DICOM
CONFORMANCE STATEMENT
FOR
ULTRASOUND DATA MANAGEMENT UNIT
POWERVIEW (MODEL UIDM-400A)

TOSHIBA CORPORATION

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1.Introduction

This document is a DICOM Conformance Statement for Toshiba's Data Management Unit (PowerView Model UIDM-400A). It is intended to provide the reader with the knowledge of how to integrate this product within a DICOM compliant hospital network. It details the DICOM Service Classes, Information Objects, and Communication Protocols which are supported by this product as follows:

- Verification Service Class (SCU/SCP)
- Storage Service Class (SCU/SCP)
- Query/Retrieve Service Class (SCU)
- Print Management Service Class (SCU)
- MOD Medium Storage Service Class(FSC/FSR/FSU)
- Storage Commitment Service Class (SCU)
- MWM (Modality Worklist Management) Service Class (SCU)
- MPPS (Modality Performed Procedure Step) Service Class (SCU)

If the reader is unfamiliar with DICOM, it is recommended that they read the DICOM Specification (referenced below) prior to reading this conformance statement. Also note that this document is formatted according to the DICOM Specification, Part 2: Conformance.

1.1.References

ACR-NEMA Digital Imaging and Communications in Medicine, DICOM V3.0.

1.2.Definitions

- **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.
- **Called Application Entity Title** - The Called AE Title defines the intended receiver of an Association.
- **Calling Application Entity Title** - The Calling AE Title defines the requestor of an Association.
- **DICOM Message Service Element (DIMSE)** - A DIMSE defines the services and protocols utilized by an Application Entity to exchange messages.
- **Information Object Definition (IOD)** - An IOD is a data model which is an abstraction of real-world information. This data model defines the nature and attributes relevant to the class of real-world objects represented.
- **Service Class Provider (SCP)** - A Service Class Provider plays the "server" role to perform operations and invoke notifications during an Association. An example of a Storage Service Class Provider would be an image storage device. In this case, the image storage device is storing the image that was sent by a Service Class User.
- **Service Class User (SCU)** - A Service Class User plays the "client" role to invoke operations and perform notifications during an Association. An example of a Storage Service Class User would be an image acquisition device. In this case, the image acquisition device will create and send a DICOM image by requesting that a Service Class Provider store that image.

- **Service/Object Pair (SOP) Class** - A SOP Class is defined by the union of an Information Object Definition and a set of DIMSE Services. A DICOM Application Entity may support one or more SOP Classes. Each SOP Class is uniquely identified by a SOP Class UID.
- **SOP Instance** - A specific occurrence of a Information Object.
- **Transfer Syntax** - The Transfer Syntax is a set of encoding rules that allow DICOM Application Entities to negotiate the encoding techniques (e.g. data element structure, byte ordering, compression) they are able to support. The Transfer Syntax is negotiated during Association Negotiation.
- **Unique Identifier (UID)** - A Unique Identifier is a globally unique, ISO compliant, ASCII-numeric string. It guarantees uniqueness across multiple countries, sites, vendors and equipment.

1.3.Acronyms, Abbreviations and Symbols

The following acronyms and abbreviations are used in this document.

- ACC American College of Cardiology
- ACR American College of Radiology
- ASCII American Standard Code for Information Interchange
- AE Application Entity
- ANSI American National Standards Institute
- CEN TC251 Comite Europeen de Normalisation - Technical Committee 251 - Medical Informatics
- DICOM Digital Imaging and COmmunications in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- HIS Hospital Information System
- HL7 Health Level 7
- IE Information Entity
- IOD Information Object Definition
- ISO International Standard Organization
- JIRA Japan Industries Association of Radiological Systems
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- RIS Radiology Information System
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

