No. MIIMR0005EA

TOSHIBA

DICOM CONFORMANCE STATEMENT

FOR

TOSHIBA SUPERCONDUCTING MRI SYSTEMS

EXCELART™-series/SECOND CONSOLE

TOSHIBA MEDICAL SYSTEMS CORPORATION

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1. CONFORMANCE STATEMENT OVERVIEW

Table 1-1 provides an overview of the network services supported by EXCELART^{TM}.

Table 1-1
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
MR Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	No
Enhanced MR Image Storage	Yes	No
MR Spectroscopy Storage	Yes	No
Grayscale Softcopy Presentation State Storage	Yes	No
Storage Commitment		
Storage Commitment Push Model	Yes*(MIDC-018A/C2)	No
Query/Retrieve		
Patient Root Q/R Information Model – Find	No	Yes*(MIDC-013A/C2)
Patient Root Q/R Information Model – Move	No	Yes*(MIDC-013A/C2)
Study Root Q/R Information Model – Find	Yes*(MIDC-019A/C2)	Yes*(MIDC-013A/C2)
Study Root Q/R Information Model – Move	Yes*(MIDC-019A/C2)	Yes*(MIDC-013A/C2)
Patient/Study Only Information Model – Find	No	Yes*(MIDC-013A/C2)
Patient/Study Only Information Model – Move	No	Yes*(MIDC-013A/C2)
Workflow Management		
Modality Worklist Information Model – Find	Yes*(MIDC-016A/C2)	No
Modality Performed Procedure Step	Yes*(MIDC-017A/C2)	No
Print Management		
Basic Grayscale Print Management	Yes	No

*:Option, (MIDC-XXX):Option Model Name

Table 1-2 provides an overview of the Media Storage Application Profiles supported by EXCELART™.

Table 1-2
MEDIA SERVICES

Media Storage Application Profile	Write Files (FSC)	Update Files (FSU)	Read Files (FSR)
Compact Disk – Recordable			
CT and MR Image CD-R	Yes	No	No
General Purpose CD-R	Yes	No	No

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3. INTRODUCTION

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 Toshiba Medical Systems and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

— The comparison of different conformance statements is the first step towards assessing interconnectivity between Toshiba Medical Systems and non- Toshiba Medical Systems equipment.

— Test procedures should be defined to validate the desired level of connectivity.

— The DICOM standard will evolve to meet the users' future requirements. Toshiba Medical Systems is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

3.3 DEFINITIONS, TERMS AND ABBREVIATIONS

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

Abbreviations and terms are as follows:

AE	Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
CD-R	Compact Disk Recordable
DIMSE	DICOM Message Service Element
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IE	Information Entity
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MWM	Modality Worklist Management
R	Required Key Attribute
O	Optional Key Attribute
PDU	Protocol Data Unit
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
U	Unique Key Attribute
UID	Unique Identifier

3.4 REFERENCES

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.18, 2004

4. NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

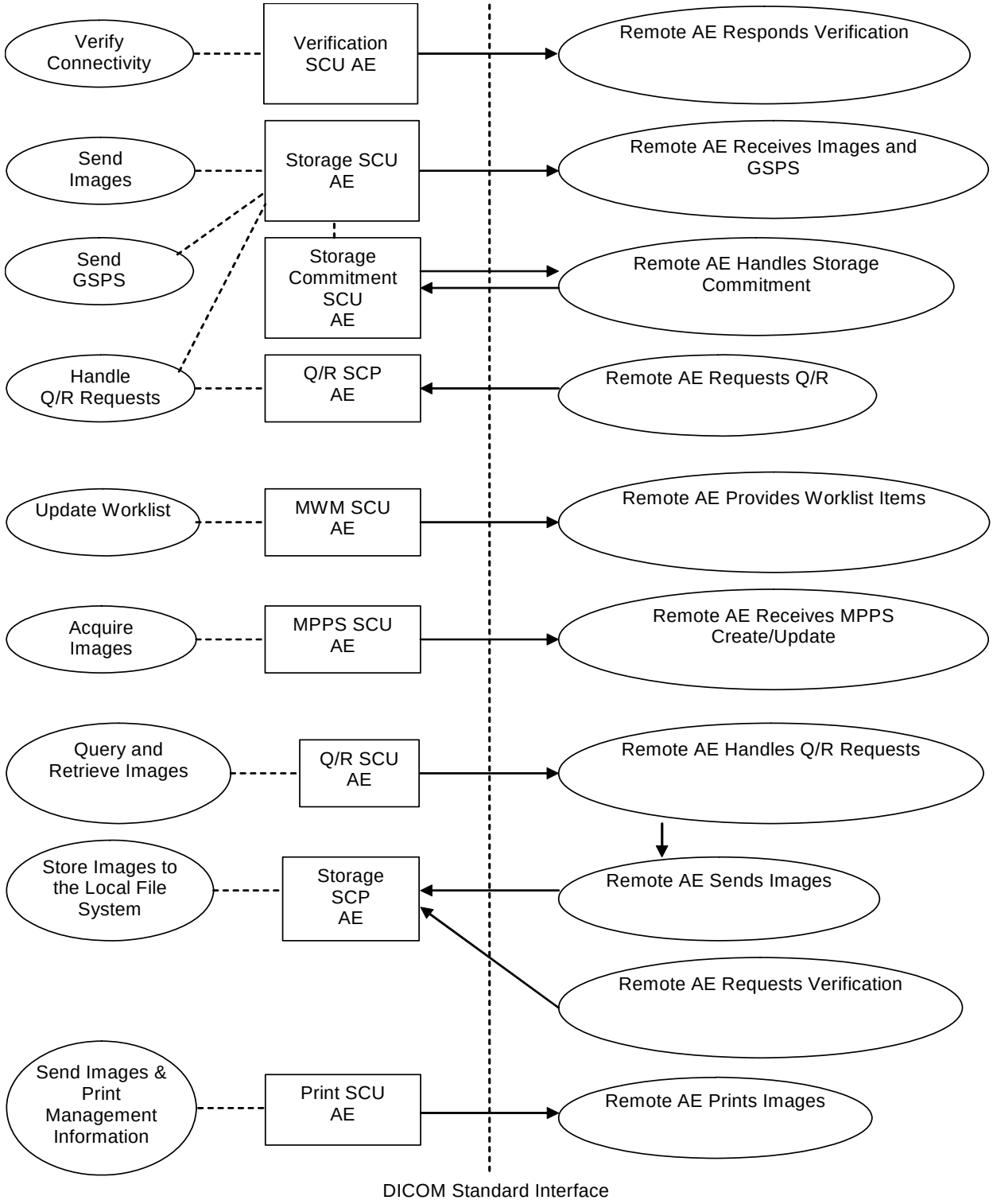

Figure 4.1-1
APPLICATION DATA FLOW DIAGRAM

- The Verification SCU AE can send verification requests to the specified DICOM destination.
- The Storage SCU AE sends images or GSPS to a remote AE. It is associated with the local real-world activity “Send Images” or “Send GSPS”. “Send Images” and “Send GSPS” is performed upon user request for specific images selected.
  If the remote AE is configured as an archive device, the Storage SCU AE will send a storage commitment request to the Storage Commitment SCU AE.
- Receiving the storage commitment request from the Storage SCU AE, the Storage Commitment SCU AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database.
- The Q/R SCP AE handles incoming query and retrieve requests issued by a remote AE. It is associated with the local real-world activity “Handle Q/R Requests”. “Handle Q/R Requests” handles retrieval requests by issuing a command to the Storage SCU AE to send the requested Images to the destination specified by the remote AE. The Q/R SCP AE functions as an SCP for C-FIND and C-MOVE requests.
- The MWM SCU AE receives Worklist information from a remote AE. It is associated with the local real-world activity “Update Worklist”. When the “Update Worklist” is performed the MWM SCU AE queries a remote AE for worklist items and provides the set of worklist items matching the query request. ”Update Worklist” is performed as a result of an operator request.
- The MPPS SCU AE sends MPPS information to a remote AE. It is associated with the local real-world activity “Acquire Images”. When the “Acquire Images” is performed the MPPS SCU AE creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator action. If the remote AE is configured as an MPPSR SCP, the MPPS SCU AE can receive MPPSR information.
- The Q/R SCU AE queries a remote AE for lists of studies, series and images and retrieves selected studies, series or images. It is associated with the local real-world activity “Query and Retrieve Images”.
- The Storage SCP AE receives incoming images. It is associated with the local real-world activity “Store Images to the Local File System”. “Store Images to the Local File System” stores the received images to the local file system. The Storage SCP AE can also respond to C-ECHO requests as a Verification SCP.
- The Print SCU AE prints images on a remote AE (Printer). It is associated with the local real-world activity “Send Images & Print Management Information”. “Send Images & Print Management Information” creates a print-job within the print queue containing one or more virtual film sheets composed from images selected by the user.

4.1.2 Functional Definition of AEs

4.1.2.1 Functional Definition of Verification SCU AE

The existence of a verification request with associated network destination will activate the Verification SCU AE. An Association request is sent to the destination AE and upon successful negotiation of a Presentation Context the verification is started. If the verification fails, the Verification SCU AE will show the error message.

4.1.2.2 Functional Definition of Storage SCU AE

The existence of a send-job queue entry with associated network destination will activate the Storage SCU AE. An Association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the image transfer fails, the Storage SCU AE will retry this send-job automatically. If the remote AE is configured as an archive device, the storage SCU AE will send a storage commitment request to the Storage Commitment SCU AE.

4.1.2.3 Functional Definition of Storage Commitment SCU AE

Receiving the storage commitment request from the Storage SCU AE, the Storage Commitment SCU AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database.

4.1.2.4 Functional Definition of Q/R SCP AE

The Q/R SCP AE waits for another application to connect at the presentation address configured for its Application Entity Title. The Q/R SCP AE will accept Associations with Presentation Contexts for SOP Class of the Query/Retrieve Service Class. It will handle query and retrieve requests on these Presentation Contexts and respond with data objects with values corresponding to the contents of the local file system. When a retrieval request is received, the Q/R SCP AE issues a command to the Storage SCU AE to send the specified images to the destination.

4.1.2.5 Functional Definition of MWM SCU AE

The MWM SCU AE attempts to download a worklist from a remote node. If the MWM SCU AE establishes an Association to a remote AE, it will transfer patient's information and worklist items via the open Association. The results will be displayed in a separate list. The patient's information will be used for the patient registration.

4.1.2.6 Functional Definition of MPPS SCU AE

The MPPS SCU AE performs the creation of an MPPS Instance automatically whenever images are acquired. Further updates on the MPPS data can be performed automatically or interactively. If the remote AE is configured as an MPPSR SCP, the MPPS SCU AE can receive MPPSR information.

4.1.2.7 Functional Definition of Q/R SCU AE

The Q/R SCU AE is activated when the user selects a remote node to query and enters some key information, Patient's Name, Patient ID and/or Study Date. The user can select studies, series and images to be retrieved. The images will be received at the Storage SCP AE.

4.1.2.8 Functional Definition of Storage SCP AE

The Storage SCP AE waits for another application to connect at the presentation address configured for its Application Entity Title. The Storage SCP AE will accept Associations with Presentation Contexts for SOP Classes of the Verification and Storage Service Classes. Any images received on such Presentation Contexts will be stored to the local file system.

4.1.2.9 Functional Definition of Print SCU AE

The existence of a print-job in the print queue will activate the Print SCU AE. An Association is established with the printer and the printer's status determined. If the printer is operating normally, the film sheets described within the print-job will be printed. If the printer is not operating normally, an error message will be displayed and this print-job can be canceled or restarted by the user operations.

4.1.3 Sequencing of Real-World Activities

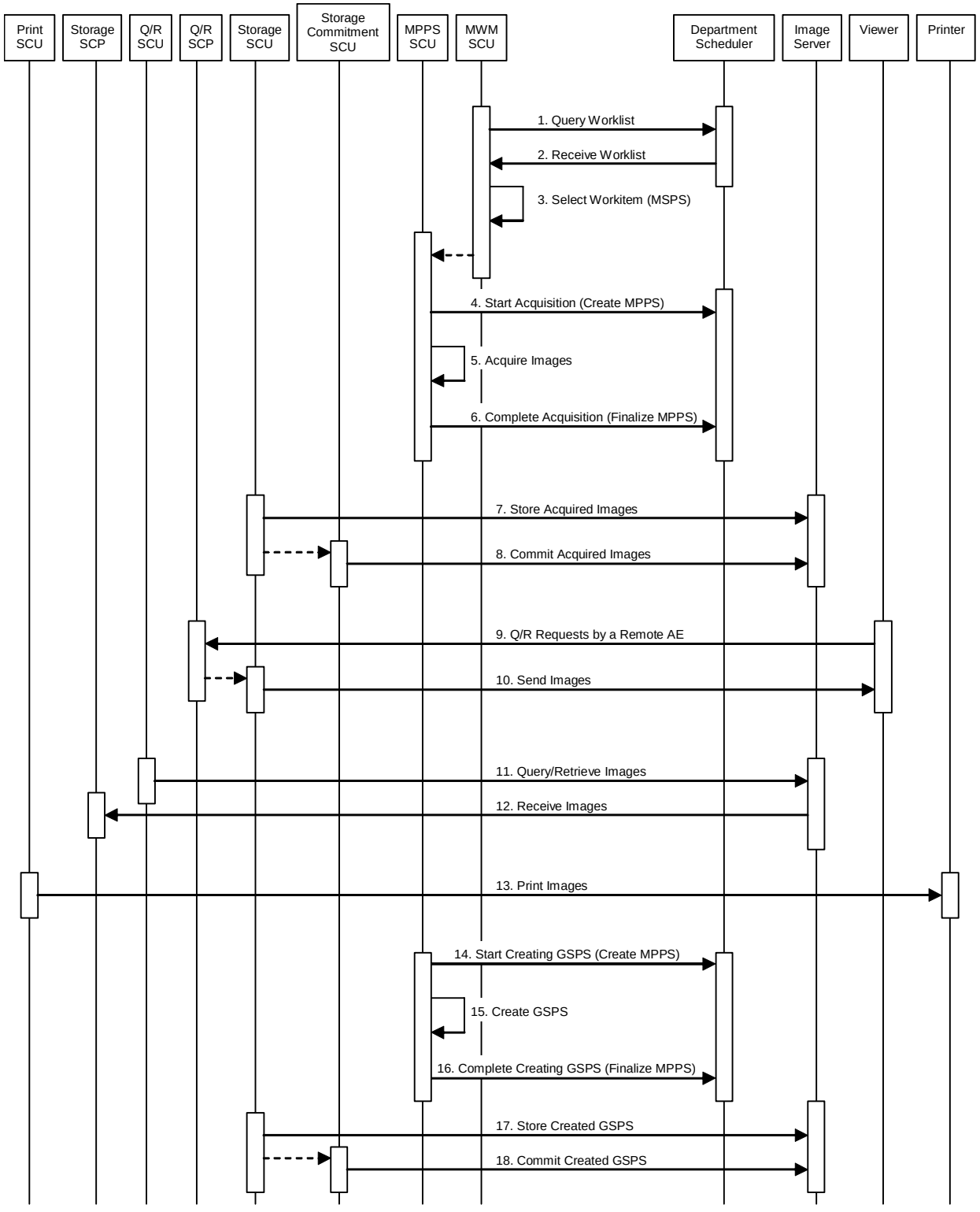

Figure 4.1-2
SEQUENCING CONSTRAINTS

Under typical scheduled workflow conditions the sequencing constraints illustrated in Figure 4.1-2 apply:

1. Query Worklist
2. Receive Worklist of Modality Scheduled Procedure Steps (MSPS)
3. Select Workitem (MSPS) from Worklist
4. Start Acquisition and Create MPPS
5. Acquire Images
6. Complete Acquisition and Finalize MPPS
7. Store Acquired Images
8. Commit Acquired Images
9. Q/R Requests by a Remote AE
10. Send Images
11. Query/Retrieve Images
12. Receive Images
13. Print Images
14. Start Creating GSPS and Create MPPS
15. Create GSPS
16. Complete Creating GSPS and Finalize MPPS
17. Store Created GSPS
18. Commit Created GSPS

Other workflow situations (e.g. unscheduled procedure steps) will have other sequencing constraints. Some activities may be omitted according to situations.

4.2 AE SPECIFICATIONS

4.2.1 Verification SCU AE Specifications

4.2.1.1 SOP Class

The Verification SCU AE provides Standard Conformance to the following DICOM SOP classes:

Table 4.2-1
SOP CLASSES FOR ECHO-SCU AE

SOP Class	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No

4.2.1.2 Association Policies

4.2.1.2.1 General

The Verification SCU AE can form associations via user control. The Verification SCU AE can only request the starting of an association. It cannot accept association start requests from external application entities. The DICOM Standard Application Context Names for DICOM is always accepted.

Table 4.2-2
DICOM APPLICATION CONTEXTS FOR VERIFICATION SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2 Number of Associations

The maximum number of simultaneous associations cannot be changed.

Table 4.2-3
NUMBERS OF ASSOCIATIONS AS A SCU FOR VERIFICATION SCU AE

Maximum Number of Simultaneous Associations	1

4.2.1.2.3 Asynchronous Nature

The Verification SCU AE does not support asynchronous communication (multiple incomplete transactions on a single association). All association requests must be completed and confirmed before new actions can be performed.

Table 4.2-4
ASYNCHRONOUS NATURE AS A SCU FOR VERIFICATION SCU AE

Maximum Number of Outstanding Asynchronous Transactions	1

4.2.1.2.4 Implementation Identifying Information

Table 4.2-5
DICOM IMPLEMENTATION CLASS AND VERSION FOR VERIFICATION SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity - Verify Connectivity

4.2.1.3.1.1 Destination and Sequencing of Activity

The Verification SCU AE initiates association through user control.

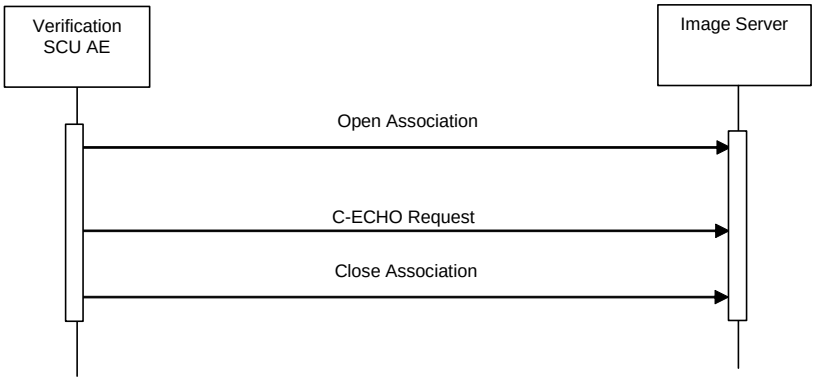

Figure 4.2-1
SEQUENCING OF ACTIVITY – VERIFY CONNECTIVITY

The following sequencing restrictions, illustrated in figure 4.2-1, apply when the Verification SCU AE:

1. The Verification SCU AE opens a new association with the specified destination AE.
2. The Verification SCU AE sends C-ECHO requests.
3. The Verification SCU AE closes the Association.

4.2.1.3.1.2 Proposed Presentation Context

The Verification SCU AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4.2-6
PROPOSED PRESENTATION CONTEXTS BY THE VERIFICATION SCU AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotia-tion**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.1.3 SOP Specific Conformance for Verification SOP Class

The Verification SCU AE provides standard conformance to the Verification Service Class as an SCU.

The Verification SCU AE performs the following actions based on the status code values in the C-ECHO responses from the destination C-ECHO SCP:

Table 4.2-7
VERIFICATION SCU AE C-ECHO RESPONSE STATUS ACTIONS

Service Status	Detailed Meaning	Error Code	Action
Success	Success	0000	No message is posted to the User Interface.
Error	Failure	Status codes other than the above	Several retries are performed, it is considered as a permanent failure. The association is terminated when the error occurs. A failure message is output to the Service Log. No messages are sent to the user interface.

4.2.1.4 Association Acceptance Policy

The Verification SCU AE does not accept associations.

4.2.2 Storage SCU AE Specification

4.2.2.1 SOP Classes

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

Table 4.2-8
SOP CLASSES FOR THE STORAGE SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No

4.2.2.2 Association Policies

4.2.2.2.1 General

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

Table 4.2-9
DICOM APPLICATION CONTEXT FOR THE STORAGE SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2 Number of Associations

The Storage SCU AE can initiate up to two Associations at a time for each destination to which a transfer request is being processed in the active job queue list. Up to two jobs, that images will be sent to the different remote hosts, will be active at a time, the other remains pending until the active job is completed or failed.

