

MR Imaging System

Echelon

V2.2

DICOM Conformance Statement

Rev. 9

 **Hitachi Medical Corporation**
Tokyo, Japan

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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. |

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.

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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

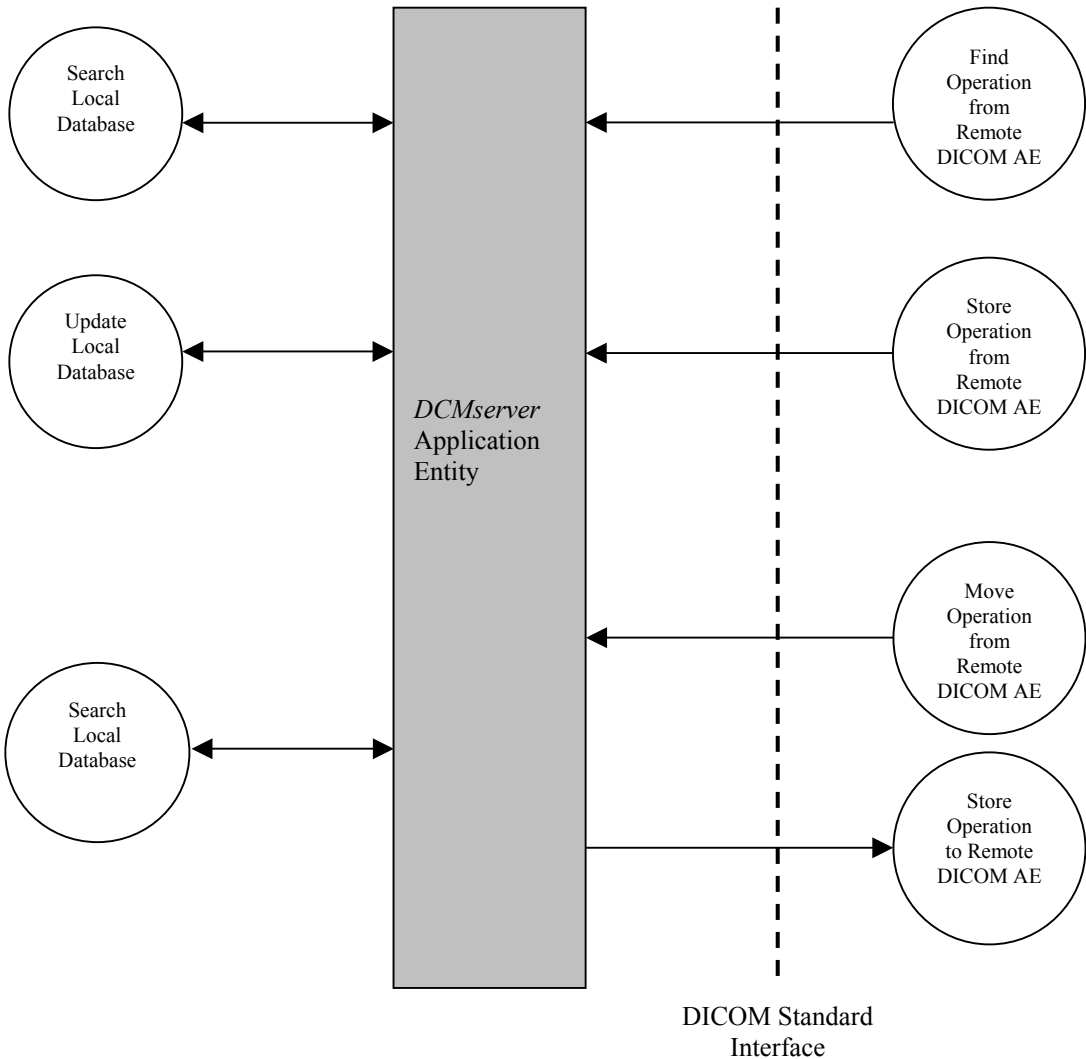


Figure 1 Image Transfer Implementation Model

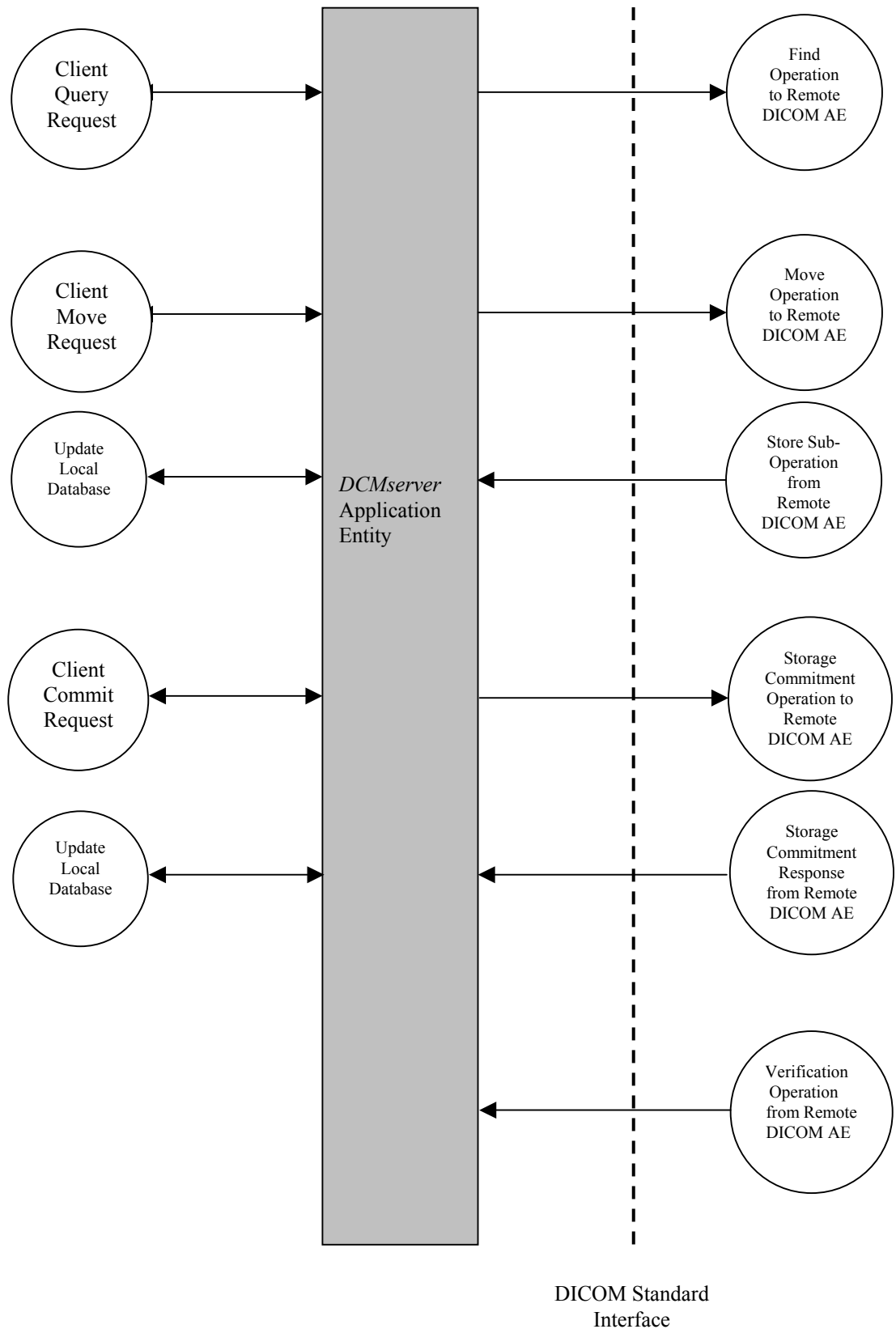


Figure 1 Image Transfer Implementation Model (Continued)