2.Implementation Model

2.1.Application Data Flow Diagram

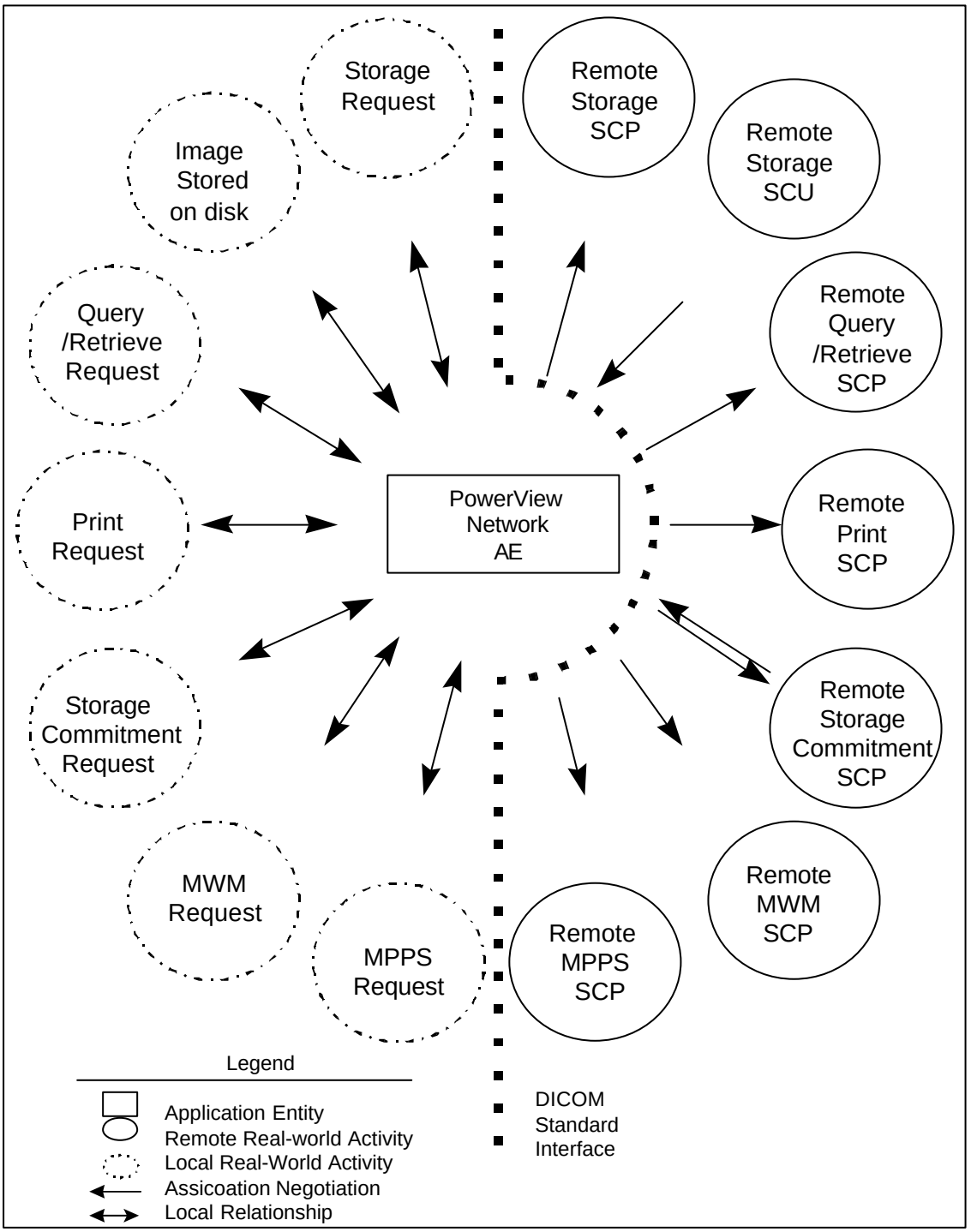

Figure 1 Network Access

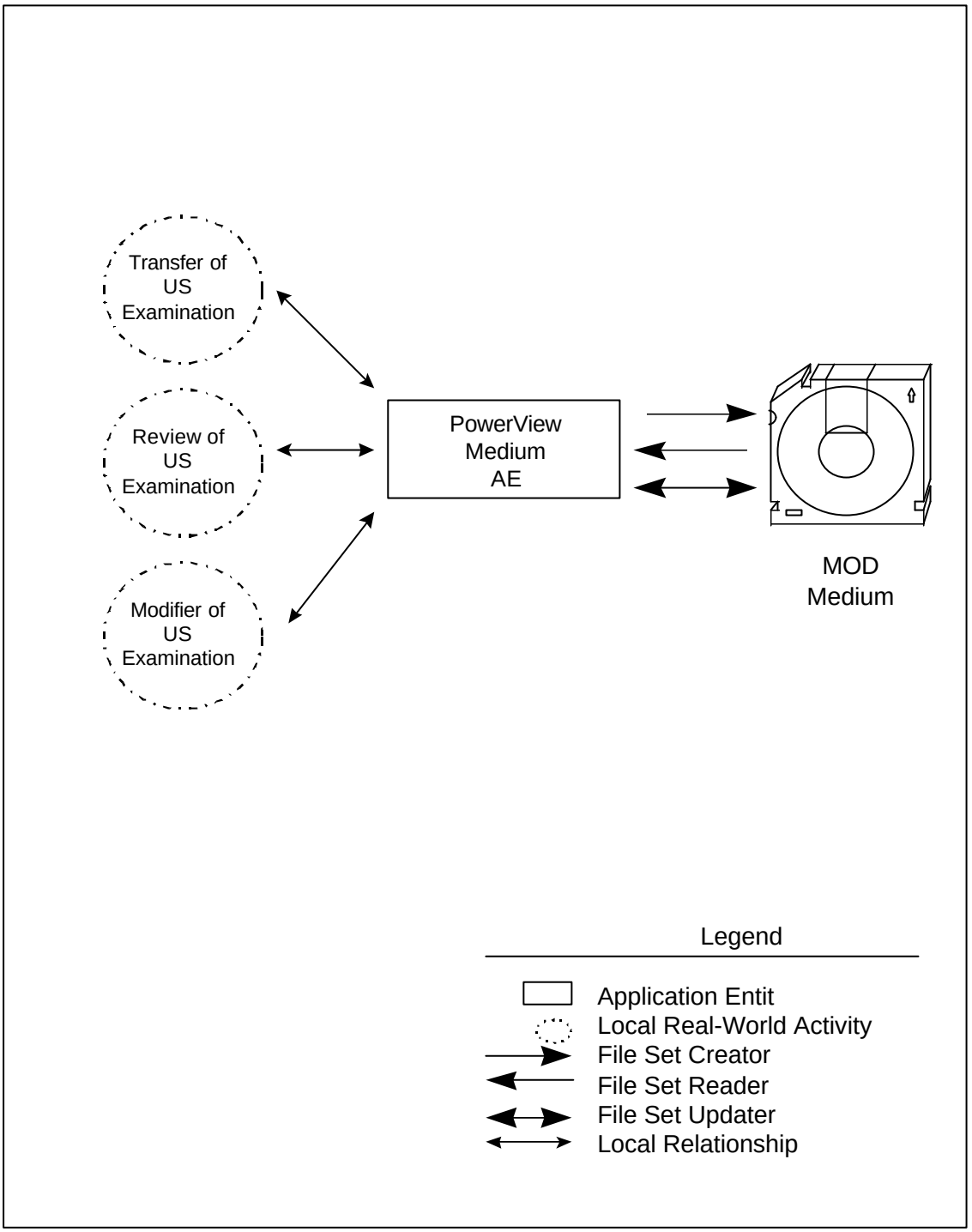

Figure 2 Media File-Set Access

2.2.Functional Definitions of AE's

2.2.1.PowerView Network AE

2.2.1.1.Storage

PowerView Network AE is used to send images to a remote DICOM device. It therefore performs the following tasks:

- Builds DICOM SC, US, US Multi-frame Image Information Objects.
- Establishes DICOM Association with remote DICOM device.
- Performs Storage of DICOM SC, US, US Multi-frame Information Objects to remote DICOM device.

2.2.1.2.Image Stored on Disk

PowerView Network AE is used to receive images from a remote DICOM device. It therefore performs the following tasks:

- Accepts to establish DICOM Association with remote DICOM device.
- Accepts to perform Storage of DICOM SC, US, US Multi-frame Information Objects from remote DICOM device.

2.2.1.3.Query/Retrieve

PowerView Network AE is used to receive images from a remote DICOM device. It therefore performs the following tasks:

- Establishes DICOM Association with remote DICOM device.
- Performs Query of Information Objects from remote DICOM device.
- Performs Retrieve of DICOM SC, US, US Multi-frame Information Objects from remote DICOM device.

2.2.1.4.Print

PowerView Network AE is used to request for Print studies/images to a remote DICOM device. It therefore performs the following tasks:

- Builds DICOM Basic Grayscale, Color Print Objects.
- Establishes DICOM Association with remote DICOM device.
- Performs transmit of DICOM Basic Grayscale, Color Print Objects to remote DICOM device.

2.2.1.5.Storage Commitment

PowerView Network AE is used to commit transmission of studies/images to a remote DICOM device. It therefore performs the following tasks:

- Establishes DICOM Association with remote DICOM device.
- Performs Storage Commitment of DICOM SC, US, US Multi-frame Information Objects to remote DICOM device.
- Accept to be informed commitment.

2.2.1.6.MWM (Modality Worklist Management)

PowerView Network AE is used to transmit request to retrieving the MWM (Modality Worklist Management) information to a remote DICOM device. It therefore performs the following tasks:

- Establishes DICOM Association with remote DICOM device.
- Performs request of DICOM MWM Objects to remote DICOM device.
- Retrieves DICOM MWM Information from remote DICOM device.

2.2.1.7.MPPS (Modality Performed Procedure Step)

PowerView Network AE is used to transmit event which is the start study and the end study to remote DICOM device. It therefore performs the following tasks:

- Establishes DICOM Association with remote DICOM device.
- Inform DICOM MPPS Information to remote DICOM device.

2.2.2.PowerView Medium AE

PowerView Medium AE is used to create/read/modify studies/images to/from a off-line DICOM MOD Medium. It therefore performs the following tasks:

- Builds DICOM SC, US, US Multi-frame Information Objects.
- Performs CREATE a DICOMDIR file that represents the contents of DICOM US, US Multi-frame Information Objects to be recorded.
- Performs RECORD DICOM US, US Multi-frame Information Objects from the local storage to a MOD medium.
- Performs READ the DICOMDIR file that represents the contents of the data as recorded.
- Performs DISPLAY the ordered list of studies/images identifying information or icon images.
- Performs READ the selected studies/images from a MOD medium and displays it on the monitor of the DICOM Reader.
- Performs READ the File-set of a MOD medium and write it onto the local storage of DICOM Reader.
- Performs MODIFY the DICOMDIR file and studies/images.

2.3.Sequence of Real World Activities

2.3.1.Features

2.3.1.1.Storage

- Operator requests to send studies/images after selecting the transferred studies from the Study List to multiple servers.
- Operator requests to send a image after capturing immediately and automatically to multiple servers.
- When the study or image transfer fails, PowerView Network AE attempt to resend the study or image automatically to multiple servers.
- Storage requests are placed on a queue, and are executed in the background.
- PowerView Network AE is a service class user (SCU) for the Storage.

2.3.1.2.Image Stored on Disk

- PowerView Network AE accepts to Retrieve of SC, US, US Multi-frame information object from Network server.
- PowerView Network AE is a service class provider (SCP) for the Storage.

2.3.1.3.Query and Retrieve

- Operator requests to query studies.
- Operator requests to retrieve the queried studies from the Study List.
- When the study or image transfer fails, operator can manually attempt to query/retrieve studies.
- PowerView Network AE is a service class user (SCU) for the Query and Retrieve.

2.3.1.4.Print

- Operator requests to print images after selecting the transferred studies from the Study List.
- The number of frames in the rows and columns on each film can be specified as desired.
- When the study or image transfer fails, PowerView Network AE attempt to resend the study or image automatically.
- Print requests are placed on a queue, and are executed in the background.
- PowerView Network AE is a service class user (SCU) for the Print.

2.3.1.5.Storage Commitment

- Operator requests to commit to transmit studies/images which will be sent.
- Storage Commitment requests are placed on a queue, and are executed in the background.
- PowerView Network AE is a service class user (SCU) for the Storage Commitment.

2.3.1.6.MWM (Modality Worklist Management)

- Operator requests to retrieve MWM information.
- Operator displays the worklist on the PowerView even in a case of the PowerView disconnect from the PACS Network. User can filter on patient name as required.
- When the retrieve fails, operator can manually attempt to retrieve MWM information.
- PowerView Network AE is a service class user (SCU) for the MWM.

2.3.1.7.MPPS (Modality Performed Procedure Step)

- PowerView Network AE transmits events such as start of this study and end of the study.
- PowerView Network AE is a service class user (SCU) for the MPPS.

2.3.1.8.MOD Medium

- Operator requests to storage studies/images after selecting studies from the Study List to a MOD medium.
- Operator requests to storage a image after capturing immediately and automatically.
- Operator requests to retrieve studies/images from a MOD medium to the local disk.
- Operator requests to delete studies/images after selecting studies from the Study List on the MOD medium.
- Storage requests are placed on a queue, and are executed in the background.

2.3.2.Operation

2.3.2.1.Storage of Studies/Images

The operations for manual image transferring are described below :
Operation-1
Step-1: Display the image to be transferred.
Step-2: Request transfer.
Operation-2
Step-1: Select the study to be transferred.
Step-2: Request transfer.

Automatic image transfer operation is performed if this feature is activated.

2.3.2.2.Image Stored on Disk

Studies/images can be retrieved passively.

2.3.2.3.Query and Retrieve

The operations for studies query and transferring are described below :
Step-1: Studies can be queried using search parameter set by the user.
Step-2: Request retrieve studies.

2.3.2.4.Print

The operation for printing is described below:
Operation-1
Step-1: Display the image to be printed.
Step-2: Request to print.
Operation-2
Step-1: Select the study to be printed.
Step-2: Request to print.
Images are transferred to the DICOM printer if this feature is activated.

2.3.2.5.Storage Commitment

Storage Commitment is performed automatically.

2.3.2.6.MWM (Modality Worklist Management)

Query the scheduled study in addition to setting the condition.

2.3.2.7.MPPS (Modality Performed Procedure Step)

Studies status is transmitted to the HIS (Hospital Information System).

2.3.2.8.MOD Medium

The operations for manual image transferring/modifying are described below :
Operation-1
Step-1: Display the image to be transferred/modified.
Step-2: Request transfer/modify.
Operation-2
Step-1: Select the study to be transferred/modified.
Step-2: Request transfer/modified.
Automatic image transfer operation is performed if this feature is activated.

