



somo·VIEWer™

DICOM Conformance Statement

2009

1 Conformance Statement Overview

The Breast Ultrasound Work Station “somo·VIEWer™” supports receiving DICOM Ultrasound, Multi-frame Ultrasound, and 3D Ultrasound images. It is also able to query and retrieve images from external systems, and to send and print images to external systems.

Table 1, Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Ultrasound Image Storage	Yes	Yes
Ultrasound Multi-frame Image Storage	Yes	Yes
Query/Retrieve		
Study Root Q/R - FIND	Yes	No
Study Root Q/R – MOVE	Yes	No
Print		
Basic Grayscale Print Management Meta SOP Class	Yes	No
Basic Color Print Management Meta SOP Class	Yes	No

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3 Introduction

This DICOM Conformance Statement is written according to part PS 3.2 of the DICOM standard†.

The application described in this conformance statement is the U-Systems **somoVIEWer™**. The **somoVIEWer™** acts as SCU and SCP for the DICOM Storage and as SCU for DICOM Query/Retrieve and Print.

3.1 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.2 Remarks

DICOM by itself does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with the SomoViewer and other vendors' of DICOM equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard†. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

3.3 Definitions Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard†.

AE	Application Entity
ANSI	American National Standards Institute
DICOM	Digital Imaging and Communications in Medicine
IOD	Information Object Definition
LAN	Local Area Network
PDU	Protocol Data Unit
SCU	Service Class User
SCP	Service Class Provider
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VR	Value Representation

3.4 References

† Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2008

4 Networking

4.1 Implementation Model

The somo·VIEWer™ stores images and patient data directly on the system's hard disk. All images and patient data are retained locally on the system (storage space permitting) allowing this data to be sent or re-sent at the operators' discretion to a DICOM storage server or printer.

