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MR Imaging System

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V3.0

DICOM Conformance Statement

Rev. 10

Hitachi Medical Corporation
Tokyo, Japan

E1E-BM6059-10

Revision History

Revision	Date	Change Description
1	05/16/2005	- Initial Version
2	10/03/2005	- Added Gray Scale Softcopy Presentation State Storage for Image Transfer Application Entity Specifications. - Added GSPS Modules in Annex A.
3	11/15/2005	- Updated system name.
4	10/10/2006	- Added AES cipher suites for Security Profiles. - Added the description of Extended Character Sets. - Updated Common Modules and MR Image Modules in Annex A.
5	06/20/2007	- Updated General Equipment Module Attributes - Added note on Annex A
6	09/18/2007	- Updated General Equipment Module Attributes - Updated chapter 9 Extensions /Specialization's/Privatization's.
7	06/30/2008	- Added Key Object Selection - Updated chapter 9 Extensions /Specialization's/Privatization's. - Updated chapter 13
8	05/11/2009	- Updated chapter 3 - Updated chapter 7 - Updated chapter 13
9	07/15/2010	- Updated system version.
10	03/14/2011	- Updated chapter 2 - Updated chapter 7 - Updated chapter 10 - Updated chapter 12

Forward

This document specifies the conformance of the Hitachi MR scanners to the DICOM 3.0 standard. It is intended to facilitate the process of interconnection between the Hitachi scanners and other DICOM 3.0 compliant devices. This document by itself however, does not guarantee interconnectivity or interoperability with other devices. It will be up to the user to make sure that all connected DICOM devices have been validated and will successfully inter-operate.
This validation needs to be performed prior to the clinical use of any data obtained from the Hitachi scanners as well as when images acquired on non-Hitachi equipment is processed or displayed on the Hitachi MR console.
Any non-Hitachi vendor should accept full responsibility for all validation required for their connection with the Hitachi scanners. Hitachi will participate with the validation process whenever required to.

Table of Contents

1. Introduction

1.1 Purpose of this Document

This document is the DICOM Conformance Statement for the Hitachi MR System. It provides a high level description of the DICOM capabilities of the Application Entity used in the MR scanners. The document is formatted according to DICOM PS3.2 (2003).
This conformance statement does not apply to other products or medical imaging devices manufactured by Hitachi.

1.2 Related Documents

The DICOM Standard (2003/2004/2006)

1.3 Definitions

Application Entity - Is the Term used for the software application capable of using DICOM services.
DCMserver - The name of the DICOM Transfer Application Entity running on the Hitachi MR System.

1.4 Acronyms and Abbreviations

The following acronyms and abbreviations are used in this conformance specification.

ACR	American College of Radiology
AE	Application Entity
API	Application Programming Interface
CA	Certificate Authority
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
GUI	Graphical User Interface
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	North American Electrical Manufacturers Association
PDU	Protocol Data Unit
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UI	User Interface
UID	Unique Identifier
VR	Value Representation

2. Implementation Model

2.1 Image Transfer and Storage Commitment

The Hitachi MR DICOM Server (*DCMserver*) is implemented as a single Application Entity.

Once it has a configuration, *DCMserver* is capable of:

- accepting associations from remote AEs wishing to Query/Retrieve/Store Information Objects in the local database or wishing to establish verification association,
- accepting associations from remote AEs wishing to respond to Storage Commitment requests originated by the Hitachi MRI system, and
- initiating associations to Query/Retrieve/Store/Commit Information Objects in remote AE's

2.1.1 Application Data Flow Diagram

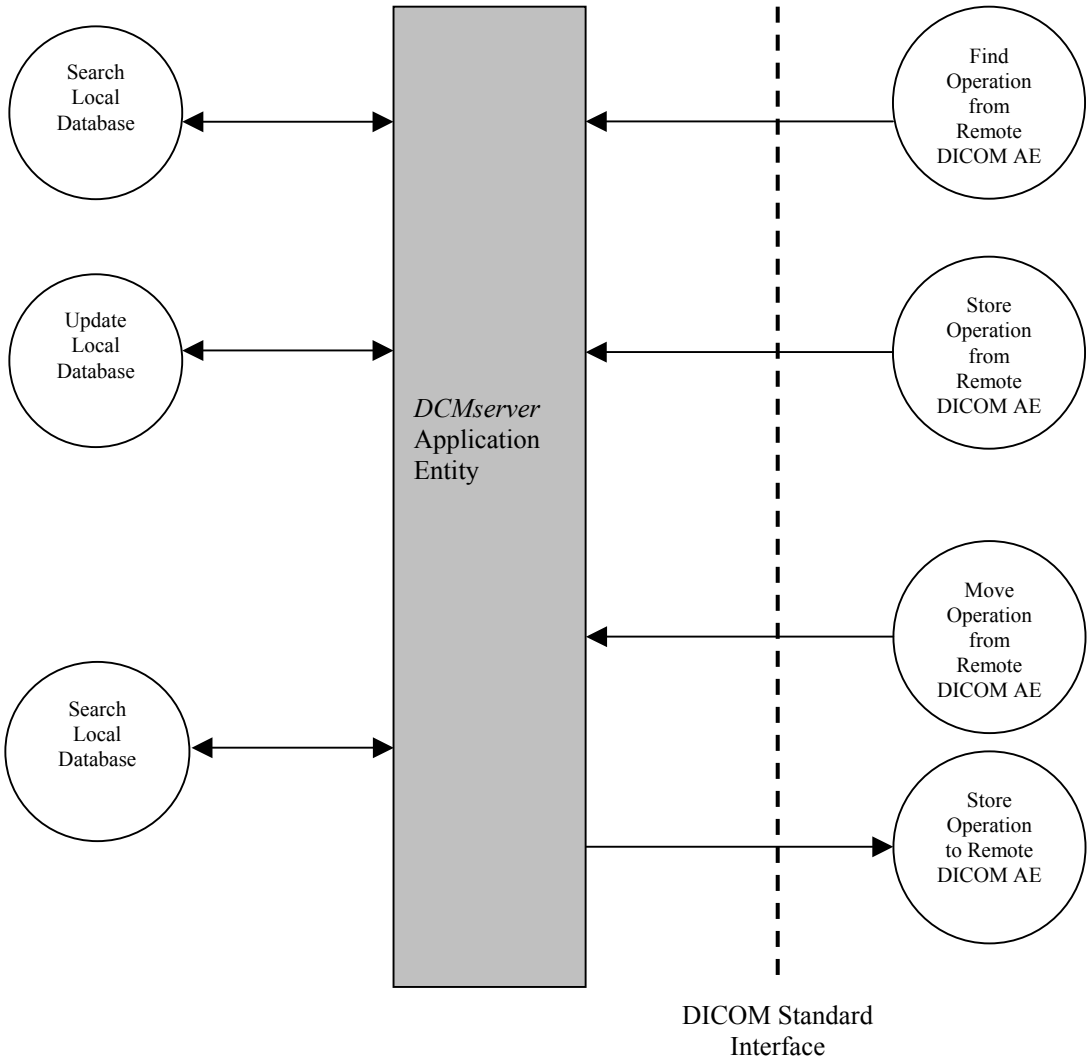

Figure 1 Image Transfer Implementation Model

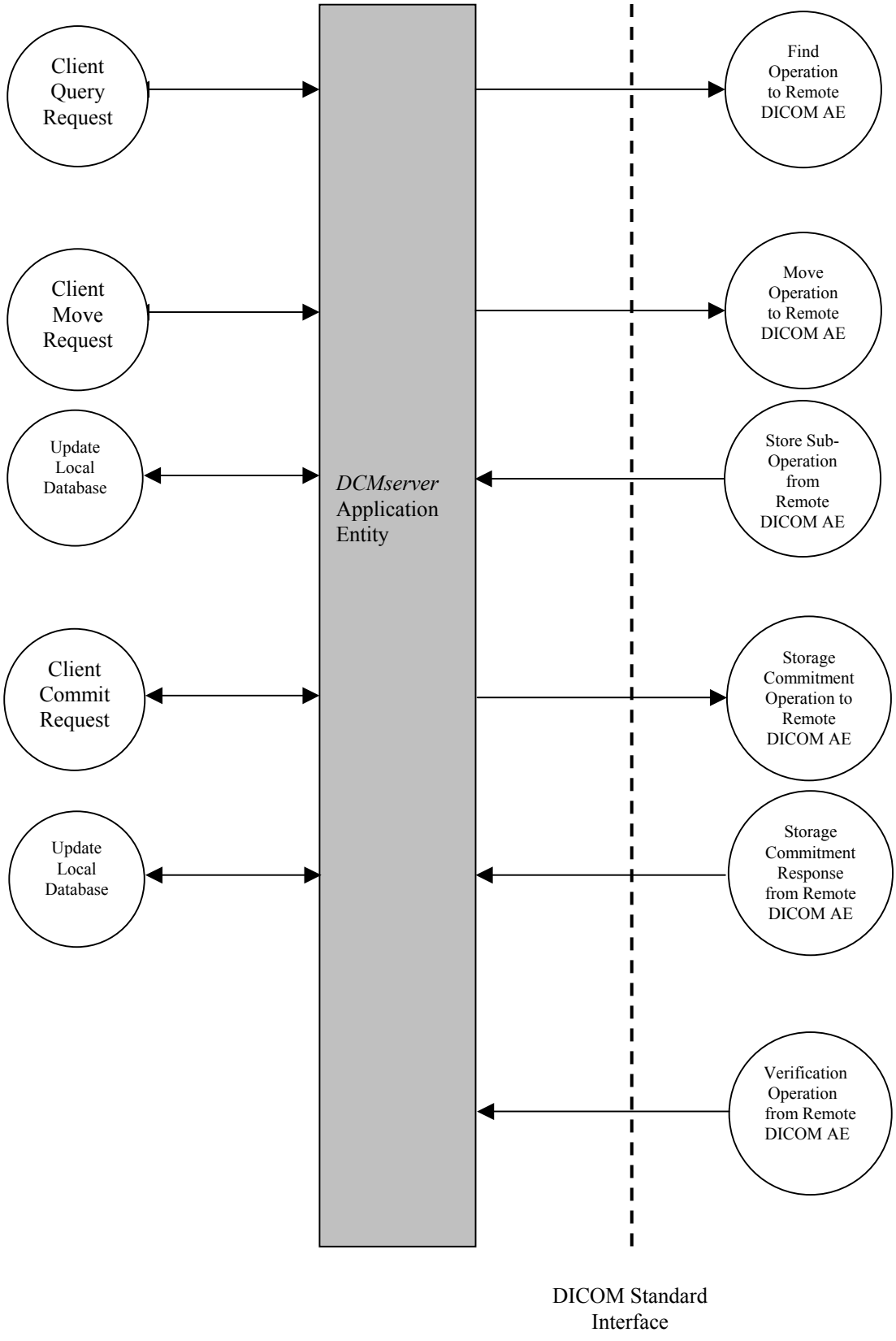

Figure 1 Image Transfer Implementation Model (Continued)

Figure 1 illustrates the following scenarios:

1. Process Find requests from a remote DICOM AE; search the local database for matches and return the requested information.
2. Process Store requests from a remote DICOM AE; update the local database with the object to be stored and return Store responses.
3. Process Move requests from a remote DICOM AE; initiate Store operations to the destination AE and return Move responses to the move requestor AE.
4. Initiate Find operations to a DICOM AE in response to a query request from Hitachi MRI system's GUI application.
5. Initiate Move operations to a DICOM AE in response to a move request from Hitachi MRI system's GUI application. This may result in Store sub-operation from a remote DICOM AE.
6. Initiate Storage Commitment requests to a DICOM AE in response to a commit request from Hitachi MRI system's GUI application.
7. Process Storage Commitment replies from a remote DICOM AE; update the local database accordingly.
8. Process Verification requests from a remote DICOM AE.

2.1.2 Functional Definitions of Application Entities

The startup sequence of the Hitachi MRI system initiates its execution. The *DCMserver* terminates when the Hitachi MRI system is shut down.

The *DCMserver* uses a configuration file that contains information used to validate association attempts from remote Application Entities. The *DCMserver* then listens on the configured port for association requests.

An association request for Storage Services from a remote Application Entity causes the *DCMserver* to validate the request according to the configuration parameters set at execution-time. The remote Application Entity then sends the Information Object Instance. The *DCMserver* stores the received Information Object Instance in its local database if the data does not already exist. The data remains in the database until removed by the local user of the Hitachi MRI system.

An association request from a remote Application Entity for Query or Move Services causes the *DCMserver* to validate the request according to the configuration parameters set at execution time. The remote Application Entity then sends the Query or Retrieve request. The *DCMserver* searches the local database for the instance(s) specified. If the request was C_FIND, then a response is returned for each match. If the request was C-MOVE, then an association is originated to the destination Application Entity specified in the C-MOVE message. Incremental responses are sent to the C-MOVE originator to indicate progress of the request.

A request from the Hitachi MRI system's GUI application causes the *DCMserver* to initiate an association with a remote Application Entity. The user can then initiate query and retrieve requests to the *DCMserver* that are sent to the remote Application Entity. The Hitachi MR User Interface displays the responses from the remote Application Entity.

2.1.3 Sequencing of Real-World Activities

It is expected that requests for Storage Commitment will only be made by the application after successful transfer of the related SOP Instances to a remote AE. This is not enforced, however, since the user can request Storage Commitment manually for the images of any patient, study, or series available on the local system. It is therefore possible that a Storage Commitment request may be issued before successful transfer of the related SOP Instances.

2.2 Print Management

This *DCMserver* accepts commands from the MR user through a Graphical User Interface. The User Interface allows the user to prepare and submit print operations to the *DCMserver*.

2.2.1 Application Data Flow Diagram

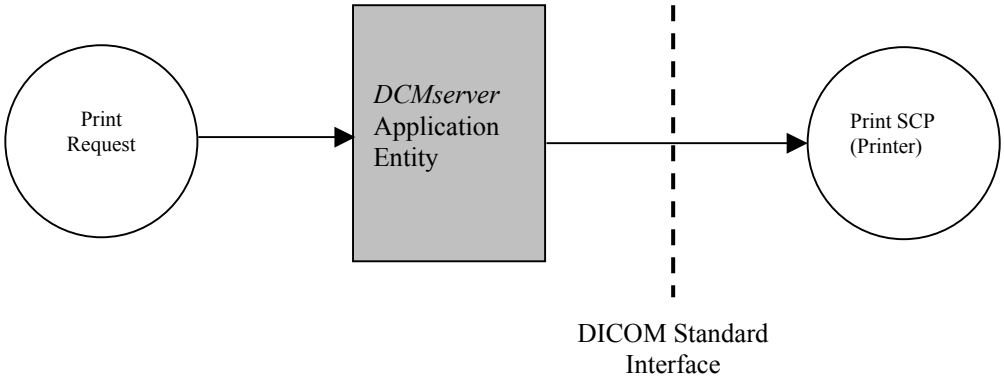

Figure 2 Print Management Implementation Model

The Hitachi MR user submits a print job to the *DCMserver*. The *DCMserver* proceeds to initiate an association to a specific Basic Grayscale/Color Print Management Meta Service Class Provider. The hardcopy information is then sent to the printer over this established association using the accepted DICOM protocol.

2.2.2 Functional Definitions of Application Entities

The startup sequence of the Hitachi MRI system initiates its execution. The *DCMserver* is shut down when the Hitachi MR system terminates.

The *DCMserver* uses a configuration file that contains information used to configure supported remote Print SCPs.

A request from the Hitachi MRI system's GUI application causes the *DCMserver* component to initiate an association with a Remote Application Entity. The Hitachi MR User Interface displays relevant status and error responses from the Remote Application Entity.

2.2.3 Sequencing of Real-World Activities

Not applicable.

2.3 Basic Worklist Management

The *DCMserver* implements the Basic Worklist Management Service, DICOM PS3.4, Annex K.