Table 4.2-10
NUMBER OF ASSOCIATIONS INITIATED FOR THE STORAGE SCU AE

Maximum number of simultaneous Associations	1

4.2.2.2.3 Asynchronous Nature

The Storage SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-11
ASYNCHRONOUS NATURE FOR THE STORAGE SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.2.2.4 Implementation Identifying Information

The implementation information for the Storage SCU AE is:

Table 4.2-12
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.2.3 Association Initiation Policy

4.2.2.3.1 Activity – Send Images

4.2.2.3.1.1 Description and Sequencing of Activities

The Storage SCU AE attempts to initiate a new Association in order to issue a Storage request (C-STORE). If the job contains multiple images then multiple C-STORE requests will be issued over the same Association. If the image transfer fails, the Storage SCU AE will retry this send-job automatically.

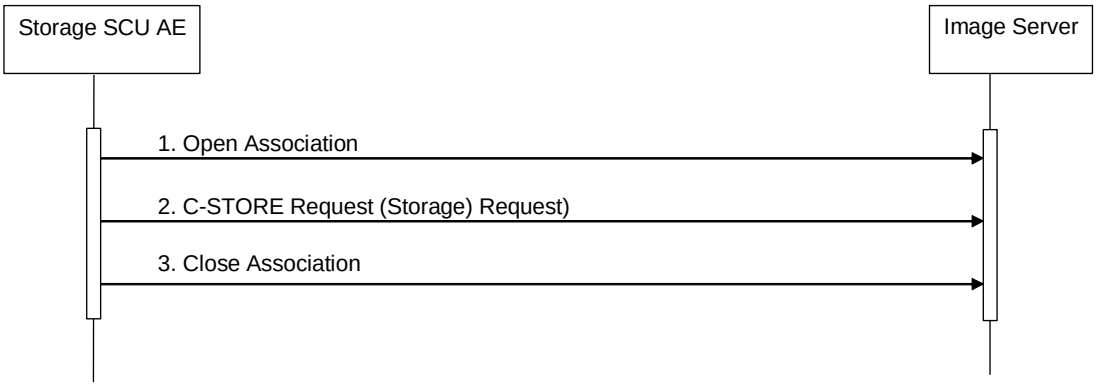

Figure 4.2-2
SEQUENCING OF ACTIVITY – SEND IMAGES

A possible sequence of interactions between the Storage SCU AE and an Image Server (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage SCU AE opens an Association with the Image Server
2. Acquired images are transmitted to the Image Server using a Storage request (C-STORE) and the Image Server replies with a C-STORE response (status success).
3. The Storage SCU AE closes the Association with the Image Server.

4.2.2.3.1.2 Proposed Presentation Contexts

The Storage SCU AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4.2-13
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY SEND IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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		
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.2.3.1.3 SOP Specific Conformance for Storage SOP Classes

The Storage SCU AE provides standard conformance to the Storage Service Class as an SCU.

The behavior of Storage SCU AE when encountering status codes in a C-STORE response is summarized in the Table below:

Table 4.2-14
STORAGE C-STORE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.
Refused	Out of Resources	A7xx	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure.
Error	Data Set does not match SOP Class	A9xx	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Error	Cannot Understand	Cxxx	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.

*	*	Any other status code.	The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application.

The behavior of Storage SCU AE during communication failure is summarized in the Table below:

Table 4.2-15
STORAGE COMMUNICATION FAILURE BEHAVIOR

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

If the image transfer fails, the Storage SCU AE will retry this send-job automatically. The delay between resending failed jobs and the number of retries is also configurable.

The contents of Image Storage SOP Instances created by the Storage SCU AE conform to the DICOM Image IOD definitions and are described in section 8.1.

4.2.3 Storage Commitment SCU AE Specification

4.2.3.1 SOP Classes

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

Table 4.2-16
SOP CLASSES FOR THE STORAGE COMMITMENT SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Verification	1.2.840.10008.1.1	No	Yes

4.2.3.2 Association Policies

4.2.3.2.1 General

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

Table 4.2-17
DICOM APPLICATION CONTEXT FOR THE STORAGE COMMITMENT SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.2 Number of Associations

The Storage Commitment SCU AE initiates one Association at a time.

Table 4.2-18
NUMBER OF ASSOCIATIONS INITIATED FOR THE STORAGE COMMITMENT SCU AE

Maximum number of simultaneous Associations	1

The Storage Commitment SCU AE accepts Associations to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class.

Table 4.2-19
NUMBER OF ASSOCIATIONS ACCEPTED FOR THE STORAGE COMMITMENT SCU AE

Maximum number of simultaneous Associations	4

4.2.3.2.3 Asynchronous Nature

The Storage Commitment SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-20
ASYNCHRONOUS NATURE FOR THE STORAGE COMMITMENT SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.3.2.4 Implementation Identifying Information

The implementation information for the Storage Commitment SCU AE is:

Table 4.2-21
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE COMMITMENT SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity – Commit Sent Images

4.2.3.3.1.1 Description and Sequencing of Activities

If the remote AE is configured as an archive device the Storage Commitment SCU AE will, after all images have been sent, transmit a single Storage Commitment request (N-ACTION). Upon receiving the N-ACTION response the Storage Commitment SCU AE will release the Association. The notification of Storage commitment (N-EVENT-REPORT) will be received over a separate Association.

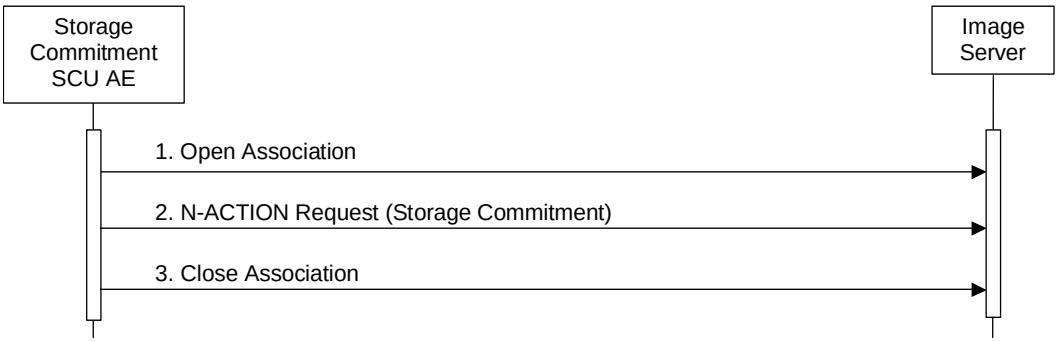

Figure 4.2-3
SEQUENCING OF ACTIVITY – COMMIT SENT IMAGES

A possible sequence of interactions between the Storage Commitment SCU AE and an Image Server (e.g. a storage or archive device supporting the Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage Commitment SCU AE opens an Association with the Image Server.
2. A Storage Commitment request (N-ACTION) is transmitted to the Image Server to obtain Storage Commitment of previously transmitted images. The Image Server replies with an N-ACTION response indicating the request has been received and is being processed.
3. The Storage Commitment AE closes the Association with the Image Server.

NOTE: The N-EVENT-REPORT will be sent over a separate Association initiated by the Image Server (see Section 4.2.2.4.1).

4.2.3.3.1.2 Proposed Presentation Contexts

The Storage Commitment SCU AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4.2-22
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY COMMIT SENT IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

A Presentation Context for the Storage Commitment Push Model will only be proposed if the remote AE is configured as an archive device.

4.2.3.3.1.3 SOP Specific Conformance for Storage Commitment SOP Class

4.2.3.3.1.3.1 Storage Commitment Operations (N-ACTION)

The Storage Commitment SCU AE provides standard conformance to the Storage Commitment Service Class as an SCU.

The Storage Commitment SCU AE will request storage commitment for instances of the Storage SOP Classes if the remote AE is configured as an archive device and a presentation context for the Storage Commitment Push Model has been accepted.

The behavior of Storage SCU Commitment AE when encountering status codes in a N-ACTION response is summarized in the Table below:

Table 4.2-23
STORAGE COMMITMENT N-ACTION RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The request for storage commitment is considered successfully sent. A timer is started which will expire if no N-EVENT-REPORT for the Transaction UID is received within a configurable timeout period.
*	*	Any other status code.	The Association is aborted using A-ABORT and the request for storage commitment is marked as failed.

The behavior of Storage Commitment AE during communication failure is summarized in the Table below:

Table 4.2-24
STORAGE COMMITMENT COMMUNICATION FAILURE BEHAVIOR

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

4.2.3.4 Association Acceptance Policy

4.2.3.4.1 Activity – Receive Storage Commitment Response

4.2.3.4.1.1 Description and Sequencing of Activities

The Storage Commitment SCU AE will accept Associations in order to receive responses to a Storage Commitment Request.

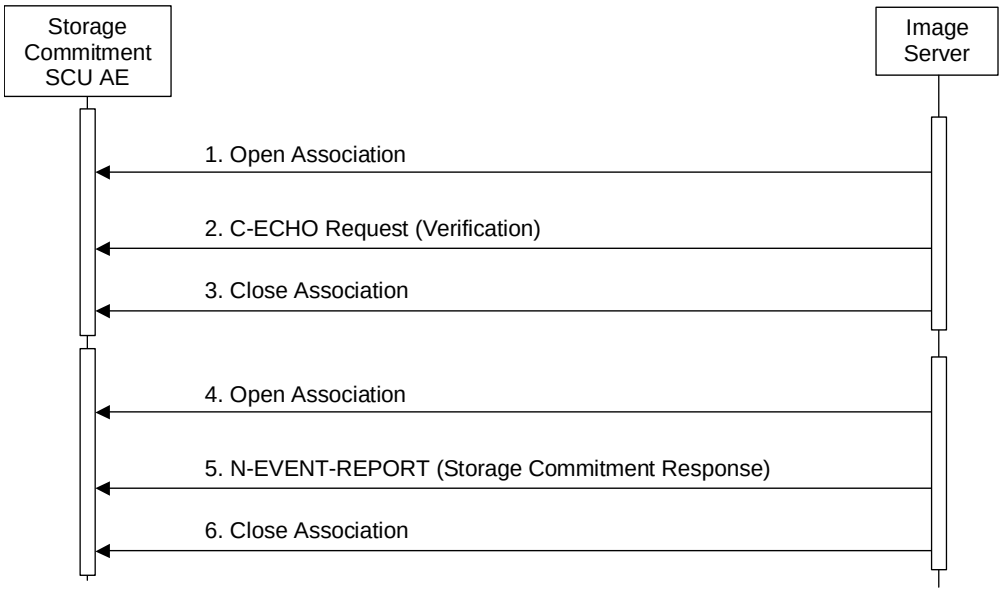

Figure 4.2-4
SEQUENCING OF ACTIVITY - RECEIVE STORAGE COMMITMENT RESPONSE

A possible sequence of interactions between the Storage Commitment SCU AE and an Image Server (e.g. a storage or archive device supporting Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Image Server opens an Association with the Storage Commitment SCU AE.
2. The Image Server issues a Verification request (C-ECHO), and the Storage Commitment SCU AE replies with a C-ECHO response (status success).
3. The Image Server closes the Association with the Storage Commitment SCU AE.
4. The Image Server opens a new Association with the Storage Commitment SCU AE.
5. The Image Server sends an N-EVENT-REPORT request notifying the Storage Commitment SCU AE of the status of a previous Storage Commitment Request. The Storage SCU AE replies with an N-EVENT-REPORT response confirming receipt.
6. The Image Server closes the Association with the Storage Commitment SCU AE.

The Storage Commitment SCU AE may reject Association attempts as shown in the Table below. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU (see PS 3.8, Section 9.3.4). The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are:

a) 1 – DICOM UL service-user

b) 2 – DICOM UL service-provider (ASCE related function)

c) 3 – DICOM UL service-provider (Presentation related function)

Table 4.2-25
ASSOCIATION REJECTION REASONS

Result	Source	Reason/Diag	Explanation
2 – rejected-transient	c	2 – local-limit-exceeded	The (configurable) maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	1 – temporary-congestion	No Associations can be accepted at this time due to the real-time requirements of higher priority activities (e.g. during image acquisition no Associations will be accepted) or because insufficient resources are available (e.g. memory, processes, threads). An Association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The Association request contained an unsupported Application Context Name. An Association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the Association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The Association request could not be parsed. An Association request with the same format will not succeed at a later time.

4.2.3.4.1.2 Accepted Presentation Contexts

The Storage Commitment SCU AE will accept Presentation Contexts as shown in the Table below.

Table 4.2-26
ACCEPTABLE PRESENTATION CONTEXTS FOR
ACTIVITY RECEIVE STORAGE COMMITMENT RESPONSE

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

4.2.3.4.1.3 SOP Specific Conformance for Storage Commitment SOP Class

4.2.3.4.1.3.1 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage Commitment SCU AE provides standard conformance to the Storage Commitment Service Class as an SCU.

The behavior of Storage Commitment SCU AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below.

Table 4.2-27
STORAGE COMMITMENT N-EVENT-REPORT BEHAVIOUR

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Storage Commitment SCU AE permits the operator(s) to delete the Referenced SOP Instances under Referenced SOP Sequence (0018,1199), or deletes the Instances from the local database automatically.
Storage Commitment Request Complete – Failures Exist	2	The Storage Commitment SCU AE requests the Storage SCU AE to send the Referenced SOP Instances under Failed SOP Sequence (0018,1198).

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below.

Table 4.2-28
STORAGE COMMITMENT N-EVENT-REPORT RESPONSE STATUS REASONS

Service Status	Further Meaning	Status Code	Reasons
Success	Success	0000	The storage commitment result has been successfully received.
Failure	Unrecognized Operation	0211H	The Transaction UID in the N-EVENT-REPORT request is not recognized (was never issued within an N-ACTION request).
Failure	Resource Limitation	0213H	The Transaction UID in the N-EVENT-REPORT request has expired (no N-EVENT-REPORT was received within a configurable time limit).
Failure	No Such Event Type	0113H	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Processing Failure	0110H	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).
Failure	Invalid Argument Value	0115H	One or more SOP Instance UIDs with the Referenced SOP Sequence (0008,1199) or Failed SOP Sequence (0008,1198) was not included in the Storage Commitment Request associated with this Transaction UID. The unrecognized SOP Instance UIDs will be returned within the Event Information of the N-EVENT-REPORT response.

4.2.3.4.1.4 SOP Specific Conformance for Verification SOP Class

The Storage Commitment SCU AE provides standard conformance to the Verification SOP Class as an SCP.

4.2.4 Q/R SCP AE Specification

4.2.4.1 SOP Classes

The Q/R SCP AE provides Standard Conformance to the following SOP Classes:

Table 4.2-29
SOP CLASSES FOR THE Q/R SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Patient Root Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
Patient/Study Only Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
Patient/Study Only Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.3.2	No	Yes

4.2.4.2 Association Policies

4.2.4.2.1 General

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

Table 4.2-30
DICOM APPLICATION CONTEXT FOR THE Q/R SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.4.2.2 Number of Associations

The Q/R SCP AE supports one Association at a time.

Table 4.2-31
NUMBER OF ASSOCIATIONS ACCEPTED FOR THE Q/R SCP AE

Maximum number of simultaneous Associations	1

4.2.4.2.3 Asynchronous Nature

The Q/R SCP AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-32
ASYNCHRONOUS NATURE FOR THE Q/R SCP AE

Maximum number of outstanding asynchronous transactions	1

4.2.4.2.4 Implementation Identifying Information

The implementation information for the Q/R SCP AE is:

Table 4.2-33
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE Q/R SCP AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.4.3 Association Initiation Policy

The Q/R SCP AE does not initiate Associations.

4.2.4.4 Association Acceptance Policy

4.2.4.4.1 Activity – Handle Q/R Requests

4.2.4.4.1.1 Description and Sequencing of Activities

The Q/R SCP AE accepts Associations only if they have valid Presentation Contexts. If none of the requested Presentation Contexts are accepted then the Association Request itself is rejected. It can be configured to only accept Associations with certain hosts (using TCP/IP address) and/or Application Entity Titles.

If the Q/R SCP AE receives a query (C-FIND) request then the response(s) will be sent over the same Association used to send the C-FIND-Request.

If the Q/R SCP AE receives a retrieval (C-MOVE) request then the responses will be sent over the same Association used to send the C-MOVE-Request. The Q/R SCP AE will notify the Storage SCU AE to send the requested SOP Instances to the C-MOVE Destination AE. The Storage SCU AE notifies the Q/R SCP AE of the success or failure of each attempt to send a Composite SOP Instance to the peer C-MOVE Destination AE. The Q/R SCP AE then sends a C-MOVE Response indicating this status after each attempt. Once the Storage SCU AE has finished attempting to transfer all the requested SOP Instances, the Q/R SCP AE sends a final C-MOVE Response indicating the overall status of the attempted retrieval.

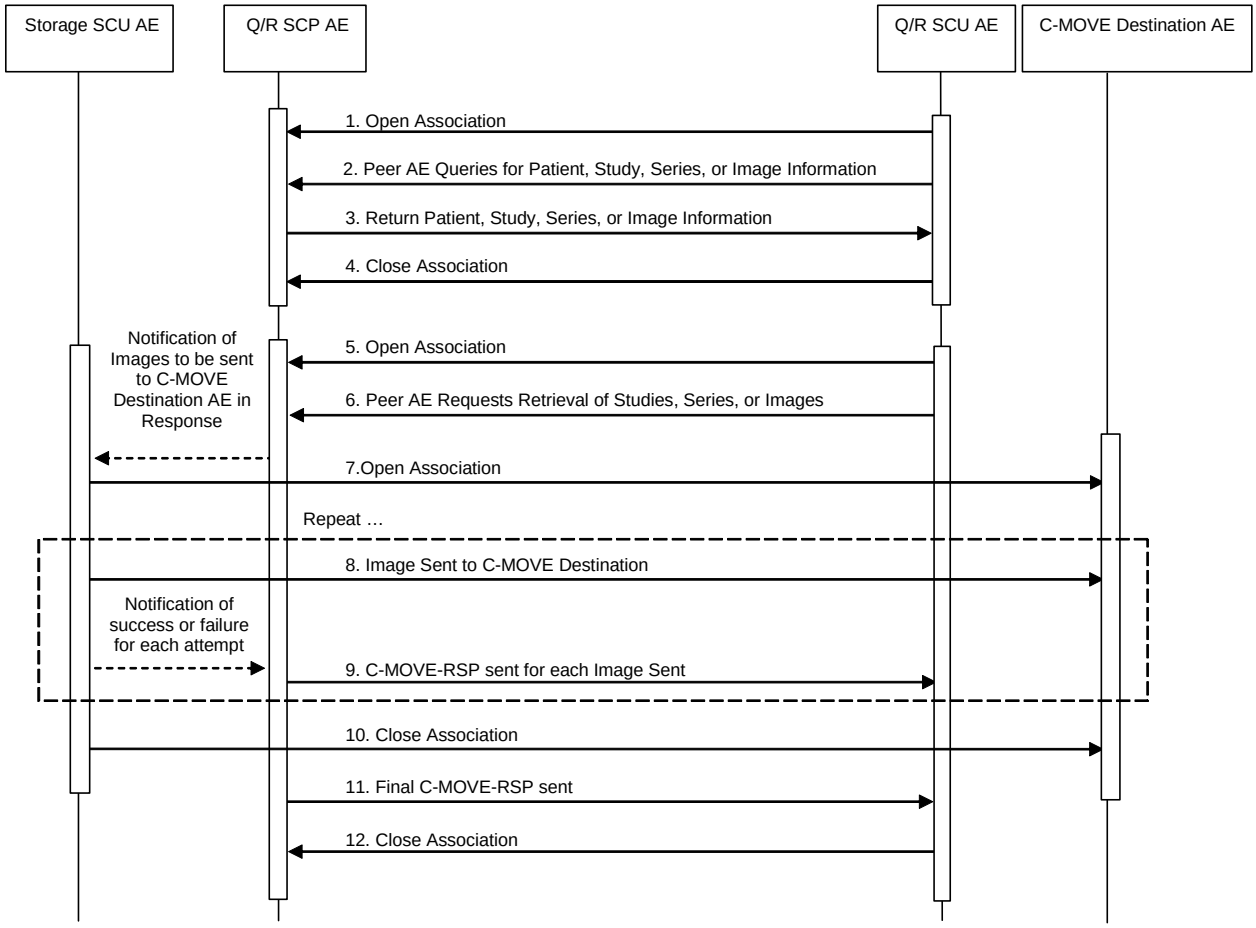

Figure 4.2-5
SEQUENCING OF ACTIVITY – HANDLE Q/R REQUESTS

The following sequencing constraints illustrated in the Figure above:

1. The Q/R SCU AE opens an Association with the Q/R SCP AE.
2. The Q/R SCU AE sends a C-FIND-RQ Message
3. The Q/R SCP AE returns a C-FIND-RSP Message to the Q/R SCU AE with matching information. A C-FIND-RSP is sent for each entity matching the identifier specified in the C-FIND-RQ. A final C-FIND-RSP is sent indicating that the matching is complete.
4. The Q/R SCU AE closes the Association.
5. The Q/R SCU AE opens an Association with the Q/R SCP AE.
6. The Q/R SCU AE sends a C-MOVE-RQ Message. The Q/R SCP AE notifies the Storage SCU AE to send the Composite SOP Instances to the peer C-MOVE Destination AE as indicated in the C-MOVE-RQ.
7. The Storage SCU AE opens an Association with the C-MOVE Destination AE.
8. The Storage SCU AE sends images to the C-MOVE Destination AE. The Storage SCU AE indicates to the Q/R SCP AE whether the transfer succeeded or failed.
9. The Q/R SCP AE then returns a C-MOVE-RSP indicating this success or failure.
10. The Storage SCU AE closes the Association.
11. The Q/R SCP AE sends a final C-MOVE-RSP indicating the overall success or failure of the retrieval.
12. The Q/R SCU AE closes the Association.

