails, user can restart the failed task by pressing “Retry” Button on the ultrasound task management dialog. Besides that, in the event that the ultrasound system is taken off the network or when a network failure occurs during a background store, the Storage SCU maintains a queue of failed C-STORE requests.

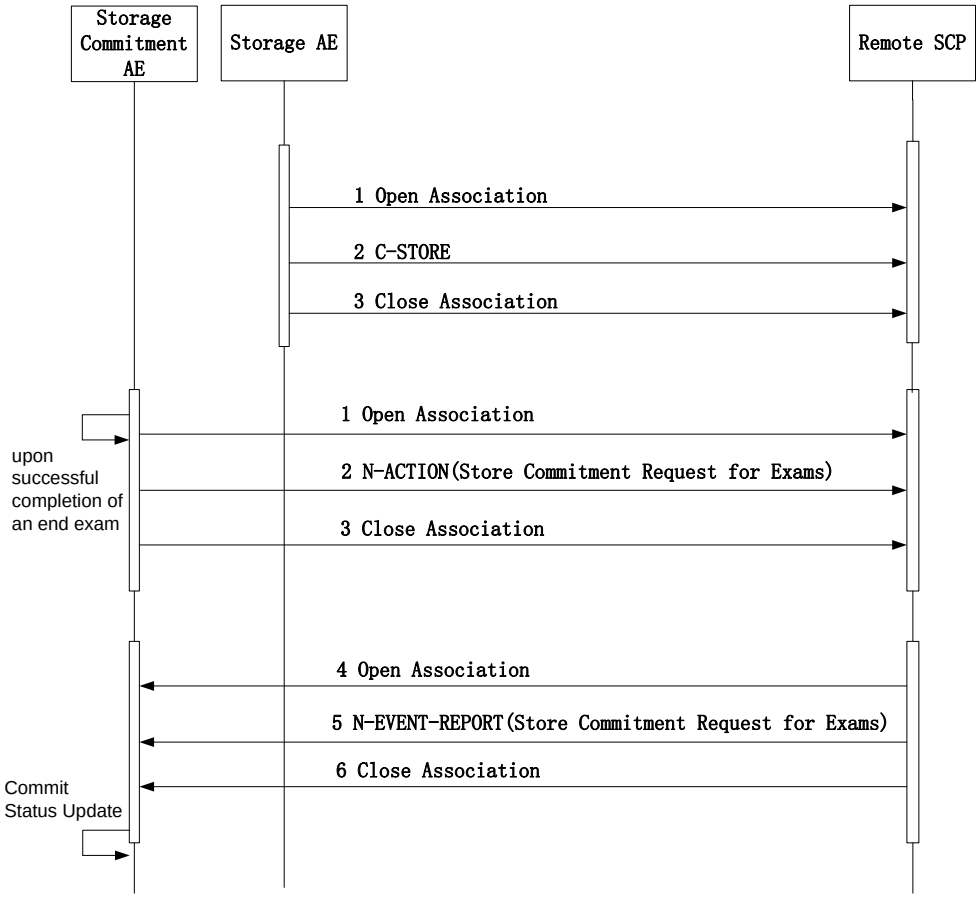

Figure 3

Sequencing of Activity – Send Storage Request

4.2.1.3.2.2 Proposed Presentation Contexts

Transfer Syntaxes only supports JPEG Lossy.

Table 8
Proposed Presentation Contexts for Storage

PROPOSED PRESENTATION CONTEXTS					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process 1)	1.2.840.10008.1.2.4.50	SCU	None

4.2.1.3.2.3 SOP Specific Conformance

Storage AE provides Standard Conformance to the Storage Service Class.

Storage AE will behave as described in the Table below in response to the status returned in the C-STORE response command message.

Table 9
Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	Image transmission is successful, The status code is logged and the task success is reported to the user via task management.
Refused	Out of Resources	A7xx	The association is aborted using A-ABORT and the send task is marked as failed.
Error	Data Set does not match SOP Class	A9xx	The association is aborted using A-ABORT and the send task is marked as failed.
Error	Cannot Understand	Cxxx	The association is aborted using A-ABORT and the send job is marked as failed.
Failure	Any other failure	xxxx	The association is aborted using A-ABORT and the send job is marked as failed.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful but the status meaning is logged.
	Data Set does not match SOP Class	B007	Image transmission is considered successful but the status meaning is logged.