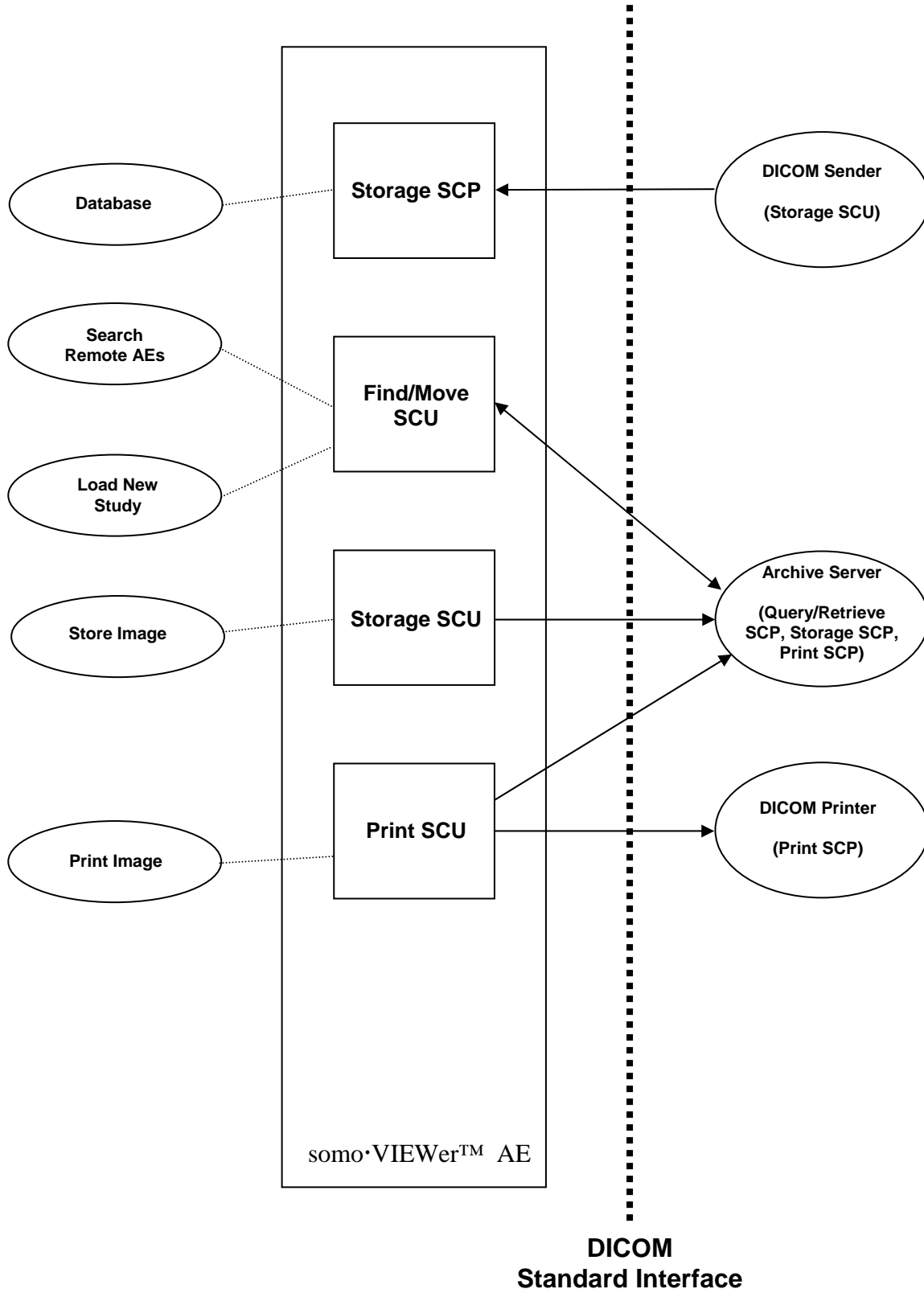
4.1.1 Application Data Flow Diagram

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

Conceptually the network services may be modeled as the following separate AEs, though in fact all the AEs share a single (configurable) AE Title:

- The Storage SCP can receive incoming images.
- The Storage SCU can send outbound images.
- The Find/Move SCU queries remote AEs for lists of studies, and retrieves series and instances.
- The Print SCU can send images to a Print SCP.

Figure 1, Application Data Flow Diagram



4.1.2 Functional Definitions of AE's

The somo•VIEWer™ has a single AE that performs all the required DICOM related tasks.

4.1.2.1 Storage SCP

The Storage SCP waits in the background for connections, will accept associations with accepted Presentation Contexts for SOP Classes of the Storage Service Class, and will store the received instances to the local database where they may subsequently be listed and viewed through the user interface.

4.1.2.2 Storage SCU

The Storage SCU is activated through the user interface when a user selects instances from the currently displayed instance and requests that they be sent to a remote AE (selected from a pre-configured list).

4.1.2.3 Find/Move SCU

The Find SCU is activated through the user interface when a user selects a remote AE to query (from a preconfigured list), then initiates a query. The Move SCU is activated through the user interface when a user selects a study to load. A connection to the remote AE is established to initiate the retrieval and the Storage SCP receives the retrieved instances.

4.1.2.4 Print SCU

The Print SCU is activated through the user interface when a user selects instances from the currently displayed instance and requests that they be sent to a remote Print SCP (selected from a pre-configured list).

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and not dependent on any sequencing. All SCU activities are sequentially initiated in the user interface but run asynchronously.

4.2 AE Specifications SomoViewer

4.2.1 SomoViewer AE

The somo•VIEWer™ AE provides Standard Conformance to the DICOM V3.0 SOP Classes as an SCP:

- Verification SOP Class
- Ultrasound Image Storage SOP Class
- Ultrasound Multi-frame Image Storage SOP Class

The somo•VIEWer™ AE provides Standard Conformance to the DICOM V3.0 SOP Classes as an SCU:

- Study Root Query/Retrieve – FIND SOP Class
- Study Root Query/Retrieve – MOVE SOP Class
- Basic Grayscale Print Management Meta SOP Class
- Basic Color Print Management Meta SOP Class

4.2.2 Association Establishment Policy

4.2.2.1 General

The default PDU size used will be 16 KB.