3.AE Specifications

3.1.PowerView Network AE Specification

- Network Activity : PowerView Network AE (initiation) provides Standard Conformance to the following DICOM SOP Classes as an SCU:

Table 1

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Patient/Study Only Query/Retrieve information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9
Basic Color Print Management	1.2.840.10008.5.1.1.18
Storage Commitment Push Model	1.2.840.10008.1.20.1
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

- Network Activity : PowerView Network AE (acception) provides Standard Conformance to the following DICOM SOP Classes as an SCP:

Table 2

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1

3.1.1.Network Association Establishment Policy

3.1.1.1.General

PowerView Network AE will utilize and understand the following Application Context Name:

Table 3

DICOM V3.0 Application Context	1.2.840.10008.3.1.1.1

PowerView Network AE contains a limitation of 100Kbytes for maximum PDU size.

3.1.1.2. Number of Association

PowerView Network AE allow simultaneous associations. There is no limitation to the number of simultaneous associations but it is recommended that no more than 32 associations are opened any given time.

3.1.1.3. Asynchronous Nature

PowerView Network AE allows a single outstanding operation on any association. Therefore, PowerView Network AE does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

3.1.1.4.Implementation identifying information

PowerView Network AE will specify the following Implementation Identifying Information:

Table 4

System	Implementation Class UID	Implementation Version Name
UIDM-400A PowerView	1.2.124.113532.1.1	DICOMIT+<Software version>

The implementation version name policies are the following: product name "**DICOMIT**" followed by version of the product.

3.1.2. Association Initiation by Real-World Activity

PowerView Network AE initiates an association when the following activity is chosen by the operator:

- Storage
  Create and store a SC, US, US Multi-frame image to a remote DICOM device.
- Query/Retrieve
  Query information from a remote DICOM device.
  Retrieve a SC, US, US Multi-frame image from a remote DICOM device.
- Print
  Request print image to a remote DICOM device.
- Storage Commitment
  Create ,store, and commit to store a SC, US, US Multi-frame image to a remote DICOM device.
- MPPS
  Inform MPPS information to a remote DICOM device.
- MWM
  Retrieve MWM information from a remote DICOM device.

3.1.2.1.Initiation Real World Activity - Verification

3.1.2.1.1.Associated Real World Activity - Verification

Verification is initiated automatically at the “send of study”.

3.1.2.1.2.Proposed Presentation Contexts - Verification

PowerView Network AE supports the following Presentation Contexts for **Verification**.

Table 5

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.1.2.2.Initiation Real World Activity - Storage

3.1.2.2.1.Associated Real World Activity - Storage

PowerView Network AE will issue a Storage request when a user of PowerView Network AE wishes to send a studies/images to a remote DICOM SCP.

3.1.2.2.2.Proposed Presentation Contexts - Storage

PowerView Network AE supports the following Presentation Contexts for **Storage**.

Table 6

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCU	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCU	None
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
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCU	None
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
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCU	None

Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCU	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCU	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCU	None
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
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCU	None

3.1.2.2.2.1.SOP Specific Conformance - Storage

PowerView Network AE operation involves the following sequence of steps for each image transfer.

(1) Association establishment (requestor only)
(2) Data transfer (SCU only)
(3) Association release (requestor only)

PowerView Network AE judges that the transfer of one image succeeded when the result of (2) “Data transfer” is “Success” even if the result of (3) “Association release” is “Failure”.

3.1.2.3.Initiation Real World Activity - Query/Retrieve

3.1.2.3.1.Associated Real World Activity - Query/Retrieve

PowerView Network AE will issue a Query request when a user of PowerView Network AE wishes to query and retrieve an information from a remote DICOM SCP.

3.1.2.3.2.Proposed Presentation Contexts - Query/Retrieve

PowerView Network AE supports the following Presentation Contexts for **Query/Retrieve**.

Table 7

Presentation Context Table

Abstract Syntax		Transfer Syntax			Extended
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
Patient/Study Only Query/Retrieve information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Patient/Study Only Query/Retrieve information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

3.1.2.3.2.1.SOP Specific Conformance - Query/Retrieve

PowerView Network AE operation involves the following sequence of steps for query and retrieve operation.

Query:
(1) Association establishment (requestor only)
(2) Transfer query request IOD (SCU only)
(3) Wait for Query result IOD
(4) Receive Query result IOD
(5) Association release (requestor only)

PowerView Network AE judges that query succeeded when the result of (4) is "Success" even if the result of (5) "Association release" is "Failure".

Retrieve:
(1) Association establishment (requestor only)
(2) Issue C-MOVE of studies
(3) Association release (requestor only)

PowerView Network AE judges that retrieve succeeded when the result of (2) is "Success" even if the result of (3) "Association release" is "Failure".

3.1.2.4.Initiation Real World Activity - Print

3.1.2.4.1.Associated Real World Activity - Print

PowerView Network AE will issue Print Management requests to an SCP supporting the DICOM V3.0 Print services, in order to produce hard copy representations of DICOM images.

3.1.2.4.2.Proposed Presentation Contexts - Print

PowerView Network AE supports the following Presentation Contexts for **Print**.

Table 8

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Basic Film Session	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Box	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Image Box	1.2.840.10008.5.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Printer	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.1.2.4.3.SOP Specific Conformance - Print

PowerView Network AE provides standard conformance to the DICOM **Print** Service Class by supporting a number of distinct SOP classes described below.

3.1.2.4.3.1.SOP Specific Conformance to Basic Film Session SOP Class

PowerView Network AE issues the following DIMSE-N commands for the Basic Film Session SOP Class: N-CREATE and N-ACTION.

3.1.2.4.3.2.SOP Specific Conformance to Basic Film Box SOP Class

PowerView Network AE issues the following DIMSE-N commands for the Basic Film Session SOP Class: N-CREATE, N-DELETE, and N-ACTION.
PowerView Network AE supports only STANDARD formats (STANDARD\1,1; STANDARD\2,2, etc.) with details dependent upon the resolution and capabilities of printer.

3.1.2.4.3.3.SOP Specific Conformance to Basic Grayscale Image Box SOP Class

PowerView Network AE issues the following DIMSE-N commands for the Basic Grayscale Image Box SOP Class: N-SET.

3.1.2.4.3.4.SOP Specific Conformance to Basic Color Image Box SOP Class

PowerView Network AE issues the following DIMSE-N commands for the Basic Color Image Box SOP Class: N-SET.

3.1.2.4.3.5.SOP Specific Conformance to Printer SOP Class

PowerView Network AE issues the following DIMSE-N commands for the Printer SOP Class: N-SET.

3.1.2.4.3.6.SOP Specific Conformance to Basic Grayscale Print Management Meta SOP Class

The Meta SOP class is supported at negotiation, but is not implemented as the individual SOP classes defined by the DICOM specification.

3.1.2.5.Initiation Real World Activity - Storage Commitment

3.1.2.5.1.Associated Real World Activity - Storage Commitment

PowerView Network AE will issue a Storage Commitment request when a user of PowerView Network AE wishes to commit studies/images storage to a remote DICOM SCP.

3.1.2.5.2.Proposed Presentation Contexts - Storage Commitment

PowerView Network AE supports the following Presentation Contexts for **Storage Commitment**.

Table 9

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

3.1.2.5.2.1.SOP Specific Conformance - Storage Commitment

PowerView Network AE operation involves the following sequence.

Option-1 Performed on image store basis.

(1) PowerView (requestor) establishes Association
(2) Send storage commitment request (N-ACTION) related to the image
(3) PowerView (requestor) releases Association
(4) Association of PowerView (acceptor) is established
(5) PowerView (acceptor) waits for storage commitment N-EVENT-REPORT to confirm commitment of the image storage.
(6) Storage commitment N-EVENT-REPORT is received by PowerView (acceptor)
(7) Association of PowerView (acceptor) is released

Option-2 Performed on study level

(1) PowerView (requestor) establishes Association
(2) Send storage commitment request (N-ACTION) related to the study
(3) PowerView (requestor) releases Association
(4) Association of PowerView (acceptor) is established
(5) PowerView (acceptor) waits for storage commitment N-EVENT-REPORT to confirm commitment of the study images.
(6) Storage commitment N-EVENT-REPORT is received by PowerView (acceptor)
(7) Association of PowerView (acceptor) is released

3.1.2.6.Initiation Real World Activity - MWM(Modality Worklist Management)

3.1.2.6.1.Associated Real World Activity - MWM

PowerView Network AE will issue a **C-FIND** request to retrieve information from a remote DICOM SCP.

3.1.2.6.2.Proposed Presentation Contexts - MWM

PowerView Network AE supports the following Presentation Contexts for a **MWM**.

Table 10

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

3.1.2.6.3.SOP Specific Conformance - MWM

All DICOM attributes associated with the Modality Worklist may be retrieved. Specific attributes are dependent on the system setting.

3.1.2.7.Initiation Real-World Activity - MPPS (Modality Performed Procedure Step)

3.1.2.7.1.Associated Real-World Activity - MPPS

MPPS is executed by PowerView Network AEafter the operator's MPPS information transfer requests are queued.

3.1.2.7.2.Proposed Presentation Contexts -MPPS

PowerView Network AE supports the following Presentation Contexts for **MPPS**.

Table 11

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.1.2.7.3.SOP Specific Conformance - MPPS

PowerView Network AE operation involves the following sequence of steps

(1) Association establishment (requestor only)
(2) Send one MPPS Event (In Progress, Completed, Discontinued) (SCU only)
(3) Association release (requestor only)

PowerView Network AE judges that the transfer of one MPPS information succeeded when the result of (2) is "Success" even if the result of (3) "Association release" is "Failure".

3.1.3.Association Acceptance Policy

PowerView Network AE accept passive association at any activated time.