2.3.1 Application Data Flow Diagram

The following figure depicts the application data flow.

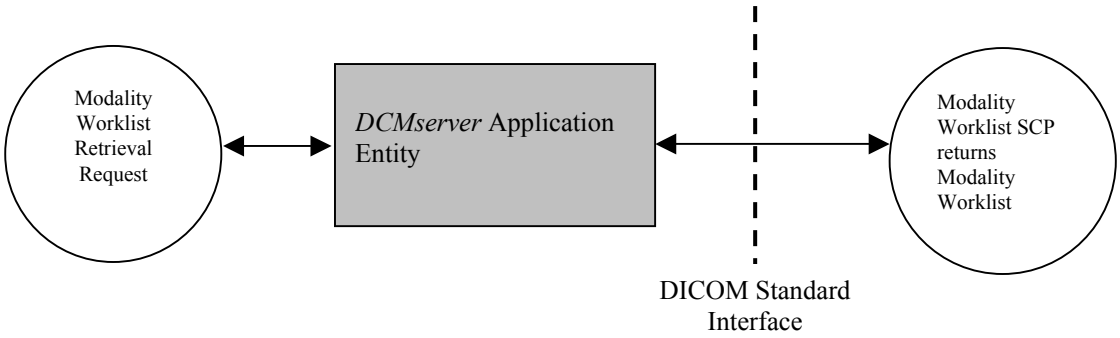

Figure 3 Modality Worklist Data Flow Diagram

The Hitachi MR user initiates Modality Worklist retrieval requests by interacting with *DCMserver* through the Graphical User Interface. The *DCMserver* initiates an association with the remote Application Entity and uses the Basic Modality Worklist Service Class to retrieve Worklists. The remote Application Entity responds to the request and send Worklists to the *DCMserver*. The *DCMserver* presents the retrieved Worklists to the Hitachi MR user through the Graphical User Interface.
The Hitachi MRI application automatically initiates the Modality Worklist retrieval request when the Hitachi MR user starts scheduled procedures. The retrieved Worklists are used to validate the scheduled procedures.

2.3.2 Functional Definitions of Application Entities

DCMserver acts as a Modality Worklist SCU in order to retrieve a Modality Worklist from a Modality Worklist SCP. In particular, *DCMserver*

1. Specify the AE Title of the Modality Worklist SCU (*DCMserver*)
2. Specify the AE Title, Host Name, Port Number of the Modality Worklist SCP
3. Specify the Required/Optional Matching Key Attributes
4. Request Modality Worklist Retrieval
5. Cancel Modality Worklist Retrieval[1]
6. Access Individual Items of Modality Worklist
7. Access Individual Attributes of Modality Worklist Item

When the Hitachi MR user issues a request to retrieve a Modality Worklist, the *DCMserver* initiates an Association to the Modality Worklist SCP.

When the Association has been established, *DCMserver* sends a C-FIND request to the Modality Worklist SCP to retrieve a Modality Worklist.

When the Modality Worklist has been received, the Hitachi MR user is notified about the availability of the Modality Worklist.

The Hitachi MR user can access all Items of the Modality Worklist. The Hitachi MR user can also access all attributes of all Items.

After the last C-FIND response is received, the *DCMserver* releases the association to the Modality Worklist SCP

[1] Cancel is not available to the user, however, the application may cancel a query in some exceptional situations.

2.3.3 Sequencing of Real-World Activities

Not applicable.

2.4 Modality Performed Procedure Step

The *DCMserver* implements the MPPS(Modality Performed Procedure Step) SOP Class, DICOM PS3.4, Annex F.7.

2.4.1 Application Data Flow Diagram

The following figure depicts the application data flow.

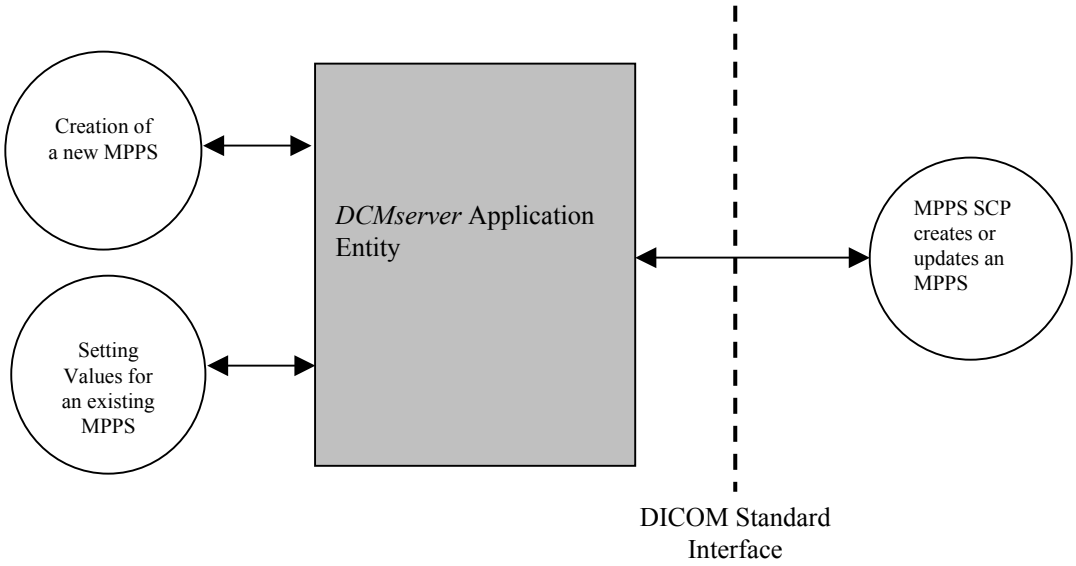

Figure 4 MPPS Implementation Model

DCMserver initiates N-CREATE or N-SET requests to a remote DICOM AE (Modality Performed Procedure Step SCP) in response to a user request to create or update a performed procedure step or to an automatic creation of a performed procedure step caused by initiation of image creation. The application will create the MPPS with "IN PROGRESS" status, and may update with the MPPS with "COMPLETED" or "DISCONTINUED" status.

2.4.2 Functional Definitions of Application Entities

DCMserver acts as an MPPS SCU in order to notify the MPPS SCP about the start and the end of the procedure step. More specially, *DCMserver*;

1. Provides the AE Title of the MPPS SCU (*DCMserver*)
2. Provides the AE Title, Host Name and Port Number of the MPPS SCP
3. Issues a connect request in order to see what operations the remote SCP supports
4. Requests the MPPS SCP to create a new MPPS or update/set some values for an existing one. The *DCMserver*;
   - Sends an N-CREATE or N-SET request to the MPPS SCP. The request contains the set of attributes that should be used for creating a new step or updating an existing step (**See Annex C**).
   - Receives N-CREATE/N-SET responses.
5. Disconnects from remote MPPS SCP

When *DCMserver* issues a request to create a new MPPS on the SCP, it initiates an association to the MPPS SCP. If successful, an N-CREATE operation is performed against the MPPS SCP. After completion of the operation, the assocaition is closed.

When *DCMserver* issues a request to set some values for an existing MPPS on the SCP, it initiates an association to the MPPS SCP. If successful, and N-SET operation is performed against the MPPS SCP. After completion of the operation, the association is closed.

2.4.3 Sequencing of Real-World Activities

DCMserver will first create a MPPS on SCP and then attempt to set/update some values in it.

2.5 Media Storage

DCMserver is implemented that creates and/or updates 120mm DVD-R and 120mm CD-R with various DICOM SOP instances. For the rest of the document we refer to media as one of the following 4.7 GB DVD-R and 650MB CD-R.

2.5.1 Application Data Flow Diagram

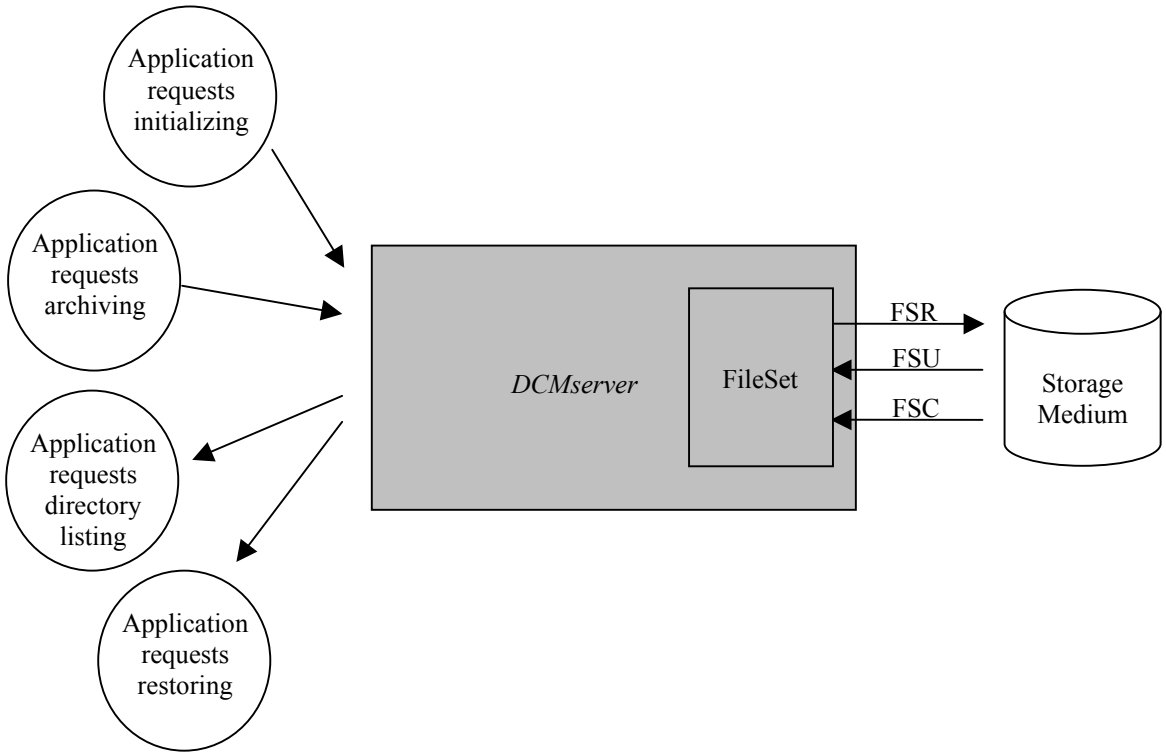

Figure 5: Media Storage Management Implementation Model

DCMserver may connect to one media. The *DCMserver* may have a local/remote storage media that may contain various SOP instances. These may have been obtained by original creation, network transfer or by removable media using other application entities. These instances of other application entities are external to this conformance statement.

The Hitachi MRI system's GUI application submits media requests to *DCMserver* via internal client/server mechanism. The *DCMserver* then processes those requests and accesses, via FileSet, the media according to Media Storage Service Class defined in PS 3.4 with the interchange option.
The *DCMserver* accesses, via *Ioagent*, the media acting as one of following roles FSC(File-set Creator), FSU(File-set Updater) and FSR(File-set Reader), defined in PS 3.10.

2.5.2 Functional Definitions of Application Entities

The startup sequence of the Hitachi MRI system initiates the *DCMserver* execution. The *DCMserver* terminates when the Hitachi MRI system is shut down.

A request from the Hitachi MRI application causes the *DCMserver* to interpret the request and act, in a sequence of operations(driven by request type), as a FSU, FSC and/or FSR to complete the request received from the Hitachi MRI system's GUI application.

The set of operations that *DCMserver* can perform are as following:

- initialize a new media, by writing a new DICOM file-set onto the media;
- display a directory listing of a DICOM file-set on the media. The listing is provided to the user in response to a query.
- retrieve the SOP instances from the media to local storage.
- store the DICOM file-set media with new SOP instances.

2.5.3 Sequencing of Real-World Activities

- A retrieve operation can only be performed on DVD-RAM, DVD-R and CD-R media that had performed a store operation.

2.5.4 File Meta Information Options

Implementation Class UID and Implementation Version Name are specified in the *DCMserver*'s configuration file.

3. Image Transfer Application Entity Specifications

The Hitachi MRI system's DICOM Image Transfer capability consists of two logical components (SCU and SCP).
The SCU portion originates associations for Store, Query, Retrieve and Storage Commitment operations. The SCP portion accepts associations for Store, Query and Retrieve operations. The SCU portion will also accept associations to negotiate a role selection of SCU for Storage Commitment responses that are sent on a different association than the request. The two components are configured with the same Application Entity Title for use in the Hitachi MR Application. They are treated as a single Application Entity in this description.

The *DCMserver* Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Patient Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7

The *DCMserver* Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Storage Commitment Push Model	1.2.840.10008.5.1.20.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59

3.1 Association Establishment Policies

3.1.1 General

The Hitachi MRI system's GUI allows the user to select the Application Entity to associate with for Store, Query, Retrieve and Storage Commitment operations. The configuration file contains the configuration parameters such as host name, port number and specific SOP Classes to negotiate for each accessible Application Entity.

The *DCMserver* will respond to association requests from remote AEs, however, it will only accept associations from those remote AEs on which it has knowledge. And it will only accept those Presentation Contexts that it is configured to support for the specific requesting AE. The AEs can be configured to allow or deny any service on a per remote AE basis.

The *DCMserver* Application Entity always accepts the Verification SOP Class.

3.1.2 Number of Associations

The *DCMserver* can initiate multiple associations concurrently.

3.1.3 Asynchronous Nature

The *DCMserver* does not support multiple outstanding transactions.

3.1.4 Implementation Identifying Information

The *DCMserver* have Implementation Class UID and the version name.

3.2 Association Initiation by Real World Activity

This section details the action of the *DCMserver* SCU component as a result of user initiated activity on the Hitachi MR console.

3.2.1 Query Request

3.2.1.1 Associated Real World Activity

The user of the Hitachi MRI system selects the "Query" operation on the user interface. Wild card or specific information can be specified by the user for Patient Name and/or Patient ID.

Query will also be issued before a move request to verify the existence of images with a Study or Series.

3.2.1.2 Proposed Presentation Contexts

The following table describes the Presentation Contexts that may be presented for the Query request. The configuration file contains 1 of the listed Abstract Syntax's.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Storage Commitment Push Model	1.2.840.10008.5.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.1.3 SOP Specific Conformance for Patient Root Query/Retrieve Model - FIND

The *DCMserver* does not use Extended Negotiation.
The *DCMserver* does not negotiate Relational Queries.
The Keys supported are listed below:

Patient Level Keys

Description	Tag	Type
Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	U
Patient's Birth Date	(0010,0030)	O
Patient's Birth Time	(0010,0032)	O
Patient's Sex	(0010,0040)	O
Other Patient Ids	(0010,1000)	O
Other Patient Names	(0010,1001)	O
Ethnic Group	(0010,2160)	O
Patient Comments	(0010,4000)	O

Study Level Keys

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O

Series Level Keys

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U

Image Level Keys

Description	Tag	Type
Instance Number	(0020,0013)	R
SOP Instance UID	(0008,0018)	U
SOP Class UID	(0008,0016)	O

3.2.1.4 SOP Specific Conformance for Study Root Query/Retrieve Model - FIND

The *DCMserver* does not use Extended Negotiation.
The *DCMserver* does not negotiate Relational Queries.
The Keys supported are listed below:

Study Level Keys

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	U
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O

Series Level Keys

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U

Image Level Keys

Description	Tag	Type
SOP Instance UID	(0008,0018)	U

3.2.2 Move Request

3.2.2.1 Associated Real World Activity

The user selects one or more patients, studies and/or series within studies from a list presented as a result of a previous Query operation.
The user of the Hitachi MRI system then selects the “Send” operation on the user interface to initiate the move operation. The destination Application Entity Title is selectable on the User Interface.