4.2.2.2 Number of Associations

The somo•VIEWer™ AE accepts multiple associations at a time. The maximum number is 10. If the number is reached, a newly required association will be rejected until some associations are released. This transient rejection response might be delayed to avoid immediate retries.

The Storage SCU initiates a new association for each request, but there is only one open association at a time. The Query/Retrieve SCU initiates a new association for request. The Print SCU initiates a new association for each request, but there is only one open association at a time.

4.2.2.3 Asynchronous Nature

The somo·VIEWer™ does not support asynchronous communication.

4.2.2.4 Implementation Identifying Information

The somo·VIEWer™ DICOM software provides a single Implementation Class UID of

- 2.16.840.1.114241.1

and Implementation Version Name of

- U-SYSTEMS_V1.0

4.2.3 Association Acceptance Policy

The somo·VIEWer™ application attempts to accept a new association for

- DIMSE C-ECHO
- DIMSE C-STORE

Service operations.

Generally associations are accepted if all of the following conditions are true:

- The maximum number of incoming associations is not reached
- At least one Presentation Context has been proposed with at least one of the following transfer syntax:
 - Explicit VR Little Endian
 - Implicit VR Little Endian
 - Explicit VR Big Endian
 - JPEG Baseline

4.2.3.1 Activity – Receive Image

4.2.3.1.1 Description and Sequencing of Activity

The somo·VIEWer™ receiving process will accept an association, receive any Ultrasound or Ultrasound Multi-frame images transmitted on that association and store the images on disk. It will store some header attributes in the database for the SomoViewer to display the study information and view the image.

4.2.3.1.2 Proposed Presentation Contexts

The Storage SCP provides Standard Conformance to the following SOP Classes:

Table 2, SOP Classes supported by the Storage SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		

Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Baseline	1.2.840.10008.1.2.50		
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
		JPEG Baseline	1.2.840.10008.1.2.50		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.3.1.3 SOP Specific Conformance to Storage SCP

In case of a successful C-Store operation, the image has successfully been written on disk either in Explicit Little Endian format or in the JPEG Baseline format received. Table 3 lists the status codes returned for the C-Store operation.

Table 3, C-Store SCP Return Status

Service Status	Meaning	Protocol Code	Behavior
Success	Image is successfully stored on file system	0000	The image transfer has completed. The association is closed. The successful image transfer does not guarantee the successful storage of metadata in the database.
Failure	Out of Resources	A700	The image transfer has failed. Association is closed. Any error information is logged.
	Data Set does not match SOP Class	A900	
	Can not understand	C000	

4.2.4 Association Initiation Policy

The somo·VIEWer™ initiates associations while process user or internal request as shown in Table 4.

Table 4, Activity Triggers Association Initiation

Activity	Associations
Export Request	C-Store
Query Request	C-Find
Retrieve Request	C-Move
Print Request	N-Create, N-Action, N-Set, N-Get, N-Event-Report, N-Delete

4.2.4.1 Activity – Send Image

4.2.4.1.1 Description and Sequencing of Activity

Upon the export request, the SomoViewer will initiate an association, send one or several Ultrasound, Ultrasound Multi-frame or Secondary Capture images on that association to the destination. There is only one open association at a time. All export requests are kept in a queue for sequentially transfer. Any failed request can be manually re-sent or deleted.

4.2.4.1.2 Proposed Presentation Contexts

The Storage SCU provides Standard Conformance to the following SOP Classes:

Table 5, SOP Classes Supported by C-Store SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.4.1.3 SOP Specific Conformance to Storage SCU

The secondary captured images created by the SomoViewer conform to the DICOM IOD definitions.