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

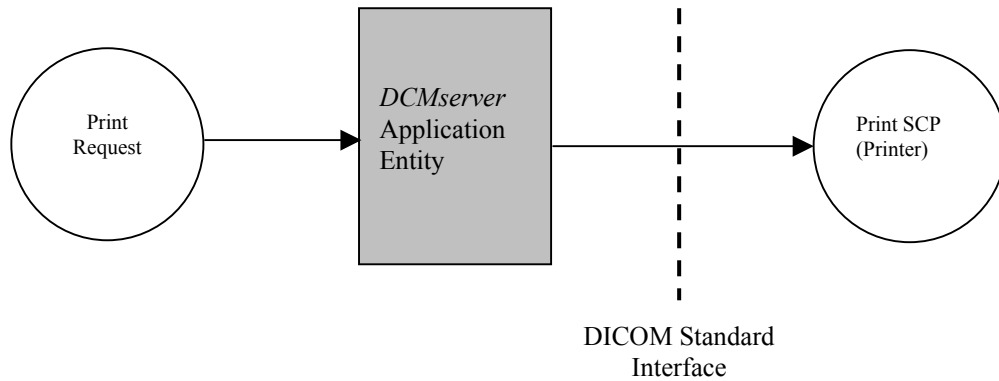


Figure 2 Print Management Implementation Model

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.

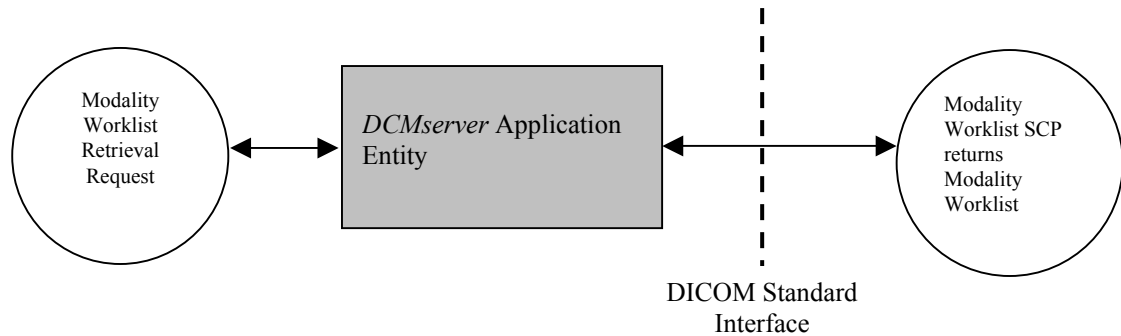


Figure 3 Modality Worklist Data Flow Diagram

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 Retrieval¹
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.

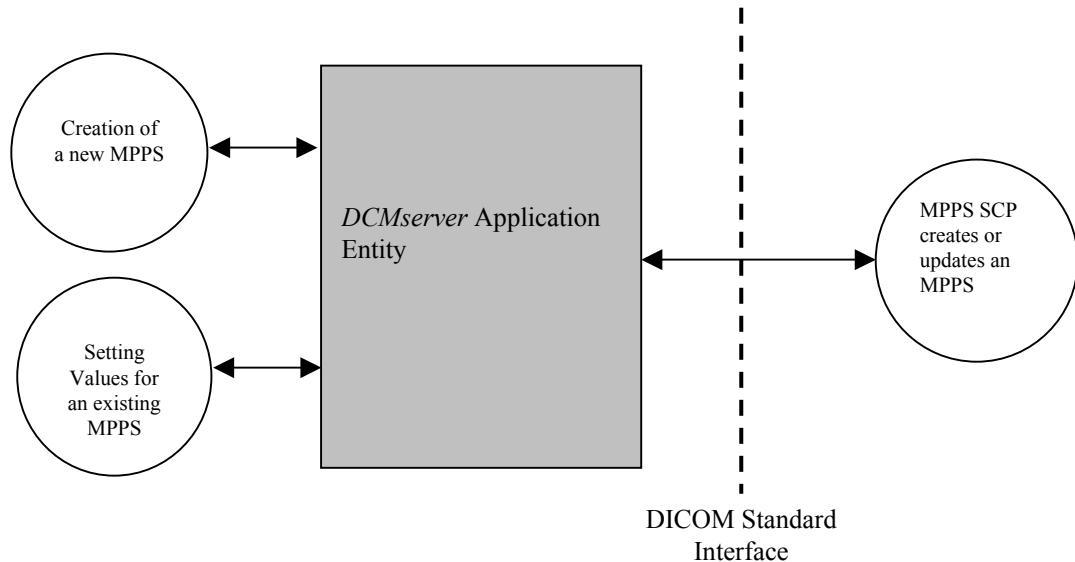


Figure 4 MPPS Implementation Model

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 association 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, an 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-RAM 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-RAM and 650MB CD-R.