3.1.3.1.Acceptance Real World Activity

- Storage/Retrieve

Store a US, US Multi-frame, SC image from a remote DICOM device.

- Storage Commitment

Accept to inform Storage Commitment from a remote DICOM device.

3.1.3.1.1.Acceptance Associated Real World Activity - Storage/Retrieve

PowerView Network AE will issue a Storage/Retrieve request when Remote Real-World activity wishes to send studies/images from a remote DICOM SCU.

3.1.3.1.2.Presentation Context Table - Storage/Retrieve

PowerView Network AE supports the following Presentation Contexts for **Acceptance Storage**.

Table 12

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCP	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCP	None
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
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCP	None

Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCP	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCP	None
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCP	None
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
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5	SCP	None

Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy, Baseline Sequential with Huffman Coding (Process1)	1.2.840.10008.1.2.4.50	SCP	None

3.1.3.1.2.1. SOP Specific Conformance - Storage/Retrieve

PowerView Network AE conforms to the DICOM Storage Service Class at Level 2 (FULL). No elements are generated by PowerVIew Network AE. In the event of a successful C-STORE operation, the image has been stored to internal storage.

PowerView Network AE returns one of the following status codes.

Table 13

Service Status	Further Meaning	Protocol Codes	Description
Refused	Out of Resources	0xA700	Indicates that there was not enough storage space to store the image.
Error	Data Set does not match SOP Class	0xA900	Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Failed	0xC000	The operation was not successful.
Warning	Data set does not match SOP Class	0xB007	Indicates that the Data Set does not match the SOP Class.
	Duplicate SOP Instance UID	0xD000	
Success	Success	0x0000	Operation performed properly.

3.1.3.1.3.Acceptance Associated Real World Activity -Storage Commitment

PowerView Network AE receive commitment signal studies/images storage from a remote DICOM SCP.

3.1.3.1.4.Presentation Context Table - Storage Commitment

PowerView Network AE accepts to receive N-EVENT-REPORT as Storage Commitment and supports the following Presentation Contexts for **Storage Commitment**.

Table 14

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**			**Extended**
Name	**UID**	**Name List**	**UID List**	**Role**	**Negotiation**
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

3.1.3.1.4.1.SOP Specific Conformance - Storage Commitment

See 3.1.2.5.2.1 SOP Specific Conformance.

3.2.PowerView Medium AE Specification

- Meduim Activity : PowerView Medium AE provides Standard Conformance to the following DICOM SOP Classes:

Table 15

SOP Class Name	SOP Class UID
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1

3.2.1.1.Real World Activity – Removable Media

A DICOM conformant Magneto-Optical Disk (MOD) is created when a non-conformant MOD is inserted into the PowerView and one or more DICOM Exams are transferred to the MOD. When Exams are first transferred, their files are added to the MOD in DICOM Part 10 format and a valid DICOMDIR is created and saved to the MOD. PowerView can add images to an existing DICOM conformant MOD and update its DICOMDIR. PowerView can be a File-set Reader and a File-set Updater.

3.2.1.1.1.Media Storage Application Profile

Defined Photometric Interpretation and Transfer Syntax Pairs

Table 16

Supported Application Profiles	Real-World Activity	Roles
STD-US-ID-MF-MOD650	Transfer of US Examination	FSC
AUG-US-ID-MF-MOD650	Modifier of US Examination	FSU
AUG-US-ID-MF-MOD650	Review of US Examination	FSR

3.2.1.1.1.1.Abstract and transfer syntaxes– Removable media

The following list applies when PowerView Medium AE is configured to support DICOM Removable Media:

Table 17

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
DICOM Media Storage Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy, Baseline (Process 1)	1.2.840.10008.1.2.4.50
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	RLE Lossless Image Compression	1.2.840.10008.1.2.5
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy, Baseline (Process 1)	1.2.840.10008.1.2.4.50

PowerView Medium AE supports the following Photometric Interpretation and Transfer Syntax pairs.

Table 18

Photometric Interpretation Value	Transfer Syntax	Transfer Syntax UID
RGB	Uncompressed	1.2.840.10008.1.2.1
	JPEG Lossy	1.2.840.10008.1.2.4.50
	RLE Lossless Image Compression	1.2.840.10008.1.2.5

4.Communications Profiles

4.1.Supported Communication Stacks

PowerView provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.2.OSI Stack

Not applicable to this product.

4.3.TCP/IP Stack

PowerView inherits its TCP/IP stack from the computer system upon which it executes.

4.3.1.API

Not applicable to this product.

4.3.2.Physical Media Support

PowerView is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it executes.

4.4.Point to Point Stack

Not applicable to this product.

5.Extensions/Specialization/Privatization

The additional Type 3 Attributes are intended for TOSHIBA internal use, therefore PowerView expects the Service Class Provider to simply ignore them, may be Private Attributes.

6.Configuration

The PowerView Configuration Utility allows the user to set and maintain configuration parameters of local and remote DICOM application entities. The parameters are as follows;

	Default parameter as shipment
• Application Entity Title (AE Title)	:TOSHIBAxxxxxxx
• Host Name for the AE Title	:TOSHIBAxxxxxxx
• Port Number for the AE Title	:104
• Alias for the AE Title	:TOSHIBAxxxxxxx
• Packet Size for the AE Title	:32000
• IP Address for the AE Title	:192.168.1.1
• Print Parameters	
• Other parameters used for configuration	

7.Support of Extended Character Stets

This Product supports the following character sets:

- ISO-IR 100 (Latin alphabet No.1) Supplementary set of ISO 8859

8.Secondary Capture Information Object Definition

8.1.Entity Module Definitions

The information modules for PowerView Network AE are defined below.

8.1.1.Secondary Capture IOD Modules

Table 19

Information Entity	Module	Reference	Usage[1]
Patient	Patient Module	8.1.2.1	M
Study	General Study Module	8.1.2.2	M
Study	Patient Study Module	8.1.2.3	U
Series	General Series Module	8.1.2.4	M
Equipment	General Equipment Module	8.1.2.5	U
Equipment	SC Equipment Module	8.1.2.6	M
Image	General Image Module	8.1.2.7	M
Image	Image Pixel Module	8.1.2.8	M
Image	SC Image Module	8.1.2.9	M
Image	Overlay Plane Module	Not Used	U
Image	Modality LUT Module	Not Used	U
Image	VOI LUT Module	Not Used	U
Image	SOP Common Module	8.1.2.10	M

1) M = Mandatory, C = Conditional, U = User option

8.2.Information Object Definitions

8.2.1.Patient Module

Table 20

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010, 0010)	2	Always set
Patient ID	(0010, 0020)	2	Always set
Patient's Birth Date	(0010, 0030)	2	Length=0 when no entry is made
Patient's Sex	(0010, 0040)	2	Length=0 when no entry is made
Ethnic Group	(0010,2160)	3	Not set when no entry is made
Patient Comments	(0010,4000)	3	Not set when no entry is made

8.2.2.General Study Module

Table 21

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020, 000D)	1	Always set
Study Date	(0008, 0020)	2	Always set
Study Time	(0008, 0030)	2	Always set
Referring Physician's Name	(0008, 0090)	2	Length=0 when no entry is made
Study ID	(0020, 0010)	2	Always set
Accession Number	(0008, 0050)	2	Length=0 when no entry is made
Name of Physician(s) Reading Study	(0008,1060)	3	Not set when no entry is made
Study Description	(0008,1030)	3	Not set when no entry is made

8.2.3.Patient Study Module

Table 22

Attribute Name	Tag	Type	Attribute Description
Patient's Age	(0010, 1010)	3	Not set when no entry is made
Patient's Size	(0010,1020)	3	Not set when no entry is made
Patient's Weight	(0010,1030)	3	Not set when no entry is made

8.2.4.General Series Module

Table 23

Attribute Name	Tag	Type	Attribute Description
Modality	(0008, 0060)	1	Always set (“US”)
Series Instance UID	(0020, 000E)	1	Always set
Series Number	(0020, 0011)	2	Always set
Series Date	(0008,0021)	3	Always set
Series Time	(0008,0031)	3	Always set
Protocol Name	(0018,1030)	3	Not set when no entry is made
Operator’s Name	(0008,1070)	3	Not set when no entry is made
Performed Procedure Step ID	(0040,0253)	3	Identification of that part of a Procedure that has been carried out within this step.
Performed Procedure Step Start Date	(0040,0244)	3	Date on which the Performed Procedure Step started.
Performed Procedure Step Start Time	(0040,0245)	3	Time on which the Performed Procedure Step started.
Performed Procedure Step Description	(0040,0254)	3	Institution-generated description of classification of the Procedure Step that was performed.