3.2.2.2 Proposed Presentation Contexts

The following table describes the Presentation Contexts that may be presented for the Move request.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Storage Commitment Push Model	1.2.840.10008.5.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.2.3 SOP Specific Conformance for Patient Root Query/Retrieve Model - MOVE

The *DCMserver* supports transfers against the Patient Query/Retrieve Information Model described in Section C.6.1.1 of DICOM PS3.4 Annex C using the C-MOVE SCU behavior described in Section C.4.2.2 of DICOM PS3.4 Annex C.

3.2.2.4 SOP Specific Conformance for Study Root Query/Retrieve Model - MOVE

The *DCMserver* supports transfers against the Study Query/Retrieve Information Model described in Section C.6.2.1 of DICOM PS3.4 Annex C using the C-MOVE SCU behavior described in Section C.4.2.2 of DICOM PS3.4 Annex C.

3.2.3 Store Request

3.2.3.1 Associated Real World Activity

The *DCMserver* Application Entity initiates an association for C-STORE if it has received a valid C-MOVE message from a local use of Hitachi MRI system or a remote Application Entity. The SOP Class UID of the Information Object to be sent over the C-STORE context is used to verify that a valid Presentation Context exists prior to issuing the C-STORE message. A mismatch results in no message being sent but the association remains active.

3.2.3.2 Proposed Presentation Contexts

The following table describes the Presentation Contexts that may be presented for the Store request.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.3.3 SOP Specific Conformance for C-STORE

The *DCMserver* Application Entity supports transfers as an SCU as described in DICOM PS3.4 Annex B.

The status returned by the accepting Application Entity is used to indicate success or failures of the C-MOVE sub-operation which initiated the transfer. In no case is the Information Object deleted from the local database.

Extended negotiation is not used by *DCMserver* for this SOP Class.

3.2.4 Storage Commitment Request

3.2.4.1 Associated Real World Activity

There are two events that may cause a Storage Commitment association request to occur. If the application is so configured, the Storage Commitment request may be made automatically after successful completion of a move operation from the local AE to a remote AE. Alternatively, the user may select a set of patients, studies, or series from a previous query request and manually request Storage Commitment for these items from a selectable AE.

3.2.4.2 Proposed Presentation Contexts

The following table describes the Presentation Contexts that may be presented for the Storage Commitment request.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query / Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve 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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Storage Commitment Push Model	1.2.840.10008.5.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.4.3 SOP Specific Conformance for Storage Commitment Push Model

The mechanisms available to get *DCMserver* to transfer SOP Instances are described in Section 3.2.1, 3.2.2 and 3.2.3.

3.2.4.3.1 Operations

Storage commitment requests are generated under the conditions described in Section 3.2.4.1.

DCMserver can request storage commitment for any SOP Instance in the local database.

The Transaction UID is applicable for the duration of the transaction, and there is no specific time limit imposed on receipt of the storage commitment result.

DCMserver does not perform extended negotiation for these SOP Classes and does not perform any validation of outgoing DICOM datasets. *DCMserver* does not support the optional Storage Media File-Set ID and UID attributes in the storage commitment request.

3.3 Association Acceptance by Real World Activity

DCMserver is association acceptance on the basis of Called Application Entity Title, Calling Application Entity Title and SOP Class UID matching.

3.3.1 Verification Association Request

3.3.1.1 Associated Real-World Activity

The *DCMserver* receives an association request for verification service from a remote AE.

3.3.1.2 Presentation Context Table

The following table lists the possible Presentation Contexts. The Application Entity configuration file specifies which of these Presentation Contexts are actually used in a specific configuration.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.3.1.3 SOP Specific Conformance for Verification

The *DCMserver* Application Entity conforms to the DICOM Verification Service Class as an SCP. Extended negotiation is not supported.

A single response is generated for the request. If the association is successfully negotiated, a success status code of 0x0000 is always returned.

3.3.1.4 Presentation Context Acceptance Criterion

The *DCMserver* always accepts the Verification SOP Class. The possible Presentation Contexts are listed in section 3.3.1.2.

3.3.1.5 Transfer Syntax Selection Policies

The *DCMserver* supports only the default DICOM Little-endian Transfer Syntax.

3.3.2 Query Association Request

3.3.2.1 Associated Real-World Activity

The *DCMserver* searches the attached database for the requested Information Objects described in the C-FIND identifier and returns a response for each match.

3.3.2.2 Presentation Context Table

The following table lists the possible Presentation Contexts. The Application Entity configuration file specifies which of these Presentation Contexts are actually used in a specific configuration.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query / Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.3.2.3 SOP Specific Conformance for Patient Root Query/Retrieve Model - FIND

The *DCMserver* Application Entity conforms to the DICOM Patient Root Query/Retrieve Service Class as an SCP for the Abstract Syntax's listed in the table in section 3.3.2.2. The following tables define the accepted search keys.

Patient Level Keys for Patient Root Query/Retrieve Model

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

Study Level Keys for Patient Root Query/Retrieve Model

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O

Series Level Keys for Patient Root Query/Retrieve Model

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U
Acquisition Type	(0018,0023)	O
Sequence	(0018,0020)	O
Sequence Name	(0018,0024)	O
Contrast Agent	(0018,0010)	O

Image Level Keys for Patient Root Query/Retrieve Model

Description	Tag	Type
SOP Instance UID	(0008,0018)	U

A response is returned for each match found in the attached database.
Possible response status values are:

Refused	Out of resources	A700
Failed	Unable to Process	C000
Cancel	Terminated due to Cancel Request	FE00
Success	matching completed	0000
Pending	Matches are continuing	FF00

The attribute 0x00000902 contains a descriptive message to explain error returns.

3.3.2.4 SOP Specific Conformance for Study Root Query/Retrieve Model - FIND

The *DCMserver* Application Entity conforms to the DICOM Study Root Query/Retrieve Service Class as an SCP for the Abstract Syntax's listed in the table in section 3.3.2.2. The following tables define the accepted search keys.

Study Level Keys for Study Root Query/Retrieve Model

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O

Series Level Keys for Study Root Query/Retrieve Model

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U
Acquisition Type	(0018,0023)	O
Sequence	(0018,0020)	O
Sequence Name	(0018,0024)	O
Contrast Agent	(0018,0010)	O

Image Level Keys for Study Root Query/Retrieve Model

Description	Tag	Type
SOP Instance UID	(0008,0018)	U

A response is returned for each match found in the attached database.
Possible response status values are:

Refused	Out of resources	A700
Failed	Unable to Process	C000
Cancel	Terminated due to Cancel Request	FE00
Success	matching completed	0000
Pending	Matches are continuing	FF00

The attribute 0x00000902 contains a descriptive message to explain error returns.

3.3.2.5 Presentation Context Acceptance Criterion

The *DCMserver* accepts SOP Class contexts if they are configured in the Application Entity configuration file. The possible Presentation Contexts are listed in section 3.3.2.2.

3.3.2.6 Transfer Syntax Selection Policies

The *DCMserver* supports the default DICOM Little-endian Transfer Syntax.

3.3.3 Move Association Request

3.3.3.1 Associated Real-World Activity

The *DCMserver* initiates an association to the destination Application Entity specified in the C-MOVE command message. The *DCMserver* then extracts the requested Information Objects described in the C-MOVE identifier from the attached database and performs C-STORE operations on the destination association.

3.3.3.2 Presentation Context Table

The following table lists the possible Presentation Contexts. The Application Entity configuration file specifies which of these Presentation Contexts are actually used in a specific configuration.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query / Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query / Retrieve Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.3.3.3 SOP Specific Conformance for Patient Root Query/Retrieve Model - MOVE

The *DCMserver* Application Entity conforms to the DICOM Patient Root Query/Retrieve Service Class as an SCP for the Abstract Syntax's listed in the table in section 3.3.3.2.

A response is returned for each Information Object sent to the destination Application Entity
Possible response status values are:

Refused	Out of resources	A700
	Move Destination Unknown	A801
Failed	Unable to Process	C000
Cancel	Terminated due to Cancel Request	FE00
Success	sub-operations completed	0000
Warning	sub-operations completed, 1 or more failures	B000
Pending	Matches are continuing	FF00

The attribute 0x00000902 contains a descriptive message to explain error returns.

3.3.3.4 SOP Specific Conformance for Study Root Query/Retrieve Model - MOVE

The *DCMserver* Application Entity conforms to the DICOM Study Root Query/Retrieve Service Class as an SCP for the Abstract Syntax's listed in the table in section 3.3.3.2.

A response is returned for each Information Object sent to the destination Application Entity.
Possible response status values are:

Refused	Out of resources	A700
	Move Destination Unknown	A801
Failed	Unable to Process	C000
Cancel	Terminated due to Cancel Request	FE00
Success	sub-operations completed	0000
Warning	sub-operations completed, 1 or more failures	B000
Pending	Matches are continuing	FF00

The attribute 0x00000902 contains a descriptive message to explain error returns.

3.3.3.5 Presentation Context Acceptance Criterion

The *DCMserver* accepts SOP Class contexts if they are configured in the Application Entity configuration file. The possible Presentation Contexts are listed in section 3.3.3.2.

3.3.3.6 Transfer Syntax Selection Policies

The *DCMserver* supports the default DICOM Little-endian Transfer Syntax.

3.3.4 Storage Association Request

3.3.4.1 Associated Real-World Activity

The *DCMserver* receives an association request for storage service from a remote AE.
The *DCMserver* stores image Information Object Instances received on the accepted association into the database of the Hitachi MRI system.

3.3.4.2 Presentation Context Table

The following table lists the possible Presentation Contexts. The Application Entity configuration file specifies which of these Presentation Contexts are actually used in a specific configuration.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.3.4.3 SOP Specific Conformance for SOP Class Storage

The *DCMserver* Application Entity conforms to the DICOM Storage Service Class as an SCP for the Abstract Syntax's listed in the table in section 3.3.4.2 at conformance level 2. Storage Conformance level 2 requires the Application Entity to retain all Type 1, Type 2 and Type 3 attributes. Annex A of this document specifies the attributes retained from the Storage SOP Class Information Objects listed in section 3.3.4.2.

The received Information Object Instance is stored in a database until the user of Hitachi MRI system causes the data to be deleted. The Hitachi MRI system's GUI application accesses the stored data for display.

Private attributes which are not recognized as valid Hitachi MRI system's private attribute sets are discarded.

A response is returned for each Information Object received from the Storage SCU.
Possible response status values are:

Refused	Out of resources	A701
Failed	Identifier does not match SOP Class	A900
	Unable to Process	C001
Success	sub-operations completed	0000

The attribute 0x00000902 contains a descriptive message to explain error returns.

Failure of a validation results in the return of status C001 in the C-STORE response message.

3.3.4.4 Presentation Context Acceptance Criterion

The *DCMserver* accepts Storage SOP Class Presentation Contexts if they are configured in the Application Entity configuration file. The possible Presentation Contexts are listed in section 3.3.4.2.

3.3.4.5 Transfer Syntax Selection Policies

The *DCMserver* supports the default DICOM Little-endian Transfer Syntax.

3.3.5 Storage Commitment Association Request

3.3.5.1 Associated Real-World Activity

The *DCMserver* receives an association request from a Storage Commitment SCP that did not respond to a Storage Commitment request from the *DCMserver* on the original association.

3.3.5.2 Presentation Context Table

The following table lists the possible Presentation Contexts. The Application Entity configuration file specifies which of these Presentation Contexts are actually used in a specific configuration.

Presentation Contexts Accepted for Storage Commitment Association Request

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model	1.2.840.10008 .5.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	SCU/SCP Role Selection
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.3.5.3 SOP Specific Conformance for SOP Class - Storage Commitment Push as SCU

3.3.5.3.1 Operations

A single response is returned for the Storage Commitment response from the Storage Commitment SCP. Possible response status values are:

Success	Operation completed	0x0000
Fail	Unable to Process	0x0110
	Identifier does not match SOP Class	0x0118

3.3.5.3.2 Notifications

DCMserver generates a storage commitment result once it has updated, successfully or not, the database records for the SOP Instance(s) that were committed.

DCMserver does not support the optional Storage Media File-Set ID and UID attributes nor the optional Retrieve AETitle attribute in the storage commitment result.

3.3.5.4 Presentation Context Acceptance Criterion

The *DCMserver* accepts Storage Commitment SOP Class Presentation Contexts if they are configured in the Application Entity configuration file. The possible Presentation Contexts are listed in section 3.3.5.2.

3.3.5.5 Transfer Syntax Selection Policies

The *DCMserver* supports the default DICOM Little-endian Transfer Syntax.

4. Print Application Entity Specifications

The Hitachi MRI system's DICOM Print capability (*DCMserver*) consists of only a SCU component. The SCU portion originates associations for printing operations.

The *DCMserver* Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Print Management Meta SOP Class UID

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18

4.1 Association Establishment Policies

4.1.1 General

The Hitachi MRI User Interface supports more than one DICOM capable imager. The *DCMserver* configuration file contains the configuration parameters such as host name, port number and AE title for that Application Entity.

The *DCMserver* maintains a separate association with each DICOM SCP. It releases the association with the DICOM SCP if no operation is done on the association in a selected time period.

4.1.2 Number of Associations

The *DCMserver* is capable of initiating multiple associations concurrently. There is no real limit on the number of associations that can be originated. There will be one association opened for each configured SCP.

4.1.3 Asynchronous Nature

The *DCMserver* does not support multiple outstanding transactions.

4.2 Association Initiation by Real World Activity

This section details the action of the *DCMserver* as a result of user initiated activity on the Hitachi MRI User Interface.

4.2.1 Print Request

4.2.1.1 Associated Real World Activity

The user of the Hitachi MRI Application selects the Print operation on the user interface.

4.2.1.2 Proposed Presentation Contexts

The following table describes the Presentation Contexts that may be presented for the Print request. The configuration file contains 1 of the listed Abstract Syntax's.

Presentation Context Table for Print Request

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3 SOP Specific Conformance for Basic Grayscale/Color Print Management Meta

The *DCMserver* supports the following mandatory SOP classes which are defined under the Basic Grayscale Print/Color Management Meta SOP Class:

Print Management SOP Class UID

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

The *DCMserver* supports the following mandatory and optional SOP class attributes and DIMSE services for the Basic Grayscale Print Management Meta SOP Class and Basic Color Print Management Meta SOP Class.

Print Management DIMSE Services

SOP Class	DIMSE Service	Optional Attribute	Tag
Basic Film Session SOP Class	N-CREATE	Number of Copies	(2000,0010)
		Print Priority	(2000,0020)
		Medium Type	(2000,0030)
		Film Destination	(2000,0040)
		Film Session Label	(2000,0050)
		Memory Allocation	(2000,0060)
Basic Film Box SOP Class	N-CREATE	Image Display Format	(2010,0010)
		Referenced Film Session Sequence	(2010,0500)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Presentation LUT Sequence	(2050,0500)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Film Orientation	(2010,0040)
		Film Size ID	(2010,0050)
		Magnification Type	(2010,0060)
		Max Density	(2010,0130)
		Configuration Information	(2010,0150)
		Smoothing Type	(2010,0080)
		Border Density	(2010,0100)
		Empty Image Density	(2010,0110)
		Min Density	(2010,0120)
		Trim	(2010,0140)
		Illumination	(2010,015E)
		Reflected Ambient Light	(2010,0160)
	N-ACTION		
	N-DELETE		
Basic Grayscale Image Box SOP Class	N-SET	Image Position	(2020,0010)
		Polarity	(2020,0020)
		Magnification type	(2010,0060)
		Smoothing type	(2010,0080)
		Requested Image Size	(2020,0030)
		Basic Grayscale Image Sequence	(2020,0110)
		>Samples Per Pixel	(0028,0002)
		>Photometric Interpretation	(0028,0004)

		>Rows	(0028,0010)
		>Columns	(0028,0011)
		>Pixel Aspect Ratio	(0028,0034)
		>Bits Allocated	(0028,0100)
		>Bits Stored	(0028,0101)
		>High Bit	(0028,0102)
		>Pixel Representation	(0028,0103)
		>Pixel Data	(7FE0,0010)
Printer SOP Class	N-EVENT-REPORT	Printer Status Info	(2110,0020)
	N-GET	Printer Status	(2110,0010)
		Printer Status Info	(2110,0020)
		Printer Name	(2110,0030)
		Manufacturer	(0008,0070)
		Manufacturer Model Name	(0008,1090)
		Device Serial Number	(0018,1000)
		Software Versions	(0018,1020)
Basic Color Image Box SCP Class	N-SET	Image Position	(2020,0010)
		Polarity	(2020,0020)
		Magnification type	(2010,0060)
		Smoothing type	(2010,0080)
		Requested Image Size	(2020,0030)
		Basic Color Image Sequence	(2020,0111)
		>Samples Per Pixel	(0028,0002)
		>Photometric Interpretation	(0028,0004)
		>Rows	(0028,0010)
		>Columns	(0028,0011)
		>Pixel Aspect Ratio	(0028,0034)
		>Bits Allocated	(0028,0100)
		>Bits Stored	(0028,0101)
		>High Bit	(0028,0102)
		>Pixel Representation	(0028,0103)
		>Pixel Data	(7FE0,0010)

4.3 Association Acceptance by Real World Activity

The *DCMserver* does not accept association requests.