2.5.1 Application Data Flow Diagram

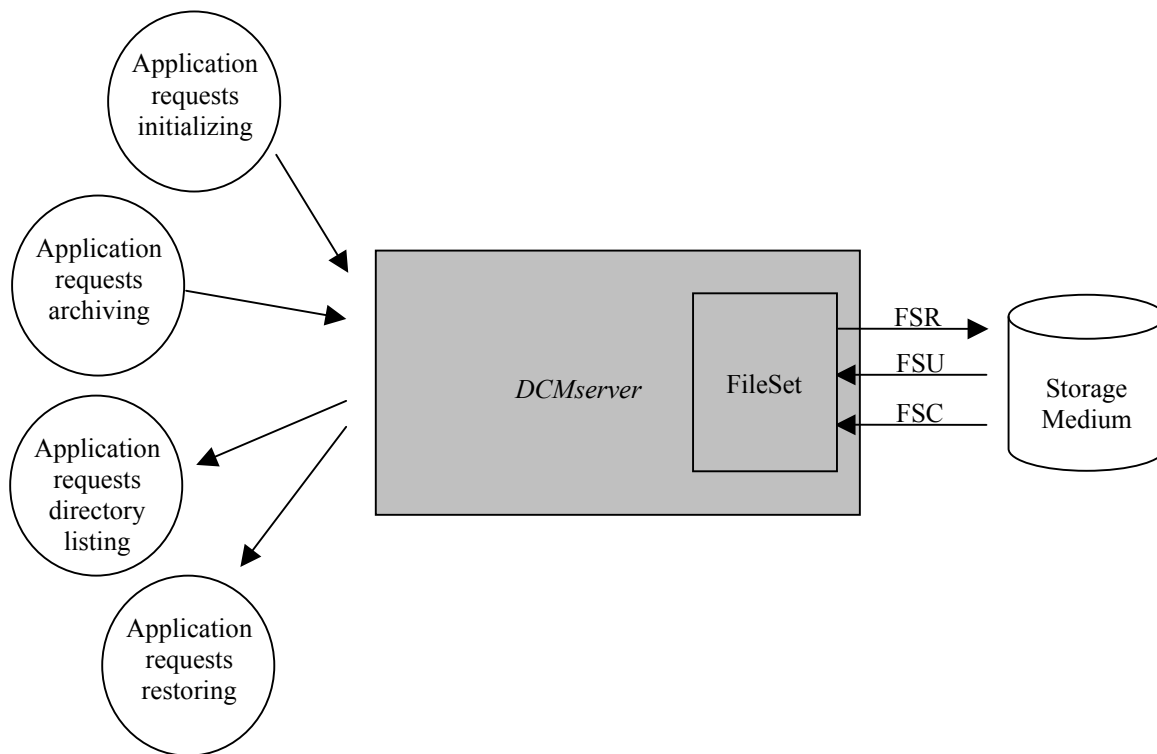


Figure 5: Media Storage Management Implementation Model

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 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

| 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-RAM | 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-RAM4.7GB 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-RAM | 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

10.5 Media security profile

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

10.5.1 Basic DICOM Media Security Profile

DCMserver supports the following features of the Basic DICOM Media Security Profile:

- Encapsulation of a DICOM File in a Secure DICOM File by below methods
- Enveloped-data content type of the Cryptographic Message Syntax defined in RFC 2630
- Triple-DES and AES-128 content-encryption can be selectable
- RSA [RFC 2313] for the key transport of Triple-DES or AES-128 content-encryption keys.
- SHA-1 digest algorithm
- X.509 certificate in PEM format
- private key in PEM format
- *DCMserver can only read media which is encrypted by DCMserver itself*

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 parameters.

- 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
- Minimum 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 87: Japanese kanji (ideographic), hiragana (phonetic), and katakana (phonetic) characters (94² characters, 2-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 |
| Beat 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 |
| MaxFscalar | (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) | |