The Q/R SCP AE may reject Association attempts as shown in the table below. The Result, Source and Reason/Diag columns represent the values returned in the corresponding fields of an ASSOCIATE-RJ PDU (see PS 3.8, Section 9.3.4). The following abbreviations are used in the Source column:

a. 1 – DICOM UL service-user
b. 2 – DICOM UL service-provider (ASCE related function)
c. 3 – DICOM UL service-provider (Presentation related function)

Table 4.2-34
ASSOCIATION REJECTION REASONS

Result	Source	Reason/Diag	Explanation
2 – rejected-transient	c	2 – local-limit-exceeded	The (configurable) maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	1 – temporary-congestion	No Associations can be accepted at this time due to the real-time requirements of higher priority activities (e.g. during image acquisition no Associations will be accepted) or because insufficient resources are available (e.g. memory, processes, threads). An Association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The Association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the Association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The Association request could not be parsed. An Association request with the same format will not succeed at a later time.

4.2.4.4.1.2 Accepted Presentation Contexts

The default Behavior of the Q/R SCP AE supports the Implicit VR Little Endian and Explicit VR Little Endian Transfer Syntaxes for all Associations.

If the both Transfer Syntaxes are proposed per Presentation Context then the Q/R SCP AE will select Explicit VR Little Endian Transfer Syntax.

Any of the Presentation Contexts shown in the following table are acceptable to the Q/R SCP AE.

Table 4.2-35
ACCEPTED PRESENTATION CONTEXTS BY THE Q/R SCP AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Patient Root Q/R Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Patient Root Q/R Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Study Root Q/R Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Study Root Q/R Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Q/R Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Q/R Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None

4.2.4.4.1.3 SOP Specific Conformance for Q/R Find SOP Classes

The Q/R SCP AE provides standard conformance to the Query/Retrieve Find SOP Class as an SCP. It supports hierarchical queries and not relational queries.

Table 4.2-36
PATIENT ROOT C-FIND SCP SUPPORTED ELEMENTS

Level Name Attribute Name	Tag	VR	Types of Matching
Patient Level			
Patient's Name	(0010,0010)	PN	S,*,U
Patient ID	(0010,0020)	LO	S,*,U
Study Level			
Study Date	(0008,0020)	DA	S,R,U
Study Time	(0008,0030)	TM	R,U
Accession Number	(0008,0050)	SH	S,*,U
Study Instance UID	(0020,000D)	UI	S,*,U
Study ID	(0020,0010)	SHI	S,*,U
Series Level			
Modality	(0008,0060)	CS	S,*,U
Series Number	(0020,0011)	IS	S,*,U
Series Instance UID	(0020,000E)	UI	S,*,U
Instance Level			
SOP Instance UID	(0008,0018)	UI	S,*,U
Instance Number	(0020,0013)	IS	S,*,U

Table 4.2-37
STUDY ROOT C-FIND SCP SUPPORTED ELEMENTS

Level Name Attribute Name	Tag	VR	Types of Matching
Study Level			
Study Date	(0008,0020)	DA	S,R,U
Study Time	(0008,0030)	TM	R,U
Accession Number	(0008,0050)	SH	S,*,U
Patient's Name	(0010,0010)	PN	S,*,U
Patient ID	(0010,0020)	LO	S,*,U
Study Instance UID	(0020,000D)	UI	S,*,U
Study ID	(0020,0010)	SH	S,*,U
Series Level			
Modality	(0008,0060)	CS	S,*,U
Series Number	(0020,0011)	IS	S,*,U
Series Instance UID	(0020,000E)	UI	S,*,U
Instance Level			
SOP Instance UID	(0008,0018)	UI	S,*,U
Instance Number	(0020,0013)	IS	S,*,U

Table 4.2-38
PATIENT/STUDY ONLY C-FIND SCP SUPPORTED ELEMENTS

Level Name Attribute Name	Tag	VR	Types of Matching
Patient Level			
Patient's Name	(0010,0010)	PN	S,*,U
Patient ID	(0010,0020)	LO	S,*,U
Study Level			
Study Date	(0008,0020)	DA	S,R,U
Study Time	(0008,0030)	TM	R,U
Accession Number	(0008,0050)	SH	S,*,U
Study Instance UID	(0020,000D)	UI	S,*,U
Study ID	(0020,0010)	SH	S,*,U

The tables should be read as follows:

Attribute Name: Attributes supported for returned C-FIND Responses.

Tag: Appropriate DICOM tag for this attribute.

VR: Appropriate DICOM VR for this attribute.

Types of Matching: The types of Matching supported by the C-FIND SCP.

A "S" indicates the identifier attribute can specify Single Value Matching, a “R” will indicate Range Matching, an “*” will denote wildcard matching, and a “U” will indicate universal matching.

The Q/R SCP AE returns C-FIND response status as specified below.

Table 4.2-39
THE Q/R SCP AE C-FIND RESPONSE STATUS RETURN BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	Matching is complete. No final identifier is supplied.
Refused	Out of Resources	A700	System reached the limit in disk space or memory usage. Error message is output to as an alert to the User Interface, and to the Service Log.
Failed	Identifier does not match SOP Class	A900	The C-FIND query identifier contains invalid Elements or values, or is missing mandatory Elements or values for the specified SOP Class. Error message is output to the Service Log.
	Unable to process	C000	The C-FIND query identifier is valid for the specified SOP Class but cannot be used to query the database. For example, this can occur if received data contains unsupported character sets. (See section 6 ‘SUPPORT OF CHARACTER SET’.)
Cancel	Matching terminated due to Cancel Request	FE00	The C-FIND SCU sent a Cancel Request. This has been acknowledged and the search for matches has been halted.
Pending	Matches are continuing and current match is supplied.	FF00	Indicates that the search for further matches is continuing. This is returned when each successful match is returned and when further matches are forthcoming. This status code is returned if all Optional keys in the query identifier are actually supported.
	Matches are continuing but one or more Optional Keys were not supported.	FF01	Indicates that the search for further matches is continuing. This is returned when each successful match is returned and when further matches are forthcoming. This status code is returned if there are Optional keys in the query identifier that are not supported.

4.2.4.4.1.4 SOP Specific Conformance for Q/R Move SOP Classes

The Q/R SCP AE provides standard conformance to the Query/Retrieve Move SOP Classes as an SCP.

The Q/R SCP AE will convey to the Storage SCU AE that an Association with a DICOM Application Entity named by the external C-MOVE SCU (through a MOVE Destination AE Title) should be established. It will also convey to the Storage SCU AE to perform C-STORE operations on specific images requested by the external C-MOVE SCU.

The Q/R SCP AE returns C-MOVE response status as specified below.

Table 4.2-40
THE Q/R SCP AE C-MOVE RESPONSE STATUS RETURN BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Sub-operations complete – No Failures	0000	All the Composite SOP Instances have been successfully sent to the C-MOVE Destination AE.
Refused	Out of Resources – Unable to calculate number of matches	A701	Number of matches cannot be determined due to system failure. Returned if the server's database is not functioning so the search for matches to the C-MOVE Request cannot be found. Error message is output as an alert on the User Interface, and to the Service Log.
	Out of Resources – Unable to perform sub-operations	A702	C-STORE sub-operations cannot be performed due to failure to access Composite SOP Instances in archive, or failure of a C-STORE Request. Error message is output as an alert on the User Interface, and to the Service Log.
	Move destination unknown	A801	The Destination Application Entity named in the C-MOVE Request is unknown to Q/R SCP AE. Error message is output to the Service Log.
Failed	Identifier does not match SOP Class	A900	The C-MOVE identifier contains invalid Elements or values, or is missing mandatory Elements or values for the specified SOP Class or retrieval level. Error message is output to the Service Log.
Cancel	Matching terminated due to Cancel Request	FE00	The C-MOVE SCU sent a Cancel Request. This has been acknowledged and the export of Composite SOP Instances to the C-MOVE Destination AE has been halted.

4.2.5 MWM SCU AE Specification

4.2.5.1 SOP Classes

The MWM SCU AE provides Standard Conformance to the following SOP Classes:

Table 4.2-41
SOP CLASSES FOR THE MWM SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

4.2.5.2 Association Policies

4.2.5.2.1 General

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

Table 4.2-42
DICOM APPLICATION CONTEXT FOR THE MWM SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.5.2.2 Number of Associations

The MWM SCU AE initiates one Association at a time for a Worklist request.

Table 4.2-43
NUMBER OF ASSOCIATIONS INITIATED FOR THE MWM SCU AE

Maximum number of simultaneous Associations	1

4.2.5.2.3 Asynchronous Nature

The MWM SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-44
ASYNCHRONOUS NATURE FOR THE MWM SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.5.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 4.2-45
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE MWM SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.5.3 Association Initiation Policy

4.2.5.3.1 Activity – Update Worklist

4.2.5.3.1.1 Description and Sequencing of Activities

The request for a “Update Worklist” is initiated by user interaction, i.e. pressing the buttons “Worklist Reload” or automatically at the time of key-word change.

Upon initiation of the request, the MWM SCU AE will build an Identifier for the C-FIND request, will initiate an Association to send the request and will wait for Worklist responses. After retrieval of all responses, the MWM SCU AE will access the local database to add or update patient demographic data. The results will be displayed in a separate list.

The MWM SCU AE will initiate an Association in order to issue a C-FIND request according to the Modality Worklist Information Model.

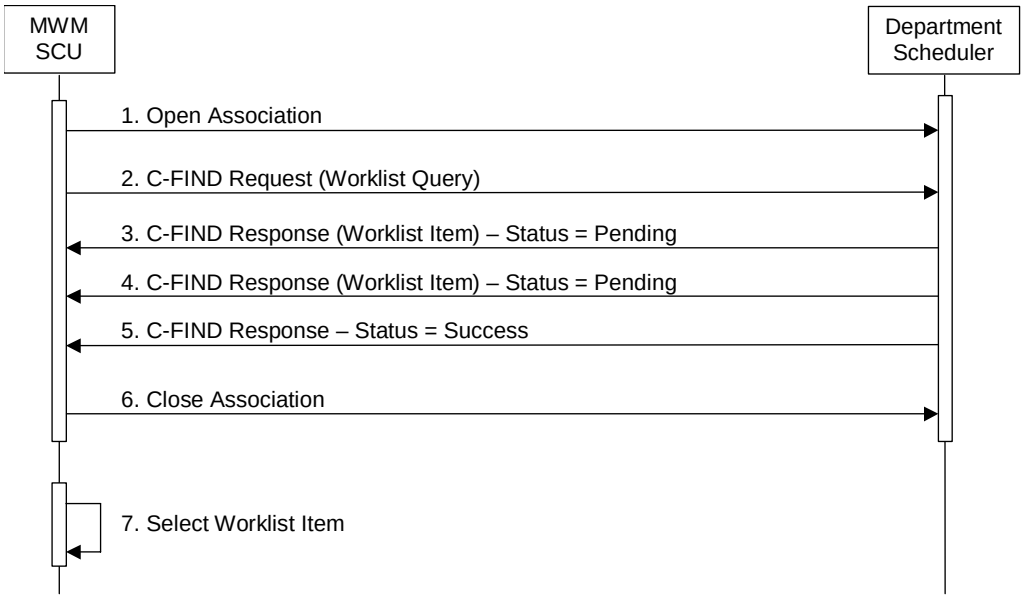

Figure 4.2-6
SEQUENCING OF ACTIVITY – UPDATE WORKLIST

A possible sequence of interactions between the MWM SCU AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the Figure above:

1. The MWM SCU AE opens an association with the Department Scheduler
2. The MWM SCU AE sends a C-FIND request to the Department Scheduler containing the Worklist Query attributes.
3. The Department Scheduler returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Department Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Department Scheduler returns another C-FIND response with status Success indicating that no further matching Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query.
6. The MWM SCU AE closes the association with the Department Scheduler.
7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.

4.2.5.3.1.2 Proposed Presentation Contexts

The MWM SCU AE will propose Presentation Contexts as shown in the following table:

Table 4.2-46
Proposed Presentation Contexts for Activity Update Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.5.3.1.3 SOP Specific Conformance for Modality Worklist SOP Class

The MWM SCU AE provides standard conformance to the Modality Worklist SOP Class as an SCU.

The behavior of the MWM SCU when encountering status codes in a Modality Worklist C-FIND response is summarized in the Table below.

Table 4.2-47
Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display or further processing.
Refused	Out of Resources	A700	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Unable to Process	Cxxx	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Cancel	Matching terminated due to Cancel request	FE00	If the query was cancelled due to too may worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
Pending	Matches are continuing	FF00	The worklist item contained in the Identifier is collected for later display or further processing.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.
*	*	Any other status code.	The Association is aborted using A-ABORT and the worklist is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.

The behavior of the MWM SCU AE during communication failure is summarized in the Table below.

Table 4.2-48
MODALITY WORKLIST COMMUNICATION FAILURE BEHAVIOR

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

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The Table below provides a description of the MWM SCU AE Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Table 4.2-49
WORKLIST REQUEST IDENTIFIER

Module Name Attribute Name	Tag	VR	M	R	D	IOD
SOP Common						
Specific Character Set	(0008,0005)	CS		x		x
Scheduled Procedure Step						
Scheduled Procedure Step Sequence	(0040,0100)	SQ		x		
> Scheduled Station AE Title	(0040,0001)	AE	S	x	x	
> Scheduled Station Name	(0040,0010)	LO				
> Scheduled Procedure Step Location	(0040,0011)	SH				
> Scheduled Procedure Step Start Date	(0040,0002)	DA	R	x	x	
> Scheduled Procedure Step Start Time	(0040,0003)	TM	R	x	x	
> Scheduled Procedure Step End Date	(0040,0004)	DA				
> Scheduled Procedure Step End Time	(0040,0005)	TM				
> Scheduled Performing Physician's Name	(0040,0006)	PN		x	x	
> Scheduled Procedure Step Description	(0040,0007)	SH		x	x	x
> Scheduled Protocol Code Sequence	(0040,0008)	SQ		x	x	x
> Scheduled Procedure Step ID	(0040,0009)	SH		x	x	x
> Scheduled Procedure Step Status	(0040,0020)	CS				
> Comments on Scheduled Procedure Step	(0040,0400)	LT				
> Modality	(0008,0060)	CS	S	x	x	x
> Requested Contrast Agent	(0032,1070)	LO				
> Pre-Medication	(0040,0012)	LO				
Requested Procedure						

Requested Procedure ID	(0040,1001)	SH	S	x	x	
Reason for the Requested Procedure	(0040,1002)	LO				
Requested Procedure Comments	(0040,1400)	LT				
Requested Procedure Code Sequence	(0032,1064)	SQ		x	x	
Referenced Study Sequence	(0008,1110)	SQ		x		
Requested Procedure Description	(0032,1060)	LO		x	x	
Study Instance UID	(0020,000D)	UI		x	x	x
Referenced Study Sequence	(0008,1110)	SQ		x	x	
>Referenced SOP Class UID	(0008,1150)	UI		x	x	
>Referenced SOP Instance UID	(0008,1155)	UI		x	x	
Requested Procedure Priority	(0040,1003)	SH				
Patient Transport Arrangements	(0040,1004)	LO				
Requested Procedure Location	(0040,1005)	LO				
Confidentiality Code	(0040,1008)	LO				
Reporting Priority	(0040,1009)	SH				
Names of Intended Recipients of Results	(0040,1010)	PN				
Imaging Service Request						
Reason for the Imaging Service Request	(0040,2001)	LO				
Imaging Service Request Comments	(0040,2400)	LT				
Requesting Physician	(0032,1032)	PN				
Referring Physician's Name	(0008,0090)	PN		x	x	x
Requesting Service	(0032,1033)	LO				x
Accession Number	(0008,0050)	SH	S	x	x	x
Issue Date of Imaging Service Request	(0040,2004)	DA		x		
Issue Time of Imaging Service Request	(0040,2005)	TM		x		
Order Entered By	(0040,2008)	PN		x		
Order Enters Location	(0040,2009)	SH		x		
Order Callback Phone Number	(0040,2010)	SH		x		
Visit Relationship						
Referenced Patient Sequence	(0008,1120)	SQ		x		
Visit Identification						
Institution Name	(0008,0080)	LO		x		
Institution Address	(0008,0081)	ST		x		
Institution Code Sequence	(0008,0082)	SQ		x		
Admission ID	(0038,0010)	LO		x		
Issuer of Admission ID	(0038,0011)	LO		x		
Visit Status						
Visit Status ID	(0038,0008)	CS				
Current Patient Location	(0038,0300)	LO				
Patient’s Institution Residence	(0038,0400)	LO				
Visit Comments	(0038,4000)	LT				
Visit Admission						
Referring Physician’s Address	(0008,0092)	ST		x		
Referring Physician’s Telephone Number	(0008,0094)	SH		x		
Admitting Diagnosis Description	(0008,1080)	LO		x		
Admitting Diagnosis Code Sequence	(0008,1084)	SQ		x		
Route of Admissions	(0038,0016)	LO		x		
Admitting Date	(0038,0020)	DA		x		
Admitting Time	(0038,0021)	TM		x		
Patient Relationship						
Referenced Visit Sequence	(0008,1125)	SQ		x		
Referenced Patient Alias Sequence	(0038,0004)	SQ		x		
Patient Identification						

Patient's Name	(0010,0010)	PN	S	x	x	x
Patient ID	(0010,0020)	LO	S	x	x	x
Issuer of Patient ID	(0010,0021)	LO				
Other Patient IDs	(0010,1000)	LO				x
Other Patient Names	(0010,1001)	PN				x
Patient's Birth Name	(0010,1005)	PN				x
Patient's Mother's Birth Name	(0010,1060)	PN				x
Medical Record Locator	(0010,1090)	LO				
Patient Demographic						
Patient's Age	(0010,1010)	AS				x
Occupation	(0010,2180)	SH				
Patient Data Confidentiality Constraint Description	(0040,3001)	LO				
Patient's Birth Date	(0010,0030)	DA		x	x	x
Patient's Birth Time	(0010,0032)	TM				
Patient's Sex	(0010,0040)	CS		x	x	x
Patient's Insurance Plan Code Sequence	(0010,0050)	SQ				
Patient's Size	(0010,1020)	DS				x
Patient's Weight	(0010,1030)	DS			x	x
Patient's Address	(0010,1040)	LO				x
Military Rank	(0010,1080)	LO				
Branch of Service	(0010,1081)	LO				
Country Residence	(0010,2150)	LO				
Region of Residence	(0010,2152)	LO				
Patient's Telephone Number	(0010,2154)	SH				
Ethnic Group	(0010,2160)	SH				
Patient's Religious Reference	(0010,21F0)	LO				
Patient Comment	(0010,4000)	LT			x	x
Patient Medical						
Medical Alerts	(0010,2000)	LO		x	x	
Contrast Allergies	(0010,2110)	LO				x
Smoking Status	(0010,21A0)	CS				x
Additional Patient History	(0010,21B0)	LT				
Pregnancy Status	(0010,21C0)	US		x	x	x
Last Menstrual Date	(0010,21D0)	DA				
Special Needs	(0038,0050)	LO				
Patient State	(0038,0500)	LO				

The above table should be read as follows:

Module Name: The name of the associated module for supported worklist attributes.

Attribute Name: Attributes supported to build the MWM SCU AE Worklist Request Identifier.

Tag: DICOM tag for this attribute.

VR: DICOM VR for this attribute.