5. Modality Worklist Application Entity Specifications

The *DCMserver* of the Hitachi MRI system is capable of providing Standard Conformance to the following DICOM V3.0 SOP Classes as SCU:

Modality Worklist SOP Class UID

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

5.1 Association Establishment Policies

5.1.1 General

When *DCMserver* issues a request to retrieve a Modality Worklist, it initiates an Association to the Modality Worklist SCP. *DCMserver* assumes the maximum PDU length to be 16384 bytes.

5.1.2 Number of Associations

DCMserver can initiate multiple associations concurrently. The maximum number of Associations which can be initiated is service user configurable. When *DCMserver* has retrieved a Modality Worklist from a Modality Worklist SCP, *DCMserver* releases the Association to the Modality Worklist SCP.

5.1.3 Asynchronous Nature

DCMserver will allow only one pending C-FIND request per Association. Therefore, *DCMserver* will not support asynchronous operations and will not perform asynchronous window negotiation.

5.2 Association Initiation by Real World Activity

This section details the action of the *DCMserver* as a result of user initiated activity on the Hitachi MRI User Interface.

5.2.1 Modality Worklist Retrieval Request

5.2.1.1 Associated Real-World Activity

When the user of the Hitachi MRI issues a request to retrieve a Modality Worklist, *DCMserver* initiates an Association to the Modality Worklist SCP. The Hitachi MRI User Interface also issues a request automatically in order to retrieve a specific Worklist when the user starts scheduled procedures.

5.2.1.2 Proposed Presentation Context

The following table describes the Presentation Contexts that are presented for the FIND request.

Presentation Context Table for Establishing Modality Worklist Association

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

5.2.1.3 SOP Specific Conformance for Modality Worklist Information Model - FIND

The *DCMserver* supports the following search keys as SCU.

Search Keys for Modality Worklist Information Model - FIND

Attribute Name	Tag	Type	User Configurable
Scheduled Station AE Title	(0040, 0001)	R	Yes
Scheduled Procedure Step Start Date	(0040, 0002)	R	Yes
Modality	(0008, 0060)	R	Yes
Patient ID	(0010, 0020)	R	Yes
Accession Number	(0008, 0050)	O	Yes
Study Instance UID	(0020, 000D)	O	No

5.3 Association Acceptance by Real World Activity

The *DCMserver* does not accept association requests.

6. MPPS Entity Specifications

The *DCMserver* of the Hitachi MRI system is capable of providing Standard Conformance to the following DICOM V3.0 SOP Classes as SCU:

Modality Worklist SOP Class UID

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

6.1 Association Establishment Policies

6.1.1 General

DCMserver initiates an Association to the MPPS SCP in response to a user of Hitachi MRI system request to create or update an MPPS or to an automatic creation of an caused by initiation of image creation. When *DCMserver* has created or set an MPPS to the MPPS SCP, *DCMserver* releases the Association to the MPPS SCP.

6.1.2 Number of Associations

DCMserver can initiate multiple associations concurrently. The maximum number of Associations which can be initiated is service user configurable.

6.1.3 Asynchronous Nature

The *DCMserver* will allow only one pending request on an Association (being it N-CREATE or N-SET). Therefore, *DCMserver* will not support DICOM asynchronous operations and will not perform asynchronous window negotiation.

6.2 Association Initiation by Real World Activity

This section details the action of the *DCMserver* as a result of user initiated activity on the Hitachi MRI User Interface.

6.2.1 MPPS Association Request

6.2.1.1 Associated Real-World Activity

When the user of the Hitachi MRI system issues a request to create or update an MPPS, *DCMserver* initiates an Association to the MPPS SCP.

The Hitachi MRI system issues a request automatically in order to create an MPPS when the user starts scheduled procedures. The Hitachi MRI system also issues a request automatically in order to update an MPPS when the user finishes the scheduled procedures.

6.2.1.2 Proposed Presentation Context

The following table lists the Presentation Contexts offered to the MPPS SCP at the time the Association is established. The *DCMserver* does not negotiate SCU/SCP Role Selection and assumes SCU.

Presentation Context Table for Establishing MPPS Association

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Performed Procedure Step Model	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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

6.3 Association Acceptance by Real World Activity

The *DCMserver* does not accept association requests.

7. Media Storage Application Entity Specification

The *DCMserver* Application Entity provides Standard Conformance to DICOM Interchange option of the Media Storage Service Class. The Application Profiles and Roles are listed in the following table:

Application Profiles Supported

Application Profiles Supported	Real World Activity	Role	Service Class Option
STD-CTMR-DVD	Create Store Query Retrieve	FSC FSU FSR FSR	Interchange Interchange Interchange Interchange
STD-CTMR-CD	Write to CD-R Query Retrieve	FSC FSR FSR	Interchange Interchange Interchange

[DVD]
The *DCMserver* will support DVD-R4.7GB media type as long as the media is formatted according to DICOM specification in PS 3.12.

[CD-R]
The *DCMserver* writes DICOM file-set(single DICOMDIR and zero or more DICOM files) to CD-R media. The *DCMserver* supports CD-R 650MB.

SOP Classes Supported

Application Profiles	SOP Class Name	SOP Class UID
STD-CTMR-DVD	MR Image Storage	1.2.840.10008.5.1.4.1.1.4
	Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
	SC Image Storage	1.2.840.10008.5.1.4.1.1.7
STD-CTMR-CD	MR Image Storage	1.2.840.10008.5.1.4.1.1.4
	Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
	SC Image Storage	1.2.840.10008.5.1.4.1.1.7

Transfer Syntaxes Supported for reading of SOP instances

Transfer Syntax Name	Transfer Syntax UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2

Transfer Syntaxes Supported for storage of SOP instances

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1

7.1 File Meta Information for the Application Entity

The *DCMserver* Application Entity Title is configurable.

7.2 Real World Activities for this Application Entity

7.2.1 Real World Activity : Create

The *DCMserver* acts as an FSC using the interchange option when requested to create.
When the *DCMserver* is requested to Create, it will create the DICOM file-set (DICOMDIR).

7.2.1.1 Application Profiles for the RWA : Create

For the list of application profiles that invoke this AE for the Initialize Media, see the table named "**Application Profiles Supported**" in section 7.

7.2.2 Real World Activity : Query

The *DCMserver* acts as an FSR using the interchange option when requested to Query.
When the *DCMserver* is requested to Query, it will read the DICOM file-set (DICOMDIR) and display the record entries according to the user query. The *DCMserver* will only return records that match the Hitachi MR application query.

7.2.2.1 Application Profiles for the RWA : Query

For the list of application profiles that invoke this AE for the Query, see the table named "**Application Profiles Supported**" in section 7.

7.2.3 Real World Activity : Retrieve

The *DCMserver* acts as an FSR using the interchange option when retrieve from the media to local storage.
The *DCMserver* will copy any SOP instance selected from a media directory list from the media to local storage upon request. The *DCMserver* will only copy any SOP instance that matches the user query to local storage.

7.2.3.1 Application Profiles for the RWA : Retrieve

For the list of application profiles that invoke this AE for the Retrieve, see the table named "**Application Profiles Supported**" in section 7.

7.2.4 Real World Activity : Store

The *DCMserver* acts as an FSU using the interchange option when requested to store a media.
The *DCMserver* will take the select list of SOP instances and eliminate any SOP instance not belonging to the SOP Class listed in the table named "**SOP Classes Supported**" in section 7.

7.2.4.1 Application Profiles for the RWA : Store

For the list of application profiles that invoke this AE for the Store, see the table named "**Application Profiles Supported**" in section 7.

7.2.5 Real World Activity : Write to CD-R

The *DCMserver* acts as an FSC using the interchange option when requested to archive a Patient data to CD-R media.
The *DCMserver* will take the select list of SOP instances and eliminate any SOP instance not belonging to the SOP Class listed in the table named "**SOP Classes Supported**" in section 7. The remaining SOP instances are written to the media.

7.2.5.1 Application Profiles for the RWA : Write to CD-R

For the list of application profiles that invoke this AE for the Write to CD-R, see the table named "**Application Profiles Supported**" in section 7.

8. Communication Profiles

8.1 Supported Communication Stacks (Parts 8,9)

The TCP/IP Network Communication Support as defined in DICOM Part 8 is supported.

8.1.1 OSI Stack

The OSI stack is not supported.

8.1.2 TCP/IP Stack

8.1.2.1 API

The *DCMserver* use Berkeley style sockets.

8.1.2.2 Physical Media Support

The Hitachi MRI system supports a single 10 base-T/100 base-TX Ethernet connection.
The *DCMserver* are not dependent on the physical medium used for the TCP/IP network other than its effect on performance.

8.1.3 Point-to-Point Stack

Not supported.

9. Extensions/Specialization's/Privatization's

9.1 Standard/Extended/Specialized/Private SOPs

Following is a list of additional term for (0018,0015).

Applied values:

ADVASCULAR
ANKLE
BRACHIALPLEXUS
BRAIN
BREAST
CHEST
CHVASCULAR
CSPINE
ELBOW
FEMALEPELVIS
FINGER
FOOT
FOREARM
GENERALABDOME
GENERALPELVIS
HAND
HEART
HIP
HNVASCULAR
IAC
JAW
KIDNEY
KNEE
LIVER
LOWERLEG
LSPINE
LWVASCULAR
MALEPELVIS
NECK
ORBITS
PITUITARY
PVVASCULAR
SHOULDER
SINUS
SPVASCULAR
SSPINE
THYROID
TOE
TSPINE
UPPERARM
UPPERLEG
UPVASCULAR
WHOLEBODY
WRIST

9.2 Private Transfer Syntax's

Not applicable.

9.3 SOP Class Extension

9.3.1 *DCMserver* SOP Class Extension

The supported SOP classes have been extended to provide support for private attributes.

10. Security Profiles

10.1 Image Transfer and Storage Commitment Security Profile

DCMserver provides conformance to the following Security Profiles defined in PS3.15.

10.1.1 Basic TLS Secure Transport Connection Profile

DCMserver accepts and initiates TLS connections from/to an AE Title when is configured to do so.

As an Association Acceptor, *DCMserver* always asks for the Association Requestor's certificate when security is enabled, if this is set and a valid certificate is not presented, the TLS connection request is denied.
If during an exchange of DICOM data, *DCMserver* detects message tampering through an integrity check failure, the Association is aborted. The provider reason will be REASON-NOT-SPECIFIED as defined by DICOM in PS3.8; an implementation-specific reason may be used in a future version of *DCMserver*.

DCMserver supports the following features of the Basic TLS Secure Transport Profile:
- support for the profile can be enabled or disabled for each DICOM SCU instantiation
- TLS_RSA_WITH_3DES_EDE_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA and TLS_RSA_WITH_NULL_SHA cipher suites
- X.509 certificate in PEM format
- private key in PEM format
- certificates of trusted CAs in PEM format

10.2 Print security profile

DCMserver provides conformance to the following Security Profiles defined in PS3.15.

10.2.1 Basic TLS Secure Transport Connection Profile

DCMserver supports the following features of the Basic TLS Secure Transport Profile:
- support for the profile can be enabled or disabled for each DICOM SCU instantiation
- TLS_RSA_WITH_3DES_EDE_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA and TLS_RSA_WITH_NULL_SHA cipher suites
- X.509 certificate in PEM format
- private key in PEM format
- certificates of trusted CAs in PEM format

10.3 MWL security profile

DCMserver provides conformance to the following Security Profiles defined in PS3.15.

10.3.1 Basic TLS Secure Transport Connection Profile

The *DCMserver* supports the following features of the Basic TLS Secure Transport Profile:
- support for the profile can be enabled or disabled
- TLS_RSA_WITH_3DES_EDE_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA and TLS_RSA_WITH_NULL_SHA cipher suites
- X.509 certificate in PEM format
- private key in PEM format
- certificates of trusted CAs in PEM format

10.4 MPPS security profile

DCMserver provides conformance to the following Security Profiles defined in PS3.15.

10.4.1 Basic TLS Secure Transport Connection Profile

DCMserver supports the following features of the Basic TLS Secure Transport Profile:
- support for the profile can be enabled or disabled
- TLS_RSA_WITH_3DES_EDE_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA and TLS_RSA_WITH_NULL_SHA cipher suites
- X.509 certificate in PEM format
- private key in PEM format
- certificates of trusted CAs in PEM format

11. Configuration

11.1 AE Title/Presentation Address Mapping

The *DCMserver* Application Entity maps Application Entity Titles to host names and port numbers via lookups in the configuration file.

11.2 Configurable Parameters

DCMserver have the following configurable pamamenters.

- AE title, host name, IP address, alias, description and port number of the *DCMserver*
- AE title, host name, IP address, alias, description and port number of remote AEs
- TCP/IP connection timeout
- If private attributes are imported and exported
- Enable/disable Security Profile
- Cipher suites for the secure communications
- Minimam density and Maximum density for DICOM Print
- Supported media types and media sizes for DICOM Print
- Number of copies for DICOM Print
- Enable/disable Presentation LUT for DICOM Print

12. Support of Extended Character Sets

Following extended character sets are supported.

- ISO-IR 6: Default character set
- ISO-IR 13: Japanese katakana (phonetic) characters (94 characters, 1-byte)
- ISO-IR 87: Japanese kanji (ideographic), hiragana (phonetic), and katakana (phonetic) characters (94^2 characters, 2-byte)
- ISO-IR 100: Latin alphabet No. 1 characters (191 characters, 1-byte)

13. Annex A

This annex details the common Information Object Definitions content transmitted and /or stored by the *DCMserver* Application Entity. They contain Type 1, Type 2 and Type 3 attributes for conformance to Storage Conformance level 2 defined in DICOM Part 3, Information Object Definitions PS3.3.

When the received image from outside through a network or media is transferred again, Type 3 tag which are not included in original data are not sent to destination.