8.2.5.General Equipment Module

Table 24

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008, 0070)	2	Always set
Institution Name	(0008, 0080)	3	Always set
Station Name	(0008,1010)	3	Always set
Institutional Department Name	(0008,1040)	3	Always set
Manufacturer's Model Name	(0008,1090)	3	Always set
Device Serial Number	(0018,1000)	3	Always set
Software Versions	(0018,1020)	3	Always set

8.2.6.SC Equipment Module

Table 25

Attribute Name	Tag	Type	Attribute Description
Conversion Type	(0008, 0064)	1	Always set

8.2.7.General Image Module

Table 26

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020, 0013)	2	Always set
Image Date	(0008, 0023)	2C	Always set
Image Time	(0008, 0033)	2C	Always set
Image Type	(0008, 0008)	3	Always set
Acquisition Date	(0008, 0022)	3	Always set
Acquisition Time	(0008, 0032)	3	Always set
Patient Orientation	(0020,0020)	2C	Always set (Length = 0)

8.2.8.Image Pixel Module

Table 27

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028, 0002)	1	Always set (3)
Photometric Interpretation	(0028, 0004)	1	Always set ("RGB")
Rows	(0028, 0010)	1	Always set
Columns	(0028, 0011)	1	Always set
Bits Allocated	(0028, 0100)	1	Always set (8)
Bits Stored	(0028, 0101)	1	Always set (8)
High Bit	(0028, 0102)	1	Always set (7)
Pixel Representation	(0028, 0103)	1	Always set (0 or 1)
Pixel Data	(7FE0, 0010)	1	Always set
Planar Configuration	(0028, 0006)	1C	Always set (0)
Pixel Aspect Ratio	(0028, 0034)	1C	Always set (1\1)

8.2.9.SC Image Module

Table 28

Attribute Name	Tag	Type	Attribute Description
Date of Secondary Capture	(0018, 1012)	3	Not set
Time of Secondary Capture	(0018, 1014)	3	Not set

8.2.10.SOP Common Module

Table 29

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008, 0016)	1	Always set
SOP Instance UID	(0008, 0018)	1	Always set
Specific Character Set	(0008, 0005)	1C	Always set (“ISO_IR 100”)

9.Ultrasound Image Information Object Definition

9.1.Entity Module Definitions

The information modules for the Ultrasound Workstation are defined below.

9.1.1.Ultrasound Image IOD Modules

Table 30

Information Entity	Module	Reference	Usage[1]
Patient	Patient Module	8.2.2.1	M
Study	General Study Module	8.2.2.2	M
Study	Patient Study Module	8.2.2.3	U
Series	General Series Module	8.2.2.4	M
Frame of Reference	Frame of Reference Module	Not Used	U
Frame of Reference	US Frame of Reference Module	Not Used	C
Equipment	General Equipment Module	8.2.2.5	M
Image[2]	General Image Module	8.2.2.6	M
Image	Image Pixel Module	8.2.2.7	M
Image	Palette Color Lookup Table	Not Used	C
Image	Contrast / bolus Module	Not Used	C
Image	US Region Calibration Module	Not Used	U
Image	US Image Module	8.2.2.8	M
Image	Overlay Plane Module	Not Used	U
Image	VOI LUT Module	Not Used	U
Image	SOP Common Module	8.2.2.9	M
Curve[2]	Curve Identification Module	Not Used	M
Curve	Curve Module	Not Used	M
Curve	Audio Module	Not Used	U
Curve	SOP Common	Not Used	M

[1] M = Mandatory, C = Conditional, U = User option
[2] The Image and Curve IEs are mutually exclusive

9.2.Information Object Definitions

9.2.1.Patient Module

Table 31

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010, 0010)	2	Always set
Patient ID	(0010, 0020)	2	Always set
Patient's Birth Date	(0010, 0030)	2	Length=0 when no entry is made
Patient's Sex	(0010, 0040)	2	Length=0 when no entry is made
Ethnic Group	(0010,2160)	3	Not set when no entry is made
Patient Comments	(0010,4000)	3	Not set when no entry is made

9.2.2.General Study Module

Table 32

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020, 000D)	1	Always set
Study ID	(0020, 0010)	2	Always set
Study Date	(0008, 0020)	2	Always set
Study Time	(0008, 0030)	2	Always set
Referring Physician's Name	(0008, 0090)	2	Always set
Accession Number	(0008, 0050)	2	Length=0 when no entry is made
Study description	(0008,1030)	3	Not set when no entry is made
Name of Physician(s) Reading Study	(0008,1060)	3	Not set when no entry is made

9.2.3.Patient Study Module

Table 33

Attribute Name	Tag	Type	Attribute Description
Patient’s Age	(0010,1010)	3	Not set when no entry is made
Patient's Size	(0010,1020)	3	Not set when no entry is made
Patient's Weight	(0010,1030)	3	Not set when no entry is made

9.2.4.General Series Module

Table 34

Attribute Name	Tag	Type	Attribute Description
Modality	(0008, 0060)	1	Always set (“US”)
Series Instance UID	(0020, 000E)	1	Always set
Series Number	(0020, 0011)	2	Always set
Series Date	(0008,0021)	3	Always set
Series Time	(0008,0031)	3	Always set
Operator’s Name	(0008,1070)	3	Not set when no entry is made
Protocol Name	(0018,1030)	3	Not set when no entry is made
Performed Procedure Step ID	(0040,0253)	3	Identification of that part of a Procedure that has been carried out within this step.
Performed Procedure Step Start Date	(0040,0244)	3	Date on which the Performed Procedure Step started.
Performed Procedure Step Start Time	(0040,0245)	3	Time on which the Performed Procedure Step started.
Performed Procedure Step Description	(0040,0254)	3	Institution-generated description of classification of the Procedure Step that was performed.

9.2.5.General Equipment Module

Table 35

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008, 0070)	2	Always set
Institution Name	(0008, 0080)	3	Always set
Station Name	(0008,1010)	3	Always set
Institutional Department Name	(0008,1040)	3	Always set
Manufacturer's Model Name	(0008,1090)	3	Always set
Device Serial Number	(0018,1000)	3	Always set
Software Version	(0018,1020)	3	Always set

9.2.6.General Image Module

Table 36

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020, 0013)	2	Always set
Image Date	(0008, 0023)	2C	Always set
Image Time	(0008, 0033)	2C	Always set
Image Type	(0008,0008)	3	Always set
Acquisition Date	(0008,0022)	3	Always set
Acquisition Time	(0008,0032)	3	Always set
Patient Orientation	(0020,0020)	2C	Always set (Length=0)

9.2.7.Image Pixel Module

Table 37

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028, 0002)	1	Always set (3)
Photometric Interpretation	(0028, 0004)	1	Always set ("RGB")
Rows	(0028, 0010)	1	Always set
Columns	(0028, 0011)	1	Always set
Bits Allocated	(0028, 0100)	1	Always set (8)
Bits Stored	(0028, 0101)	1	Always set (8)
High Bit	(0028, 0102)	1	Always set (7)
Pixel Representation	(0028, 0103)	1	Always set (0)
Pixel Data	(7FE0, 0010)	1	Always set
Planar Configuration	(0028, 0006)	1C	Always set (0)
Pixel Aspect Ratio	(0028,0034)	1C	Always set (1\1)

9.2.8.US Image Module

Table 38

Attribute Name	Tag	Type	Attribute Description
Sample Per Pixel	(0028, 0002)	1	Always set (3)
Photometric Interpretation	(0028, 0004)	1	Always set (“RGB”)
Bits Allocated	(0028,0100)	1	Always set (8)
Bits Stored	(0028, 0101)	1	Always set (8)
High Bit	(0028, 0102)	1	Always set (7)
Planar Configuration	(0028, 0006)	1C	Always set (0)
Pixel Representation	(0028, 0103)	1	Always set (0)
Image Type	(0008, 0008)	2	Always set
Lossy Image Compression	(0028, 2110)	1C	Always set (0 or 1)
Ultrasound Color Data Present	(0028, 0014)	3	Always set (1)
Transducer Type	(0018, 6031)	3	Not set when entry is not made

9.2.9.SOP Common Module

Table 39

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008, 0016)	1	Always set
SOP Instance UID	(0008, 0018)	1	Always set
Specific Character Set	(0008, 0005)	1C	Always set (“ISO_IR 100”)

10.Ultrasound Multi-frame Image Information Object Definition

10.1.Entity Module Definitions

The information modules for the Ultrasound Workstation are defined below.

10.1.1.Ultrasound Multi-frame Image IOD Modules

Table 40

Information Entity	Module	Reference	Usage[1]
Patient	Patient Module	8.3.2.1	M
Study	General Study Module	8.3.2.2	M
Study	Patient Study Module	8.3.2.3	U
Series	General Series Module	8.3.2.4	M
Frame of Reference	Frame of Reference Module	Not Used	U
Frame of Reference	US Frame of Reference Module	Not Used	C
Equipment	General Equipment Module	8.3.2.5	M
Image[2]	General Image Module	8.3.2.6	M
Image	Image Pixel Module	8.3.2.7	M
Image	Palette Color Lookup Table Module	Not Used	C
Image	Contrast / bolus Module	Not Used	C
Image	Cine Module	8.3.2.8	M
Image	Multi-frame Module	8.3.2.9	M
Image	US Region Calibration Module	Not Used	U
Image	US Image Module	8.3.2.10	M
Image	VOI LUT Module	Not Used	U
Image	SOP Common Module	8.3.2.11	M
Curve[2]	Curve Identification Module	Not Used	M
Curve	Curve Module	Not Used	M
Curve	Audio Module	Not Used	U
Curve	SOP Common	Not Used	M

[1] M = Mandatory, C = Conditional, U = User option
[2] The Image and Curve IEs are mutually exclusive

10.2.Information Object Definitions

10.2.1.Patient Module

Table 41

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010, 0010)	2	Always set
Patient ID	(0010, 0020)	2	Always set
Patient's Birth Date	(0010, 0030)	2	Length=0 when no entry is made
Patient's Sex	(0010, 0040)	2	Length=0 when no entry is made
Ethnic Group	(0010,2160)	3	Not set when no entry is made
Patient Comments	(0010,4000)	3	Not set when no entry is made