	Elements Discarded	B006	Image transmission is considered successful but the status meaning is logged.
	Any other status code.	xxxx	The Association is aborted using A-ABORT and the send job is marked as failed.

The behavior during communication failure is summarized in the Table below:

Table 10

Storage Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via task management.

The following tables provide the list of attributes requested in the Storage.

Table 11

US Image IOD

IE	Module
Patient	Patient
Study	General Study
	Patient Study
Series	General Series
Equipment	General Equipment
Image	General Image
	Image Pixel
	US Region Calibration
	US Image
	VOI LUT
	SOP Common

Table 12

US Multi-Frame Image IOD

IE	Module
Patient	Patient
Study	General Study
	Patient Study
Series	General Series
Equipment	General Equipment
Image	General Image

	Image Pixel
	Cine
	Multi-frame
	US Region Calibration
	US Image
	VOI LUT
	SOP Common

Table 13

Patient Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0010,0010)	PN	2	Patient's Name	MWL/USER
(0010,0020)	LO	2	Patient ID	MWL/USER
(0010,0030)	DA	2	Patient's Birth Date	MWL/USER, default is set to zero length
(0010,0040)	CS	2	Patient's Sex	MWL/USER, default is set to zero length
(0010,1000)	LO	3	Other Patient IDs	MWL/USER

Table 14

General Study Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0020)	DA	2	Study Date	AUTO
(0008,0030)	TM	2	Study Time	AUTO
(0008,0050)	SH	2	Accession Number	MWL/USER, default is set to zero length
(0008,0090)	PN	2	Referring Physician's Name	MWL/USER, default is set to zero length
(0008,1030)	LO	3	Study Description	USER
(0020,000D)	UI	1	Study Instance UID	MWL/AUTO
(0020,0010)	SH	2	Study ID	MWL/AUTO

Table 15

General Series Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0021)	DA	3	Series Date	AUTO

(0008,0031)	TM	3	Series Time	AUTO
(0008,0060)	CS	1	Modality	“US”
(0008,1050)	PN	3	Performing Physician's Name	MWL/USER, default is set to zero length
(0008,1070)	PN	3	Operators' Name	MWL/USER, default is set to zero length
(0018,1030)	LO	3	Protocol Name	AUTO – set to ExamType
(0020,000E)	UI	1	Series Instance UID	AUTO
(0020,0011)	IS	2	Series Number	AUTO

Table 16

General Equipment Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0070)	LO	2	Manufacturer	“MINDRAY”
(0008,1010)	SH	3	Station Name	AUTO
(0008,1090)	LO	3	Manufacturer's Model Name	TE Air
(0018,1020)	LO	3	Software Version(s)	AUTO

Table 17

General Image Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0023)	DA	2C	Content Date	AUTO
(0008,0033)	TM	2C	Content Time	AUTO
(0008,2111)	ST	3	Derivation Description	AUTO
(0020,0013)	IS	2	Instance Number	AUTO
(0020,0020)	CS	2C	Patient Orientation	Set to zero length
(0020,4000)	LT	3	Image Comments	Set to zero length
(0028,0301)	CS	3	Burned In Annotation	“YES”

Table 18

US Image Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0008)	CS	2	Image Type	“ORIGINAL/PRIMARY”
(0028,0002)	US	1	Samples per Pixel	1 or 3
(0028,0004)	CS	1	Photometric Interpretation	“YBR_FULL_422”
(0028,0006)	US	1C	Planar Configuration	0
(0028,0014)	US	3	Ultrasound Color Data Present	0 or 1
(0028,0100)	US	1	Bits Allocated	0x0008
(0028,0101)	US	1	Bits Stored	0x0008
(0028,0102)	US	1	High Bit	0x0007
(0028,0103)	US	1	Pixel Representation	0x0000

Table 19

Image Pixel Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0028,0010)	US	1	Rows	AUTO
(0028,0011)	US	1	Columns	AUTO