M: Matching keys for (automatic) Worklist Update. An "S" will indicate that the MWM SCU AE will supply an attribute value for Single Value Matching, a "R" will indicate Range Matching.

R: Return keys. An "x" will indicate that the MWM SCU AE will supply this attribute as Return Key with zero length for Universal Matching. This setting can be configured using the service tool. The system's default setting is described in the above table.

D: Displayed keys. An "x" indicates that this worklist attribute is displayed to the user during a patient registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination. This setting can be configured using the service tool. The system's default setting is described in the above table.

IOD: An "x" indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step. This setting can be

configured using the service tool. The system’s default setting is described in the above table.

4.2.5.4 Association Acceptance Policy

The MWM SCU AE does not accept Associations.

4.2.6 MPPS SCU AE Specification

4.2.6.1 SOP Classes

The MPPS SCU AE provides Standard Conformance to the following SOP Classes:

Table 4.2-50
SOP CLASSES FOR THE MPPS SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

4.2.6.2 Association Policies

4.2.6.2.1 General

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

Table 4.2-51
DICOM APPLICATION CONTEXT FOR THE MPPS SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.6.2.2 Number of Associations

The MPPS SCU AE initiates one Association at a time.

Table 4.2-52
NUMBER OF ASSOCIATIONS INITIATED FOR THE MPPS SCU AE

Maximum number of simultaneous Associations	1

4.2.6.2.3 Asynchronous Nature

The MPPS SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-53
ASYNCHRONOUS NATURE FOR THE MPPS SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.6.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 4.2-54
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE MPPS SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.6.3 Association Initiation Policy

4.2.6.3.1 Activity – Acquire Images

4.2.6.3.1.1 Description and Sequencing of Activities

The MPPS SCU AE performs the creation of a MPPS Instance automatically whenever images are acquired. Further updates on the MPPS data can be performed automatically or interactively.

The MPPS SCU AE will initiate an Association to issue an:

— N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation, or an:
— N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

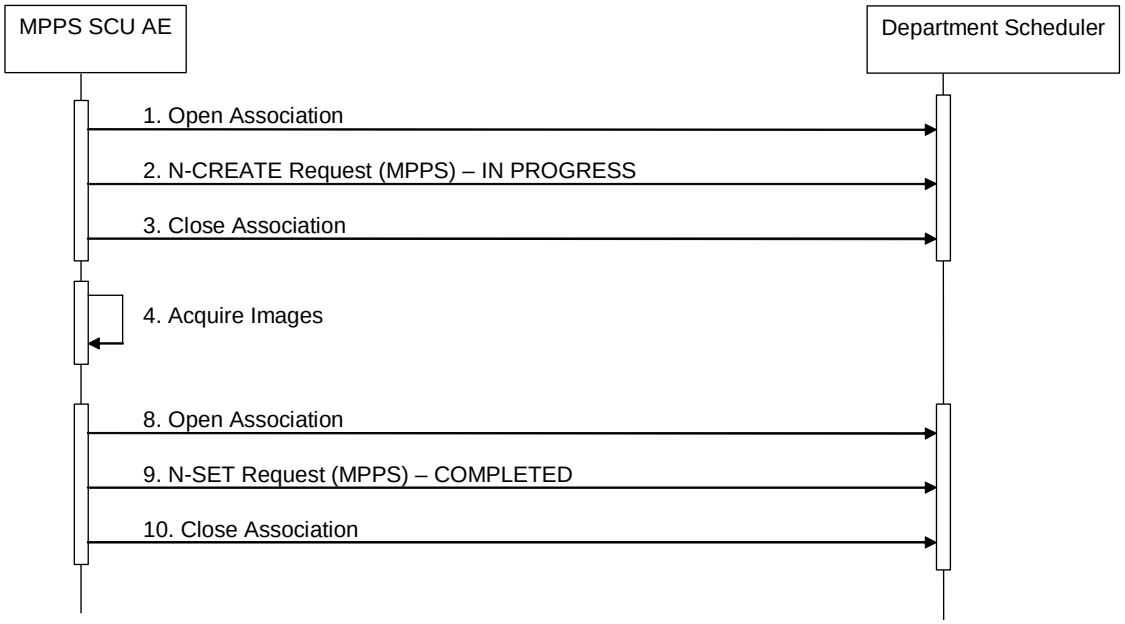

Figure 4.2-7
SEQUENCING OF ACTIVITY – ACQUIRE IMAGES

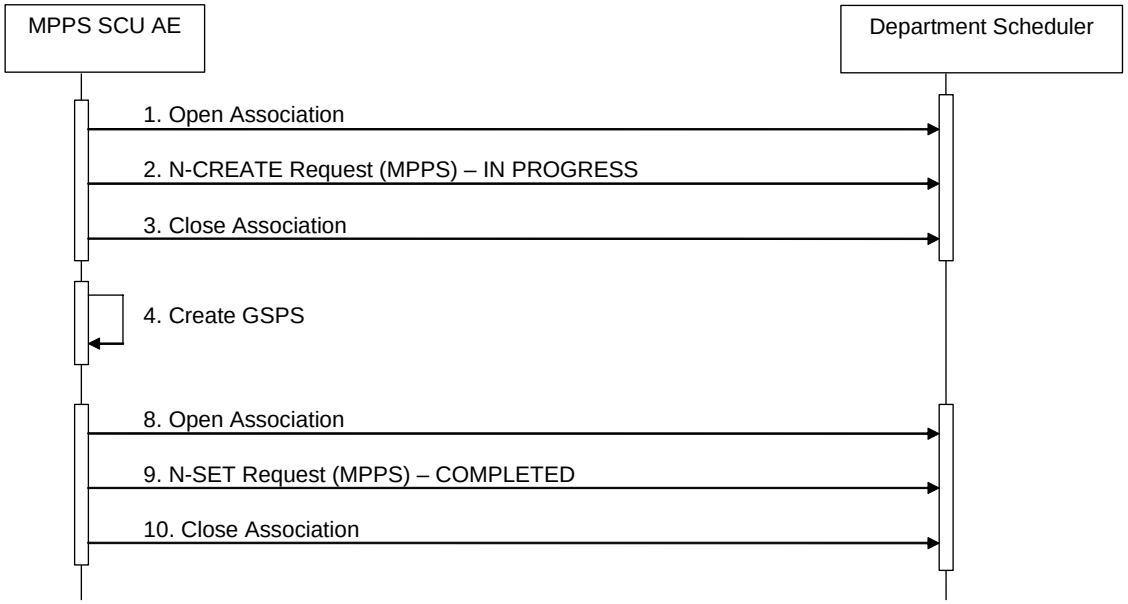

Figure 4.2-8
SEQUENCING OF ACTIVITY – CREATE GSPS

A possible sequence of interactions between the MPPS SCU AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the MPPS SOP Class and MPPSR SCP Class as an SCP) is illustrated in the Figure above:

1. The MPPS SCU AE opens an association with the Department Scheduler
2. The MPPS SCU AE sends an N-CREATE request to the Department Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Department Scheduler acknowledges the MPPS creation with an N-CREATE response (status success).
3. The MPPS SCU AE closes the association with the Department Scheduler.
4. All images are acquired and stored in the local database. (Figure 4.2-7)
   GSPS are created and stored in the local database. (Figure 4.2-8)
5. The MPPS SCU AE opens an association with the Department Scheduler.
6. The MPPS SCU AE sends an N-SET request to the Department Scheduler to update the MPPS instance with status of “COMPLETED” and set all necessary attributes. The Department Scheduler acknowledges the MPPS update with an N-SET response (status success).
7. The MPPS SCU AE closes the association with the Department Scheduler.

4.2.6.3.1.2 Proposed Presentation Contexts

The MPPS SCU AE will propose Presentation Contexts as shown in the following Table:

Table 4.2-55
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY ACQUIRE IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.6.3.1.3 SOP Specific Conformance for MPPS SOP Class

The MPPS SCU AE provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

The behavior of the MPPS SCU AE when encountering status codes in an MPPS N-CREATE or N–SET response is summarized in the Table below.

Table 4.2-56
MPPS N-CREATE / N-SET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Failure	Processing Failure – Performed Procedure Step Object may no longer be updated	0110H	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Additional information in the Response will be logged (i.e. Error Comment and Error ID).
Warning	Attribute Value Out of Range	0116H	The MPPS operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user.

The behavior of the MPPS SCU AE during communication failure is summarized in the Table below:

Table 4.2-57
MPPS COMMUNICATION FAILURE BEHAVIOR

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

The Table below provides a description of the MPPS N-CREATE and N-SET request identifiers sent by the MPPS SCU AE. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

Table 4.2-58
MPPS N-CREATE / N-SET REQUEST IDENTIFIER

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character Set	(0008,0005)	CS	Created, if an extended or replacement character set is used. Refer to 6.SUPPORT OF CHARACTER SETS	
Performed Procedure Step Relationship				
Scheduled Step Attributes Sequence	(0040,0270)	SQ	Always Set	
> Study Instance UID	(0020,000D)	UI	From Modality Worklist	
> Referenced Study Sequence	(0008,1110)	SQ	From Modality Worklist	
>> Referenced SOP Class UID	(0008,1150)	UI	From Modality Worklist	
>> Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist	
> Accession Number	(0008,0050)	SH	From Modality Worklist	
> Requested Procedure ID	(0040,1001)	SH	From Modality Worklist or user input	
> Requested Procedure Description	(0032,1060)	LO	From Modality Worklist or user input	
> Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	
> Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist or user input	
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	From Modality Worklist	
Patient’s Name	(0010,0010)	PN	From Modality Worklist or user input	
Patient ID	(0010,0020)	LO	From Modality Worklist or user input.	
Patient’s Birth Date	(0010,0030)	DA	From Modality Worklist or user input.	
Patient’s Sex	(0010,0040)	CS	From Modality Worklist or user input.	
Referenced Patient Sequence	(0008,1120)	SQ	Zero length	
Performed Procedure Step Information				
Performed Procedure Step ID	(0040,0253)	SH	Automatically created.	
Performed Station AE Title	(0040,0241)	AE	MPPS AE Title	
Performed Station Name	(0040,0242)	SH	From configuration	
Performed Location	(0040,0243)	SH	From configuration	
Performed Procedure Step Start Date	(0040,0244)	DA	Actual start date	
Performed Procedure Step Start Time	(0040,0245)	TM	Actual start time	
Performed Procedure Step Status	(0040,0252)	CS	IN PROGRESS	COMPLETED or DISCONTINUED

Performed Procedure Step Description	(0040,0254)	LO	Zero length	
Performed Procedure Type Description	(0040,0255)	LO	Zero length	
Procedure Code Sequence	(0008,1032)	SQ	Zero or more items	Zero or more items
Performed Procedure Step End Date	(0040,0250)	DA	Zero length	Actual end date
Performed Procedure Step End Time	(0040,0251)	TM	Zero length	Actual end time
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	SQ	Zero or more items	
Image Acquisition Results				
Modality	(0008,0060)	CS	MR	
Study ID	(0020,0010)	SH	Automatically created.	
Performed Protocol Code Sequence	(0040,0260)	SQ	Zero or more items	Zero or more items
Performed Series Sequence	(0040,0340)	SQ	Zero length	One or more items
> Performing Physician's Name	(0008,1050)	PN		x
> Protocol Name	(0018,1030)	LO		x
> Operator's Name	(0008,1070)	PN		x
> Series Instance UID	(0020,000E)	UI		x
> Series Description	(0008,103E)	LO		x
> Retrieve AE Title	(0008,0054)	AE		x
> Referenced Image Sequence	(0008,1140)	SQ		One or more items
>> Referenced SOP Class UID	(0008,1150)	UI		x
>> Referenced SOP Instance UID	(0008,1155)	UI		x
> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	SQ		x
>> Referenced SOP Class UID	(0008,1150)	UI		x
>> Referenced SOP Instance UID	(0008,1155)	UI		x
Billing and Material Code				
Film Consumption Sequence	(0040,0321)	SQ		Zero or more items
>Number of Films	(2100,0170)	IS		x
>Medium Type	(2000,0030)	CS		x
>Film Size ID	(2010,0050)	CS		x

4.2.6.4 Association Acceptance Policy

The MPPS SCU AE does not accept Associations.

4.2.7 Q/R SCU AE Specification

4.2.7.1 SOP Classes

The Q/R SCU AE provides Standard Conformance to the following SOP Classes:

Table 4.2-59
SOP CLASSES FOR THE Q/R SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Q/R Information Model – Find	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Q/R Information Model – Move	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

4.2.7.2 Association Policies

4.2.7.2.1 General

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

Table 4.2-60
DICOM APPLICATION CONTEXT FOR THE Q/R SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.7.2.2 Number of Associations

The Q/R SCU AE initiates one Association at a time.

Table 4.2-61
NUMBER OF ASSOCIATIONS INITIATED FOR THE Q/R SCU AE

Maximum number of simultaneous Associations	1

4.2.7.2.3 Asynchronous Nature

The Q/R SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-62
ASYNCHRONOUS NATURE FOR THE Q/R SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.7.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 4.2-63
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE Q/R SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.7.3 Association Initiation Policy

4.2.7.3.1 Activity – Query and Retrieve Images

4.2.7.3.1.1 Description and Sequencing of Activities

The Q/R SCU AE is activated when the user selects a remote node to query and enters some key information, Patient's Name, Patient ID and/or Study Date. The user can select studies, series and images to be retrieved. The images will be received at the Storage SCP AE.

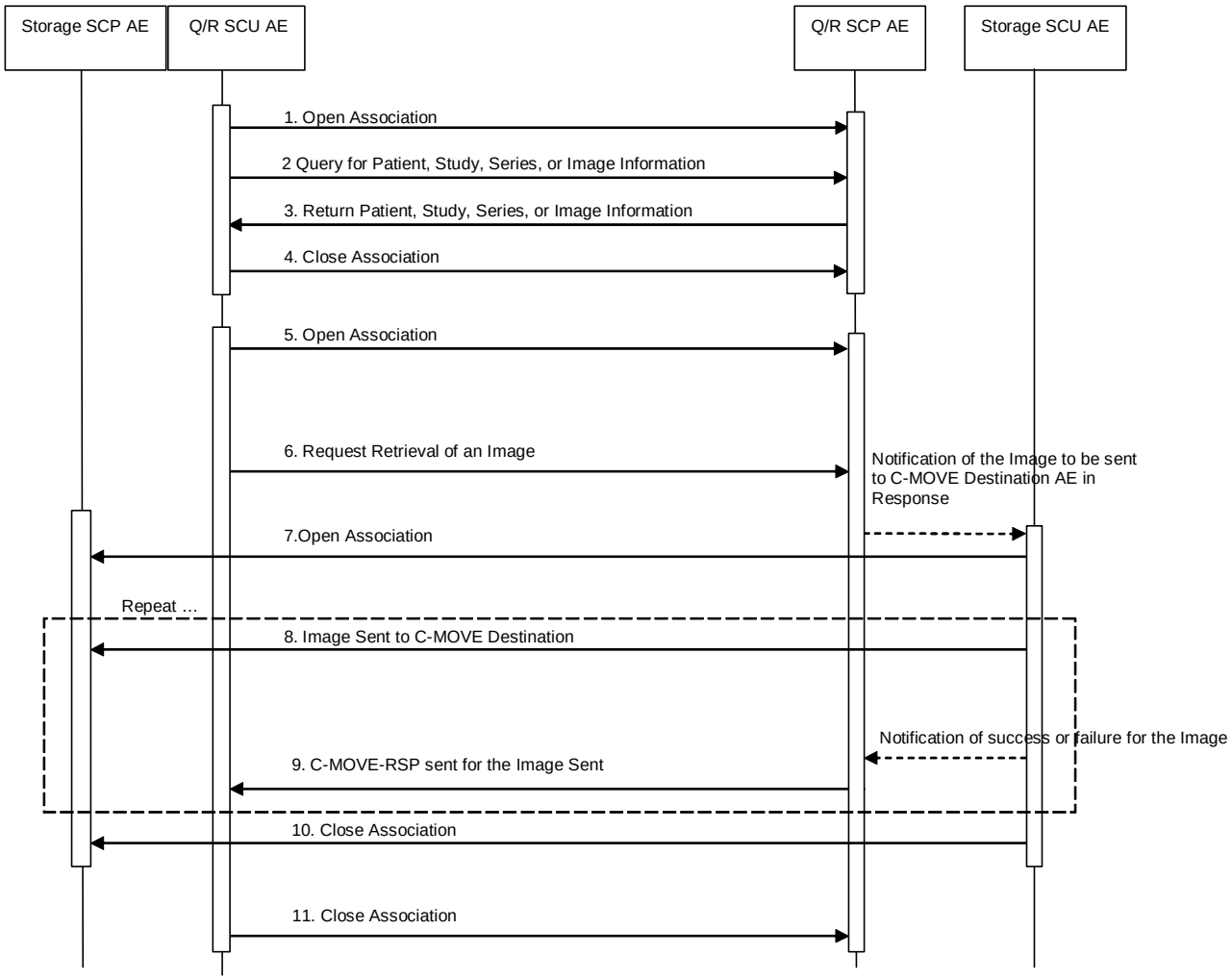

Figure 4.2-9
SEQUENCING OF ACTIVITY – QUERY AND RETRIEVE IMAGES

The following sequencing constraints illustrated in the Figure above:

1. The Q/R SCU AE opens an Association with the Q/R SCP AE.
2. The Q/R SCU AE sends a C-FIND-RQ Message
3. The Q/R SCP AE returns a C-FIND-RSP Message to the Q/R SCU AE with matching information. A C-FIND-RSP is sent for each entity matching the identifier specified in the C-FIND-RQ. A final C-FIND-RSP is sent indicating that the matching is complete.
4. The Q/R SCU AE closes the Association.
5. The Q/R SCU AE opens an Association with the Q/R SCP AE.
6. The Q/R SCU AE sends a C-MOVE-RQ Message. The Q/R SCP AE notifies the Storage SCU AE to send the Composite SOP Instances to the peer C-MOVE Destination AE as indicated in the C-MOVE-RQ.
7. The Storage SCU AE opens an Association with the C-MOVE Destination AE.
8. The Storage SCU AE sends images to the C-MOVE Destination AE. The Storage SCU AE indicates to the Q/R SCP AE whether the transfer succeeded or failed.
9. The Q/R SCP AE then returns a C-MOVE-RSP indicating this success or failure.
10. The Storage SCU AE closes the Association.
11. The Q/R SCU AE closes the Association.

4.2.7.3.1.2 Proposed Presentation Contexts

The Q/R SCU AE will propose Presentation Contexts as shown in the following Table:

Table 4.2-64
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY QUERY AND RETRIEVE IMAGES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root Q/R Information Model – 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		
Study Root Q/R Information Model – 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		

4.2.7.3.1.3 SOP Specific Conformance for Q/R Find SOP Classes

The Q/R SCU AE provides standard conformance to the Query/Retrieve Find SOP Classes as an SCU.

The behavior of the Q/R SCU AE when encountering status codes in a Q/R C-FIND response is summarized in the Table below:

Table 4.2-65
THE Q/R SCU AE C-FIND RESPONSE STATUS BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Study, Series or Image information items are available for display or further processing.
Refused	Out of Resources	A700	The Association is aborted using A-ABORT and the Study, Series, or Image information query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the Study, Series, or Image information query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Unable to Process	Cxxx	The Association is aborted using A-ABORT and the Study, Series, or Image information query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Cancel	Matching terminated due to Cancel request	FE00	The Association is aborted using A-ABORT and the Study, Series, or Image information query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
Pending	Matches are continuing	FF00	The Study, Series, or Image information items contained in the Identifier is collected for later display or further processing.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The Study, Series, or Image information items contained in the Identifier is collected for later display or further processing.
*	*	Any other status code.	The Association is aborted using A-ABORT and the Study, Series, or Image information is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.

The behavior of the Q/R SCU AE during communication failure is summarized in the Table below.

Table 4.2-66
Q/R FIND COMMUNICATION FAILURE BEHAVIOR

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

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), in order to completely elucidate the “tree” of instances available on the remote AE.

The Table below provides a description of the Q/R SCU AE C-FIND Request Identifier.

Table 4.2-67
STUDY ROOT REQUEST IDENTIFIER FOR C-FIND

Name	Tag	Types of Matching
Study Level		
Study Date	(0008,0020)	S,*,U,R
Study Time	(0008,0030)	U
Accession Number	(0008,0050)	U
Patient's Name	(0010,0010)	U
Patient's ID	(0010,0020)	S,*,U
Study Instance UID	(0020,000D)	UNIQUE
Study ID	(0020,0010)	U
Series Level		
Modality	(0008,0060)	S,*,U
Series Instance UID	(0020,000E)	UNIQUE
Series Number	(0020,0011)	S,*,U

Types of Matching:

The types of Matching supported by the Q/R SCU AE. 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. "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.