10.2.2.General Study Module

Table 42

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020, 000D)	1	Always set
Study Date	(0008, 0020)	2	Always set
Study Time	(0008, 0030)	2	Always set
Referring Physician's Name	(0008, 0090)	2	Always set
Study ID	(0020, 0010)	2	Always set
Accession Number	(0008, 0050)	2	Length=0 when no entry is made
Study Description	(0008,1030)	3	Not set when no entry is made
Name of Physician(s) Reading Study	(0008,1060)	3	Not set when no entry is made

10.2.3.Patient Study Module

Table 43

Attribute Name	Tag	Type	Attribute Description
Patient’s Age	(0010,1010)	3	Not set when no entry is made
Patient's Size	(0010,1020)	3	Not set when no entry is made
Patient's Weight	(0010,1030)	3	Not set when no entry is made

10.2.4.General Series Module

Table 44

Attribute Name	Tag	Type	Attribute Description
Modality	(0008, 0060)	1	Always set (“US”)
Series Instance UID	(0020, 000E)	1	Always set
Series Number	(0020,0011)	2	Always set
Series Date	(0008,0021)	3	Always set
Series Time	(0008,0031)	3	Always set
Operator’s Name	(0008,1070)	3	Not set when no entry is made
Protocol Name	(0018,1030)	3	Not set when no entry is made
Performed Procedure Step ID	(0040,0253)	3	Identification of that part of a Procedure that has been carried out within this step.
Performed Procedure Step Start Date	(0040,0244)	3	Date on which the Performed Procedure Step started.
Performed Procedure Step Start Time	(0040,0245)	3	Time on which the Performed Procedure Step started.
Performed Procedure Step Description	(0040,0254)	3	Institution-generated description of classification of the Procedure Step that was performed.

10.2.5.General Equipment Module

Table 45

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008, 0070)	2	Always set
Institution Name	(0008, 0080)	3	Always set
Station Name	(0008,1010)	3	Always set
Institutional Department Name	(0008,1040)	3	Always set
Manufacturer’s Model Name	(0008,1090)	3	Always set
Device Serial Number	(0018,1000)	3	Always set
Software Version	(0018,1020)	3	Always set

10.2.6.General Image Module

Table 46

Attribute Name	Tag	Type	Attribute Description
Image Number	(0020, 0013)	2	Always set
Patient Orientation	(0020,0020)	2C	Always set (Length=0)
Image Date	(0008, 0023)	2C	Always set
Image Time	(0008, 0033)	2C	Always set
Image Type	(0008,0008)	3	Always set
Acquisition Number	(0020,0012)	3	Always set
Acquisition Date	(0008,0022)	3	Always set
Acquisition Time	(0008,0032)	3	Always set
Lossy Image Compression	(0028,2110)	3	Always set (0 or 1)

10.2.7.Image Pixel Module

Table 47

Attribute Name	Tag	Type	Attribute Description
Samples per Pixel	(0028, 0002)	1	Always set (3)
Photometric Interpretation	(0028, 0004)	1	Always set (“RGB”)
Rows	(0028, 0010)	1	Always set
Columns	(0028, 0011)	1	Always set
Bits Allocated	(0028, 0100)	1	Always set (8)
Bits Stored	(0028, 0101)	1	Always set (8)
High Bit	(0028, 0102)	1	Always set (7)
Pixel Representation	(0028, 0103)	1	Always set (0)
Pixel Data	(7FE0, 0010)	1	Always set
Planar Configuration	(0028, 0006)	1C	Always set (0)

10.2.8.Cine Module

Table 48

Attribute Name	Tag	Type	Attribute Description
Frame Time	(0018, 1063)	1C	Always set
Start Trim	(0008, 2142)	3	Always set (0)
Stop Trim	(0008, 2143)	3	Always set
Recommended Display Frame Rate	(0008, 2144)	3	Always set
Cine Rate	(0018, 0040)	3	Always set
Frame Delay	(0018, 1066)	3	Always set
Effective Duration	(0018, 0072)	3	Always set
Actual Frame Duration	(0018, 1242)	3	Always set

10.2.9.Multi-frame Module

Table 49

Attribute Name	Tag	Type	Attribute Description
Number of Frame	(0028, 0008)	1	Always set
Frame Increment Pointer	(0028, 0009)	1	Always set (0x00181063)

10.2.10.US Image Module

Table 50

Attribute Name	Tag	Type	Attribute Description
Sample Per Pixel	(0028, 0002)	1	Always set (3)
Photometric Interpretation	(0028, 0004)	1	Always set (“RGB”)
Bits Allocated	(0028,0100)	1	Always set (8)
Bits Stored	(0028, 0101)	1	Always set (8)
High Bit	(0028, 0102)	1	Always set (7)
Planar Configuration	(0028, 0006)	1C	Always set (0)
Pixel Representation	(0028, 0103)	1	Always set (0)
Frame Increment Pointer	(0028, 0009)	1C	Always set (0x00181063)
Image Type	(0008, 0008)	2	Always set
Ultrasound Color Data Present	(0028, 0014)	3	Always set (1)
Transducer Type	(0018, 6031)	3	Not set when the entry is no made
Lossy Image Compression	(0028,2110)	1C	Always set (0 or 1)

10.2.11.SOP Common Module

Table 51

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008, 0016)	1	Always set
SOP Instance UID	(0008, 0018)	1	Always set
Specific Character Set	(0008, 0005)	1C	Always set (“ISO_IR 100”)

11.DIMSE-Service and Attributes - Query/Retrieve

11.1.DIMSE-Services

Table 52

SOP Class	DIMSE Service Element	Usage SCU	Usage
Patient/Study Only Query/Retrieve information Model - FIND SOP Class	C-FIND	M	Used
	C-FIND CANCEL	M	Used
Patient/Study Only Query/Retrieve information Model - MOVE SOP Class	C-MOVE	M	Used
	C-MOVE CANCEL	M	Used

11.2.Patient/Study Only Q/R Information Model - Find

11.2.1.Patient Level SCU Request

Table 53

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010, 0010)	R	
Patient ID	(0010, 0020)	U	

11.2.2.Study Level SCU Request

Table 54

Attribute Name	Tag	Type	Attribute Description
Study Date	(0008,0020)	R	
Study Time	(0008, 0030)	R	
Accession Number	(0008, 0050)	R	Always set Length = 0
Study ID	(0020,0010)	R	
Study Instance UID	(0020,000D)	U	Always set Length = 0

12.DIMSE-Service and Attributes - Print

12.1. DIMSE-Services

Table 55

SOP Class	DIMSE Service Element	Reference	Usage SCU[1]
Basic Film Session SOP Class	N-CREATE	10.2.1	M
	N-SET	Not used	U
	N-DELETE	Used	U
	N-ACTION	Not used	U
Basic Film Box SOP Class	N-CREATE	10.3.1	M
	N-SET	Not used	U
	N-DELETE	Used	U
	N-ACTION	Used	M
Image Box SOP Class	N-SET	10.4.1 10.5.1	M
Printer SOP Class	N-EVENT-REPORT	Used	M
	N-GET	10.6.1	U

[1] M = Mandatory, U = User option

12.2.Basic Film Session SOP Class

12.2.1.N-CREATE Attributes

Table 56

Attribute Name	Tag	Usage	Attribute Description
Number of Copies	(2000,0010)	U	Always set
Print Priority	(2000,0020)	U	Always set
Medium Type	(2000,0030)	U	Always set
Film Destination	(2000,0040)	U	Not set when no data is available
Film Session Label	(2000,0050)	U	Always set (“Not”)
Memory Allocation	(2000,0060)	U	Not set when no data is available

12.3.Basic Film Box SOP Class

12.3.1.N-CREATE Attributes

Table 57

Attribute Name	Tag	Usage	Attribute Description
Image Display Format	(2010,0010)	M	Always set
Film Orientation	(2010,0040)	U	Always set
Film Size ID	(2010,0050)	U	Always set
Magnification Type	(2010,0060)	U	Always set
Border Density	(2010,0100)	U	Always set
Empty Image Density	(2010,0110)	U	Always set
Trim	(2010,0140)	U	Always set
Referenced Film Session Sequence	(2010,0500)	M	Always set
>Referenced SOP Class UID	(0008,1150)	M	Always set
>Referenced SOP Instance UID	(0008,1155)	M	Always set

12.4.Basic Grayscale Image Box SOP Class

12.4.1.N-SET Attributes

Table 58

Attribute Name	Tag	Usage	Attribute Description
Image Position	(2020,0010)	M	Always set
Polarity	(2020,0020)	U	Always set
Magnification Type	(2010,0060)	U	Always set
Smoothing Type	(2010,0080)	U	Always set
Basic Grayscale Image Sequence	(2020,0110)	M	Always set
>Samples Per Pixel	(0028,0002)	M	Always set (1)
>Photometric Interpretation	(0028,0004)	M	Always set
>Rows	(0028,0010)	M	Always set
>Columns	(0028,0011)	M	Always set
>Pixel Aspect Ratio	(0028,0034)	M	Always set
>Bits Allocated	(0028,0100)	M	Always set (8)
>Bits Stored	(0028,0101)	M	Always set (8)
>High Bit	(0028,0102)	M	Always set (7)
>Pixel Representation	(0028,0103)	M	Always set (0)
>Pixel Data	(7FE0,0010)	M	Always set