4.2.4.2 Activity – C-Find Request

4.2.4.2.1 Description and Sequencing of Activity

Upon the query request, the SomoViewer opens a new, dedicated association, issues a C-Find request with the query parameters. “Pending Responses” are propagated back to the initiator. After the C-Find request has been completed, the association is closed.

4.2.4.2.2 Proposed Presentation Contexts

The Find SCU provides Standard Conformance to the following SOP Classes:

Table 6, SOP Classes Supported by C-Find SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.4.2.3 SOP Specific Conformance to Find SCU

Only a single information model, Study Root, is supported.

All queries are initiated at the highest level of the information model (the STUDY level), and then for each response received, recursively repeated at the next lower levels (the SERIES and then IMAGE levels) if configured. No CANCEL requests are ever issued.

Unexpected attributes returned in a C-FIND response (those not requested) are ignored. Requested return attributes not returned by the SCP are listed as blank value. Non-matching responses returned by the SCP due to unsupported matching keys are not filtered locally by the FIND-SCU and thus will still be presented in the browser. No attempt is made to filter out duplicate responses.

Specific Character Set will always be included at every query level.

Table 7, Study-Root Request Identifier for Find SCU

Level Name Attribute Name	Tag	VR	Types of Matching
SOP Common Specific Character Set	0008, 0005	CS	
Study Level			
Patient's Name	0010, 0010	PN	S, *, U
Patient ID	0010, 0020	LO	S, *, U
Patient's Birth Date	0010, 0030	DA	S, *, U
Patient's Sex	0010, 0040	CS	S, *, U
Issuer of Patient ID	0010, 0021	LO	NONE
Other Patient IDs	0010, 1000	CS	NONE
Study Instance UID	0020, 000D	UI	UNIQUE
Study ID	0020, 0010	SH	S, *, U
Study Date	0008, 0020	DA	S, *, U, R
Study Time	0008, 0030	TM	NONE
Accession Number	0008, 0050	SH	S, *, U
Study Description	0008, 1030	LO	S, *, U
Referring Physician's Name	0008, 0090	PN	S, *, U
Modalities at Study	0008, 0061	CS	S, *, U
Series Level			
Series Instance UID	0020, 000E	UI	UNIQUE
Series Number	0020, 0011	IS	S, *, U
Modality	0008, 0060	CS	S, *, U
Body Part Examined	0018, 0015	CS	NONE
Laterality	0020, 0060	CS	NONE
Series Description	0008, 103E	LO	S, *, U
Series Date	0008, 0021	DT	S, *, U, R
Series Time	0008, 0031	TM	NONE
Operator's Name	0008, 1070	PN	NONE
Image Level			
SOP Instance UID	0008, 0018	UI	UNIQUE
SOP Class UID	0008, 0016	UI	NONE
Instance Number	0020, 0013	IS	NONE
Content Date	0008, 0023	DA	NONE
Content Time	0008, 0033	TM	NONE
View Name	0008, 2127	SH	NONE

Types of Matching:

An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, an "*" indicates wildcard matching, and a 'U' indicates Universal Matching. "NONE" indicates that no matching is supported, but that values for this Element are requested to be returned (i.e. universal matching), and "UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

Table 8 lists the status codes received for the C-Find operation.

Table 8, C-Find SCU Status

Service Status	Meaning	Protocol Code	Behavior
Success	Query has completed – No failures or Warnings.	0000	The query results are propagated to the initiator. Association is closed.
Pending	Suboperations are continuing	FF00	The query are continuing.
Failure	Out of Resources	A700	The query has failed. Association is closed. Any error information is logged.
	SOP Class not supported	A800	
	Data Set does not match SOP Class	A900	
	Unable to Process	C000	

4.2.4.3 Activity – C-Move Request

4.2.4.3.1 Description and Sequencing of Activity

Upon the retrieve request, the SomoViewer opens a new, dedicated association, issues a C-Move request with the query parameters. After the C-Move request has been completed, the association is closed. The retrieved images are displayed.