The Q/R SCU AE supports Study and Series level as a Query Level.

4.2.7.3.1.4 SOP Specific Conformance for Q/R Move SOP Classes

The Q/R SCU AE provides standard conformance to the Query/Retrieve Move SOP Classes as an SCU.

The behavior of the Q/R SCU AE when encountering status codes in a Q/R C-MOVE response is summarized in the Table below:

Table 4.2-68
THE Q/R SCU AE C-MOVE RESPONSE STATUS BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Sub-operations complete – No Failures	0000	The Storage SCP AE has successfully received the SOP Instance. If all SOP Instances in a move job have status success then the job is marked as complete.
Refused	Out of Resources – Unable to calculate number of matches	A701	The Association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure.
	Out of Resources – Unable to perform sub-operations	A702	The Association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
	Move destination unknown	A801	The Association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Warning	Sub-operations complete but one or more failures.	B000	The Association is aborted using A-ABORT and the move job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.

The behavior of the Q/R SCU AE during communication failure is summarized in the Table below.

Table 4.2-69
Q/R MOVE COMMUNICATION FAILURE BEHAVIOR

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

The system requests Image Level Move only.

4.2.7.4 Association Acceptance Policy

The Q/R SCU AE does not accept Associations.

4.2.8 Storage SCP AE Specification

4.2.8.1 SOP Classes

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

Table 4.2-70
SOP CLASSES FOR THE STORAGE SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes

4.2.8.2 Association Policies

4.2.8.2.1 General

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

Table 4.2-71
DICOM APPLICATION CONTEXT FOR THE STORAGE SCP AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.8.2.2 Number of Associations

The Storage SCP AE supports one Association at a time.

Table 4.2-72
NUMBER OF ASSOCIATIONS ACCEPTED FOR THE STORAGE SCP AE

Maximum number of simultaneous Associations	1

4.2.8.2.3 Asynchronous Nature

The Storage SCP AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-73
ASYNCHRONOUS NATURE FOR THE STORAGE SCP AE

Maximum number of outstanding asynchronous transactions	1

4.2.8.2.4 Implementation Identifying Information

The implementation information for the Storage SCP AE is:

Table 4.2-74
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE STORAGE SCP AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.8.3 Association Initiation Policy

The Storage SCP AE does not initiate Associations.

4.2.8.4 Association Acceptance Policy

The Storage SCP AE accepts Associations only if they have valid Presentation Contexts. If none of the requested Presentation Contexts are accepted then the Association Request itself is rejected. It can be configured to only accept Associations with certain hosts (using TCP/IP address) and/or Application Entity Titles.

Table 4.2-75
ASSOCIATION REJECTION REASONS

Result	Source	Reason/Diag	Explanation
2 – rejected-transient	c	2 – local-limit-exceeded	The (configurable) maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	1 – temporary-congestion	No Associations can be accepted at this time due to the real-time requirements of higher priority activities (e.g. during image acquisition no Associations will be accepted) or because insufficient resources are available (e.g. memory, processes, threads). An Association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The Association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the Association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The Association request could not be parsed. An Association request with the same format will not succeed at a later time.

4.2.8.4.1.1 Accepted Presentation Contexts

The default Behavior of the Storage SCP AE supports the Implicit VR Little Endian Transfer Syntax.

Any of the Presentation Contexts shown in the following table are acceptable to the Storage SCP AE.

Table 4.2-76
ACCEPTED PRESENTATION CONTEXTS BY THE STORAGE SCP AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.8.4.1.2 SOP Specific Conformance for Verification SOP Class

The Storage SCP AE provides standard conformance to the Verification SOP Class as an SCP.

4.2.8.4.1.3 SOP Specific Conformance for Storage SOP Classes

The associated Activity with the Storage service is the storage of medical image data received over the network on a designated hard disk. The Storage SCP AE will return a failure status if it is unable to store the images on to the hard disk.

The Storage SCP AE is Level 0 conformant as a Storage SCP.

The Storage SCP AE receives only images with own private information

Table 4.2-77
THE STORAGE SCP AE C-STORE RESPONSE STATUS RETURN REASONS

Service Status	Further Meaning	Status Code	Reason
Success	Success	0000	The Composite SOP Instance was successfully received, verified, and stored in the system database.
Refused	Out of Resources	A700	Indicates that there was not enough local resources.
Error	Data Set does not match SOP Class	A900	Indicates that the Data Set does not encode a valid instance of the SOP Class specified.
	Cannot understand	C000	Indicates that the Storage SCP AE cannot parse the Data Set into Elements.

4.2.9 Print SCU AE Specification

4.2.9.1 SOP Classes

The Print SCU AE provides Standard Conformance to the following Meta SOP Classes:

Table 4.2-78
META SOP CLASSES FOR THE PRINT SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Yes	No

The above Meta SOP Classes are defined by the following set of supported SOP Classes:

Table 4.2-79
SOP CLASSES FOR THE PRINT SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No

4.2.9.2 Association Policies

4.2.9.2.1 General

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

Table 4.2-80
DICOM APPLICATION CONTEXT FOR THE PRINT SCU AE

Application Context Name	1.2.840.10008.3.1.1.1

4.2.9.2.2 Number of Associations

The Print SCU AE initiates one Association at a time.

Table 4.2-81
NUMBER OF ASSOCIATIONS ACCEPTED FOR THE PRINT SCU AE

Maximum number of simultaneous Associations	1

4.2.9.2.3 Asynchronous Nature

The Print SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 4.2-82
ASYNCHRONOUS NATURE FOR THE PRINT SCU AE

Maximum number of outstanding asynchronous transactions	1

4.2.9.2.4 Implementation Identifying Information

The implementation information for the Print SCU AE is:

Table 4.2-83
DICOM IMPLEMENTATION CLASS AND VERSION FOR THE PRINT SCU AE

Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

4.2.9.3 Association Initiation Policy

4.2.9.3.1 Activity – Send Images & Print Management Information

4.2.9.3.1.1 Description and Sequencing of Activities

A user composes images onto film sheets and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies.

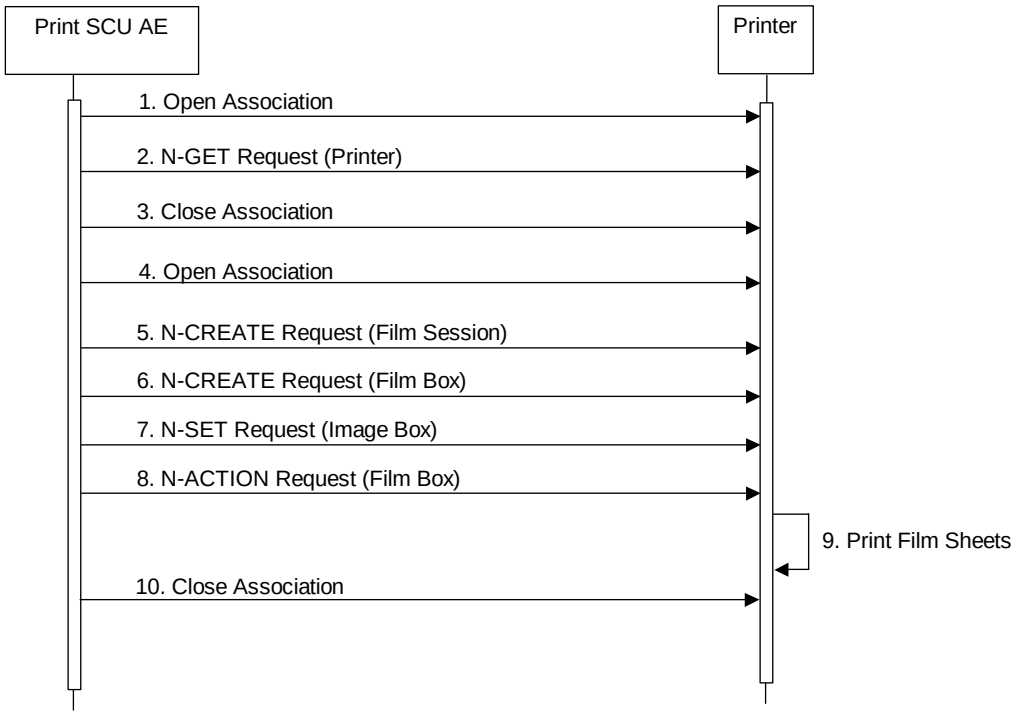

Figure 4.2-10
SEQUENCING OF ACTIVITY – SEND IMAGES & PRINT MANAGEMENT INFORMATION

A typical sequence of DIMSE messages sent over an association between the Print SCU AE and a Printer is illustrated in the Figure above:

1. The Print SCU AE opens an Association with the Printer.
2. N-GET on the Printer SOP Class is used to obtain current printer status information.
3. N-CREATE on the Film Session SOP Class creates a Film Session.
4. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session.
5. N-SET on the Image Box SOP Class transfers the contents of the film sheet to the printer.
6. N-ACTION on the Film Box SOP Class instructs the Printer to print the Film Box.
7. The Printer prints the requested number of film sheets.
8. The Printer asynchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class). The printer can send this message at any time. The Print SCU AE does not require the N-EVENT-REPORT to be sent. The Print SCU AE is capable of receiving an N-EVENT-REPORT notification at any time during an association.
9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. The Print SCU AE closes the Association with the Printer.

4.2.9.3.1.2 Proposed Presentation Contexts

The Print SCU AE is capable of proposing the Presentation Contexts shown in the Table below:

Table 4.2-84
PROPOSED PRESENTATION CONTEXTS FOR ACTIVITY
SEND IMAGES & PRINT MANAGEMENT INFORMATION

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
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
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.9.3.1.3 Common SOP Specific Conformance for all Print SOP Classes

The general behavior of the Print SCU AE during communication failure is summarized in the Table below. This behavior is common for all SOP Classes supported by the Print SCU AE.

Table 4.2-85
PRINT COMMUNICATION FAILURE BEHAVIOR

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

4.2.9.3.1.4 SOP Specific Conformance for Printer SOP Class

The Print SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

— N-GET

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

4.2.9.3.1.4.1 Printer SOP Class Operations (N-GET)

The Print SCU AE 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 the Table below:

Table 4.2-86
PRINTER SOP CLASS N-GET REQUEST ATTRIBUTES

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

The Printer Status information is evaluated as follows:

1. If Printer status (2110,0010) is NORMAL, the print-job continues to be printed.
2. If Printer status (2110,0010) is FAILURE, the print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job control application.
3. If Printer status (2110,0010) is WARNING, the print-job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job control application.

The behavior of The Print SCU AE when encountering status codes in an N-GET response is summarized in the Table below:

Table 4.2-87
PRINTER SOP CLASS N-GET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The request to get printer status information was success.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.3.1.5 SOP Specific Conformance for the Film Session SOP Class

The Print SCU AE supports the following DIMSE operations for the Film Session SOP Class:

— N-CREATE
— N-DELETE

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

4.2.9.3.1.5.1 Film Session SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

Table 4.2-88
FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Source
Number of Copies	(2000,0010)	IS	1 .. 99	User
Print Priority	(2000,0020)	CS	MED	Auto
Medium Type	(2000,0030)	CS	BLUE FILM, CLEAR FILM or PAPER	User
Film Destination	(2000,0040)	CS	MAGAZINE or PROCESSOR	User
Film Session Label	(2000,0050)	LO	"TOSHIBA_MRI"	Auto
Memory Allocation	(2000,0060)	IS		

The behavior of The Print SCU AE when encountering status codes in a N-CREATE response is summarized in the Table below:

Table 4.2-89
FILM SESSION SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Attribute Value Out of Range	0116H	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
Warning	Attribute List Error	0107H	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.3.1.5.2 Film Session SOP Class Operations (N-DELETE)

The behavior of The Print SCU AE when encountering status codes in a N-DELETE response is summarized in the Table below:

Table 4.2-90
PRINTER SOP CLASS N-DELETE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.3.1.6 SOP Specific Conformance for the Film Box SOP Class

The Print SCU AE supports the following DIMSE operations for the Film Box SOP Class:

— N-CREATE
— N-ACTION

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

4.2.9.3.1.6.1 Film Box SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

Table 4.2-91
FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Source
Image Display Format	(2010,0010)	ST	STANDARD\C,R	User
Referenced Film Session Sequence	(2010,0500)	SQ		Auto
>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.1.1	Auto
>Referenced SOP Instance UID	(0008,1155)	UI	From created Film Session SOP Instance	Auto
Film Orientation	(2010,0040)	CS	PORTRAIT or LANDSCAPE	User
Film Size ID	(2010,0050)	CS	14INX17IN, 14INX14IN, 11INX14IN, 11INX11IN, 85INX11IN, 8INX10IN, etc.	User
Magnification Type	(2010,0060)	CS	REPLICATE, BILINEAR, CUBIC or NONE	User
Smoothing Type	(2010,0080)	CS		User
Border Density	(2010,0100)	CS	BLACK or WHITE	User
Empty Image Density	(2010,0110)	CS	BLACK or WHITE	User
Min Density	(2010,0120)	US	0 .. 9999	User
Max Density	(2010,0130)	US	0 .. 9999	User
Trim	(2010,0140)	CS	YES or NO	User
Configuration Information	(2010,0150)	ST		Auto

The behavior of the Print SCU AE when encountering status codes in a N-CREATE response is summarized in the Table below:

Table 4.2-92
FILM BOX SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Requested Min Density or Max Density outside of printer's operating range	B605	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.3.1.6.2 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 Print SCU AE when encountering status codes in a N-ACTION response is summarized in the Table below:

Table 4.2-93
FILM BOX SOP CLASS N-ACTION RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. The film has been accepted for printing.
Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	B603	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60A	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Failure	Unable to create Print Job SOP Instance; print queue is full.	C602	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Image size is larger than Image Box size.	C603	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.3.1.7 SOP Specific Conformance for the Grayscale Image Box SOP Class

The Print SCU AE supports the following DIMSE operations for the Grayscale Image Box SOP Class:

— N-SET

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

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

The attributes supplied in an N-SET Request are listed in the Table below:

Table 4.2-94
GRAYSCALE IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES

Attribute Name	Tag	VR	Value	Source
Image Position	(2020,0010)	US	1 .. 36	Auto
Polarity	(2020,0020)	CS	NORMAL or REVERSE	User
Magnification Type	(2010,0060)	CS	REPLICATE, BILINEAR, CUBIC or NONE	User
Smoothing Type	(2010,0080)	CS		User
Basic Grayscale Image Sequence	(2020,0110)	SQ		Auto
>Samples Per Pixel	(0028,0002)	US	1	Auto
>Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	Auto
>Rows	(0028,0010)	US		Auto
>Columns	(0028,0011)	US		Auto
>Pixel Aspect Ratio	(0028,0034)	IS	1\1	Auto
>Bits Allocated	(0028,0100)	US	8	Auto
>Bits Stored	(0028,0101)	US	8	Auto
>High Bit	(0028,0102)	US	7	Auto
>Pixel Representation	(0028,0103)	US	0	Auto
>Pixel Data	(7FE0,0010)	OB		Auto

The behavior of the Print SCU AE when encountering status codes in a N-SET response is summarized in the Table below:

Table 4.2-95
GRAYSCALE IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOR

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. Image successfully stored in Image Box.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Requested Min Density or Max Density outside of printer's operating range.	B605	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60A	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Failure	Image size is larger than Image Box size.	C603	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Insufficient memory in printer to store the image.	C605	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.9.4 Association Acceptance Policy

The Print SCU AE does not accept Associations.

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

This Product supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

Table 4.3-1
SUPPORTED PHYSICAL NETWORK INTERFACES

Ethernet 1000baseT
Ethernet 100baseT
Ethernet 10baseT

4.3.2 Additional Protocols

None.

4.4 CONFIGURATION

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

All local applications use the AE Titles and TCP/IP Ports configured via the Service/Installation Tool. The Field Service Engineer can configure the TCP Port via the Service/Installation Tool.

Table 4.4-1
AE TITLE CONFIGURATION TABLE

Application Entity	Default AE Title	Default TCP/IP Port
Verification SCU		Not Applicatable
MWM SCU		
MPPS SCU		
Q/R SCU		
Print SCU		
Storage SCU		
Storage Commitment SCU		
Storage SCP		
Q/R SCP		
Storage Commitment SCU		8530 (For receiving C-ECHO and N-EVENT-REPORT)

Note AE-Title of the Storage Commitment SCU AE must be different from the others.

4.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Titles, host names and port numbers of remote applications are configured using the Utility Tool.

4.4.2 Parameters

A large number of parameters related to acquisition and general operation can be configured using the Utility Tool. The Table below only shows those configuration parameters relevant to DICOM communication. See the Product's Service Manual for details on general configuration capabilities.

Table 4.4-2
CONFIGURATION PARAMETERS TABLE

Parameter	Configurable (Yes/No) [Range]	Default Value
General Parameters		
Max PDU Receive Size	Yes [1-999999]	16 Kbytes
Max PDU Send Size		
Time-out waiting for a acceptance or rejection response to an Association Request (Application Level Timeout)	Yes [1-999999]	30 sec
Time-out waiting for a response to an Association release request (Application Level Timeout)	Yes [1-999999]	15 sec
Time-out waiting for completion of a TCP/IP connect request (Low-level timeout)	Yes [1-999999]	15 sec
Time-out awaiting a Response to a DIMSE Request (Low-Level Timeout)	Yes [1-999999]	15 sec
Time-out for waiting for data between TCP/IP-packets (Low Level Timeout)	Yes [1-999999]	15 sec
Storage SCU Parameters		
Storage SCU time-out waiting for a response to a C-STORE-RQ	Yes [1-999999]	30sec
Number of times a failed send job may be retried	Yes	3
Delay between retrying failed send jobs	Yes	60sec
Maximum number of simultaneously initiated Associations by the Storage SCU AE	No	2
Supported Transfer Syntaxes (separately configurable for each remote AE)	Yes	Implicit VR Little Endian
Behavior when receiving the Warning "Coercion of Data Elements" as service status.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning "Data Set does not match SOP Class" as service status.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning "Elements Discarded" as service status.	Yes [Considered as Success or Failure]	Considered as Failure
Storage Commitment SCU Parameters		
Storage Commitment SCU time-out waiting for a response to a N-ACTIION-RQ	Yes [1-999999]	30 Sec

Parameter	Configurable (Yes/No) [Range]	Default Value
Maximum number of simultaneously initiated Associations by the Storage Commitment SCU AE	No	1
Timeout waiting for a Storage Commitment Notification (maximum duration of applicability for a Storage Commitment Transaction UID).	Yes	1 day
Maximum number of simultaneously accepted Associations by the Storage Commitment SCU AE	No	3
Delay association release after sending a Storage Commitment Request (wait for a Storage Commitment Notification over the same association).	No	0
Behavior when receiving N-EVENT Report - the Storage Commitment Request Successful.	Yes	Permit the operator (s) to delete the Instances
Q/R SCP parameters		
Maximum number of simultaneously accepted Associations by the Q/R SCP AE	No	3
Modality Worklist SCU Parameters		
Modality Worklist SCU time-out waiting for the final response to a C-FIND-RQ	Yes [1-999999]	30sec
Maximum number of simultaneously initiated Associations by the MWM SCU AE	No	1
MPPS SCU Parameters		
MPPS SCU time-out waiting for a response to a N-CREATE-RQ	Yes [1-999999]	30sec
MPPS SCU time-out waiting for a response to a N-SET-RQ	Yes [1-999999]	30sec
MPPS SCU time-out waiting for a response to a N-GET-RQ	Yes [1-999999]	30sec
Maximum number of simultaneously initiated Associations by the MPPS SCU AE	No	1
Supported Transfer Syntaxes for MPPS	Yes	Implicit VR Little Endian
Behavior when receiving the Warning “Attribute Value Out of Range” as service status.	Yes [Considered as Success or Failure]	Considered as Failure
Storage SCP parameters		
Maximum number of simultaneously accepted Associations by the Storage SCP AE	No	3
Print SCU Parameters		
Print SCU time-out waiting for a response to a N-GET-RQ	No	30sec
Print SCU time-out waiting for a response to a N-CREATE-RQ	No	30sec
Print SCU time-out waiting for a response to a N-SET-RQ	No	30sec
Print SCU time-out waiting for a response to a N-ACTION-RQ	No	30sec
Maximum number of simultaneously initiated Associations by the Print SCU AE	No	1

Parameter	Configurable (Yes/No) [Range]	Default Value
Supported Transfer Syntaxes (separately configurable for each remote printer)	Yes	Implicit VR Little Endian
Behavior when receiving the Warning “Attribute Value Out of Range” as service status of the Film Session N-CREATE.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Attribute List Error” as service status of the Film Session N-CREATE.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Requested Min Density or Max Density outside of printer’s operating range” as service status of the Film Box N-CREATE.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)” as service status of the Film Box N-ACTION.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been demagnified.” as service status of the Film Box N-ACTION.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been cropped to fit.” as service status of the Film Box N-ACTION.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.” as service status of the Film Box N-ACTION.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been demagnified. ” as service status of the Grayscale Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Requested Min Density or Max Density outside of printer’s operating range.” as service status of the Grayscale Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been cropped to fit.” as service status of the Grayscale Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.” as service status of the Grayscale Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure

Parameter	Configurable (Yes/No) [Range]	Default Value
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been demagnified. ” as service status of the Color Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Requested Min Density or Max Density outside of printer’s operating range.” as service status of the Color Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size is larger than Image Box size. The image has been cropped to fit.” as service status of the Color Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure
Behavior when receiving the Warning “Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.” as service status of the Color Image Box N-SET.	Yes [Considered as Success or Failure]	Considered as Failure

5. MEDIA INTERCHANGE

5.1 IMPLEMENTATION MODEL

5.1.1 Application Data Flow

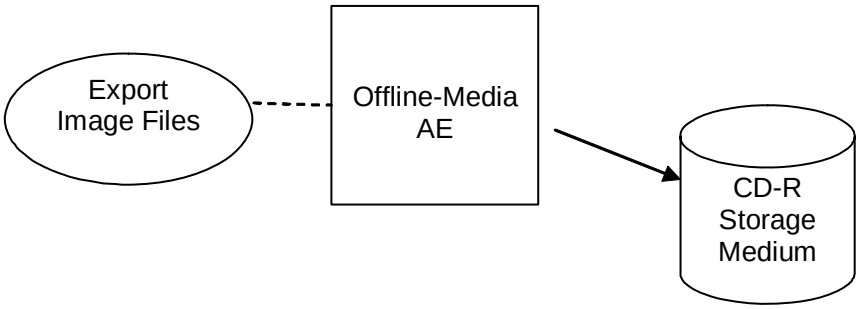

Figure 5.1-1
APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE

— The Offline-Media AE exports image files to a CD-R Storage medium. It is associated with the local real-world activity “Export Image Files” performed upon user request.