12.5.Basic Color Image Box SOP Class

12.5.1.N-SET Attributes

Table 59

Attribute Name	Tag	Usage	Attribute Description
Image Position	(2020,0010)	M	Always set
Polarity	(2020,0020)	U	Always set
Magnification Type	(2010,0060)	U	Always set
Smoothing Type	(2010,0080)	U	Always set
Basic Color Image Sequence	(2020,0111)	M	Always set
>Samples Per Pixel	(0028,0002)	M	Always set (3)
>Photometric Interpretation	(0028,0004)	M	Always set
>Planar Configuration	(0028,0006)	M	Always set (0)
>Rows	(0028,0010)	M	Always set
>Columns	(0028,0011)	M	Always set
>Pixel Aspect Ratio	(0028,0034)	M	Always set
>Bits Allocated	(0028,0100)	M	Always set (8)
>Bits Stored	(0028,0101)	M	Always set (8)
>High Bit	(0028,0102)	M	Always set (7)
>Pixel Representation	(0028,0103)	M	Always set (0)
>Pixel Data	(7FE0,0010)	M	Always set

12.6.Printer SOP Class

12.6.1.N-GET Attributes

Table 60

Attribute Name	Tag	Usage SCU/SCP
Printer Status	(2110,0010)	U/M
Printer Status Info	(2110,0020)	U/M
Printer Name	(2110,0030)	U/U
Manufacturer	(0008,0070)	U/U
Manufacturer's Model Name	(0008,1090)	U/U
Device Serial Number	(0018,1000)	U/U
Software Version	(0018,1020)	U/U

13.DIMSE-SERVICE AND ATTRIBUTES - STORAGE COMMITMENT

13.1.DIMSE-Service Class

Table 61

SOP Class	DIMSE Service Element	Usage SCU
STORAGE COMMITMENT PUSH MODEL SOP Class	N-ACTION	M
	N-EVENT-REPORT	M

13.2.STORAGE COMMITMENT PUSH MODEL SOP CLASS

13.2.1.N-ACTION Attributes

Table 62

Action type Name	Action Type ID	Attribute Name	Tag	Requirement Type SCU
Request Storage Commitment	1	Transaction UID	(0008,1195)	1
		Referenced SOP Sequence	(0008,1199)	1
		> Referenced SOP Class UID	(0008,1150)	1
		> Referenced SOP Instance UID	(0008,1155)	1
		Referenced Study Component Sequence	(0008,1111)	1C
		> Referenced SOP Class UID	(0008,1150)	1
		> Referenced SOP Instance UID	(0008,1155)	1

13.2.2.N-EVENT-REPORT Attributes

Table 63

Event Type Name	Event Type ID	Attribute Name	Tag	Requirement Type SCP
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)	1
		Referenced SOP Sequence	(0008,1199)	1
		> Referenced SOP Class UID	(0008,1150)	1
		> Referenced SOP Instance UID	(0008,1155)	1
Storage Commitment Request Complete Failure Exist	2	Transaction UID	(0008,1195)	1
		Referenced SOP Sequence	(0008,1199)	1
		> Referenced SOP Class UID	(0008,1150)	1
		> Referenced SOP Instance UID	(0008,1155)	1

14.DIMSE-Service and Attributes - MWM

14.1.DIMSE-Service - MWM

Table 64

SOP Class	DIMSE Service Element	Usage SCU *1	Usage
Modality Worklist Information Model-FIND	C-FIND	M	Used

*1 : M = Mandatory

The following table shows the list suggested parameters to include in the Worklist query in the [WORKLIST] section of the configuration file. This list is easily modified to fit the PACS environment.

14.2.DIMSE Attributes -MWM

14.2.1.Matching Key Attributes

14.2.1.1.Scheduled Procedure Step Module

Table 65

Description / Module	Tag	Matching Key Type	Remark/Matching Type
Scheduled Procedure Step Sequence	(0040,0100)	Required	
>Scheduled Station AE title	(0040,0001)	Required	Defined in configuration setting. Single value matching only.
>Scheduled Procedure Step Start Date	(0040,0002)	Required	Defined in configuration setting. Single value matching or range matching.
>Scheduled Procedure Step Start Time	(0040,0003)	Required	Defined in configuration setting. Single value matching or range matching.
>Modality	(0008,0060)	Required	Single value matching only.
>Scheduled Performing Physician's Name	(0040,0006)	Required	Single value matching only.
>Scheduled Station Name	(0040,0010)	Optional	Single value matching only.

14.2.1.2.Patient Identification Step Module

Table 66

Description / Module	Tag	Matching Key Type	Remark/Matching Type
Patient's Name	(0010,0010)	Required	Single value matching only.
Patient ID	(0010,0020)	Required	Single value matching only.

14.2.1.3.Visit Admission Module

Table 67

Description / Module	Tag	Matching Key Type	Remark/Matching Type
>Referring Physician's Name	(0008,0090)	Optional	Single value matching only.

14.2.1.4.Study Scheduling Module

Table 68

Description / Module	Tag	Matching Key Type	Remark/Matching Type
>Requested Procedure Description	(0032,1060)	Optional	Single value matching only.

14.2.2.Return Key Attributes

The supported Return Key Attributes is listed as follows.

14.2.2.1.Scheduled Procedure Step Module

Table 69

Description / Module	Tag	Return Key Type	Remark
Scheduled Procedure Step Sequence	(0040,0100)	1	
>Modality	(0008,0060)	1	
>Scheduled Station AE title	(0040,0001)	1	
>Scheduled Procedure Step Start Date	(0040,0002)	1	
>Scheduled Procedure Step Start Time	(0040,0003)	1	
>Scheduled Performing Physician's Name	(0040,0006)	2	
>Scheduled Action item Code Sequence	(0040,0008)	1C	
>>Code Value	(0008,0100)	1C	
>>Code Scheme Designator	(0008,0102)	1C	
>>Code Meaning	(0008,0104)	3	
>Scheduled Station Name	(0040,0010)	2	

14.2.2.2.Requested Procedure Module

Table 70

Description / Module	Tag	Return Key Type	Remark
Study Instance UID	(0020,000D)	1	

14.2.2.3.Imaging Service Request Module

Table 71

Description / Module	Tag	Return Key Type	Remark
Accession Number	(0008,0050)	2	

14.2.2.4.Patient Identification Module

Table 72

Description / Module	Tag	Return Key Type	Remark
Patient's Name	(0010,0010)	1	
Patient ID	(0010,0020)	1	

14.2.2.5.Patient Demographic Module

Table 73

Description / Module	Tag	Return Key Type	Remark
Patient's Birth Date	(0010,0030)	2	
Patient's Sex	(0010,0040)	2	

14.2.2.6.Visit Identification Module

Table 74

Description / Module	Tag	Return Key Type	Remark
Admission ID	(0038,0010)	2	

14.2.2.7.Visit Status Module

Table 75

Description / Module	Tag	Return Key Type	Remark
Current Patient Location	(0038,0300)	2	

14.2.2.8.Visit Admission Module

Table 76

Description / Module	Tag	Return Key Type	Remark
>Referring Physician's Name	(0008,0090)	2	

14.2.2.9.Study Scheduling Module

Table 77

Description / Module	Tag	Return Key Type	Remark
>Requested Procedure Description	(0032,1060)	1C	

15.DIMSE-Service and Attributes - MPPS

15.1.DIMSE-Services

Table 78

SOP Class	DIMSE Service Element	Usage SCU *1	Usage
Modality Performed Procedure	N-CREATE	M	Used
Step SOP Class	N-SET	M	Used

*1 : M = Mandatory

15.2.Modality Performed Procedure Step SOP Class

15.2.1.N-CREATE Attributes

Table 79

Attribute Name	Tag	Req. Type
Specific Character Set	(0008,0005)	1C
Scheduled Step Attribute Sequence	(0040,0270)	1
>Study Instance UID	(0020,000D)	1
>Referenced Study Sequence	(0008,1110)	2
>>Referenced SOP Class UID	(0008,1150)	1C
>>Referenced SOP Instance UID	(0008,1155)	1C
>Accession Number	(0008,0050)	2
>Requested Procedure ID	(0040,1001)	2
>Requested Procedure Description	(0032,1060)	2
>Scheduled Procedure Step ID	(0040,0009)	2
>Scheduled Procedure Step Description	(0040,0007)	2
>Scheduled Action Item Code Seq.	(0040,0008)	2
>>Code Value	(0008,0100)	1C
>>Coding Scheme Designator	(0008,0102)	1C
>>Code Meaning	(0008,0104)	3
Patient’s Name	(0010,0010)	2
Patient ID	(0010,0020)	2
Patient’s Birth Date	(0010,0032)	2
Patient’s Sex	(0010,0040)	2
Referenced Patient Sequence	(0008,1120)	2
>Referenced SOP Class UID	(0008,1150)	1C
>Referenced Instance UID	(0008,1155)	1C
Performed Procedure Step ID	(0040,0253)	1
Performed Station AE Title	(0040,0241)	1
Performed Station Name	(0040,0242)	2
Performed Location	(0040,0243)	2
Performed Procedure Step Start Date	(0040,0244)	1
Performed Procedure Step Start Time	(0040,0245)	1
Performed Procedure Step Status	(0040,0252)	1
Performed Procedure Step Description	(0040,0254)	2
Performed Procedure Type Description	(0040,0255)	2
Procedure Code Sequence	(0008,1032)	2
>Code Value	(0008,0100)	1C
>Coding Scheme Designator	(0008,0102)	1C
>Code Meaning	(0008,0104)	3