4.2.4.3.2 Proposed Presentation Contexts

The Move SCU provides Standard Conformance to the following SOP Classes:

Table 9, SOP Classes Supported by C-Move SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.4.3.3 SOP Specific Conformance to Move SCU

Only a single information model, Study Root, is supported.

A retrieval will be performed at the STUDY level. No CANCEL requests are ever issued.

The instances are retrieved to the current application’s local database by specifying the destination as the AE Title of the SomoViewer. This implies that the remote C-MOVE SCP must be preconfigured to determine the presentation address corresponding to the SomoViewer. The SomoViewer receiving application will accept storage requests addressed to it from anywhere, so no pre-configuration of the local application to accept from the remote AE is necessary.

Table 10, Study Root Request Identifier for Move SCU

Level Name Attribute Name	Tag	VR	Types of Matching
SOP Common Specific Character Set	0008, 0005	CS	
Study Level Study Instance UID	0020, 000D	UI	UNIQUE

Table 11 lists the status codes received for the C-Move operation.

Table 11, C-Move SCU Status

Service Status	Meaning	Protocol Code	Behavior
Success	Retrieve has completed – No failures or Warnings.	0000	Association is closed. The retrieve results (images) are displayed.
Pending	Suboperations are continuing	FF00	The retrieve are continuing.
Failure	Out of Resources	A701, A702	The retrieve has failed. Association is closed. Any error information is logged.
	SOP Class not supported	A800	
	Move Destination Unknown	A801	
	Data Set does not match SOP Class	A900	
	Unable to Process	C000	

4.2.4.4 Activity – Print Image

4.2.4.4.1 Description and Sequencing of Activity

Upon a print request, the SomoViewer will initiate an association, send one or several images to the DICOM printer for printing based on the configured print layout. There is only one open association at a time. All print requests are kept in a queue for sequentially printing. Any failed request is discarded.

4.2.4.4.2 Proposed Presentation Contexts

The Print Management Meta SOP Class provides Standard Conformance to the following SOP Classes:

Table 12, Proposed Presentation Contexts for Print Management Meta SOP Class

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

The SomoViewer AE will negotiate an association with Basic Color Print Management Meta SOP Class then the Basic Grayscale Print Management Meta SOP Class. The first acceptable syntax will be used unless the printer type is set to GREYSCALE in the Printer Settings. When set to GREYSCALE only the Basic Grayscale Print Management Meta SOP Class syntaxes will be negotiated.

The AE provides standard conformance with two Print Management Meta SOP Classes. This means that the AE provides standard conformance with the underlying SOP classes that are shown in Table 13. The details of the conformance to the underlying SOP classes can be found in the referenced sections.

Table 13, Underlying SOP classes for Print Management Meta SOP Classes

SOP Class Name	SOP Class UID	Usage
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	M
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	M
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	M
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	M
Printer SOP Class	1.2.840.10008.5.1.1.16	M

4.2.4.4.3 SOP Specific Conformance to Printer SOP Class

The SomoViewer supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-GET
- N-EVENT-REPORT

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.4.4.3.1 Printer SOP Class Operations (N-GET)

The SomoViewer uses the Printer SOP Class N-GET operation to obtain information about the current printer status. The attributes obtained via N-GET are listed in Table 14.

Table 14, Printer SOP Class N-GET Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Printer Status	(2110,0010)	CS	Provided by printer	ALWAYS	PRINTER
Printer Status Info	(2110,0020)	CS	Provided by printer	ALWAYS	PRINTER
Printer Name	(2110,0030)	LO	Provided by printer	ALWAYS	PRINTER
Manufacturer	(0008,0070)	LO	Provided by printer	ALWAYS	PRINTER
Manufacturer Model Name	(0008,1090)	LO	Provided by printer	ALWAYS	PRINTER
Device Serial Number	(0018,1000)	LO	Provided by printer	ALWAYS	PRINTER
Software Versions	(0018,1020)	LO	Provided by printer	ALWAYS	PRINTER
Date Of Last Calibration	(0018,1200)	DA	Provided by printer	ALWAYS	PRINTER
Time Of Last Calibration	(0018,1201)	TM	Provided by printer	ALWAYS	PRINTER

If Printer Status (2110,0010) is FAILURE, the print request is discarded. In all cases the returned status information (2110,0010) and (2110,0020) is logged.

