# DICOM Conformance Statement

## MR R11.1

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# 1. DICOM Conformance Statement Overview

This document is the DICOM Conformance Statement for MR systems later referred to as the MR System. This document holds for the following:

- Ingenia Ambition (S/X) 1.5T
- Ingenia Elition (S/X) 3.0T
- Ingenia Evolution 1.5T
- Ingenia Evolution 3.0T
- Ingenia (S) 1.5T
- Ingenia 3.0T
- Ingenia 1.5T CX
- Ingenia 3.0T CX
- Ingenia LS
- Achieva 1.5T
- Achieva 3T (TX and X)
- Achieva dStream 1.5T
- Achieva dStream 3.0T (TX)
- Prodiva CS/CX
- MR 5300
- MR 7000
- MR 7700

The system creates the DICOM MR Image, Enhanced MR Image, MR Spectroscopy and Raw Data objects. (Please refer to Chapter 8 for more details.) These objects can be sent and received. It depends on the capabilities of the remote system, which of these objects are supported in the transactions. The capabilities of the remote systems are locally stored on the MR System in configuration files per DICOM node. In case the remote system does not support Enhanced MR Images, the MR System will send the object as standard ('classic') MR Images.

The MR System is a modality that generates MR Images. It supports the following DICOM functionality:

- DICOM Verification service (for both SCU and SCP).
- Storage of DICOM objects on a remote DICOM system.
- Commitment of stored DICOM objects on a remote DICOM system (Push Model).
- Querying for data on a remote DICOM system.
- Retrieval of DICOM objects from a remote DICOM system.
- Basic Worklist Management (BWLM).
- Implementation of Modality Performed Procedure Step (MPPS).
- Storage and Retrieval of DICOM objects per removable media.
- Printing of hardcopies on a remote DICOM printer.
- Query for data by a remote DICOM system.

The MR system includes the Real World Value Macro information in the MR Image and Enhanced MR Image objects.
The information in the RWV attributes is consistent with the information in the Rescaling attributes, but might be differently scaled.
Images of type APTW contain pixels that are outside of the range Real World Value First Value Mapped and Real World Value Last Value Mapped, such pixels has no real world values.
As a result a measurement that uses the Rescaling attributes might give a different value compared to the same measurement using the RWV attributes as not all Pixels might contribute to the measurement based on the real world values.

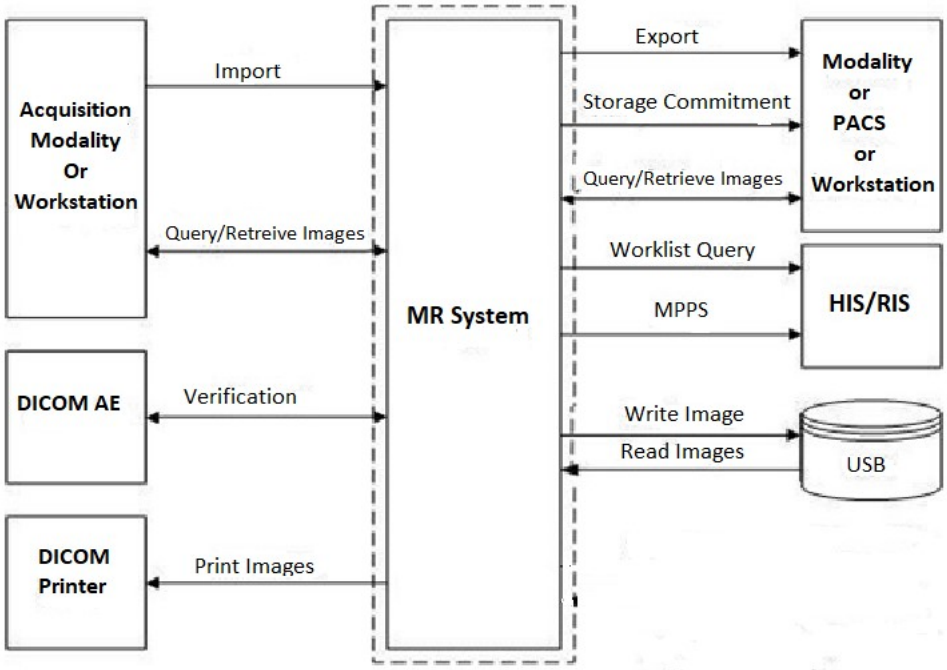


**Figure 1: MR System in a DICOM network overview**

**Table 1: Network Services**

| SOP Class Name | UID | User of Service (SCU) | Provider of Service (SCP) |
|---|---|---|---|
| **Other** | | | |
| Verification SOP Class | 1.2.840.10008.1.1 | Yes | Yes |
| **Print Management** | | | |
| Basic Grayscale Print Management Meta SOP Class | 1.2.840.10008.5.1.1.9 | Yes | No |
| >Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Yes | No |
| >Printer SOP Class | 1.2.840.10008.5.1.1.16 | Yes | No |

| | | | |
|---|---|---|---|
| >Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Yes | No |
| >Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 | Yes | No |
| **Query/Retrieve** | | | |
| Study Root QR Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.1.2.2.1 | Yes | Yes |
| Study Root QR Information Model - MOVE SOP Class | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | Yes |
| **Transfer** | | | |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 | Yes | Yes |
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 | Yes | Yes |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 | Yes | Yes |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 | Yes | Yes |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 | Yes | Yes |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 | Yes | Yes |
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 | Yes | Yes |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 | Yes | Yes |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 | Yes | Yes |
| **Workflow Management** | | | |
| Modality Worklist Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.31 | Yes | No |
| Modality Performed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 | Yes | No |
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Yes | No |