Performed Procedure Step End Date	(0040,0250)	2
Performed Procedure Step End Time	(0040,0251)	2
Modality	(0008,0060)	1
Study ID	(0020,0010)	2
Performed Action Item Code Sequence	(0040,0260)	2
>Code Value	(0008,0100)	1C
>Coding Scheme Designator	(0008,0102)	1C
>Code Meaning	(0008,0104)	3
Performed Series Sequence	(0040,0340)	2
>Performing Physician's Name	(0008,1050)	2C
>Protocol Name	(0018,1030)	1C
>Operator's Name	(0008,1070)	2C
>Series Instance UID	(0020,000E)	1C
>Series Description	(0008,103E)	2C
>Retrieve AE Title	(0008,0054)	2C
>Referenced Image Sequence	(0008,1140)	2C
>>Referenced SOP Class UID	(0008,1150)	1C
>>Referenced SOP Instance UID	(0008,1155)	1C
>Referenced Standalone SOP Instance sequence	(0040,0220)	2C
>>Referenced SOP Class UID	(0008,1150)	1C
>>Referenced SOP Instance UID	(0008,1155)	1C

15.2.2.N-SET Attribute

Table 80

Attribute	Tag	Req. Type	Requirement Type Final Status
Performed Procedure Step Status	(0040,0252)	3	
Performed Procedure Step Description	(0040,0254)	3	
Performed Procedure Type Description	(0040,0255)	3	
Procedure Code Sequence	(0008,1032)	3	
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Code Meaning	(0008,0104)	3	
Performed Procedure Step End Date	(0040,0250)	3	1
Performed Procedure Step End Time	(0040,0251)	3	1
Performed Action Item Code Sequence	(0040,0260)	3	
>Code Value	(0008,0100)	1C	
>Coding Scheme Designator	(0008,0102)	1C	
>Code Meaning	(0008,0104)	3	
Performed Series Sequence	(0040,0340)	3	1
>Performing Physician's Name	(0008,1050)	2C	2
>Protocol Name	(0018,1030)	1C	1
>Operator's Name	(0008,1070)	2C	2
>Series Instance UID	(0020,000E)	1C	1
>Series Description	(0008,103E)	2C	2
>Retrieve AE Title	(0008,0054)	2C	2
>Referenced Image Sequence	(0008,1140)	2C	
>>Referenced SOP Class UID	(0008,1150)	1C	
>>Referenced SOP Instance UID	(0008,1155)	1C	
>Referenced Standalone SOP Instance Sequence	(0040,0220)	2C	
>>Referenced SOP Class UID	(0008,1150)	1C	
>>Referenced SOP Instance UID	(0008,1155)	1C	

16.DIMSE-Service and Attributes - Storage (Acceptance)

16.1.DIMSE-Services

Table 81

SOP Class	DIMSE Service Element	Usage SCU *1	Usage
Ultrasound Image Storage Ultrasound Multi-frame image Storage	C-STORE	M	Used

*1 : M = Mandatory

16.2.C-STORE Attribute

All Type1, Type2, and Type3 attributes defined in the Information Object Definition associated with SOP Class will be stored and accessed.

17.DIMSE-Service and Attributes - MOD medium

17.1.MOD Archive Specification

The MOD achive provides standard conformance to DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed as follows:

Table 82

Application Profiles Supported	Real World Activity	Role
STD-US-ID-MF-MOD640	Transfer of US Examination	FSC
AUG-US-ID-MF-MOD640	Modifier of US Examination	FSU
AUG-US-ID-MF-MOD640	Review of US Examination	FSR

17.1.1.Real-World Activities for this Application Entity

17.1.1.1.Real World Activity

A DICOM conformable Magneto-Optical Disk (MOD) is created when a non-conformable MOD is inserted into the DICOM IMAGE MANAGER and one or more DICOM Exams are transferred to the MOD. When Exams are first transferred, their files are added to the MOD in DICOM Part 10 format and a valid DICOMDIR is created and saved to the MOD. The DICOM IMAGE MANAGER can add images to an existing DICOM conformable MOD and update its DICOMDIR. The DICOM IMAGE MANAGER can be a File-set Reader and a File-set Updater.

17.1.1.1.1.Information Object Definition and DICOMDIR Keys

Information Object Definition and DICOMDIR keys are described in section 8.

17.2.Media Storage Directory IOD Modules

Table 83

Object	Module/Key	Reference	Usage
Dicom File Meta Information		Table.85,86	M
Basic Directory Information Object	File-set Identification Module	Table.87	M
	Directory Information Module	Table.88	U
Definition of Specific Directory Records	PATIENT keys	Table.89	M
	STUDY keys	Table.90	M
	SERIES keys	Table.91	M
	IMAGE keys	Table.92	M

17.3.Media Storage Image IOD Modules

Table 84

Object	Module	Reference	Usage
Dicom File Meta Information		Table.85	M
Information Object Definition	The MOD stores a received image in its entirety, without change, in its internal data store. Thus, the IOD modules are dependent on the originating acquisition station and cannot be defined here.	N/A	M

17.4.DICOM File Meta Information

17.4.1.DICOM File Meta Information of Directory IOD

Table 85

Attribute Name	Tag	Type	Attribute Description
File Preamble	No Tag	1	Always Set
DICOM Prefix	No Tag	1	Always Set (“DICM”)
Group Length	(0002, 0000)	1	Always Set
File Meta Information Version	(0002, 0001)	1	Always Set (0x0001)
Media Storage SOP Class UID	(0002, 0002)	1	Always Set (1.2.840.10008.1.3.10)
Media Storage SOP Instance UID	(0002, 0003)	1	Always Set
Transfer Syntax UID	(0002, 0010)	1	Always Set
Implementation Class UID	(0002, 0012)	1	Always Set (1.2.124.113532.1.1)

17.4.2.DICOM File Meta Information Image IOD

Table 86

Attribute Name	Tag	Type	Attribute Description
File Preamble	No Tag	1	Always Set
DICOM Prefix	No Tag	1	Always Set (“DICM”)
Group Length	(0002, 0000)	1	Always Set
File Meta Information Version	(0002, 0001)	1	Always Set (0x0001)
Media Storage SOP Class UID	(0002, 0002)	1	Always Set
Media Storage SOP Instance UID	(0002, 0003)	1	Always Set
Transfer Syntax UID	(0002, 0010)	1	Always Set
Implementation Class UID	(0002, 0012)	1	Always Set
Implementation Version Name	(0002, 0013)	3	Always Set

17.5.Basic Directory Information Object Definitions

17.5.1.File-set identification Module

Table 87

Attribute Name	Tag	Type	Attribute Description
File-set ID	(0004, 1130)	2	Always Set

17.5.2.Directory Information Module

Table 88

Attribute Name	Tag	Type	Attribute Description
Offset of the First Directory Record of the Root Directory Entity	(0004, 1200)	1	Always Set
Offset of the Last Directory Record of the Root Directory Entity	(0004, 1202)	1	Always Set
File-set Consistency Flag	(0004, 1212)	1	Always Set
Directory Record Sequence	(0004, 1220)	2	Always Set
>Offset of the Next Directory Record	(0004, 1400)	1C	Always Set
>Record In-use Flag	(0004, 1410)	1C	Always Set
>Offset of Referenced Lower-Level Directory Entity	(0004, 1420)	1C	Always Set
>Directory Record Type	(0004, 1430)	1C	Always Set
>Referenced File ID	(0004, 1500)	1C	Always Set
>Referenced SOP Class UID in File	(0004, 1510)	1C	Always Set
>Referenced SOP Instance UID in File	(0004, 1511)	1C	Always Set
>Referenced Transfer Syntax UID in File	(0004, 1512)	1C	Always Set

17.5.3.Definition of Specific Directory Records

17.5.3.1.PATIENT Keys

Table 89

Attribute Name	Tag	Type	Attribute Description
Patent's Name	(0010, 0010)	2	Set if present in image object.
Patient ID	(0010, 0020)	1	Always Set
Any other Attribute of the Patient IOD or Patient IE present in the original image received.		3	

17.5.3.2.STUDY keys

Table 90

Attribute Name	Tag	Type	Attribute Description
Study Date	(0008, 0020)	1	Always Set
Study Time	(0008, 0030)	1	Always Set
Study Instance UID	(0020, 000D)	1C	Always Set
Study ID	(0020, 0010)	1	Always Set
Accession Number	(0008, 0050)	2	Set if present in image object.
Study Description	(0008, 1030)	2	Set if present in image object.
Any other Attribute of the Study IOD or Study IE present in the original image received.		3	

17.5.3.3.SERIES keys

Table 91

Attribute Name	Tag	Type	Attribute Description
Modality	(0008, 0060)	1	Always Set
Series Instance UID	(0020, 000E)	1	Always Set
Series Number	(0020, 0011)	1	Always Set
Any other Attribute of the Series IE modules present in the original image received.		3	

17.5.3.4.IMAGE keys

Table 92

Attribute Name	Tag	Type	Attribute Description
Referenced Image Sequence	(0008, 1140)	3	Set if present in image object.
>Referenced SOP Class UID	(0008, 1150)	3	Set if present in image object.
>Referenced SOP Instance UID	(0008, 1155)	3	Set if present in image object.
Image Position Patient (Patient)	(0020, 0032)	3	Set if present in image object.
Frame of Reference UID	(0020, 0052)	3	Set if present in image object.
Rows	(0028, 0010)	3	Set if present in image object.
Columns	(0028, 0011)	3	Always Set
Pixel Spacing	(0028, 0030)	3	Always Set
Image Type	(0008, 0008)	3	Set if present in image object.
Image Number	(0020, 0013)	1	Always Set