The behavior of the SomoViewer when encountering status codes in an N-GET response is summarized in Table 15.

Table 15, Printer SOP Class N-GET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request to get printer status information was successful. Print operation will continue.
*	*	Any other status code	Association is closed. The print image is discarded. Information is logged.

4.2.4.4.3.2 Printer SOP Class Notifications (N-EVENT-REPORT)

The SomoViewer is capable of receiving an N-EVENT-REPORT request at any time during an association for printing.

The behavior of the SomoViewer when receiving Event Types within the N-EVENT-REPORT is summarized in Table 16.

Table 16, Printer SOP Class N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
Normal	1	Event information is logged and printing will continue. An N-EVENT-REPORT response will be sent with a success status.
Warning	2	
Failure	3	
*	*	

4.2.4.4.4 SOP Specific Conformance for the Basic Film Session SOP Class

The SomoViewer supports the following DIMSE operations for the Basic Film Session SOP Class:

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.4.4.4.1 Film Session SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in Table 17.

Table 17, Film Session SOP Class N-CREATE Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Copies	(2000,0010)	IS	Value from 1 to 10	ALWAYS	CONFIG
Print Priority	(2000,0020)	CS	LOW, MED or HIGH	ALWAYS	CONFIG
Medium Type	(2000,0030)	CS	PAPER, CLEAR FILM or BLUE FILM	ALWAYS	CONFIG
Film Destination	(2000,0040)	CS	PROCESSOR or MAGAZINE	ALWAYS	CONFIG

The behavior of Hardcopy AE when encountering status codes in an N-CREATE response is summarized in the Table 18.

Table 18, Film Session SOP Class N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film session successfully created	0000	Print operation will continue.
Warning	Memory allocation not supported	B600	Association is closed. The print image is discarded. Information is logged.
*	*	Any other code	

4.2.4.4.4.2 Film Session SOP Class Operations (N-DELETE)

The behavior of the SomoViewer when encountering status codes in a N-DELETE response is summarized in Table 19.

Table 19, Film Session SOP Class N-DELETE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Successfully operation	0000	Print operation will continue.
*	*	Any other code	Association is closed. The print image is discarded. Information is logged.

4.2.4.4.5 SOP Specific Conformance for the Basic Film Box SOP Class

The SomoViewer supports the following DIMSE operations for the Basic Film Box SOP Class:

- N-CREATE
- N-ACTION

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.4.4.5.1 Film Box SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE request are listed in Table 20.

Table 20, Film Box SOP Class N- CREATE Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Display Format	(2010,0010)	ST	STANDARD\1,1 Only selection allowed	ALWAYS	AUTO
Film Orientation	(2010,0040)	CS	PORTRAIT Only selection allowed	ALWAYS	AUTO
Film Size ID	(2010,0050)	CS	8INX10IN 10INX12IN 10INX14IN 11INX14IN 11INX17IN 12INX18IN 14INX14IN 14INX17IN 20CMX25CM 24CMX24CM 24CMX30CM 35CMX43CM	ALWAYS	CONFIG