5.1.2 Functional Definition of AEs

5.1.2.1 Functional Definition of Offline-Media AE

The Offline-Media AE is performed upon user request for selected studies /series/images to/from an offline DICOM CD-R medium. It therefore performs the following tasks:

Export:

— Builds DICOM Information Objects.

— Creates a DICOMDIR file that represents the contents of the DICOM Information Objects to be recorded.

— Records DICOM Information Objects and the DICOMDIR file to the CD-R medium.

5.1.3 Sequencing of Real-World Activities

5.1.3.1 Activity - Export Image Files

5.1.3.1.1 Activity-Export Image Files to CD-R

Operator requests to create new File-set(s) onto a new CD-R. The requests are placed in a queue and are executed in the background.

The operations for “Export Image Files” are described below:

Step-1: Select the instance(s), series or studies on the local storage device to be created to the CD-R medium.

Step-2: Select the image archiving.

Step-3: Select the Virtual CD device as a destination.

Step-4: Request to copy to the CD-R.

5.1.4 File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is:

Table 5.1-1
DICOM IMPLEMENTATION CLASS AND VERSION FOR MEDIA STORAGE

File Meta Information Version	1
Implementation Class UID	1.2.392.200036.9116.4.1.20
Implementation Version Name	TM_MR_DCM_V2.0

5.2 AE SPECIFICATIONS

5.2.1 Offline-Media AE Specification

The Offline-Media AE provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed below:

Table 5.2-1
APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA

Application Profiles Supported	Real World Activity	Role	SC Option
STD-CTMR-CD, STD-GEN-CD	Export Image Files	FSC	Interchange

5.2.1.1 File Meta Information for the Application Entity

The Offline-Media AE does not set the Source Application Entity Title.

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity – Export Image Files

The Offline-Media AE acts as an FSC using the interchange option when requested to export SOP Instances from the local database to a CD-R medium.

5.2.1.2.1.1 Media Storage Application Profiles

The Offline-Media AE supports the STD-CTMR-CD and the STD-GEN-CD Application Profile.

5.2.1.2.1.1.2 Options

The Offline-Media AE supports the SOP Classes and Transfer Syntaxes listed in the Table below for the STD-CTMR-CD Application Profile as an FSC.

Table 5.2-2
IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR THE STD-CTMR-CD PROFILE

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
Secondary Capture Image Storage (Grayscale)	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

The Offline-Media AE supports the SOP Classes and Transfer Syntaxes listed in the Table below for the STD-GEN-CD Application Profile as an FSC.

Table 5.2-3
IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR THE STD-GEN-CD PROFILE (FSC)

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
Secondary Capture Image Storage (Grayscale)	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

5.3 MEDIA CONFIGURATION

Not applicable to the Offline-Media AE.

6. SUPPORT OF CHARACTER SETS

This product supports the following character sets:

- ISO-IR 6 (default) ISO 646
- ISO-IR 100 (Latin alphabet No.1) Supplementary set of ISO 8859
- ISO-IR 87 (Japanese) JIS X 0208 (Kanji)

Character sets ISO-IR 100 and ISO-IR 87 can be set to the tags listed in the Table below;

Table 6-1
Tag lists for ISO-IR 100/87

Attribute Name	Tag	VR
Referring Physician's Name	(0008,0090)	PN
Performing Physician's Name	(0008,1050)	PN
Name of Physician(s) Reading Study	(0008,1060)	PN
Operators' Name	(0008,1070)	PN
Patient's Name	(0010,0010)	PN
Patient Comments	(0010,4000)	LT
Contrast/Bolus Agent	(0018,0010)	LO
Image Comments	(0020,4000)	LT

7. SECURTIY

This product does not support any specific security measures.

It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

a. Firewall or router protections to ensure that only approved external hosts have network access to the product.

b. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.

c. 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))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8. ANNEXES

8.1 IOD CONTENTS

8.1.1 Created SOP Instances

Table 8.1-1 specifies the attributes of a MR Image transmitted by the Storage SCU AE.

Table 8.1-2 specifies the attributes of a Secondary Capture Image transmitted by the Storage SCU AE.

Table 8.1-3 specifies the attributes of an Enhanced MR Image transmitted by the Storage SCU AE.

Table 8.1-4 specifies the attributes of a MR Spectroscopy transmitted by the Storage SCU AE.

Table 8.1-5 specifies the attributes of a Grayscale Softcopy Presentation State transmitted by the Storage SCU AE.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of …” column are:

VNAP	Value Not Always Present (attribute sent zero length if no value is present)
ANAP	Attribute Not Always Present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value

The abbreviations used in the “Source” column:

MWL	the attribute value source is from Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
MPPS	the attribute value is the same as that use for Modality Performed Procedure Step
CONFIG	the attribute value source is a configurable parameter

8.1.1.1 MR Image IOD

Table 8.1-1
IOD OF CREATED MR IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-6	ALWAYS
Study	General Study	Table 8.1-7	ALWAYS
	Patient Study	Table 8.1-8	ALWAYS
Series	General Series	Table 8.1-9	ALWAYS
Frame of Reference	Frame of Reference	Table 8.1-10	ALWAYS
Equipment	General Equipment	Table 8.1-11	ALWAYS
Image	General Image	Table 8.1-12	ALWAYS
	Image Plane	Table 8.1-13	ALWAYS
	Image Pixel	Table 8.1-14	ALWAYS
	Contrast/Bolus	Table 8.1-15	Only if contrast media was used in this image
	VOI LUT	Table 8.1-16	ALWAYS
	SOP Common	Table 8.1-17	ALWAYS
	MR Image	Table 8.1-18	ALWAYS
	Private Application	Table 8.1-19	Only if private data are present

8.1.1.2 SC Image IOD

Table 8.1-2
IOD OF CREATED SC IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-6	ALWAYS
Study	General Study	Table 8.1-7	ALWAYS
	Patient Study	Table 8.1-8	ALWAYS
Series	General Series	Table 8.1-9	ALWAYS
Equipment	General Equipment	Table 8.1-11	ALWAYS
	SC Equipment	Table 8.1-20	ALWAYS
Image	General Image	Table 8.1-12	ALWAYS
	Image Pixel	Table 8.1-21	ALWAYS
	SC Image	Table 8.1-22	ALWAYS
	VOI LUT	Table 8.1-23	ALWAYS
	SOP Common	Table 8.1-24	ALWAYS
	Private Application	Table 8.1-25	Only if private data are present

8.1.1.3 Enhanced MR Image IOD

Table 8.1-3
IOD OF CREATED ENHANCED MR IMAGE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-6	ALWAYS
Study	General Study	Table 8.1-7	ALWAYS
	Patient Study	Table 8.1-8	ALWAYS
Series	General Series	Table 8.1-9	ALWAYS
	MR Series	Table 8.1-26	ALWAYS
Frame of Reference	Frame of Reference	Table 8.1-10	ALWAYS
	Synchronization	Table 8.1-27	Only if time synchronization was applied.
Equipment	General Equipment	Table 8.1-11	ALWAYS
	Enhanced General Equipment	Table 8.1-28	ALWAYS
Image	Image Pixel	Table 8.1-21	ALWAYS
	Enhanced Contrast/Bolus	Table 8.1-29	Only if contrast media were applied.
	Multi-frame Functional Groups	Table 8.1-30	ALWAYS
	Multi-frame Dimension	Table 8.1-56	ALWAYS
	Cardiac Synchronization	Table 8.1-57	Only if cardiac synchronization was applied.
	Respiratory Synchronization	Table 8.1-58	Only if respiratory synchronization was applied.
	Bulk Motion Synchronization	Table 8.1-59	Only if bulk motion synchronization was applied.
	Acquisition Context	Table 8.1-60	ALWAYS
	Enhanced MR Image	Table 8.1-61	ALWAYS
	MR Pulse Sequence	Table 8.1-62	Only if Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise.
	Softcopy Presentation LUT	Table 8.1-63	ALWAYS
	SOP Common	Table 8.1-24	ALWAYS

8.1.1.4 MR Spectroscopy IOD

Table 8.1-4
IOD OF CREATED MR SPECTROSCOPY SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-6	ALWAYS
Study	General Study	Table 8.1-7	ALWAYS
	Patient Study	Table 8.1-8	ALWAYS
Series	General Series	Table 8.1-9	ALWAYS
	MR Series	Table 8.1-64	ALWAYS
Frame of Reference	Frame of Reference	Table 8.1-10	ALWAYS
	Synchronization	Table 8.1-65	Only if time synchronization was applied.
Equipment	General Equipment	Table 8.1-28	
Image	Enhanced Contrast/Bolus	Table 8.1-29	Only if contrast media were applied.
	Multi-frame Functional Groups	Table 8.1-30	ALWAYS
	Multi-frame Dimension	Table 8.1-56	ALWAYS
	Cardiac Synchronization	Table 8.1-57	Only if cardiac synchronization was applied.
	Respiratory Synchronization	Table 8.1-58	Only if respiratory synchronization was applied.
	Bulk Motion Synchronization	Table 8.1-59	Only if bulk motion synchronization was applied.
	Acquisition Context	Table 8.1-60	ALWAYS
	MR Spectroscopy	Table 8.1-66	ALWAYS
	MR Spectroscopy Pulse Sequence	Table 8.1-67	Only if Image Type (0008,0008) Value 1 is ORIGINAL. May be present otherwise.
	MR Spectroscopy Data	Table 8.1-68	ALWAYS
	SOP Common	Table 8.1-24	ALWAYS
	Private Application	Table 8.1-68	Only if private data are present

8.1.1.5 Grayscale Softcopy Presentation State IOD

Table 8.1-5
IOD OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1-6	ALWAYS
Study	General Study	Table 8.1-7	ALWAYS
	Patient Study	Table 8.1-8	Only if “Patient’s Age” is present
Series	General Series	Table 8.1-9	ALWAYS
	Presentation Series	Table 8.1-70	ALWAYS
Equipment	General Equipment	Table 8.1-11	ALWAYS
Presentation State	Presentation State	Table 8.1-71	ALWAYS
	Displayed Area	Table 8.1-72	ALWAYS
	Spatial Transformation	Table 8.1-73	Only if Graphic Annotations are to be applied to referenced image(s)
	Modality LUT	Table 8.1-74	ALWAYS
	Softcopy VOI LUT	Table 8.1-75	Only if a VOI LUT is to be applied to referenced image(s)
	Softcopy Presentation LUT	Table 8.1-76	ALWAYS
	SOP Common	Table 8.1-77	ALWAYS
	Private Application	Table 8.1-78	Only if private data are present

8.1.1.6 Common Modules

Table 8.1-6
PATIENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received. Maximum 64 characters.	VNAP	MWL/ USER
Patient ID	(0010,0020)	LO	From Modality Worklist or user input. Maximum 64 characters.	VNAP	MWL/ USER
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input	VNAP	MWL/ USER
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input	VNAP	MWL/ USER
Patient Comments	(0010,4000)	LT	From User Input. Maximum 1024 characters.	VNAP	USER

Table 8.1-7
GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or generated by device	ALWAYS	MWL/ AUTO
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<hhmmss.frac>	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist or user input	VNAP	MWL/ USER
Study ID	(0020,0010)	SH	Requested Procedure ID from Worklist or User Input	VNAP	MWL/ USER
Accession Number	(0008,0050)	SH	From Modality Worklist or user input	VNAP	MWL/ USER
Name of Physician(s) Reading Study	(0008,1060)	PN	From Modality Worklist or user input	VNAP	MWL/ USER

Table 8.1-8
PATIENT STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Calculated from DoB input on base of actual Date	ALWAYS	AUTO
Patient's Size	(0010,1020)	DS	From Modality Worklist or user input	ALWAYS	AUTO
Patient's Weight	(0010,1030)	DS	From Modality Worklist or user input	ALWAYS	AUTO

Table 8.1-9
GENERAL SERIES MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	“MR”	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device	ALWAYS	AUTO
Series Date	(0008,0021)	DA		ANAP	AUTO
Series Time	(0008,0031)	TM		ANAP	AUTO
Protocol Name	(0018,1030)	LO		ANAP	USER
Series Description	(0008,103E)	LO		ANAP	USER
Operator’s Name	(0008,1070)	PN	Operator field in Study list. Maximum 64 characters.	VNAP	USER
Body Part Examined	(0018,0015)	CS	User input	ALWAYS	AUTO
Patient Position	(0018,5100)	CS	Generated by device	ALWAYS	AUTO
Laterality	(0020,0060)	CS		VNAP	AUTO
Smallest Pixel Value in Series	(0028,0108)	SS		ALWAYS	AUTO
Largest Pixel Value in Series	(0028,0109)	SS		ALWAYS	AUTO
Performed Procedure Step Date	(0040,0244)	DA		VNAP	AUTO
Performed Procedure Step Time	(0040,0245)	TM		VNAP	AUTO
Performed Procedure Step ID	(0040,0253)	SH	From Modality Worklist	VNAP	MWM
Performed Procedure Step Description	(0040,0254)	LO	From Modality Worklist	VNAP	AUTO
Request Attributes Sequence	(0040,0275)	SQ	From Modality Worklist	VNAP	MWM
>Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist	VNAP	MWM
>Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	VNAP	MWM
>Requested Procedure ID	(0040,1001)	SH	From Modality Worklist	VNAP	MWM

Table 8.1-10
FRAME OF REFERENCE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	UI		ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO		VNAP	AUTO

Table 8.1-11
GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	“TOSHIBA_MEC”	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	From Configuration	ALWAYS	CONFIG
Station Name	(0008,1010)	SH	From Configuration	ALWAYS	CONFIG
Manufacturer’s Model Name	(0008,1090)	LO		ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO		ALWAYS	CONFIG
Software Version	(0018,1020)	LO		ALWAYS	CONFIG

Table 8.1-12
GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by device	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS		VNAP	AUTO
Referenced Image Sequence	(0008,1140)	SQ		VNAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		VNAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		VNAP	AUTO
Image Type	(0008,0008)	CS		ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS	Generated by device	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	<yyyymmdd>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	<hhmmss.frac>	ALWAYS	AUTO
Image in Acquisition	(0020,1002)	IS		VNAP	AUTO
Image Comments	(0020,4000)	LT	From user input. Maximum 44 characters.	VNAP	USER

8.1.1.7 MR Image Modules

Table 8.1-13
IMAGE PLANE MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Spacing	(0028,0030)	DS		ALWAYS	AUTO
Image Position (Patient)	(0020,0032)	DS		ALWAYS	AUTO
Image Orientation (Patient)	(0020,0037)	DS		ALWAYS	AUTO
Slice Thickness	(0018,0050)	DS		ALWAYS	AUTO
Slice Location	(0020,1041)	DS		ANAP	AUTO

Table 8.1-14
IMAGE PIXEL MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Rows	(0028,0010)	SS		ALWAYS	AUTO
Columns	(0028,0011)	SS		ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	1	ALWAYS	AUTO
Smallest Image Pixel Value	(0028,0106)	SS		ALWAYS	AUTO
Largest Image Pixel Value	(0028,0107)	SS		ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB or OW		ALWAYS	AUTO

Table 8.1-15
CONTRAST/BOLUS MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO		VNAP	USER

Table 8.1-16
VOI/LUT MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS		ALWAYS	USER or AUTO
Window Width	(0028,1051)	DS		ALWAYS	USER or AUTO

Table 8.1-17
SOP COMMON MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character set	(0008,0008)	CS	Refer to Section 6	ANAP	CONFIG
SOP Class UID	(0008,0016)	UI	“1.2.840.10008.5.1.4.1.1.2”	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

Table 8.1-18
MR IMAGE MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	“ORIGINAL¥PRIMARY¥OTHER”, “ORIGINAL¥PRIMARY¥GDC” or “DERIVED¥SECONDARY¥OTHER”	ALWAYS	AUTO
Scanning Sequence	(0018,0020)	CS		ALWAYS	AUTO
Sequence Variant	(0018,0021)	CS	“NONE”	ALWAYS	AUTO
Scan Options	(0018,0022)	CS		VNAP	AUTO
MR Acquisition Type	(0018,0023)	CS		VNAP	AUTO
Sequence Name	(0018,0024)	SH		VNAP	AUTO
Repetition Time	(0018,0080)	DS		ALWAYS	AUTO
Echo Time	(0018,0081)	DS		ALWAYS	AUTO
Inversion Time	(0018,0082)	DS		ANAP	AUTO
Number of Averages	(0018,0083)	DS		ALWAYS	AUTO
Imaging Frequency	(0018,0084)	DS		ANAP	AUTO
Imaged Nucleus	(0018,0085)	SH		ALWAYS	AUTO
Echo Number(s)	(0018,0086)	IS		ALWAYS	AUTO
Spacing Between Slices	(0018,0088)	DS		ANAP	AUTO
Number of Phase Encoding Step	(0018,0089)	IS		ANAP	AUTO
Echo Train Length	(0018,0091)	IS		VNAP	AUTO
Percent Phase Field of View	(0018,0094)	DS		ANAP	AUTO
Trigger Time	(0018,1060)	DS		ANAP	AUTO
Nominal Interval	(0018,1062)	IS		ANAP	AUTO
Cardiac Number of Images	(0018,1090)	IS		ANAP	AUTO
Acquisition Matrix	(0018,1310)	US		ALWAYS	AUTO
Phase Encoding Direction	(0018,1312)	CS		ANAP	AUTO
Flip Angle	(0018,1314)	DS		ANAP	AUTO
SAR	(0018,1316)	DS		ANAP	AUTO
Temporal Position Identifier	(0020,0100)	IS		ANAP	AUTO
Number of Temporal Position	(0020,0105)	IS		ANAP	AUTO
Temporal Resolution	(0020,0110)	DS		ANAP	AUTO

Table 8.1-19
PRIVATE APPLICATION MODULE OF CREATED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator Code	(700D,00xx)	LO	“TOSHIBA_MEC_MR3”	ANAP	AUTO
Scale Factor	(700D,xx00)	DS	Ex.) ”0.0123”	ANAP	AUTO
Acquisition Order	(700D,xx01)	OB		ANAP	AUTO
Orientation Vector	(700D,xx02)	DS		ANAP	AUTO
Flip Flag	(700D,xx03)	SS		ANAP	AUTO
Rotate Information	(700D,xx04)	OB		ANAP	AUTO
FOV	(700D,xx05)	DS		ANAP	AUTO
Image Matrix	(700D,xx06)	US		ANAP	AUTO
Image Information	(700D,xx07)	OB		ANAP	AUTO
Original Data	(700D,xx08)	OB		ANAP	AUTO
Original Data Flag	(700D,xx09)	SS		ANAP	AUTO