Table 20

SOP Common Module

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,0005)	CS	1C	Specific Character Set	AUTO
(0008,0012)	DA	3	Instance Creation Date	AUTO
(0008,0013)	TM	3	Instance Creation Time	AUTO
(0008,0016)	UI	1C	SOP Class UID	AUTO
(0008,0018)	UI	1C	SOP Instance UID	AUTO

Table 21

Cine Module Used for US Multi-Frame Images Only

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0008,2142)	IS	3	Start Trim	Set by the system
(0008,2143)	IS	3	Stop Trim	Set by the system
(0008,2144)	IS	3	Recommended Display Frame Rate	Set by the system
(0018,0040)	IS	3	Cine Rate	Set by the system
(0018,0072)	DS	3	Effective Duration	Set by the system
(0018,1063)	DS	1C	Frame Time	Set by the system
(0018,1066)	DS	3	Frame Delay	Set by the system
(0018,1242)	IS	3	Actual Frame Duration	Set by the system
(0018,1244)	US	3	Preferred Playback Sequencing	Set by the system

Table 22

Multi-Frame Module Used for US Multi-Frame Images Only

ATTRIBUTE	VR	TYPE	ATTRIBUTE NAME	VALUE(S) AND COMMENTS
(0028,0008)	IS	1	Number of Frames	AUTO
(0028,0009)	AT	1	Frame Increment Pointer	0018 1063 = Frame Time

Conventions used for the Value(s) and Comments section are:

MWL – the attribute value source is from Modality WORKLIST

USER – the attribute value source is from User's input

AUTO – automatically generated by the MODALITY system

CONFIG - the attribute value source is a configurable parameter

4.2.1.3.3 Activity – Send Find Request

4.2.1.3.3.1 Description and Sequencing of Activities

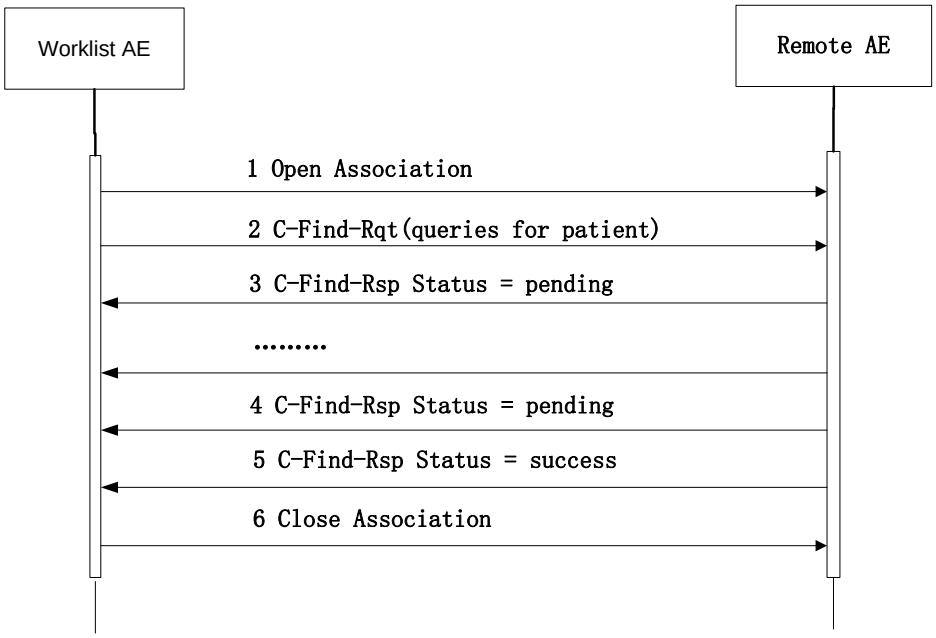

Figure 4

Sequencing of Activity – Send FIND Request

A possible sequence of interactions between the Worklist AE and a remote AE (e.g. a system such as a RIS or HIS; or a PACS) is illustrated in the Figure below:

1. The Worklist AE opens an association with the remote AE
2. The Worklist AE sends a C-FIND request to the remote AE containing the Query attributes.
3. The remote AE returns a C-FIND response containing the requested attributes of the first matching Item.
4. The remote AE returns another C-FIND response containing the requested attributes of the second matching Item. And then another one.
5. When the remote AE returns all the C-FIND responses with status Success indicating that no further matching Items exist.
6. The C-Find AE closes the association with the remote AE.