13.1 Common Modules

Patient Module Attributes

Attribute Name	Tag	Type
Patient's Name	0010,0010	2
Patient ID	0010,0020	2
Issuer of Patient ID	0010,0021	3
Patient's Birth Date	0010,0030	2
Patient's Birth Time †	0010,0032	3
Patient's Sex	0010,0040	2
Other Patient IDs †	0010,1000	3
Other Patient Names	0010,1001	3
Ethnic Group †	0010,2160	3
Patient Comments †	0010,4000	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

Patient Identification Module Attributes

Attribute Name	Tag	Type
Issuer of Patient ID †	0010,0021	3
Patient's Mother's Birth Name †	0010,1060	3
Medical Record Locator †	0010,1090	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

Patient Demographic Module Attributes

Attribute Name	Tag	Type
Patient's Address †	0010,1040	3
Military Rank †	0010,1080	3
Branch of Service †	0010,1081	3
Country of Residence †	0010,2150	3
Region of Residence †	0010,2152	3
Patient's Telephone Numbers †	0010,2154	3
Patient's Religious Preference †	0010,21F0	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

Patient Medical Module Attributes

Attribute Name	Tag	Type
Medical Alerts †	0010,2000	3
Contrast Allergies †	0010,2110	3
Smoking Status †	0010,21A0	3
Pregnancy Status †	0010,21C0	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

General Study Module Attributes

Attribute Name	Tag	Type
Study Instance UID	0020,000D	1
Study ID	0020,0010	2
Study Date	0008,0020	2
Study Time	0008,0030	2
Accession Number	0008,0050	2
Referring Physician's Name	0008,0090	2
Referring Physician Identification Sequence	0008,0096	3
Study Description †	0008,1030	3
Procedure Code Sequence	0008,1032	3
Physician of Record †	0008,1048	3
Physician(s) of Record Identification Sequence	0008,1049	3
Name of Physician Reading Study †	0008,1060	3
Physician(s) Reading Study Identification Sequence	0008,1062	3
Referenced Study Sequence	0008,1110	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

Patient Study Module Attributes

Attribute Name	Tag	Type
Patient's Age †	0010,1010	3
Patient’s Size †	0010,1020	3
Patient's Weight †	0010,1030	3
Occupation	0010,2180	3
Additional Patient’s History †	0010,21B0	3
Admitting Diagnoses Description	0008,1080	3
Admitting Diagnosis Code Sequence	0008,1084	3

† This tag can be suppressed to transfer by changing Patient Registration Setting on the Hitachi MR scanners.

General Series Module Attributes

Attribute Name	Tag	Type
Modality	0008,0060	1
Series Instance UID	0020,000E	1
Series Number	0020,0011	2
Patient Position	0018,5100	2C
Laterality	0020,0060	2C
Series Date	0008,0021	3
Series Time	0008,0031	3
Series Description	0008,103E	3
Performing Physicians’ Name	0008,1050	3
Operators' Name	0008,1070	3
Referenced Performed Procedure Step Sequence	0008,1111	3
Body Part Examined	0018,0015	3
Protocol Name	0018,1030	3
Patient Position FFS	0018,5100	2C
Smallest Pixel Value in Series	0028,0108	3
Largest Pixel Value in Series	0028,0109	3
Performed Procedure Step Start Date	0040,0244	3
Performed Procedure Step Start Time	0040,0245	3
Performed Procedure Step ID	0040,0253	3

Attribute Name	Tag	Type
Performed Procedure Step Description	0040,0254	3
Performed Protocol Code Sequence	0040,0260	3
Request Attributes Sequence	0040,0275	3
Comments on the Performed Procedure Step	0040,0280	3

Frame of Reference Module Attributes

Attribute Name	Tag	Type
Frame of Reference UID	0020,0052	1
Position Reference Indicator	0020,1040	2

General Equipment Module Attributes

Attribute Name	Tag	Type
Manufacturer	0008,0070	2
Institution Name	0008,0080	3
Institution Address †	0008,0081	3
Station Name	0008,1010	3
Institutional Department Name	0008,1040	3
Manufacturer's Model Name	0008,1090	3
Device Serial Number	0018,1000	3
Software Versions	0018,1020	3
Spatial Resolution	0018,1050	3
Date of Last Calibration	0018,1200	3
Time of Last Calibration	0018,1201	3
Pixel Padding Value	0028,0120	3

† This tag is not included into IODs which are sent from the Hitachi MR scanners.

General Image Module Attributes

Attribute Name	Tag	Type
Instance Number	0020,0013	2
Patient Orientation	0020,0020	2C
Content Date	0008,0023	2C
Content Time	0008,0033	2C
Image Type	0008,0008	3
Referenced Image Sequence	0008,1140	3
> Referenced SOP Class UID	0008,1150	1
> Referenced SOP Instance UID	0008,1155	1
Acquisition Number	0020,0012	3
Acquisition Date	0008,0022	3
Acquisition Time	0008,0032	3
Images in Acquisition	0020,1002	3
Image Comments	0020,4000	3
Lossy Image Compression	0028,2110	3
Presentation LUT Shape	2050,0020	3

Image Plane Module Attributes

Attribute Name	Tag	Type
Image Position (Patient)	0020,0032	1
Image Orientation (Patient)	0020,0037	1
Pixel Spacing	0028,0030	1
Slice Thickness	0018,0050	2
Slice Location	0020,1041	3

Image Pixel Module Attributes

Attribute Name	Tag	Type
Samples per Pixel	0028,0002	1
Photometric Interpretation	0028,0004	1
Rows	0028,0010	1
Columns	0028,0011	1
Bits Allocated	0028,0100	1
Bits Stored	0028,0101	1
High Bit	0028,0102	1
Pixel Representation	0028,0103	1
Pixel Data	7FE0,0010	1
Planar Configuration	0028,0006	1C
Pixel Aspect Ratio	0028,0034	1C
Smallest Image Pixel Value	0028,0106	3
Largest Image Pixel Value	0028,0107	3
Red Palette Color Lookup Table Descriptor	0028,1101	3
Green Palette Color Lookup Table Descriptor	0028,1102	3
Blue Palette Color Lookup Table Descriptor	0028,1103	3
Red Palette Color Lookup Table Data	0028,1201	3
Green Palette Color Lookup Table Data	0028,1202	3
Blue Palette Color Lookup Table Data	0028,1203	3

Contrast/Bolus Module Attributes

Attribute Name	Tag	Type
Contrast/Bolus Agent	0018,0010	2
Contrast/Bolus Agent Sequence	0018,0012	3
Contrast/Bolus Administration Route Sequence	0018,0014	3
Additional Drug Sequence	0018,002A	3
Contrast/Bolus Volume	0018,1041	3
Contrast/Bolus Start Time	0018,1042	3
Contrast/Bolus Stop Time	0018,1043	3
Contrast/Bolus Total Dose	0018,1044	3
Contrast Flow Rate	0018,1046	3
Contrast Flow Duration	0018,1047	3
Contrast/Bolus Ingredient	0018,1048	3
Contrast/Bolus Ingredient Concentration	0018,1049	3

VOI LUT Module Attributes

Attribute Name	Tag	Type
Window Center	0028,1050	3
Window Width	0028,1051	1C
Window Center & Width Explanation	0028,1055	3
VOI LUT Sequence	0028,3110	3

SOP Common Module Attributes

Attribute Name	Tag	Type
Specific Character Set	0008,0005	1
Instance Creation Date	0008,0012	1
Instance Creation Time	0008,0013	1
SOP Class UID	0008,0016	1
SOP Instance UID	0008,0018	1

13.2 MR Image Modules

MR Image Module Attributes

Attribute Name	Tag	Type
Image Type	0008,0008	1
Bits Allocated	0028,0100	1
Scanning Sequence	0018,0020	1
Sequence Variant	0018,0021	1
Samples per Pixel	0028,0002	1
Photometric Interpretation	0028,0004	1
Scan Options	0018,0022	2
MR Acquisition Type	0018,0023	2
Repetition Time	0018,0080	2C
Echo Time	0018,0081	2
Echo Train Length	0018,0091	2
Inversion Time	0018,0082	2C
Trigger Time	0018,1060	2C
Sequence Name	0018,0024	3
Angio Flag	0018,0025	3
Number of Averages	0018,0083	3
Imaging Frequency	0018,0084	3
Imaged Nucleus	0018,0085	3
Echo Number	0018,0086	3
Magnetic Field Strength	0018,0087	3
Spacing Between Slices	0018,0088	3
Number of Phase Encoding Steps	0018,0089	3
Percent Sampling	0018,0093	3
Percent Phase Field of View	0018,0094	3
Pixel Bandwidth	0018,0095	3
Normal Interval	0018,1062	3
Beet Rejection Flag	0018,1080	3
Low R-R Value	0018,1081	3
High R-R Value	0018,1082	3
Intervals Acquired	0018,1083	3
Intervals Rejected	0018,1084	3
PVC Rejection	0018,1085	3
Skip Beats	0018,1086	3
Heart Rate	0018,1088	3
Trigger Time	0018,1060	2C
Cardiac Number of Images	0018,1090	3
Trigger Window	0018,1094	3
Reconstruction Diameter	0018,1100	3
Receive Coil Name	0018,1250	3
Transmit Coil Name	0018,1251	3
Acquisition Matrix	0018,1310	3
In-plane Phase Encoding Direction	0018,1312	3
Flip Angle	0018,1314	3
SAR	0018,1316	3
Variable Flip Angle Flag	0018,1315	3
dB/dt	0018,1318	3
Temporal Position Identifier	0020,0100	3
Number of Temporal Positions	0020,0105	3
Temporal Resolution	0020,0110	3
Samples per Pixel	0028,0002	1
Photometric Interpretation	0028,0004	1
Bits Allocated	0028,0100	1

Attribute Name	Tag	Type
Anatomic Region Sequence	0008,2218	3
Primary Anatomic Structure Sequence	0008,2228	3

Additional Attributes Module

Attribute Name	Tag	Type
Content Qualification	0018,9004	3
Number of k-Space Trajectories	0018,9093	3
Saturation Recovery	0018,9024	3
Geometry of k-Space Traversal	0018,9032	3
Rectilinear Phase Encode Reordering	0018,9034	3
Number of Frames	0028,0008	3
Frame Increment Pointer	0028,0009	3
Burned In Annotation	0028,0301	3
Rescale Intercept	0028,1052	3
Rescale Slope	0028,1053	3
Rescale Type	0028,1054	3
Shared Functional Groups Sequence	5200,9229	3
> MR Spatial Saturation Sequence	0018,9107	3
>> Slab Thickness	0018,9104	3
>> Slab Orientation	0018,9105	3
>> Mid Slab Position	0018,9106	3
> MR Receive Coil Sequence	0018,9042	3
>> Multi-Coil Definition Sequence	0018,9045	3
>>> Multi-Coil Element Name	0018,9047	3
>>> Multi-Coil Element Used	0018,9048	3
> MR Modifier Sequence	0018,9115	3
>> Spoiling	0018,9016	3
>> T2 Preparation	0018,9021	3
>> Spectrally Selected Excitation	0018,9026	3
>> Parallel Reduction Factor In-plane	0018,9069	3
>> Parallel Acquisition	0018,9077	3
>> Inversion Times	0018,9079	3
>> Parallel Reduction Factor out-of-plane	0018,9155	3
> MR Diffusion Sequence	0018,9117	3
>> Diffusion Directionality	0018,9075	3
>> Diffusion Gradient Direction Sequence	0018,9076	3
>>> Diffusion Gradient Orientation	0018,9089	3
>>> Private Tag	0029,101F	3
>> Diffusion b-value	0018,9087	3
>> Diffusion Anisotropy Type	0018,9147	3
Per-Frame Functional Groups Sequence	5200,9230	3
> MR Spatial Saturation Sequence	0018,9107	3
>> Slab Thickness	0018,9104	3
>> Slab Orientation	0018,9105	3
>> Mid Slab Position	0018,9106	3
> MR Receive Coil Sequence	0018,9042	3
>> Multi-Coil Definition Sequence	0018,9045	3
>>> Multi-Coil Element Name	0018,9047	3
>>> Multi-Coil Element Used	0018,9048	3
> MR Modifier Sequence	0018,9115	3
>> Spoiling	0018,9016	3
>> T2 Preparation	0018,9021	3
>> Spectrally Selected Excitation	0018,9026	3

Attribute Name	Tag	Type
>> Parallel Reduction Factor In-plane	0018,9069	3
>> Parallel Acquisition	0018,9077	3
>> Inversion Times	0018,9079	3
>> Parallel Reduction Factor out-of-plane	0018,9155	3
> MR Diffusion Sequence	0018,9117	3
>> Diffusion Directionality	0018,9075	3
>> Diffusion Gradient Direction Sequence	0018,9076	3
>>> Diffusion Gradient Orientation	0018,9089	3
>> Diffusion b-value	0018,9087	3
>> Diffusion Anisotropy Type	0018,9147	3

Private Attributes

Attribute Name	Tag	VR	Value
Private Creator	(0009,00xx)	LO	From Application
Technologist	(0009,xx01)	LO	From Application
ScheduledStudyDateTime	(0009,xx02)	LO	From Application
StudyAppData	(0009,xx03)	OB	From Application
ProtocolName	(0009,xx48)	LO	From Application
Cms_BodyPartExamined	(0009,xx4e)	LO	From Application
IsProtected	(0009,xx4f)	LO	From Application
Cms_PatientPosition	(0009,xx50)	CS	From Application
Cmi_contrastBolusAgent	(0009,xx51)	LO	From Application
Cms_institutionName	(0009,xx52)	LO	From Application
Cms_institutionalDepartmentName	(0009,xx53)	LO	From Application
Cms_seriesDescription	(0009,xx54)	LO	From Application
Cms_operatorsName	(0009,xx55)	LO	From Application
Cms_PerformingPhysiciansName	(0009,xx56)	LO	From Application
Cms_institutionAddress	(0009,xx57)	ST	From Application
Cmi_imageComments	(0009,xx58)	LO	From Application
Cmi_instanceCreationDateTime	(0009,xx59)	LO	From Application
MppsStepStatus	(0009,xx5A)	LO	From Application
FilmedCount	(0009,xx5B)	IS	From Application
IsAllowCascadeSave	(0009,xx5C)	LO	From Application
IsAllowCascadeProtect	(0009,xx5D)	LO	From Application
IsDeleted	(0009,xx5E)	LO	From Application
Private Creator	(0011,00xx)	LO	From Application
IsRapidRegistration	(0011,xx01)	LO	From Application
IsProtected	(0011,xx02)	LO	From Application
FilmedCount	(0011,xx03)	IS	From Application
ApplicationData	(0011,xx04)	OB	From Application
IsAllowCascadeSave	(0011,xx05)	LO	From Application
IsAllowCascadeProtect	(0011,xx06)	LO	From Application
IsDeleted	(0011,xx07)	LO	From Application
Private Creator	(0019,00xx)	LO	From Application
ProcType	(0019,xx01)	LO	From Application
Plane	(0019,xx02)	LO	From Application
IsSnapShotSeries	(0019,xx03)	SH	From Application
MaxFscalor	(0019,xx04)	DS	From Application
SeriesCategoryType	(0019,xx05)	LO	From Application
ImageContrastBolusAgent	(0019,xx07)	LO	From Application
ImageSliceThickness	(0019,xx08)	LO	From Application
ImageReconstructionDiameter	(0019,xx09)	LO	From Application
ImageEchoTime	(0019,xx0a)	LO	From Application
ImageRepetitionTime	(0019,xx0b)	LO	From Application
SequenceType	(0019,xx0c)	LO	From Application