8.1.1.8 SC Image Modules

Table 8.1-20
SC EQUIPMENT MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Conversion Type	(0028,0064)	CS	“WSD”	ALWAYS	AUTO
Modality	(0008,0060)	CS	“MR”	ALWAYS	AUTO
Secondary Capture Device ID	(0018,1010)	LO		ANAP	AUTO
Secondary Capture Device Manufacture	(0018,1016)	LO		ANAP	AUTO
Secondary Capture Manufacturer’s Model Name	(0018,1018)	LO		ANAP	AUTO
Secondary Capture Device Software Version	(0018,1019)	LO		ANAP	AUTO

Table 8.1-21
IMAGE PIXEL MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1 or 3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	“MONOCHROME2”	ALWAYS	AUTO
Rows	(0028,0010)	US		ALWAYS	AUTO
Columns	(0028,0011)	US		ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16 or 8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16 or 8	ALWAYS	AUTO
High Bit	(0028,0102)	US	15 or 7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB or OW		ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0	ANAP	AUTO

Table 8.1-22
SC IMAGE MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Date of Secondary Capture	(0018,1012)	DA		ANAP	AUTO
Date of Secondary Capture	(0018,1014)	TM		ANAP	AUTO

Table 8.1-23
VOI/LUT MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS		ANAP	USER or AUTO
Window Width	(0028,1051)	DS		ANAP	USER or AUTO

Table 8.1-24
SOP COMMON MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character set	(0008,0008)	CS	Refer to Section 6	ANAP	CONFIG
SOP Class UID	(0008,0016)	UI	“1.2.840.10008.5.1.4.1.1.7”	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

Table 8.1-25
PRIVATE APPLICATION MODULE OF CREATED SC IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator Code	(700D,00xx)	LO	“TOSHIBA_MEC_MR3”	ANAP	AUTO
Scale Factor	(700D,xx00)	DS	Ex.) ”0.0123”	ANAP	AUTO
Acquisition Order	(700D,xx01)	OB		ANAP	AUTO
Orientation Vector	(700D,xx02)	DS		ANAP	AUTO
Flip Flag	(700D,xx03)	SS		ANAP	AUTO
Rotate Information	(700D,xx04)	OB		ANAP	AUTO
FOV	(700D,xx05)	DS		ANAP	AUTO
Image Matrix	(700D,xx06)	US		ANAP	AUTO
Image Information	(700D,xx07)	OB		ANAP	AUTO
Original Data	(700D,xx08)	OB		ANAP	AUTO
Original Data Flag	(700D,xx09)	SS		ANAP	AUTO

8.1.1.9 Enhanced MR Image Modules

Table 8.1-26
MR SERIES MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	“MR”	ANAP	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO

Table 8.1-27
SYNCHRONIZATION MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Synchronization Frame of Reference UID	(0020,0200)	UI		ALWAYS	AUTO
Synchronization Trigger	(0018,106A)	CS		ANAP	AUTO
Trigger Source or Type	(0018,1061)	LO		ANAP	AUTO
Synchronization Channel	(0018,106C)	US		ANAP	AUTO
Acquisition Time Synchronized	(0018,1800)	CS		ALWAYS	AUTO
Time Source	(0018,1801)	SH		ANAP	AUTO
Time Distribution Protocol	(0018,1802)	CS		ANAP	AUTO
NTP Source Address	(0018,1803)	LO		ANAP	AUTO

Table 8.1-28
ENHANCED GENERAL EQUIPMENT MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	“TOSHIBA_MEC”	ALWAYS	AUTO
Manufacturer’s Model Name	(0008,1090)	LO		ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO		ALWAYS	AUTO
Software Version	(0018,1020)	LO		ALWAYS	AUTO

Table 8.1-29
ENHANCED CONTRAST/BOLUS MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent Sequence	(0018,0012)	SQ		ANAP	AUTO
>Contrast/Bolus Agent Number	(0018,9337)	US		ANAP	AUTO
>Contrast/Bolus Administration Route Sequence	(0018,0014)	SQ		ANAP	AUTO
>Contrast/Bolus Ingredient Code Sequence	(0018,9338)	SQ		ANAP	AUTO
>Contrast/Bolus Volume	(0018,1041)	DS		ANAP	AUTO
>Contrast/Bolus Ingredient Concentration	(0018,1049)	DS		ANAP	AUTO
>Contrast/Bolus Ingredient Opaque	(0018,9425)	CS		ANAP	AUTO
>Contrast Administration Profile Sequence	(0018,9340)	SQ		ANAP	AUTO
>>Contrast/Bolus Volume	(0018,1041)	DS		ANAP	AUTO
>>Contrast/Bolus Start Time	(0018,1042)	TM		ANAP	AUTO
>>Contrast/Bolus Stop Time	(0018,1043)	TM		ANAP	AUTO
>>Contrast Flow Rate	(0018,1046)	DS		ANAP	AUTO
>>Contrast Flow Duration	(0018,1047)	DS		ANAP	AUTO

Table 8.1-30
MULTI-FRAME FUNCTIONAL GROUP MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Shared Functional Groups Sequence	(5200,9229)	SQ		ALWAYS	AUTO
Per-frame Functional Groups Sequence	(5200,9230)	SQ		ALWAYS	AUTO
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Number of Frames	(0028,0008)	IS		ALWAYS	AUTO
Concatenation Frame Offset Number	(0020,9228)	UL		ANAP	AUTO
Representative Frame Number	(0028,6010)	US		ANAP	AUTO
Concatenation UID	(0020,9161)	UI		ANAP	AUTO
In-concatenation Number	(0020,9162)	US		ANAP	AUTO
In-concatenation Total Number	(0020,9163)	US		ANAP	AUTO

MULTI-FRAME FUNCTIONAL GROUP MACROS

Functional Group Macro	Section	Presence of Module
Pixel Measures	**Table 8.1-31**	M
Frame Content	**Table 8.1-32**	M
Plane Position	**Table 8.1-33 PIXEL POSITION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES**	M
Plane Orientation	**Table 8.1-34 PLANE ORIENTATION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES**	M
Referenced Image	**Table 8.1-35**	C
Derivation Image	**Table 8.1-36**	C
Cardiac Trigger	**Table 8.1-37**	C
Frame Anatomy	**Table 8.1-38**	M
Pixel value Transformation	**Table 8.1-39**	M
Frame VOI LUT	**Table 8.1-40**	U
Real World Value Mapping	**Table 8.1-41**	U
Contrast/Bolus Usage	**Table 8.1-42**	C
MR Image Frame Type	**Table 8.1-43**	M
MR Timing and Related Parameters	**Table 8.1-44**	C
MR FOV/Geometry	**Table 8.1-45**	C
MR Echo	**Table 8.1-46**	C
MR Modifier	**Table 8.1-47**	C
MR Image Modifier	**Table 8.1-48**	C
MR Receive Coil	**Table 8.1-49**	C
MR Transmit Coil	**Table 8.1-50**	C
MR Diffusion	**Table 8.1-51**	C
MR Averages	**Table 8.1-52**	C
MR Spatial Saturation	**Table 8.1-53**	C
MR Metabolite Map	**Table 8.1-54**	C
MR Velocity Encoding	**Table 8.1-55**	C

Table 8.1-31
PIXEL MEASURES MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Measures Sequence	(0028,9110)	SQ		ALWAYS	AUTO
>Pixel Spacing	(0028,0030)	DS		ALWAYS	AUTO
>Slice Thickness	(0018,0050)	DS		ALWAYS	AUTO

Table 8.1-32
FRAME CONTENT MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Content Sequence	(0028,9111)	SQ		ALWAYS	AUTO
>Frame Acquisition Number	(0020,9156)	US		VNAP	AUTO
>Frame Reference Datetime	(0018,9151)	DT		VNAP	AUTO
>Frame Acquisition Datetime	(0018,9074)	DT		VNAP	AUTO
>Frame Acquisition Duration	(0018,9220)	FD		VNAP	AUTO
>Cardiac Cycle Position	(0018,9236)	CS		ANAP	AUTO
>Respiratory Cycle Position	(0018,9214)	CS		ANAP	AUTO
>Dimension Index Values	(0020,9157)	UL		ANAP	AUTO
>Temporal Position Index	(0020,9128)	UL		ANAP	AUTO
>Stack ID	(0020,9056)	SH		ANAP	AUTO
>In-Stack Position Number	(0020,9057)	UL		ANAP	AUTO
>Frame Comments	(0020,9158)	LT		ANAP	AUTO

Table 8.1-33
PIXEL POSITION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Plane Position Sequence	(0020,9113)	SQ		ALWAYS	AUTO
> Image Position (Patient)	(0020,0032)	DS		ALWAYS	AUTO

Table 8.1-34
PLANE ORIENTATION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Plane Orientation Sequence	(0020,9116)	SQ		ALWAYS	AUTO
> Image Orientation (Patient)	(0020,0037)	DS		ALWAYS	AUTO

Table 8.1-35
REFERENCED IMAGE MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Image Sequence	(0008,1140)	SQ		VNAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		VNAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		VNAP	AUTO
>Referenced Frame Number	(0008,1160)	IS		VNAP	AUTO
>Purpose of Reference Code Sequence	(0040,A170)	SQ		VNAP	AUTO

Table 8.1-36
DERIVATION IMAGE MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Derivation Image Sequence	(0008,9124)	SQ		VNAP	AUTO
>Derivation Description	(0008,2111)	ST		VNAP	AUTO
>Derivation Code Sequence	(0008,9215)	SQ		VNAP	AUTO
>Source Image Sequence	(0008,2112)	SQ		VNAP	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		VNAP	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		VNAP	AUTO
>>Referenced Frame Number	(0008,1160)	IS		VNAP	AUTO
>>Purpose of Reference Code Sequence	(0040,A170)	SQ		VNAP	AUTO

Table 8.1-37
CARDIAC TRIGGER MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Cardiac Trigger Sequence	(0018,9118)	SQ		VNAP	AUTO
> Trigger Delay Time	(0020,9153)	FD		VNAP	AUTO

Table 8.1-38
FRAME ANATOMY MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Anatomy Sequence	(0020,9071)	SQ		ALWAYS	AUTO
>Frame Laterality	(0020,9072)	CS		ALWAYS	AUTO
>Anatomic Region Sequence	(0008,2218)	SQ		VNAP	AUTO

Table 8.1-39
PIXEL VALUE TRANSFORMATION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Value Transformation Sequence	(0028,9145)	SQ		ALWAYS	AUTO
>Rescale Intercept	(0028,1052)	DS	0	ALWAYS	AUTO
>Rescale Slope	(0028,1053)	DS	1	ALWAYS	AUTO
>Rescale Type	(0028,1054)	LO	“US”	ALWAYS	AUTO

Table 8.1-40
FRAME VOI LUT MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame VOI LUT Sequence	(0028,9132)	SQ		VNAP	AUTO
> Window Center	(0028,1050)	DS		VNAP	AUTO
> Window Width	(0028,1051)	DS		VNAP	AUTO
> Window Center & Width Explanation	(0028,1055)	LO		ANAP	AUTO

Table 8.1-41
REAL WORLD VALUE MAPPING MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Real World Value Mapping Sequence	(0040,9096)	SQ		ANAP	AUTO
>Real World Value First Value Mapped	(0040,9216)	US		ANAP	AUTO
>Real World Value Last Value Mapped	(0040,9211)	US		ANAP	AUTO
>Real World Value Intercept	(0040,9224)	FD		ANAP	AUTO
>Real World Value Slope	(0040,9225)	FD		ANAP	AUTO
>Real World Value LUT Data	(0040,9212)	FD		ANAP	AUTO
>LUT Explanation	(0028,3003)	LO		ANAP	AUTO
>LUT Label	(0040,9210)	SH		ANAP	AUTO
>Measurement Units Code Sequence	(0040,08EA)	SQ		ANAP	AUTO

Table 8.1-42
CONTRAST/BOLUS USAGE MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Usage Sequence	(0018,9341)	SQ		VNAP	AUTO
>Contrast/Bolus Agent Number	(0018,9337)	US		VNAP	AUTO
>Contrast/Bolus Agent Administered	(0018,9342)	CS		VNAP	AUTO
>Contrast/Bolus Agent Detected	(0018,9343)	CS		VNAP	AUTO
>Contrast/Bolus Agent Phase	(0018,9344)	CS		VNAP	AUTO

Table 8.1-43
MR IMAGE FRAME TYPE MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Image Frame Type Sequence	(0018,9226)	SQ		ALWAYS	AUTO
>Frame Type	(0008,9007)	CS		ALWAYS	AUTO
>Pixel Presentation	(0008,9205)	CS	“MONOCHROME”	ALWAYS	AUTO
>Volumetric Properties	(0008,9206)	CS	“VOLUME”	ALWAYS	AUTO
>Volume Based Calculation Technique	(0008,9207)	CS	“NONE”	ALWAYS	AUTO
>Complex Image Component	(0008,9208)	CS	“MAGNITUDE”	ALWAYS	AUTO
>Acquisition Contrast	(0008,9209)	CS		ALWAYS	AUTO

Table 8.1-44
MR TIMING AND RELATED PARAMETERS MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Timing and Related Parameters Sequence	(0018,9112)	SQ		VNAP	AUTO
>Repetition Time	(0018,0080)	DS		VNAP	AUTO
>Flip Angle	(0018,1314)	DS		VNAP	AUTO
>Echo Train Length	(0018,0091)	IS		VNAP	AUTO
>RF Echo Train Length	(0018,9240)	US		VNAP	AUTO
>Gradient Echo Train Length	(0018,9241)	US		VNAP	AUTO
>Specific Absorption Rate Sequence	(0018,9239)	SQ		VNAP	AUTO
>>Specific Absorption Rate Definition	(0018,9179)	CS	“IEC_WHOLE_BODY”	ALWAYS	AUTO
>>Specific Absorption Rate Value	(0018,9181)	FD		ALWAYS	AUTO
>Gradient Output Type	(0018,9180)	CS		VNAP	AUTO
>Gradient Output	(0018,9182)	FD		VNAP	AUTO
>Operating Mode Sequence	(0018,9176)	SQ		VNAP	AUTO
>>Operating Mode Type	(0018,9177)	CS		ALWAYS	AUTO
>>Operating Mode	(0018,9178)	CS	“IEC_NORMAL”	ALWAYS	AUTO

Table 8.1-45
MR FOV/GEOMETRY MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR FOV/Geometry Sequence	(0018,9125)	SQ		VNAP	AUTO
>In-plane Phase Encoding Direction	(0018,1312)	CS		VNAP	AUTO
>MR Acquisition Frequency Encoding Steps	(0018,9058)	US		VNAP	AUTO
>MR Acquisition Phase Encoding Steps in-plane	(0018,9231)	US		VNAP	AUTO
>MR Acquisition Phase Encoding Steps out-of-plane	(0018,9232)	US		VNAP	AUTO
>Percent Sampling	(0018,0093)	DS		VNAP	AUTO
>Percent Phase Field of View	(0018,0094)	DS		VNAP	AUTO

Table 8.1-46
MR ECHO MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Echo Sequence	(0018,9114)	SQ		VNAP	AUTO
>Effective Echo Time	(0018,9082)	FD		VNAP	AUTO

Table 8.1-47
MR MODIFIER MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Modifier Sequence	(0018,9115)	SQ		VNAP	AUTO
>Inversion Recovery	(0018,9009)	CS		VNAP	AUTO
>Inversion Times	(0018,9079)	FD		VNAP	AUTO
>Flow Compensation	(0018,9010)	CS		VNAP	AUTO
>Flow Compensation Direction	(0018,9183)	CS		VNAP	AUTO
>Spoiling	(0018,9016)	CS		VNAP	AUTO
>T2 Preparation	(0018,9021)	CS		VNAP	AUTO
>Spectrally Selected Excitation	(0018,9026)	CS		VNAP	AUTO
>Spatial Pre-saturation	(0018,9027)	CS		VNAP	AUTO
>Partial Fourier	(0018,9081)	CS		VNAP	AUTO
>Partial Fourier Direction	(0018,9036)	CS		VNAP	AUTO
>Parallel Acquisition	(0018,9077)	CS		VNAP	AUTO
>Parallel Acquisition Technique	(0018,9078)	CS		VNAP	AUTO
>Parallel Reduction Factor In-plane	(0018,9069)	FD		VNAP	AUTO
>Parallel Reduction Factor out-of plane	(0018,9155)	FD		VNAP	AUTO
>Parallel Reduction Factor Second In-plane	(0018,9168)	FD		VNAP	AUTO

Table 8.1-48
MR IMAGE MODIFIER MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Imaging Modifier Sequence	(0018,9006)	SQ		VNAP	AUTO
>Magnetization Transfer	(0018,9020)	CS		VNAP	AUTO
>Blood Signal Nulling	(0018,9022)	CS		VNAP	AUTO
>Tagging	(0018,9028)	CS		VNAP	AUTO
>Tag Spacing First Dimension	(0018,9030)	FD		ANAP	AUTO
>Tag Spacing Second Dimension	(0018,9218)	FD		ANAP	AUTO
>Tag Angle First Axis	(0018,9019)	FD		ANAP	AUTO
>Tag Angle Second Axis	(0018,9219)	SS		ANAP	AUTO
>Tag Thickness	(0018,9035)	FD		ANAP	AUTO
>Tagging Delay	(0018,9184)	FD		ANAP	AUTO
>Transmitter Frequency	(0018,9098)	FD		VNAP	AUTO
> Pixel Bandwidth	(0018,0095)	DS		VNAP	AUTO

Table 8.1-49
MR RECEIVE COIL MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Receive Coil Sequence	(0018,9042)	SQ		VNAP	AUTO
>Receive Coil Name	(0018,1250)	SH		VNAP	AUTO
>Receive Coil Manufacturer Name	(0018,9041)	LO	“TMSC”	ALWAYS	AUTO
>Receive Coil Type	(0018,9043)	CS		VNAP	AUTO
>Quadrature Receive Coil	(0018,9044)	CS		VNAP	AUTO
>Multi-Coil Definition Sequence	(0018,9045)	SQ		VNAP	AUTO
>>Multi-Coil Element Name	(0018,9047)	SH		VNAP	AUTO
>>Multi-Coil Element Used	(0018,9048)	CS		VNAP	AUTO
>Multi-Coil Configuration	(0018,9046)	LO		ANAP	AUTO

Table 8.1-50
MR TRANSMIT COIL MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Transmit Coil Sequence	(0018,9049)	SQ		VNAP	AUTO
>Transmit Coil Name	(0018,1251)	SH		VNAP	AUTO
>Transmit Coil Manufacturer Name	(0018,9050)	LO	“TMSC”	ALWAYS	AUTO
>Transmit Coil Type	(0018,9051)	CS		VNAP	AUTO

Table 8.1-51
MR DIFFUSION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Diffusion Sequence	(0018,9117)	SQ		VNAP	AUTO
>Diffusion b-value	(0018,9087)	FD		VNAP	AUTO
>Diffusion Directionality	(0018,9075)	CS		VNAP	AUTO
>Diffusion Gradient Direction Sequence	(0018,9076)	SQ		ANAP	AUTO
>>Diffusion Gradient Orientation	(0018,9089)	FD		ANAP	AUTO
>Diffusion Anisotropy Type	(0018,9147)	CS		ANAP	AUTO

Table 8.1-52
MR AVERAGES MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Averages Sequence	(0018,9119)	SQ		VNAP	AUTO
>Number of Averages	(0018,0083)	DS		VNAP	AUTO

Table 8.1-53
MR SPATIAL SATURATION MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Spatial Saturation Sequence	(0018,9107)	SQ		VNAP	AUTO
>Slab Thickness	(0018,9104)	FD		VNAP	AUTO
>Slab Orientation	(0018,9105)	FD		VNAP	AUTO
>Mid Slab Position	(0018,9106)	FD		VNAP	AUTO

Table 8.1-54
MR METABOLITE MAP MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Metabolite Map Sequence	(0018,9152)	SQ		VNAP	AUTO
>Metabolite Map Description	(0018,9080)	ST		VNAP	AUTO
>Metabolite Map Code Sequence	(0018,9083)	SQ		VNAP	AUTO
>>Code Value	(0008,0100)	SH		VNAP	AUTO
>>Coding Scheme Designator	(0008,0102)	SH		VNAP	AUTO
>>Coding Scheme Version	(0008,0103)	SH		VNAP	AUTO
>>Code Meaning	(0008,0104)	LO		VNAP	AUTO
>Chemical Shift Sequence	(0018,9084)	SQ		VNAP	AUTO
>>Chemical Shift Minimum Integration Limit in ppm	(0018,9295)	FD		VNAP	AUTO
>>Chemical Shift Maximum Integration Limit in ppm	(0018,9296)	FD		VNAP	AUTO