4.2.1.3.3.2 Proposed Presentation Contexts

Table 23

Proposed Presentation Contexts for Worklist AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Worklist Information Model – Find	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Worklist AE will propose Presentation Contexts for the SOP Classes listed above. For these SOP Class, Worklist AE will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes.

4.2.1.3.3.3 SOP Specific Conformance

Table 24
C_FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior (as SCU)
Refused	Out of resources	A700	The association is aborted and a notify message is displayed: Worklist server error#01
Failed	Identifier Does Not Match SOP Class	A900	
Failed	Unable to process	Cxxx	
Cancel	Matching terminated due to Cancel request	FE00	/
Success	Matching is complete - No final Identifier is supplied.	0000	Patient lists show on the UI
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	FF00	The worklist item contained in the Identifier is collected for later display or further processing.
Pending	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier.	FF01	The worklist item contained in the Identifier is collected for later display or further processing.
*	The Association is aborted using A-ABORT and the query is marked as failed. The status meaning is logged and	Any other status code.	The association is aborted and a notify message is displayed: Worklist server

	reported to the user if an interactive query. Any additional error information in the Response will be logged.		error#01

Worklist AE provides Standard Conformance to the Storage Service Class.

Worklist AE will behave as described in the Table in response to the status returned in the C-FIND response command message.

The behavior of Ultrasound System during communication failure is summarized in the Table below.

Table 25

COMMUNICATION FAILURE BEHAVIOR FOR WORKLIST AE

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the worklist marked as failed. The reason is logged and reported to the user if an interactive query.
Association aborted by the SCP or network layers	The query is marked as failed. The reason is logged and reported to the user if an interactive query.

The Table below provides a description of the Ultrasound system Query Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Table 26

Worklist Request Identifier

ATTRIBUTE	VR	ATTRIBUTE NAME	MATCHING KEYS	RETURN KEYS
Module: Patient Identification Module (M)				
(0010,0010)	PN	Patient's Name	configurable	X (DI)
(0010,0020)	LO	Patient ID	configurable	X(DI)
(0010,1000)	LO	Other Patient IDs		X (DI)
Module: Patient Demographic Module (M)				
(0010,0030)	DA	Patient's Birth Date		X(DI)
(0010,0040)	CS	Patient's Sex		X(DI)
Module: Imaging Service Request Module (M)				
(0008,0090)	PN	Referring Physician's Name		X (DI)

The convention used for Matching Keys is:

X - Return keys. An " X " indicates that MODALITY supplies this attribute as a Return Key with zero length for Universal Matching.

DI – Display to the user.

4.3 Network Interface

4.3.1 Supported Communications Stacks

Modality DICOM AEs provide DICOM 3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.3.2 TCP/IP Stack

Modality DICOM AEs inherit their TCP/IP stack from the IOS Operating System upon which they execute.

4.3.3 Additional Protocols

Modality does not support additional protocols.

4.4 Configuration

The Configuration Utility allows the service engineer to set and maintain configuration parameters of local and remote DICOM application entities.

4.4.1 AE Title/Presentation Address Mapping

This mapping (including IP and port numbers) is defined during the system Network Configuration procedure.

4.4.2 Configurable Parameters

DICOM Service Setting:

- Client AE Title
- Server AE Title
- Server address
- Port
- TLS Port

WORKLIST:

- Client AE Title
- Server AE Title
- Server address
- Port
- TLS Port

5 SECURITY

5.1 Security Profiles

TE Air supports secure DICOM communication in conformance with the Basic TLS Secure Transport Connection Profile and the AES TLS Secure Transport Connection Profile.At default configuration,the TLS option is deactivated.

Basic TLS Secure Transport Connection Profile and the AES TLS Secure Transport Connection Profile are supported using Transport Layer Security Version 1.2 protocol with the following features:

Supported TLS Feature	**Mechanism**
Entity Authentication	RS A based certificates
Exchange of Master Secrets	RSA
Data Integrity	SHA
Privacy (Cyphersuite Options)	TLS_RSA_WITH_AES_128_CBC_SHA

5.2 Association level security

None supported.

Any Calling AE Titles and/or IP addresses may open an Association.

5.3 Application level security

DICOM TLS.