Attribute Name	Tag	VR	Value	Presence of Value	Source
Magnification Type	(2010,0060)	CS	NONE, BILINEAR BICUBIC CUBIC MITCHELL LANCZOS REPLICATE SHARP1 SHARP2 SHARP3	ALWAYS	CONFIG
Smoothing Type	(2010,0080)	CS	Only from printer conformance	VNAP	CONFIG
Border Density	(2010,0100)	CS	BLACK, WHITE or 0 ... 99999	ALWAYS	CONFIG
Empty Image Density	(2010,0110)	CS	BLACK, WHITE or 0 ... 99999	ALWAYS	CONFIG
Min Density	(2010,0120)	US	0 to 99999	ALWAYS	CONFIG
Max Density	(2010,0130)	US	0 to 99999	ALWAYS	CONFIG
Trim	(2010,0140)	CS	Always "NO"	ALWAYS	CONFIG
Configuration Information	(2010,0150)	ST	As entered in the Config field on the <i>DICOM Configuration</i> screen.	ANAP	CONFIG
Referenced Film Session Sequence	(2010,0500)	SQ		ALWAYS	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.1.1	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Provided by SCP (printer)	ALWAYS	AUTO

The behavior of the SomoViewer when encountering status codes in an N-CREATE response is summarized in Table 21.

Table 21, Film Box SOP Class N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film session successfully created	0000	Print operation will continue.
Warning	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605	Association is closed. The print image is discarded. Information is logged.
Failure	There is an existing Film Box that has not been printed and N-ACTION at the Film Session level is not supported. A new Film Box will not be created when a previous Film Box has not been printed.	C616	
*	*	Any other code	

4.2.4.4.5.2 Film Box SOP Class Operations (N-ACTION)

An N-ACTION request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behavior of the SomoViewer when encountering status codes in an N-ACTION response is summarized in Table 22.

Table 22, Film Box SOP Class N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film accepted for printing	0000	Print operation will continue.
Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	B603	Association is closed. The print image is discarded. Information is logged.
	Image size is larger than image box size, the image has been de-magnified.	B604	
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	
Failure	Unable to create Print Job SOP Instance. Print queue is full	C602	
	Image size is larger than image box size	C603	
	Combined Print Image size is larger than the Image Box size	C613	
*	*	Any other code	

4.2.4.4.6 SOP Specific Conformance for the Basic Grayscale Image Box SOP Class

The SomoViewer supports the following DIMSE operations for the Basic Grayscale Image Box SOP Class:

- N-SET

Details of the supported attributes and status handling behavior are described in the following subsection.

4.2.4.4.6.1 Grayscale Image Box SOP Class Operations (N-SET)

The attributes supplied in an N-SET request are listed in Table 23.

Table 23, Grayscale Image Box SOP Class N-SET Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	(2020,0010)		The position of the image on the film, based on Image Display Format (2010,0010).	ALWAYS	AUTO
Basic Grayscale Image Sequence	(2020,0110)	SQ		ALWAYS	AUTO
>Samples Per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
>Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
>Rows	(0028,0010)	US	Image dependant	ALWAYS	AUTO
>Columns	(0028,0011)	US	Image dependant	ALWAYS	AUTO
>Pixel Aspect Ratio	(0028,0034)	IS	Only sent if none 1:1 aspect ratio	ANAP	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

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Pixel Data	(7FE0,0010)	OB	Pixel data of print image	ALWAYS	AUTO

The behavior of the SomoViewer when encountering status codes in an N-SET response is summarized in Table 24.

Table 24, Grayscale Image Box SOP Class N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Image successfully stored in Image Box	0000	Print operation will continue.
Warning	Image size larger than image box size, the image has been de-magnified.	B604	Association is closed. The print image is discarded. Information is logged.
	Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead.	B605	
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	
Failure	Image size is larger than image box size	C603	
	Insufficient memory in printer to store the image	C605	
	Combined Print Image size is larger than the Image Box size	C613	
*	*	Any other code	

4.2.4.4.7 SOP Specific Conformance for the Basic Color Image Box SOP Class

The SomoViewer supports the following DIMSE operations for the Basic Color Image Box SOP Class:

- N-SET

Details of the supported attributes and status handling behavior are described in the following subsection.

4.2.4.4.7.1 Color Image Box SOP Class Operations (N-SET)

The attributes supplied in an N-SET request are listed in Table 25.