Table 8.1-55
MR VELOCITY ENCODING MACRO OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
MR Velocity Encoding Sequence	(0018,9197)	SQ		VNAP	AUTO
>Velocity Encoding Direction	(0018,9090)	FD		VNAP	AUTO
>Velocity Encoding Minimum Value	(0018,9091)	FD		VNAP	AUTO
>Velocity Encoding Maximum Value	(0018,9217)	FD		VNAP	AUTO

Table 8.1-56
MULTI-FRAME DIMENSION MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Dimension Organization Sequence	(0020,9221)	SQ		VNAP	AUTO
>Dimension Organization UID	(0020,9164)	UI		ANAP	AUTO
Dimension Index Sequence	(0020,9222)	SQ		VNAP	AUTO
>Dimension Index Pointer	(0020,9165)	AT		ANAP	AUTO
>Dimension Index Private Creator	(0020,9213)	LO		ANAP	AUTO
>Functional Group Pointer	(0020,9167)	AT		ANAP	AUTO
>Functional Group Private Creator	(0020,9238)	LO		ANAP	AUTO
>Dimension Organization UID	(0020,9164)	UI		ANAP	AUTO

Table 8.1-57
CARDIAC SYNCHRONIZATION MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Cardiac Synchronization Technique	(0018,9037)	CS		VNAP	AUTO
Cardiac Signal Source	(0018,9085)	CS		VNAP	AUTO
Cardiac RR Interval Specified	(0018,9070)	FD		VNAP	AUTO
Cardiac Beat Rejection Technique	(0018,9169)	CS		VNAP	AUTO
Low R-R Value	(0018,1081)	IS		VNAP	AUTO
High R-R Value	(0018,1082)	IS		VNAP	AUTO
Intervals Acquired	(0018,1083)	IS		VNAP	AUTO
Intervals Rejected	(0018,1084)	IS		VNAP	AUTO

Table 8.1-58
RESPIRATORY SYNCHRONIZATION MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Respiratory Motion Compensation Technique	(0018,9170)	CS		VNAP	AUTO
Respiratory Signal Source	(0018,9171)	CS		VNAP	AUTO

Table 8.1-59
BULK MOTION SYNCHRONIZATION MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Bulk Motion Compensation Technique	(0018,9172)	CS		VNAP	AUTO
Bulk Motion Signal Source	(0018,9173)	CS		ANAP	AUTO

Table 8.1-60
ACQUISITION CONTEXT MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Context Sequence	(0040,0555)	SQ		VNAP	AUTO
>Value Type	(0040,A040)	CS		ANAP	AUTO
>Concept Name Code Sequence	(0040,A043)	SQ		ANAP	AUTO
>Referenced Frame Numbers	(0040,A136)	US		ANAP	AUTO
>Numeric Value	(0040,A30A)	DS		ANAP	AUTO
>Measurement Units Code Sequence	(0040,08EA)	SQ		ANAP	AUTO
>Date	(0040,A121)	DA		ANAP	AUTO
>Time	(0040,A122)	TM		ANAP	AUTO
>Person Name	(0040,A123)	PN		ANAP	AUTO
>Text Value	(0040,A160)	UT		ANAP	AUTO
>Concept Code Sequence	(0040,A168)	SQ		ANAP	AUTO
Acquisition Context Description	(0040,0556)	ST		ANAP	AUTO

Table 8.1-61
ENHANCED MR IMAGE MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Acquisition Number	(0020,0012)	IS		VNAP	AUTO
Acquisition Datetime	(0008,002A)	DT		VNAP	AUTO
Acquisition Duration	(0018,9073)	FD		VNAP	AUTO
Referenced Raw Data Sequence	(0008,9121)	SQ		ANAP	AUTO
Referenced Waveform Sequence	(0008,113A)	SQ		ANAP	AUTO
Referenced Image Evidence Sequence	(0008,9092)	SQ		ANAP	AUTO
Source Image Evidence Sequence	(0008,9154)	SQ		ANAP	AUTO
Referenced Grayscale Presentation State Sequence	(0008,9237)	SQ		ANAP	AUTO
Content Qualification	(0018,9004)	CS		VNAP	AUTO
Resonant Nucleus	(0018,9100)	CS		VNAP	AUTO
k-space Filtering	(0018,9064)	CS		VNAP	AUTO
Magnetic Field Strength	(0018,0087)	FD		VNAP	AUTO
Applicable Safety Standard Agency	(0018,9174)	CS		VNAP	AUTO
Applicable Safety Standard Description	(0018,9175)	LO		ANAP	AUTO
Image Comments	(0020,4000)	LT		ANAP	AUTO
Image Type	(0008,0008)	CS		ALWAYS	AUTO
Pixel Presentation	(0008,9205)	CS	“MONOCHROME”	ALWAYS	AUTO
Volumetric Properties	(0008,9206)	CS	“VOLUME”	ALWAYS	AUTO
Volume Based Calculation Technique	(0008,9207)	CS	“NONE”	ALWAYS	AUTO
Complex Image Component	(0008,9208)	CS	“MAGNITUDE”	ALWAYS	AUTO
Acquisition Contrast	(0008,9209)	CS		ALWAYS	AUTO
Samples per Pixel	(0028,0002)	US	“1”	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	“MONOCHROME2”	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	“16”	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	“16”	ALWAYS	AUTO
High Bit	(0028,0102)	US	“15”	ALWAYS	AUTO
Spacing between Slices	(0018,0088)	DS		ANAP	AUTO
Lossy Image Compression	(0028,2110)	CS	“00”	ALWAYS	AUTO
Lossy Image Compression Ratio	(0028,2112)	DS		ANAP	AUTO
Icon Image Sequence	(0088,0200)	SQ		ANAP	AUTO

Table 8.1-62
MR PULSE SEQUENCE MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pulse Sequence Name	(0018,9005)	SH		VNAP	AUTO
MR Acquisition Type	(0018,0023)	CS		ALWAYS	AUTO
Echo Pulse Sequence	(0018,9008)	CS	“GRADIENT”	ALWAYS	AUTO
Multiple Spin Echo	(0018,9011)	CS		VNAP	AUTO
Multi-planar Excitation	(0018,9012)	CS	“NO”	ALWAYS	AUTO
Phase Contrast	(0018,9014)	CS	“NO”	ALWAYS	AUTO
Time of Flight Contrast	(0018,9015)	CS	“NO”	ALWAYS	AUTO
Steady State Pulse Sequence	(0018,9017)	CS	“NONE”	ALWAYS	AUTO
Echo Planar Pulse Sequence	(0018,9018)	CS	“NO”	ALWAYS	AUTO
Saturation Recovery	(0018,9024)	CS	“NO”	ALWAYS	AUTO
Spectrally Selected Suppression	(0018,9025)	CS	“NONE”	ALWAYS	AUTO
Oversampling Phase	(0018,9029)	CS	“NONE”	ALWAYS	AUTO
Geometry of k-Space Traversal	(0018,9032)	CS	“RECTILINEAR”	ALWAYS	AUTO
Rectilinear Phase Encode Reordering	(0018,9034)	CS	“LINEAR”	ALWAYS	AUTO
Segmented k-Space Traversal	(0018,9033)	CS	“SINGLE”	ALWAYS	AUTO
Coverage of k-Space	(0018,9094)	CS	“FULL”	ALWAYS	AUTO
Number of k-Space Trajectories	(0018,9093)	US	1	ALWAYS	AUTO

Table 8.1-63
SOFTCOPY PRESENTATION LUT MODULE OF CREATED ENHANCED MR IMAGE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation LUT Sequence	(2050,0010)	SQ		ANAP	AUTO
>LUT Descriptor	(0028,3002)	US or SS		ANAP	AUTO
>LUT Explanation	(0028,3003)	LO		ANAP	AUTO
>LUT Data	(0028,3006)	US or SS or OW		ANAP	AUTO
Presentation LUT Shape	(2050,0020)		“IDENTITY”	ALWAYS	AUTO

8.1.1.10 MR Spectroscopy Modules

Table 8.1-64
MR SERIES MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	“MR”	ANAP	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ANAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO

Table 8.1-65
SYNCHRONIZATION MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Synchronization Frame of Reference UID	(0020,0200)	UI		ALWAYS	AUTO
Synchronization Trigger	(0018,106A)	CS		ANAP	AUTO
Trigger Source or Type	(0018,1061)	LO		ANAP	AUTO
Synchronization Channel	(0018,106C)	US		ANAP	AUTO
Acquisition Time Synchronized	(0018,1800)	CS		ALWAYS	AUTO
Time Source	(0018,1801)	SH		ANAP	AUTO
Time Distribution Protocol	(0018,1802)	CS		ANAP	AUTO
NTP Source Address	(0018,1803)	LO		ANAP	AUTO

Table 8.1-66
MR SPECTROSCOPY MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS		VNAP	AUTO
Transmitter Frequency	(0018, 9098)	FD		VNAP	AUTO
Spectral Width	(0018,9052)	FD		VNAP	AUTO
Chemical Shift Reference	(0018,9053)	FD		VNAP	AUTO
Volume Localization Technique	(0018,9054)	CS		VNAP	AUTO
Volume Localization Sequence	(0018,9126)	SQ		VNAP	AUTO
>Slab Thickness	(0018,9104)	FD		VNAP	AUTO
>Slab Orientation	(0018,9105)	FD		VNAP	AUTO
>Mid Slab Position	(0018,9106)	FD		VNAP	AUTO
De-Coupling	(0018,9059)	CS		VNAP	AUTO
De-Coupled Nucleus	(0018,9060)	CS		VNAP	AUTO
De-Coupling Frequency	(0018,9061)	FD		VNAP	AUTO
De-Coupling Method	(0018,9062)	CS		VNAP	AUTO
De-Coupling Chemical Shift Reference	(0018,9063)	FD		VNAP	AUTO
Time Domain Filtering	(0018,9065)	CS		VNAP	AUTO
Number of Zero Fills	(0018,9066)	US		VNAP	AUTO
Baseline Correction	(0018,9067)	CS		VNAP	AUTO
Frequency Correction	(0018, 9101)	CS		VNAP	AUTO
First Order Phase Correction	(0018,9198)	CS		VNAP	AUTO
Water Referenced Phase Correction	(0018,9199)	CS		VNAP	AUTO

Table 8.1-67
MR SPECTROSCOPY PULSE SEQUENCE MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pulse Sequence Name	(0018,9005)	SH		ALWAYS	AUTO
MR Spectroscopy Acquisition Type	(0018,9200)	CS		ALWAYS	AUTO
Echo Pulse Sequence	(0018,9008)	CS	“GRADIENT”	ALWAYS	AUTO
Multiple Spin Echo	(0018,9011)	CS		ALWAYS	AUTO
Multi-planar Excitation	(0018,9012)	CS	“NO”	ALWAYS	AUTO
Steady State Pulse Sequence	(0018,9017)	CS	“NONE”	ALWAYS	AUTO
Echo Planar Pulse Sequence	(0018,9018)	CS	“NO”	ANAP	AUTO
Spectrally Selected Suppression	(0018,9025)	CS	“NONE”	ANAP	AUTO
Geometry of k-Space Traversal	(0018,9032)	CS	“RECTILINEAR”	ANAP	AUTO
Rectilinear Phase Encode Reordering	(0018,9034)	CS	“LINEAR”	ANAP	AUTO
Segmented k-Space Traversal	(0018,9033)	CS	“SINGLE”	ANAP	AUTO
Coverage of k-Space	(0018,9094)	CS	“FULL”	ANAP	AUTO
Number of k-Space Trajectories	(0018,9093)	US	1	ANAP	AUTO

Table 8.1-68
MR SPECTROSCOPY DATA MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rows	(0028,0010)	US		ALWAYS	AUTO
Columns	(0028,0011)	US		ALWAYS	AUTO
Data Point Rows	(0028,9001)	UL		ALWAYS	AUTO
Data Point Columns	(0028,9002)	UL		ALWAYS	AUTO
Data Representation	(0028,9108)	CS		ALWAYS	AUTO
Signal Domain Columns	(0028,9003)	CS		ALWAYS	AUTO
Signal Domain Rows	(0028,9235)	CS		ALWAYS	AUTO
First Order Phase Correction Angle	(5600,0010)	OF		ALWAYS	AUTO
Spectroscopy Data	(5600,0020)	OF		ALWAYS	AUTO

Table 8.1-69
PRIVATE APPLICATION MODULE OF CREATED MR Spectroscopy SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator Code	(700D,00xx)	LO	“TOSHIBA_MEC_MR3”	ANAP	AUTO
Number of PAC channel	(700D,xx80)	US		ANAP	AUTO
Reference mode	(700D,xx81)	US		ANAP	AUTO
Gain value group for MRS	(700D,xx82)	SQ		ANAP	AUTO
> Gain value of each channel for MRS	(700D,xx83)	FL		ANAP	AUTO
> Phase value of each channel for MRS	(700D,xx84)	FL		ANAP	AUTO
> Reference gain value of each channel for MRS	(700D,xx85)	FL		ANAP	AUTO
> Reference gain value of each channel for MRS	(700D,xx86)	FL		ANAP	AUTO
Receiver gain of reference scan	(700D,xx87)	FL		ANAP	AUTO
Flag of water Sat pulse	(700D,xx88)	UL		ANAP	AUTO
Selected contrast TE	(700D,xx89)	FL		ANAP	AUTO
Raw Data Set Sequence	(700D,xx8A)	SQ		ANAP	AUTO
>Multi Slice number	(700D,xx8B)	DS		ANAP	AUTO
>Multi Coverage number	(700D,xx8C)	DS		ANAP	AUTO
>Raw Data Sequence	(700D,xx8D)	SQ		ANAP	AUTO
>>Coil Channel No.	(700D,xx8E)	DS		ANAP	AUTO
>>MRS Raw Data	(700D,xx8F)	OB		ANAP	AUTO
>>MRS Ref Raw Data	(700D,xx90)	OF		ANAP	AUTO
Receiver gain of prescan	(700D,xx91)	FL	in dB	ANAP	AUTO

8.1.1.11 Grayscale Softcopy Presentation State Modules

Table 8.1-70
PRESENTATION SERIES MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	“PR”	ALWAYS	AUTO

Table 8.1-71
PRESENTATION STATE MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by device	ALWAYS	AUTO
Presentation Label	(0070,0080)	CS	Generated by device	ALWAYS	AUTO
Presentation Description	(0070,0081)	LO		VNAP	USER
Presentation Creation Date	(0070,0082)	DA	<yyyymmdd>	ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM	<hhmmss.frac>	ALWAYS	AUTO
Presentation Creator’s Name	(0070,0084)	PN		VNAP	USER
Presentation Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
>Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO

Table 8.1-72
DISPLAYED AREA MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Displayed Area Selection Sequence	(0070,005A)	SQ		ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ		ANAP	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		ANAP	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ANAP	AUTO
>Displayed Area Top Left Hand Corner	(0070,0052)	IS		ALWAYS	AUTO
>Displayed Area Bottom Right Hand Corner	(0070,0053)	IS		ALWAYS	AUTO
>Presentation Size Model	(0070,0100)	CS		ALWAYS	AUTO
>Presentation Pixel Aspect Ratio	(0070,0102)	IS		ALWAYS	AUTO
>Presentation Pixel Magnification Ratio	(0070,0103)	FL		ANAP	AUTO

Table 8.1-73
SPATIAL TRANSFORMATION MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Horizontal Flip	(0070,0041)	US		ALWAYS	AUTO
Image Rotation	(0070,0042)	US		ALWAYS	AUTO

Table 8.1-74
MODALITY LUT MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rescale Intercept	(0028,1052)	DS		ANAP	AUTO
Rescale Slope	(0028,1053)	DS		ANAP	AUTO
Rescale Type	(0028,1054)	LO		ANAP	AUTO

Table 8.1-75
SOFTCOPY VOI LUT MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Softcopy VOI LUT Sequence	(0028,3110)	SQ		ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
>Window Center	(0028,1050)	DS		ALWAYS	AUTO
>Window Width	(0028,1051)	DS		ALWAYS	AUTO
>Window Center & Width Explanation	(0028,1055)	LO		ANAP	AUTO

Table 8.1-76
SOFTCOPY PRESENTATION LUT MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation LUT Shape	(2050,0020)	CS		ALWAYS	AUTO

Table 8.1-77
SOP COMMON MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	Refer to Section 6	ANAP	AUTO
Instance Creation Date	(0008,0012)	DA	<yyyymmdd>	ANAP	AUTO
Instance Creation Time	(0008,0013)	TM	<hhmmss.frac>	ANAP	AUTO
SOP Class UID	(0008,0016)	UI	“1.2.840.10008.5.1.4.1.1.11.1”	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

Table 8.1-78
PRIVATE APPLICATION MODULE OF CREATED GRAYSCALE SOFTCOPY PRESENTATION STATE SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator Code	(700D,00xx)	LO	“TOSHIBA_MEC_MR3”	ANAP	AUTO
Scale Factor	(700D,xx00)	DS	Ex.) ”0.0123”	ANAP	AUTO
Acquisition Order	(700D,xx01)	OB		ANAP	AUTO
Orientation Vector	(700D,xx02)	DS		ANAP	AUTO
Flip Flag	(700D,xx03)	SS		ANAP	AUTO
Rotate Information	(700D,xx04)	OB		ANAP	AUTO
FOV	(700D,xx05)	DS		ANAP	AUTO
Image Matrix	(700D,xx06)	US		ANAP	AUTO
Image Information	(700D,xx07)	OB		ANAP	AUTO
Original Data	(700D,xx08)	OB		ANAP	AUTO
Original Data Flag	(700D,xx09)	SS		ANAP	AUTO

8.1.2 Usage of Attributes from received IOD's

No SOP Class specific fields are required.

8.1.3 Attribute Mapping

The relationships between attributes received via Modality Worklist, stored in acquired images and communicated via MPPS are summarized in Table 8.1-79.

Table 8.1-79
ATTRIBUTE MAPPING BETWEEN MODALITY WORKLIST, IMAGE AND MPPS

Modality Worklist	Image IOD	MPPS IOD
--	--	Scheduled Step Attribute Sequence
Study Instance UID	Study Instance UID	>Study Instance UID
Referenced Study Sequence	Referenced Study Sequence	>Referenced Study Sequence
Accession Number	Accession Number	>Accession Number
--	Request Attributes Sequence	--
Requested Procedure ID	>Requested Procedure ID	>Requested Procedure ID
Scheduled Procedure Step ID	>Scheduled Procedure Step ID	>Scheduled Procedure Step ID
Scheduled Procedure Step Description	>Scheduled Procedure Step Description	>Scheduled Procedure Step Description
Requested Procedure ID	Study ID	Study ID
--	Performed Procedure Step ID	Performed Procedure Step ID
--	Performed Procedure Step Description	Performed Procedure Step Description
Requested Procedure Code Sequence	Requested Procedure Code Sequence	Requested Procedure Code Sequence

This table shows only typical data sets.

Other data sets are also set as default settings.
All map settings, including the default setting data sets, can be customized.

8.1.4 Coerced/Modified Fields

Not applicable to this product

8.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

This product reserves private attribute values in the group 700D.
The private attributes added to created SOP instances or directory records are listed in the following table;

Table 8.2-1
DATA DICTIONARY OF PRIVATE ATTRIBUTES

Tag	Attribute Name	VR	VM
(700D,00xx)	Private Creator Code (“TOSHIBA_MEC_MR3”)	LO	1
(700D,xx00)	Scale Factor	DS	1
(700D,xx01)	Acquisition Order	OB	1
(700D,xx02)	Orientation Vector	DS	9
(700D,xx03)	Flip Flag	SS	1
(700D,xx04)	Rotate Information	OB	1
(700D,xx05)	FOV	DS	4
(700D,xx06)	Image Matrix	US	4
(700D,xx07)	Image Information	OB	1
(700D,xx08)	Original Data	OB	1
(700D,xx09)	Original Data Flag	SS	1

8.3 CONTROLLED TERMINOLOGY AND TEMPLATES

Not applicable to this product

8.4 GRAYSCALE IMAGE CONSISTENCY

Not applicable to this product

8.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

Not applicable to this product

8.6 PRIVATE TRANSFER SYNTAXES

Not applicable to this product