Attribute Name	Tag	VR	Value
TaskUid	(0019,xx0d)	LO	From Application
SeriesAppData	(0019,xx0e)	OB	From Application
MultiSliceNumber	(0019,xx0f)	IS	From Application
ImageScanTime	(0019,0x10)	LO	From Application
IsProtected	(0019,xx11)	LO	From Application
ImageIncrement	(0019,xx12)	IS	From Application
MppsStepStatus	(0019,xx13)	LO	From Application
StorageCommittedCount	(0019,xx14)	IS	From Application
ArchivedCount	(0019,xx15)	IS	From Application
TransferredCount	(0019,xx16)	IS	From Application
IsAllowCascadeSave	(0019,xx17)	LO	From Application
IsAllowCascadeProtect	(0019,xx18)	LO	From Application
IsDeleted	(0019,xx19)	LO	From Application
CharacterizedImageInstanceUid	(0019,xx1A)	UI	From Application
CharacterizedImageCount	(0019,xx1B)	IS	From Application
InternalWindowWidth	(0019,xx1C)	LO	From Application
InternalWindowLevel	(0019,xx1D)	LO	From Application
Private Creator	(0029,00xx)	LO	From Application
SliceNumber	(0029,xx01)	IS	From Application
PhaseNumber	(0029,xx02)	IS	From Application
ProcType	(0029,xx03)	LO	From Application
StopwatchTime	(0029,xx04)	LO	From Application
Plane	(0029,xx05)	LO	From Application
ScanTime	(0029,xx06)	LO	From Application
DualSliceFlag	(0029,xx08)	LO	From Application
SspRatio	(0029,xx09)	LO	From Application
GatingSignalSource	(0029,xx0a)	LO	From Application
Rephase	(0029,xx0b)	LO	From Application
HalfEcho	(0029,xx0c)	LO	From Application
RectFOVRatio	(0029,xx0d)	LO	From Application
HalfScan	(0029,xx0e)	LO	From Application
NumShots	(0029,xx0f)	LO	From Application
ContrastAgent	(0029,xx10)	LO	From Application
EchoAllocation	(0029,xx11)	LO	From Application
NumEchoShift	(0029,xx12)	LO	From Application
FatSat	(0029,xx13)	LO	From Application
MTC	(0029,xx14)	LO	From Application
NumPreSat	(0029,xx15)	LO	From Application
TargetVelocity	(0029,xx16)	LO	From Application
VENCAxis	(0029,xx17)	LO	From Application
NumVENCDirection	(0029,xx18)	LO	From Application
IsScalableWindowLevel	(0029,xx1c)	LO	From Application
ThreeDSettingLineAngle	(0029,xx1d)	LO	From Application
MPGTotalAxis	(0029,xx1e)	LO	From Application
MPGAxisNumber	(0029,xx1f)	LO	From Application
MultiEchoNumber	(0029,xx20)	IS	From Application
NaviAverageGateWidth	(0029,xx21)	DS	From Application
ShimCompensateValue	(0029,xx22)	ST	From Application
GCOffset	(0029,xx23)	LO	From Application
NaviMaxGateWidth	(0029,xx24)	DS	From Application
NaviMinGateWidth	(0029,xx25)	DS	From Application
NaviMaxGatePosition	(0029,xx26)	DS	From Application
NaviMinGatePosition	(0029,xx27)	DS	From Application
TimeDuration	(0029,xx28)	DS	From Application
TablePosition	(0029,xx29)	DS	From Application
NaviInitialGateWidth	(0029,xx2a)	DS	From Application
NaviFinalGateWidth	(0029,xx2b)	DS	From Application

Attribute Name	Tag	VR	Value
NaviInitialGatePosition	(0029,xx2c)	DS	From Application
NaviFinalGatePosition	(0029,xx2d)	DS	From Application
NaviAverageGatePosition	(0029,xx2e)	DS	From Application
ImageAppData	(0029,xx2f)	OB	From Application
DiffusionBValue	(0029,xx30)	FD	The value is same as Diffusion b-value of MR Diffusion Macro
SharedFunctionalGroupsSequence	(0029,xx31)	SQ	The value is same as Shared Functional Groups Sequence of Multi-frame Functional Groups Module
PerFrameFunctionalGroupsSequence	(0029,xx32)	SQ	The value is same as Per-frame Functional Groups Sequence of Multi-frame Functional Groups Module
LossyImageCompressionRatio	(0029,xx33)	DS	The value is same as Lossy Image Compression Ratio of Enhanced MR Image Module
InstanceCreatorUID	(0029,xx34)	UI	The value is same as Instance Creator UID of SOP Common Module
RelatedGeneralSOPClassUID	(0029,xx35)	UI	The value is same as Related General SOP Class UID of SOP Common Module
OriginalSpecializedSOPClassUID	(0029,xx36)	UI	The value is same as Original Specialized SOP Class UID of SOP Common Module
TimezoneOffsetFromUTC	(0029,xx37)	SH	The value is same as Timezone Offset From UTC of SOP Common Module
SOPInstanceStatus	(0029,xx38)	CS	The value is same as SOP Instance Status of SOP Common Module
SOPAuthorizationDateandTime	(0029,xx39)	DT	The value is same as SOP Authorization Date and Time of SOP Common Module
SOPAuthorizationComment	(0029,xx3a)	LT	The value is same as SOP Authorization Comment of SOP Common Module
AuthorizationEquipmentCertificationNumber	(0029,xx3b)	LO	The value is same as Authorization Equipment Certification Number of SOP Common Module
ConcatenationFrameOffsetNumber	(0029,xx3c)	UL	The value is same as Concatenation Frame Offset Number of Multi-frame Functional Groups Module
RepresentativeFrameNumber	(0029,xx3d)	CS	The value is same as Representative Frame Number of Multi-frame Functional Groups Module
ConcatenationUID	(0029,xx3e)	UI	The value is same as Concatenation UID of Multi-frame Functional Groups Module
InConcatenationNumber	(0029,xx3f)	US	The value is same as In-concatenation Number of Multi-frame Functional Groups Module
CardiacSynchronizationTechnique	(0029,xx40)	CS	The value is same as Cardiac Synchronization Technique of Cardiac Synchronization Module
CardiacSignalSource	(0029,xx41)	CS	The value is same as Cardiac Signal Source of Cardiac Synchronization Module
CardiacRRIntervalSpecified	(0029,xx42)	FD	The value is same as Cardiac RR Interval Specified of Cardiac Synchronization Module

Attribute Name	Tag	VR	Value
CardiacBeatRejectionTechnique	(0029,xx43)	CS	The value is same as Cardiac Beat Rejection Technique of Cardiac Synchronization Module
LowRRValue	(0029,xx44)	IS	The value is same as Low R-R Value of Cardiac Synchronization Module
HighRRValue	(0029,xx45)	IS	The value is same as High R-R Value of Cardiac Synchronization Module
IntervalsAcquired	(0029,xx46)	IS	The value is same as Intervals Acquired of Cardiac Synchronization Module
IntervalsRejected	(0029,xx47)	IS	The value is same as Intervals Rejected of Cardiac Synchronization Module
RespiratoryMotionCompensationTechnique	(0029,xx48)	CS	The value is same as Respiratory Motion Compensation Technique of Respiratory Synchronization Module
RespiratorySignalSource	(0029,xx49)	CS	The value is same as Respiratory Signal Source of Respiratory Synchronization Module
BulkMotionCompensationTechnique	(0029,xx4a)	CS	The value is same as Bulk Motion Compensation Technique of Bulk Motion Synchronization Module
BulkMotionSignalSource	(0029,xx4b)	CS	The value is same as Bulk Motion Signal Source of Bulk Motion Synchronization Module
PixelPresentation	(0029,xx4c)	CS	The value is same as Pixel Presentation of Common CT/MR Image Description Macro/Enhanced MR Image Module
VolumetricProperties	(0029,xx4d)	CS	The value is same as Volumetric Properties of Common CT/MR Image Description Macro/Enhanced MR Image Module
VolumeBasedCalculationTechnique	(0029,xx4e)	CS	The value is same as Volume Based Calculation Technique of Common CT/MR Image Description Macro /Enhanced MR Image Module
AcquisitionContextDescription	(0029,xx4f)	ST	The value is same as Acquisition Context Description of Acquisition Context Module
LUTDescriptor	(0029,xx51)	LO	The value is same as LUT Descriptor of Modality LUT module
LUTExplanation	(0029,xx52)	LO	The value is same as LUT Explanation of Modality LUT module
LUTData	(0029,xx53)	LO	The value is same as LUT Data of Modality LUT module
PresentationLUTShape	(0029,xx54)	CS	The value is same as Presentation LUT Shape of General Image Module /Enhanced MR Image Module
FrameAnatomySequence	(0029,xx55)	SQ	The value is same as Frame Anatomy Sequence of Frame Anatomy Macro
FrameLaterality	(0029,xx56)	CS	The value is same as Frame Laterality of Frame Anatomy Macro
AnatomicRegionSequence	(0029,xx57)	SQ	The value is same as Anatomic Region Sequence of General Anatomy Mandatory Macro
AnatomicRegionCodeValue	(0029,xx58)	SH	The value is same as Code Value of Code Sequence Macro
AnatomicRegionCodingSchemeDesignator	(0029,xx59)	SH	The value is same as Coding Scheme Designator of Code Sequence Macro

Attribute Name	Tag	VR	Value
AnatomicRegionCodingSchemeVersion	(0029,xx5a)	SH	The value is same as Coding Scheme Version of Code Sequence Macro
AnatomicRegionCodeMeaning	(0029,xx5b)	LO	The value is same as Code Meaning of Code Sequence Macro
PixelValueTransformationSequence	(0029,xx5c)	SQ	The value is same as Pixel Value Transformation Sequence of Pixel Value Transformation Macro
RescaleType	(0029,xx5d)	LO	The value is same as Rescale Type of Pixel Value Transformation Macro
CardiacSynchronizationSequence	(0029,xx5e)	SQ	The value is same as Cardiac Synchronization Sequence of Cardiac Synchronization Macro
TriggerDelayTime	(0029,xx5f)	FD	The value is same as Nominal Cardiac Trigger Delay Time of Cardiac Synchronization Macro
FrameVOILUTSequence	(0029,xx60)	SQ	The value is same as Frame VOI LUT Sequence of Frame VOI LUT Macro
WindowCenterAndWidthExplanation	(0029,xx61)	LO	The value is same as Window Center & Width Explanation of Frame VOI LUT Macro
MRModifierSequence	(0029,xx63)	SQ	The value is same as MR Modifier Sequence of MR Modifier Macro
ParallelAcquisitionTechnique	(0029,xx64)	CS	The value is same as Parallel Acquisition Technique of MR Modifier Macro
ParallelReductionFactorSecIn	(0029,xx65)	FD	The value is same as Parallel Reduction Factor Second In-plane of MR Modifier Macro
InversionRecovery	(0029,xx66)	CS	The value is same as Inversion Recovery of MR Modifier Macro
FlowCompensation	(0029,xx67)	CS	The value is same as Flow Compensation of MR Modifier Macro
FlowCompensationDirection	(0029,xx68)	CS	The value is same as Flow Compensation Direction of MR Modifier Macro
SpatialPreSaturation	(0029,xx69)	CS	The value is same as Spatial Pre-saturation of MR Modifier Macro
PartialFourier	(0029,xx6a)	CS	The value is same as Partial Fourier of MR Modifier Macro
PartialFourierDirection	(0029,xx6b)	CS	The value is same as Partial Fourier Direction of MR Modifier Macro
MRReceiveCoilSequence	(0029,xx70)	SQ	The value is same as MR Receive Coil Sequence of MR Receive Coil Macro
ReceiveCoilManufacturerName	(0029,xx71)	LO	The value is same as Receive Coil Manufacturer Name of MR Receive Coil Macro
ReceiveCoilType	(0029,xx72)	CS	The value is same as Receive Coil Type of MR Receive Coil Macro
QuadratureReceiveCoil	(0029,xx73)	CS	The value is same as Quadrature Receive Coil of MR Receive Coil Macro
MultiCoilConfiguration	(0029,xx74)	LO	The value is same as Multi-Coil Configuration of MR Receive Coil Macro

Attribute Name	Tag	VR	Value
ComplexImageComponent	(0029,xx75)	CS	The value is same as Complex Image Component of MR Image Frame Type Macro/Enhanced MR Image Module /MR Image Description Macro
PulseSequenceName	(0029,xx76)	SH	The value is same as Pulse Sequence Name of MR Pulse Sequence Module
EchoPulseSequence	(0029,xx77)	CS	The value is same as Echo Pulse Sequence of MR Pulse Sequence Module
MultipleSpinEcho	(0029,xx78)	CS	The value is same as Multiple Spin Echo of MR Pulse Sequence Module
MultiPlanarExcitation	(0029,xx79)	CS	The value is same as Multi-planar Excitation of MR Pulse Sequence Module
PhaseContrast	(0029,xx7a)	CS	The value is same as Phase Contrast of MR Pulse Sequence Module
TimeOfFlightContrast	(0029,xx7b)	CS	The value is same as Time of Flight Contrast of MR Pulse Sequence Module
SteadyStatePulseSequence	(0029,xx7c)	CS	The value is same as Steady State Pulse Sequence of MR Pulse Sequence Module
EchoPlanarPulseSequence	(0029,xx7d)	CS	The value is same as Echo Planar Pulse Sequence of MR Pulse Sequence Module
SpectrallySelectedSuppression	(0029,xx7e)	CS	The value is same as Spectrally Selected Suppression of MR Pulse Sequence Module
OversamplingPhase	(0029,xx7f)	CS	The value is same as Oversampling Phase of MR Pulse Sequence Module
SegmentedKSpaceTraversal	(0029,xx80)	CS	The value is same as Segmented k-Space Traversal of MR Pulse Sequence Module
CoverageOfKSpace	(0029,xx81)	CS	The value is same as Coverage of k-Space of MR Pulse Sequence Module
MRTimingAndRelatedParametersSequence	(0029,xx82)	SQ	The value is same as MR Timing and Related Parameters Sequence of MR Timing and Related Parameters Macro
RFEchoTrainLength	(0029,xx83)	US	The value is same as RF Echo Train Length of MR Timing and Related Parameters Macro
GradientEchoTrainLength	(0029,xx84)	US	The value is same as Gradient Echo Train Length of MR Timing and Related Parameters Macro
GradientOutputType	(0029,xx85)	CS	The value is same as Gradient Output Type of MR Timing and Related Parameters Macro
GradientOutput	(0029,xx86)	FD	The value is same as Gradient Output of MR Timing and Related Parameters Macro
MRFOVGeometrySequence	(0029,xx87)	SQ	The value is same as MR FOV Geometry Sequence of MR FOV/Geometry Macro
MRAcquisitionFrequencyEncodingSteps	(0029,xx88)	US	The value is same as MR Acquisition Frequency Encoding Steps of MR FOV/Geometry Macro

Attribute Name	Tag	VR	Value
MRAcquisitionPhaseEncodingStepsInPlane	(0029,xx89)	US	The value is same as MR Acquisition Phase Encoding Steps in-plane of MR FOV/Geometry Macro
MRAcquisitionPhaseEncodingStepsOutOfPlane	(0029,xx8a)	US	The value is same as MR Acquisition Phase Encoding Steps out-of-plane of MR FOV/Geometry Macro
MRTransmitCoilSequence	(0029,xx8b)	SQ	The value is same as MR Transmit Coil Sequence of MR Transmit Coil Macro
TransmitCoilName	(0029,xx8c)	SH	The value is same as Transmit Coil Name of MR Transmit Coil Macro
TransmitCoilManufacturerName	(0029,xx8d)	LO	The value is same as Transmit Coil Manufacturer Name of MR Transmit Coil Macro
TransmitCoilType	(0029,xx8e)	CS	The value is same as Transmit Coil Type of MR Transmit Coil Macro
MREchoSequence	(0029,xx8f)	SQ	The value is same as MR Echo Sequence of MR Echo Macro
EffectiveEchoTime	(0029,xx90)	FD	The value is same as Effective Echo Time of MR Echo Macro
MRMetaboliteMapSequence	(0029,xx91)	SQ	The value is same as MR Metabolite Map Sequence of MR Metabolite Map Macro
MetaboliteMapDescription	(0029,xx92)	ST	The value is same as Metabolite Map Description of MR Metabolite Map Macro
MetaboliteMapCodeSequence	(0029,xx93)	SQ	The value is same as Metabolite Map Code Sequence of MR Metabolite Map Macro
MetaboliteMapCodeValue	(0029,xx94)	SH	The value is same as Code Value of Code Sequence Macro
MetaboliteMapCodingSchemeDesignator	(0029,xx95)	SH	The value is same as Coding Scheme Designator of Code Sequence Macro
MetaboliteMapCodingSchemeVersion	(0029,xx96)	SH	The value is same as Coding Scheme Version of Code Sequence Macro
MetaboliteMapCodeMeaning	(0029,xx97)	LO	The value is same as Code Meaning of Code Sequence Macro
MRImagingModifierSequence	(0029,xx98)	SQ	The value is same as MR Imaging Modifier Sequence of MR Imaging Modifier Macro
MagnetizationTransfer	(0029,xx99)	CS	The value is same as Magnetization Transfer of MR Imaging Modifier Macro
BloodSignalNulling	(0029,xx9a)	CS	The value is same as Blood Signal Nulling of MR Imaging Modifier Macro
Tagging	(0029,xx9b)	CS	The value is same as Tagging of MR Imaging Modifier Macro
TagSpacingFirstDimension	(0029,xx9c)	FD	The value is same as Tag Spacing First Dimension of MR Imaging Modifier Macro
TagSpacingSecondDimension	(0029,xx9d)	FD	The value is same as Tag Spacing Second Dimension of MR Imaging Modifier Macro
TagAngleFirstAxis	(0029,xx9e)	FD	The value is same as Tag Angle First Axis of MR Imaging Modifier Macro
TagAngleSecondAxis	(0029,xx9f)	SS	The value is same as Tag Angle Second Axis of MR Imaging Modifier Macro