Table 25 Color Image Box SOP Class N-SET Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	(2020,0010)		The position of the image on the film, based on Image Display Format (2010,0010).	ALWAYS	AUTO
Basic Color Image Sequence	(2020,0111)	SQ		ALWAYS	AUTO
>Samples Per Pixel	(0028,0002)	US	3	ALWAYS	AUTO
>Photometric Interpretation	(0028,0004)	CS	RGB	ALWAYS	AUTO
>Planar Configuration	(0028,0006)	US	1	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
>Rows	(0028,0010)	US	Image dependant	ALWAYS	AUTO
>Columns	(0028,0011)	US	Image dependant	ALWAYS	AUTO
>Pixel Aspect Ratio	(0028,0034)	IS	Only sent if none 1:1 aspect ratio	ANAP	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)	OB	Pixel data of print image	ALWAYS	AUTO

The behavior of the SomoViewer when encountering status codes in an N-SET response is summarized in Table 26

Table 26 Color Image Box SOP Class N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Image successfully stored in Image Box	0000	Print operation will continue.
Warning	Image size larger than image box size, the image has been de-magnified.	B604	Association is closed. The print image is discarded. Information is logged.
	Image size is larger than the Image Box size. The Image has been cropped to fit.	B609	
	Image size or Combined Print Image size is larger than the Image Box size. Image or Combined Print Image has been decimated to fit.	B60A	
Failure	Image size is larger than image box size	C603	
	Insufficient memory in printer to store the image	C605	
	Combined Print Image size is larger than the Image Box size	C613	
*	*	Any other code	

4.3 Network Interfaces

4.3.1 Physical Network Interface

The SomoViewer supports a single network interface. One of the following physical network interfaces will be available:

Table 27, Supported Physical Network Interface

Ethernet 1000baseT
Ethernet 100baseT
Ethernet 10baseT

4.3.2 Additional Protocols

The SomoViewer uses the Windows XP Operating Systems. All networking features available on the Windows XP Operating Systems are available for use.

4.3.3 IPv4 and IPv6 Support

The SomoViewer only supports IPv4 connections.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

The AE Title must be unique. On the SomoViewer the AE Title to Presentation Address mapping is done by mapping the AE Title to the IP address configured in the Application Entity screen that is accessible to the user.

4.4.1.1 Local AE Titles

There is only one local Application Entity and its AE Title and port can be configured in the Local Settings screen.

Table 28, AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
SomoViewer	SomoViewer	1004

4.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Titles, host names and port numbers of remote Application Entities for Print, Store and Query/Retrieve are configured in the Application Entity screen.

4.4.2 Parameters

Table 26 lists some parameters and their default value.

Table 29, Configuration Parameters

Parameter	User Configurable (Yes/No)	Service Configurable (Yes/No)	Default Value
Maximum PDU receive size	No	No	16kB
Maximum PDU send size	No	No	16kB (smaller sizes are negotiated per association)
Timeout for accepting/rejecting an association request	No	Yes	30s
Timeout for responding association open/close request	No	Yes	30s
Timeout for accepting message over network	No	No	120s
Timeout for waiting for data between TCP/IP packets	No	No	120s
Timeout for requesting an association	No	Yes	30s
Timeout for waiting for sending message to a remote node (Storage SCU)	No	No	Unlimited
Timeout for waiting for a service response message from a remote node (Query/Retrieve SCU)	No	No	Unlimited

Parameter	User Configurable (Yes/No)	Service Configurable (Yes/No)	Default Value
Timeout waiting for a response to a N-CREATE-RQ, N-SET-RQ or N-ACTION-RQ	No	No	20s

5 Support of Character Sets

Extended character sets are not supported.

6 Security

The SomoViewer does not support any specific security measures. It is assumed that the SomoViewer is used within a secured environment that includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the SomoViewer.
- Firewall or router protections to ensure that the SomoViewer only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

7 Extensions/Specializations/Privatization

7.1 Standard Extended / Specialized / Private SOP Classes

Not applicable.

7.2 Private Transfer Syntaxes

Not applicable.