Attribute Name	Tag	VR	Value
TagThickness	(0029,xxa0)	FD	The value is same as Tag Thickness of MR Imaging Modifier Macro
TaggingDelay	(0029,xxa1)	FD	The value is same as Tagging Delay of MR Imaging Modifier Macro
TransmitterFrequency	(0029,xxa2)	FD	The value is same as Transmitter Frequency of MR Imaging Modifier Macro
PixelBandwidth	(0029,xxa3)	DS	The value is same as Pixel Band width of MR Imaging Modifier Macro
MRVelocityEncodingSequence	(0029,xxa4)	SQ	The value is same as MR Velocity Encoding Sequence of MR Velocity Encoding Macro
VelocityEncodingDirection	(0029,xxa5)	FD	The value is same as Velocity Encoding Direction of MR Velocity Encoding Macro
VelocityEncodingMinimumValue	(0029,xxa6)	FD	The value is same as Velocity Encoding Minimum Value of MR Velocity Encoding Macro
VelocityEncodingMaximumValue	(0029,xxa7)	FD	The value is same as Velocity Encoding Maximum Value of MR Velocity Encoding Macro
MRImageFrameTypeSequence	(0029,xxa8)	SQ	The value is same as MR Image Frame Type Sequence of MR Image Frame Type Macro
FrameType	(0029,xxa9)	CS	The value is same as Frame Type of MR Image Frame Type Macro
PixelPresentation	(0029,xxaa)	CS	The value is same as Pixel Presentation of Common CT/MR Image Description Macro
VolumetricProperties	(0029,xxab)	CS	The value is same as Volumetric Properties of Common CT/MR Image Description Macro
VolumeBasedCalculationTechnique	(0029,xxac)	CS	The value is same as Volume Based Calculation Technique of Common CT/MR Image Description Macro
FilmedCount	(0029,xxad)	IS	From Application
IsTransferred	(0029,xxae)	LO	From Application
IsArchived	(0029,xxaf)	LO	From Application
MppsStepStatus	(0029,xxb0)	LO	From Application
CommitmentStatus	(0029,xxb1)	LO	From Application
IsStorageCommitted	(0029,xxb2)	LO	From Application
IsDicom	(0029,xxb3)	LO	From Application
IsAllowCascadeSave	(0029,xxb4)	LO	From Application
IsAllowCascadeProtect	(0029,xxb5)	LO	From Application
IsDeleted	(0029,xxb6)	LO	From Application
ApplicationData	(0029,xxb7)	OB	From Application
IsAllowCascadeSave	(0029,xxb8)	LO	From Application
IsAllowCascadeProtect	(0029,xxb9)	LO	From Application
IsDeleted	(0029,xxba)	LO	From Application
VOI1	(0029,xxbb)	IS	From Application
VOI2	(0029,xxbc)	IS	From Application
MixingTime	(0029,xxbd)	DS	From Application
SelectiveIRPosition	(0029,xxbe)	FD	From Application
SelectiveIRRow	(0029,xxbf)	FD	From Application
SelectiveIRColumn	(0029,xxc0)	FD	From Application
SelectiveIROrientation	(0029,xxc1)	FD	From Application
SelectiveIRThickness	(0029,xxc2)	DS	From Application
RephaseOrderSlice	(0029,xxc3)	CS	From Application

Attribute Name	Tag	VR	Value
RephaseOrderPhase	(0029,xxc4)	CS	From Application
RephaseOrderFreq	(0029,xxc5)	CS	From Application

13.3 Enhanced MR Image Module

MR Series Module Attributes

Attribute Name	Tag	Type
Modality	0008,0060	1

Enhanced General Equipment Module Attributes

Attribute Name	Tag	Type
Manufacturer	0008,0070	1
Manufacturer's Model Name	0008,1090	1
Device Serial Number	0018,1000	1
Software Versions	0018,1020	1

Multi-frame Functional Groups Module Attributes

Attribute Name	Tag	Type
Shared Functional Groups Sequence	5200,9229	2
Per-frame Functional Groups Sequence	5200,9230	1
Instance Number	0020,0013	1
Content Date	0008,0023	1
Content Time	0008,0033	1
Number of Frames	0028,0008	1

Multi-frame Functional Groups Macros Attributes

Attribute Name	Tag	Type
> Pixel Measures Sequence	0028,9110	1
>> Pixel Spacing	0028,0030	1C
>> Slice Thickness	0018,0050	1C
> Frame Content Sequence	0020,9111	1
>> Frame Reference DateTime	0018,9151	1C
>> Frame Acquisition DateTime	0018,9074	1C
>> Frame Acquisition Duration	0018,9220	1C
> Plane Position Sequence	0020,9113	1
>> Image Position (Patient)	0020,0032	1C
> Plane Orientation Sequence	0020,9116	1
>> Image Orientation (Patient)	0020,0037	1C
> Referenced Image Sequence	0008,1140	2
>> Referenced SOP Class UID	0008,1150	1
>> Referenced SOP Instance UID	0008,1155	1
>> Purpose of Reference Code Sequence	0040,A170	1
>>> Code Value	0008,0100	1
>>> Coding Scheme Designator	0008,0102	1
>>> Code Meaning	0008,0104	1
> Derivation Image Sequence	0008,9124	2
> Cardiac Synchronization Sequence	0018,9118	1
>> Nominal Cardiac Trigger Delay Time	0020,9153	1
> Frame Anatomy Sequence	0020,9071	1
>> Frame Laterality	0020,9072	1
>> Anatomic Region Sequence	0008,2218	1

Attribute Name	Tag	Type
>>> Code Value	0008,0100	1
>>> Coding Scheme Designator	0008,0102	1
>>> Coding Scheme Version	0008,0103	1C
>>> Code Meaning	0008,0104	1
> Pixel Value Transformation Sequence	0028,9145	1
>> Rescale Intercept	0028,1052	1
>> Rescale Slope	0028,1053	1
>> Rescale Type	0028,1054	1
> MR Image Frame Type Sequence	0018,9226	1
>> Frame Type	0008,9007	1
>> Pixel Presentation	0008,9205	1
>> Volumetric Properties	0008,9206	1
>> Volume Based Calculation Technique	0008,9207	1
>> Complex Image Component	0008,9208	1
>> Acquisition Contrast	0008,9209	1
> MR Timing and Related Parameters Sequence	0018,9112	1
>> Repetition Time	0018,0080	1C
>> Flip Angle	0018,1314	1C
>> Echo Train Length	0018,0091	1C
>> RF Echo Train Length	0018,9240	1C
>> Gradient Echo Train Length	0018,9241	1C
>> Gradient Output Type	0018,9180	1C
>> Gradient Output	0018,9182	1C
> MR FOV/Geometry Sequence	0018,9125	1
>> In-plane Phase Encoding Direction	0018,1312	1C
>> MR Acquisition Frequency Encoding Steps	0018,9058	1C
>> MR Acquisition Phase Encoding Steps in-plane	0018,9231	1C
>> MR Acquisition Phase Encoding Steps out-of-plane	0018,9232	1C
>> Percent Sampling	0018,0093	1C
>> Percent Phase Field of View	0018,0094	1C
> MR Echo Sequence	0018,9114	1
>> Effective Echo Time	0018,9082	1C
> MR Modifier Sequence	0018,9115	1
>> Inversion Recovery	0018,9009	1C
>> Inversion Times	0018,9079	1C
>> Flow Compensation	0018,9010	1C
>> Flow Compensation Direction	0018,9183	1C
>> Spoiling	0018,9016	1C
>> T2 Preparation	0018,9021	1C
>> Spectrally Selected Excitation	0018,9026	1C
>> Spatial Pre-saturation	0018,9027	1C
>> Partial Fourier	0018,9081	1C
>> Partial Fourier Direction	0018,9036	1C
>> Parallel Acquisition	0018,9077	1C
>> Parallel Acquisition Technique	0018,9078	1C
>> Parallel Reduction Factor In-plane	0018,9069	1C
>> Parallel Reduction Factor out-of-plane	0018,9155	1C

Attribute Name	Tag	Type
>> Parallel Reduction Factor Second In-plane	0018,9168	1C
> MR Imaging Modifier Sequence	0018,9006	1
>> Magnetization Transfer	0018,9020	1C
>> Blood Signal Nulling	0018,9022	1C
>> Tagging	0018,9028	1C
>> Tag Spacing First Dimension	0018,9030	1C
>> Tag Spacing Second Dimension	0018,9218	1C
>> Tag Angle First Axis	0018,9019	1C
>> Tag Angle Second Axis	0018,9219	1C
>> Tag Thickness	0018,9035	1C
>> Tagging Delay	0018,9184	3
>> Transmitter Frequency	0018,9098	1C
>> Pixel Bandwidth	0018,0095	1C
> MR Receive Coil Sequence	0018,9042	1
>> Receive Coil Name	0018,1250	1C
>> Receive Coil Manufacturer Name	0018,9041	2C
>> Receive Coil Type	0018,9043	1C
>> Quadrature Receive Coil	0018,9044	1C
>> Multi-Coil Definition Sequence	0018,9045	1C
>>> Multi-Coil Element Name	0018,9047	1
>>> Multi-Coil Element Used	0018,9048	1
>> Multi-Coil Configuration	0018,9046	3
> MR Transmit Coil Sequence	0018,9049	1
>> Transmit Coil Name	0018,1251	1C
>> Transmit Coil Manufacturer Name	0018,9050	2C
>> Transmit Coil Type	0018,9051	1C
> MR Diffusion Sequence	0018,9117	1
>> Diffusion b-value	0018,9087	1C
>> Diffusion Directionality	0018,9075	1C
>> Diffusion Gradient Direction Sequence	0018,9076	1C
>>> Diffusion Gradient Orientation	0018,9089	1C
>> Diffusion Anisotropy Type	0018,9147	1C
> MR Averages Sequence	0018,9119	1
>> Number of Averages	0018,0083	1C
> MR Spatial Saturation Sequence	0018,9107	2
>> Slab Thickness	0018,9104	1
>> Slab Orientation	0018,9105	1
>> Mid Slab Position	0018,9106	1
> MR Metabolite Map Sequence	0018,9152	1
>> Metabolite Map Description	0018,9080	1C
> MR Velocity Encoding Sequence	0018,9197	1
>> Velocity Encoding Direction	0018,9090	1C
>> Velocity Encoding Minimum Value	0018,9091	1C
>> Velocity Encoding Maximum Value	0018,9217	1C

Multi-frame Dimension Module Attributes

Attribute Name	Tag	Type
Dimension Organization Sequence	0020,9221	2
Dimension Index Sequence	0020,9222	2

Cardiac Synchronization Module Attributes

Attribute Name	Tag	Type
Cardiac Synchronization Technique	0018,9037	1C
Cardiac Signal Source	0018,9085	1C
Cardiac RR Interval Specified	0018,9070	1C
Cardiac Beat Rejection Technique	0018,9169	1C
Low R-R Value	0018,1081	2C
High R-R Value	0018,1082	2C
Intervals Acquired	0018,1083	2C
Intervals Rejected	0018,1084	2C
Skip Beats	0018,1086	3

Respiratory Synchronization Module Attributes

Attribute Name	Tag	Type
Respiratory Motion Compensation Technique	0018,9170	1C
Respiratory Signal Source	0018,9171	1C

Bulk Motion Synchronization Module Attributes

Attribute Name	Tag	Type
Bulk Motion Compensation Technique	0018,9172	1C
Bulk Motion Signal Source	0018,9173	1C

Supplemental Palette Color Lookup Table Module Attributes

Attribute Name	Tag	Type
Red Palette Color Lookup Table Descriptor	0028,1101	1
Green Palette Color Lookup Table Descriptor	0028,1102	1
Blue Palette Color Lookup Table Descriptor	0028,1103	1
Red Palette Color Lookup Table Data	0028,1201	1
Green Palette Color Lookup Table Data	0028,1202	1
Blue Palette Color Lookup Table Data	0028,1203	1

Acquisition Context Module Attributes

Attribute Name	Tag	Type
Acquisition Context Sequence	0040,0555	2
Acquisition Context Description	0040,0556	3

MR Pulse Sequence Module Attributes

Attribute Name	Tag	Type
Pulse Sequence Name	0018,9005	1C
MR Acquisition Type	0018,0023	1C
Echo Pulse Sequence	0018,9008	1C
Multiple Spin Echo	0018,9011	1C
Multi-planar Excitation	0018,9012	1C
Phase Contrast	0018,9014	1C
Time of Flight Contrast	0018,9015	1C
Steady State Pulse Sequence	0018,9017	1C
Echo Planar Pulse Sequence	0018,9018	1C
Saturation Recovery	0018,9024	1C
Spectrally Selected Suppression	0018,9025	1C
Oversampling Phase	0018,9029	1C

Attribute Name	Tag	Type
Geometry of k-Space Traversal	0018,9032	1C
Rectilinear Phase Encode Reordering	0018,9034	1C
Segmented k-Space Traversal	0018,9033	1C
Coverage of k-Space	0018,9094	1C
Number of k-Space Trajectories	0018,9093	1C

Enhanced MR Image Module Attributes

Attribute Name	Tag	Type
Acquisition Number	0020,0012	3
Acquisition DateTime	0008,002A	1C
Acquisition Duration	0018,9073	1C
Referenced Image Evidence Sequence	0008,9092	1C
> Study Instance UID	0020,000D	1
> Referenced Series Sequence	0008,1115	1
>> Series Instance UID	0020,000E	1
>> Referenced SOP Sequence	0008,1199	1
>>> Referenced SOP Class UID	0008,1150	1
>>> Referenced SOP Instance UID	0008,1155	1
Content Qualification	0018,9004	1
Resonant Nucleus	0018,9100	1C
k-space Filtering	0018,9064	1C
Magnetic Field Strength	0018,0087	1C
Applicable Safety Standard Agency	0018,9174	1
Applicable Safety Standard Description	0018,9175	3
Image Comments	0020,4000	3
Image Type	0008,0008	1
Pixel Presentation	0008,9205	1
Volumetric Properties	0008,9206	1
Volume Based Calculation Technique	0008,9207	1
Complex Image Component	0008,9208	1
Acquisition Contrast	0008,9209	1
Samples per Pixel	0028,0002	1
Photometric Interpretation	0028,0004	1
Bits Allocated	0028,0100	1
Bits Stored	0028,0101	1
High Bit	0028,0102	1
Spacing between Slices	0018,0088	3
Burned In Annotation	0028,0301	1
Lossy Image Compression	0028,2110	1
Lossy Image Compression Ratio	0028,2112	1C
Presentation LUT Shape	2050,0020	1

13.4 SC Image Modules

SC Image Module Attributes

Attribute Name	Tag	Type
Conversion Type	0008,0064	1

13.5 GSPS Modules

Presentation Series Module Attributes

Attribute Name	Tag	Type
Modality	0008,0060	1

Presentation State Module Attributes

Attribute Name	Tag	Type
Instance Number	0020,0013	1
Presentation Label	0070,0080	1
Presentation Description	0070,0081	2
Presentation Creation Date	0070,0082	1
Presentation Creation Time	0070,0083	1
Presentation Creator's Name	0070,0084	2
Referenced Series Sequence	0008,1115	1
>Series Instance UID	0020,000E	1C
>Referenced Image Sequence	0008,1140	1C
>>Referenced SOP Class UID	0008,1150	1C
>>Referenced SOP Instance UID	0008,1155	1C

Displayed Area Module Attributes

Attribute Name	Tag	Type
Displayed Area Selection Sequence	0070,005A	1
>Referenced Image Sequence	0008,1140	1C
>>Referenced SOP Class UID	0008,1150	1C
>>Referenced SOP Instance UID	0008,1155	1C
>Displayed Area Top Left Hand Corner	0070,0052	1
>Displayed Area Bottom Right Hand Corner	0070,0053	1
>Presentation Size Mode	0070,0100	1
>Presentation Pixel Spacing	0070,0101	1C
>Presentation Pixel Magnification Ratio	0070,0103	1C

Graphic Annotation Module Attributes

Attribute Name	Tag	Type
Graphic Annotation Sequence	0070,0001	1
>Referenced Image Sequence	0008,1140	1C
>>Referenced SOP Class UID	0008,1150	1C
>>Referenced SOP Instance UID	0008,1155	1C
>Graphic Layer	0070,0002	1
>Text Object Sequence	0070,0008	1C
>>Anchor Point Annotation Units	0070,0004	1C
>>Unformatted Text Value	0070,0006	1
>>Anchor Point	0070,0014	1C
>>Anchor Point Visibility	0070,0015	1C
>Graphic Object Sequence	0070,0009	1C
>>Graphic Annotation Units	0070,0005	1
>>Graphic Dimensions	0070,0020	1
>>Number of Graphic Points	0070,0021	1
>>Graphic Data	0070,0022	1
>>Graphic Type	0070,0023	1
>>Graphic Filled	0070,0024	1C

Spatial Transformation Module Attributes

Attribute Name	Tag	Type
Image Rotation	0070,0042	1
Image Horizontal Flip	0070,0041	1

Graphic Layer Module Attributes

Attribute Name	Tag	Type
Graphic Layer Sequence	0070,0060	1
>Graphic Layer	0070,0002	1
>Graphic Layer Order	0070,0062	1
>Graphic Layer Recommended Display RGB Value	0070,0067	3
>Graphic Layer Description	0070,0068	3

Softcopy VOI LUT Module Attributes

Attribute Name	Tag	Type
Softcopy VOI LUT Sequence	0028,3110	1
>Referenced Image Sequence	0008,1140	1C
>>Referenced SOP Class UID	0008,1150	1C
>>Referenced SOP Instance UID	0008,1155	1C
>VOI LUT Sequence	0028,3010	1C
>>LUT Descriptor	0028,3002	1C
>>LUT Data	0028,3006	1C
>Window Center	0028,1050	1C
>Window Width	0028,1051	1C

Softcopy Presentation LUT Module Attributes

Attribute Name	Tag	Type
Presentation LUT Shape	2050,0020	1C

13.6 Key Object Selection Modules

SR Document Content Module Attributes

Attribute Name	Tag	Type
Observation Date time	0040,A032	1C
Content Template Sequence	0040,A504	1C
> Mapping Resource	0008,0105	3
> Template Identifier	0040,DB00	3
Content Sequence	0040,A730	1C
> Relationship Type	0040,A010	1
> Referenced Content Item Identifier	0040,DB73	1C
> Value Type	0040,A040	3
> Concept Name Code Sequence	0040,A043	3
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Concept Code Sequence	0040,A168	3
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Relationship Type	0040,A010	1
> Referenced Content Item Identifier	0040,DB73	1C
> Value Type	0040,A040	3
> Concept Name Code Sequence	0040,A043	3

Attribute Name	Tag	Type
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Concept Code Sequence	0040,A168	3
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Relationship Type	0040,A010	1
> Referenced Content Item Identifier	0040,DB73	1C
> Value Type	0040,A040	3
> Concept Name Code Sequence	0040,A043	3
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Person Name	0040,A123	3
> Relationship Type	0040,A010	1
> Referenced Content Item Identifier	0040,DB73	1C
> Value Type	0040,A040	3
> Concept Name Code Sequence	0040,A043	3
>> Code Value	0008,0100	3
>> Coding Scheme Designator	0008,0102	3
>> Coding Scheme Version	0008,0103	3
>> Code Meaning	0008,0104	3
> Text Value	0040,A160	3
> Relationship Type	0040,A010	1
> Referenced Content Item Identifier	0040,DB73	1C
> Referenced SOP Sequence	0008,1199	3
>> Referenced SOP Class UID	0008,1150	3
>> Referenced SOP Instance UID	0008,1155	3
> Value Type	0040,A040	3
Value Type	0040,A040	1
Concept Name Code Sequence	0040,A043	1
> Code Value	0008,0100	1
> Coding Scheme Designator	0008,0102	1
> Code Meaning	0008,0104	1
> Coding Scheme Version	0008,0103	1C
> Mapping Resource	0008,0105	1
> Context Group Version	0008,0106	1C
> Context Group Local Version	0008,0107	1C
> Context Group Extension Creator UID	0008,010D	1C
> Context Group Extension Flag	0008,010B	3
> Context Identifier	0008,010F	3
Continuity Of Content	0040,A050	1

Key Object Document Module Attributes

Attribute Name	Tag	Type
Content Date	0008,0023	1
Content Time	0008,0033	1
Instance Number	0020,0013	1
Referenced Request Sequence	0040,A370	1C
Current Requested Procedure Evidence Sequence	0040,A375	1
> Study Instance UID	0020,000D	1
> Referenced Series Sequence	0008,1115	3
>>Referenced SOP Sequence	0008,1199	3
>>> Referenced SOP Class UID	0008,1150	3
>>> Referenced SOP Instance UID	0008,1155	3
>>Series Instance UID	0020,000E	3
Identical Documents Sequence	0040,A525	1C

Key Object Document Series Module Attributes

Attribute Name	Tag	Type
Modality KO	0008,0060	1
Referenced Performed Procedure Step Sequence	0008,1111	2
Series Instance UID	0020,000E	1
Series Number	0020,0011	1

14. Annex B

This annex details the actual Return keys for Modality Worklist Information Model -FIND request.

Return Keys for Modality Worklist Information Model - FIND

Attribute Name	Tag	Type
Specific Character Set	0008,0005	1C
Scheduled Procedure Step Sequence	0040,0100	1
>Scheduled Station AE Title	0040,0001	1
>Scheduled Procedure Step Start Date	0040,0002	1
>Scheduled Procedure Step Start Time	0040,0003	1
>Scheduled Procedure Step End Date	0040,0004	3
>Scheduled Procedure Step End Time	0040,0005	3
>Modality	0008,0060	1
>Scheduled Performing Physician Name	0040,0006	2
>Scheduled Procedure Step Description	0040,0007	1C
>Scheduled Station Name	0040,0010	2
>Scheduled Procedure Step Location	0040,0011	2
>Scheduled Protocol Code Sequence	0040,0008	1C
>>Code Value	0008,0100	1C
>>Coding Scheme Designator	0008,0102	1C
>>Coding Scheme Version	0008,0103	3
>>Code Meaning	0008,0104	3
>Pre-Medication	0040,0012	2C
>Scheduled Procedure Step ID	0040,0009	1
>Requested Contrast Agent	0032,1070	2C
>Scheduled Procedure Step Status	0040,0020	3
>Comments on the Scheduled Procedure Step	0040,0400	3
Requested Procedure ID	0040,1001	1
Requested Procedure Description	0032,1060	1C
Requested Procedure Code Sequence	0032,1064	1C
>Code Value	0008,0100	1C
>Coding Scheme Designator	0008,0102	1C
>Coding Scheme Version	0008,0103	3
>Code Meaning	0008,0104	3
Study Instance UID	0020,000D	1
Referenced Study Sequence	0008,1110	2
>Referenced SOP Class UID	0008,1150	1C
>Referenced SOP Instance UID	0008,1155	1C
Requested Procedure Priority	0040,1003	2
Patient Transport Arrangements	0040,1004	2
Reason For Requested Procedure	0040,1002	3
Requested Procedure Comments	0040,1400	3
Requested Procedure Location	0040,1005	3
Confidentiality Code	0040,1008	3
Reporting Priority	0040,1009	3
Names of Intended Recipients of Results	0040,1010	3
Accession Number	0008,0050	2
Requesting Physician	0032,1032	2
Referring Physician's Name	0008,0090	2
Reason for the Imaging Service Request	0040,2001	3
Imaging Service Request Comments	0040,2400	3
Requesting Service	0032,1033	3
Issuing Date of Imaging Service Request	0040,2004	3
Issuing Time of Imaging Service Request	0040,2005	3
Placer Order Number / Imaging Service Request	0040,2016	3
Filler Order Number / Imaging Service Request	0040,2017	3

Attribute Name	Tag	Type
Order Entered By …	0040,2008	3
Order Enterer's Location	0040,2009	3
Order Callback Phone Number	0040,2010	3
Admission ID	0038,0010	2
Issuer of Admission ID	0038,0011	3
Institution Name	0008,0080	3
Institution Address	0008,0081	3
Institution Code Sequence	0008,0082	3
>Code Value	0008,0100	3
>Coding Scheme Designator	0008,0102	3
>Coding Scheme Version	0008,0103	3
>Code Meaning	0008,0104	3
Current Patient Location	0038,0300	2
Visit Status ID	0038,0008	3
Patient's Institution Residence	0038,0400	3
Visit Comments	0038,4000	3
Referenced Patient Sequence	0008,1120	2
>Referenced SOP Class UID	0008,1150	2
>Referenced SOP Instance UID	0008,1155	2
Referring Physician's Address	0008,0092	3
Referring Physician's Phone Numbers	0008,0094	3
Admitting Diagnosis Description	0008,1080	3
Admitting Diagnosis Code Sequence	0008,1084	3
>Code Value	0008,0100	3
>Coding Scheme Designator	0008,0102	3
>Coding Scheme Version	0008,0103	3
>Code Meaning	0008,0104	3
Route of Admissions	0038,0016	3
Admitting Date	0038,0020	3
Admitting Time	0038,0021	3
Referenced Visit Sequence	0008,1125	3
>Referenced SOP Class UID	0008,1150	3
>Referenced SOP Instance UID	0008,1155	3
Referenced Patient Alias Sequence	0038,0004	3
>Referenced SOP Class UID	0008,1150	3
>Referenced SOP Instance UID	0008,1155	3
Patient Name	0010,0010	1
Patient ID	0010,0020	1
Issuer of Patient ID	0010,0021	3
Other Patient Ids	0010,1000	3
Other Patient Names	0010,1001	3
Patient's Birth Name	0010,1005	3
Patient's Mother's Birth Name	0010,1060	3
Medical Record Locator	0010,1090	3
Patient's Birth Date	0010,0030	2
Patient's Sex	0010,0040	2
Patient's Weight	0010,1030	2
Confidentiality Constraint on Patient Data	0040,3001	2
Patient's Age	0010,1010	3
Patient's Occupation	0010,2180	3
Patient's Birth Time	0010,0032	3
Patient's Insurance Plan Code Sequence	0010,0050	3
>Code Value	0008,0100	3
>Coding Scheme Designator	0008,0102	3
>Coding Scheme Version	0008,0103	3

Attribute Name	Tag	Type
>Code Meaning	0008,0104	3
Patient's Size	0010,1020	3
Patient's Address	0010,1040	3
Military Rank	0010,1080	3
Branch of Service	0010,1081	3
Country of Residence	0010,2150	3
Region of Residence	0010,2152	3
Patient's Telephone Numbers	0010,2154	3
Ethnic Group	0010,2160	3
Patient's Religious Preference	0010,21F0	3
Patient Comments	0010,4000	3
Patient State	0038,0500	2
Pregnancy Status	0010,21C0	2
Medical Alerts	0010,2000	2
Contrast Allergies	0010,2110	2
Special Needs	0038,0050	2
Smoking Status	0010,21A0	3
Additional Patient History	0010,21B0	3
Last Menstrual Date	0010,21D0	3

15. Annex C

This annex details attributes for Modality Performed Procedure Step N-CREATE and N-SET request.

MPPS SOP Class N-CREATE, N-SET and Final State Attributes

Attribute Name	Tag	Req. Type N-CREATE (SCU/SCP)	Req. Type N-SET (SCU/SCP)	Req. Type Final State
Performed Procedure Step Relationship				
Scheduled Step Attribute Sequence	(0040,0270)	1/1	Not allowed	
>Study Instance UID	(0020,000D)	1/1	Not allowed	
>Referenced Study Sequence	(0008,1110)	2/2	Not allowed	
>>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Referenced SOP Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	Not allowed	
>Accession Number	(0008,0050)	2/2	Not allowed	
>Placer Order Number/Imaging Service Request	(0040,2016)	3/3	Not allowed	
>Filler Order Number/Imaging Service Request	(0040,2017)	3/3	Not allowed	
>Requested Procedure ID	(0040,1001)	2/2	Not allowed	
>Requested Procedure Description	(0032,1060)	2/2	Not allowed	
>Scheduled Procedure Step ID	(0040,0009)	2/2	Not allowed	
>Scheduled Procedure Step Description	(0040,0007)	2/2	Not allowed	
>Scheduled Protocol Code Sequence	(0040,0008)	2/2	Not allowed	
>>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme Version	(0008,0103)	3/3	Not allowed	
>>Code Meaning	(0008,0104)	3/3	Not allowed	
Patient's Name	(0010,0010)	2/2	Not allowed	
Patient ID	(0010,0020)	2/2	Not allowed	
Patient's Birth Date	(0010,0030)	2/2	Not allowed	
Patient's Sex	(0010,0040)	2/2	Not allowed	
Referenced Patient Sequence	(0008,1120)	2/2	Not allowed	
>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	Not allowed	
>Referenced Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	Not allowed	

Performed Procedure Step Information				
Performed Procedure Step ID	(0040,0253)	1/1	Not allowed	
Performed Station AE Title	(0040,0241)	1/1	Not allowed	
Performed Station Name	(0040,0242)	2/2	Not allowed	
Performed Location	(0040,0243)	2/2	Not allowed	
Performed Procedure Step Start Date	(0040,0244)	1/1	Not allowed	
Performed Procedure Step Start Time	(0040,0245)	1/1	Not allowed	
Performed Procedure Step Status	(0040,0252)	1/1	3/1	
Performed Procedure Step Description	(0040,0254)	2/2	3/2	
Performed Procedure Type Description	(0040,0255)	2/2	3/2	
Procedure Code Sequence	(0008,1032)	2/2	3/2	
>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Version	(0008,0103)	3/3	3/3	
>Code Meaning	(0008,0104)	3/3	3/3	
Performed Procedure Step End Date	(0040,0250)	2/2	3/1	1
Performed Procedure Step End Time	(0040,0251)	2/2	3/1	1
Image Acquisition Results				
Modality	(0008,0060)	1/1	Not allowed	
Study ID	(0020,0010)	2/2	Not allowed	
Performed Protocol Code Sequence	(0040,0260)	2/2	3/2	
>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Version	(0008,0103)	3/3	3/3	
>Code Meaning	(0008,0104)	3/3	3/3	
Performed Series Sequence	(0040,0340)	2/2	3/1	1
>Performing Physician's Name	(0008,1050)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	2
>Protocol Name	(0018,1030)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	1
>Operator's Name	(0008,1070)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	2

>Series Instance UID	(0020,000E)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	1
>Series Description	(0008,103E)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	2
>Retrieve AE Title	(0008,0054)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	2
>Referenced Image Sequence	(0008,1140)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	
>>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>>Referenced SOP Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Referenced Standalone SOP Instance Sequence	(0040,0220)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	

E