In case a remote DICOM system supports both the Enhanced MR Image Storage SOP Class and the MR Image Storage SOP Class and on the MR system both SOP Classes are enabled, then the MR system holds a preference to send data in the Enhanced format.

**Table 2: Media Services**

| Media Storage Application Profile | File-set Creator (FSC) | File-set Updater (FSU) | File-set Reader (FSR) |
|---|---|---|---|
| **USB** | | | |
| General Purpose USB Media. | Yes | Yes | Yes |

MR supports USB devices for media storage.
Image compression is not supported.

# 2. Table of Contents

# 3. Introduction

The introduction specifies product and relevant disclaimers as well as any general information that the vendor feels is appropriate.

## 3.1. Revision History

The revision history provides dates and differences of the different releases.

**Table 1: Revision History**

| Document Version | Date of Issue | Description |
|---|---|---|
| 01 | 01-Aug-2022 | Initial version of MR R11.1 |

## 3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

## 3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to ensure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

## 3.4. Definitions, Terms and Abbreviations

**Table 2: Definitions, Terms and Abbreviations**

| Abbreviation/Term | Explanation |
|---|---|
| ACSE | Association Control Service Element |
| AE | Application Entity |
| AP | Application Profile |
| CD | Compact Disc |
| CT | Computed Tomography |
| DICOM | Digital Imaging and Communications in Medicine |
| DIMSE | DICOM Message Service Element |
| EBE | DICOM Explicit VR Big Endian |
| ELE | DICOM Explicit VR Little Endian |
| FSC | File-set Creator |
| PSC | Philips Support Connect (configuration editor) |
| FSR | File-set Reader |
| FSU | File-set Updater |
| GUI | Graphic User Interface |
| ILE | DICOM Implicit VR Little Endian |
| IOD | Information Object Definition |
| MPPS | Modality Performed Procedure Step |
| MR | Magnetic Resonance |
| NEMA | National Electrical Manufacturers Association |
| PDU | Protocol Data Unit |
| PDU | Protocol Data Units |
| RIS | Radiology Information System |
| RQ | Request |
| RSP | Response |
| RWA | Real-World Activity |
| SC | Secondary Capture |
| SCM | Study Component Management |
| SCP | Service Class Provider |
| SCU | Service Class User |
| SOP | Service Object Pair |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| UID | Unique Identifier |
| UL | Upper Layer |
| USB | Universal Serial Bus |
| WLM | Worklist Management |

## 3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 22 (NEMA PS 3.1- PS 3.22),
National Electrical Manufacturers Association
1300 North 17th Street
Suite 900
Arlington, Virginia 22209
Internet: https://www.dicomstandard.org/current
Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2022) plus all the supplements and correction items that have been approved as Final Text.

# 4. Networking

This section contains the networking related services (vs. the media related ones).

## 4.1. Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

### 4.1.1. Application Data Flow

The MR System incorporates two networking Application Entities (AE). The related networking application data flow as a functional overview of the MR system is shown in Figure 2:

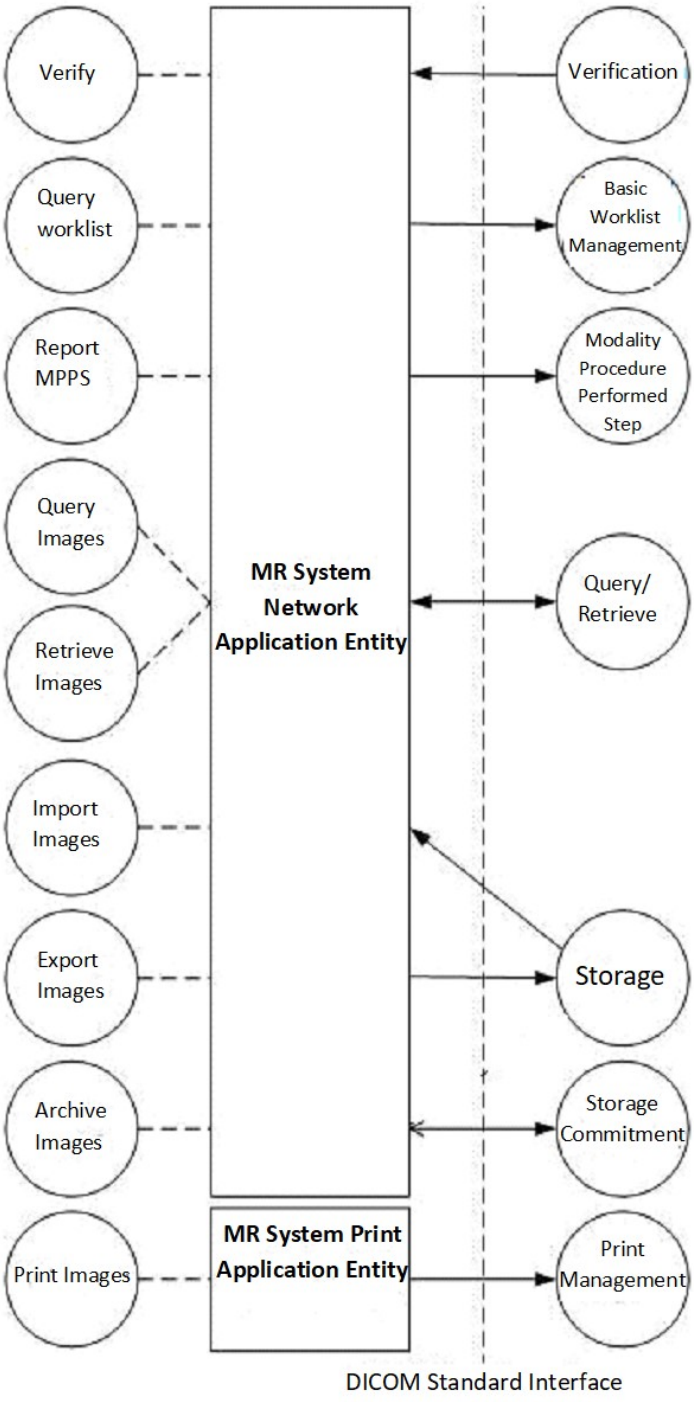


**Figure 2: MR System AE Data Flow Diagram**

## 4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

### 4.1.2.1. Functional Definition of MR AE

**Verification**
The MR System Network AE as Verification SCP implements the RWA Verify to handle verification requests.

**Query Worklist**
The MR System Network AE as Basic Worklist Management SCU implements the RWA Query Worklist to request the worklist from a DICOM Radiology Information System (RIS).
The function is initiated on the MR System by selecting the "RIS" device. After receiving the worklist data from the RIS the MR System will display the worklist on the user interface.
After selection of the relevant patient record the received patient data is displayed. The tags Performed Procedure Step Start Date – 0x0040,0244 and Performed Procedure Step Start Time- 0x0040,0245, are updated to the current date and time before the patient data is stored in the local database.

**Report MPPS**
The MR System Network AE as SCU implements the RWA Report MPPS to create and update a Modality Performed Procedure Step object.
The RWA is initiated at the start of the first scan of a new examination to inform the DICOM Radiology Information System (RIS) (status "IN-PROGRESS").
When the image objects has been acquired and archived one may click the "Complete Examination" button when the MPPS is completed or the "discontinue" button if the MPPS is discontinued. The MR System Network AE will send a new MPPS notification with the status "COMPLETED" or "DISCONTINUED".

**Query Images**
The MR System Network AE as Query/Retrieve SCU implements the RWA Query Images to find Examinations on a remote system (e.g. PACS).
The MR System Network AE as Query/Retrieve SCP implements the RWA Query Images to let a remote system find Examinations on the MR system.

**Retrieve Images**
The MR System Network AE as Query/Retrieve SCU implements the RWA Retrieve Images to initiate MOVE of selected objects from a remote system (e.g. PACS).
The MR System Network AE as Query/Retrieve SCP implements the RWA Retrieve Images to move selected objects to another DICOM node.

**Import Images**
The MR System Network AE as Storage SCP implements the RWA Import Images to store images and related objects from a remote archive System using the relevant storage SOP classes.
The MR System Network AE will respond to a remote request and store the images in the patient database. DICOM instances (Secondary Capture, original Grayscale Softcopy Presentation State, MR images from a Philips MR System and Private Philips MR SOP classes) may be imported for reference purposes only; when these are exported again then consistency and completeness cannot be guaranteed.

**Export Images**
The MR System Network AE as Storage SCU implements the RWA Export Images to store images and related object data on a remote system using the relevant storage SOP classes.
The acquired images and object data, as selected per Examinations, can be sent to a selected remote system, either manually or automatically.
The MR System can be configured to send Grayscale Softcopy Presentation State data for the selected Images.

If the Grayscale Softcopy Presentation State object is not configured to send, it will be included in the selected images as private sequence and will be converted to an overlay.
By default a considerable amount of information is stored in private attributes of the exported images and related objects. When modifying/processing those images such application is responsible for data consistency and therefore should use the private data elements with caution. These images cannot be imported anymore on the MR scanner.

- **Splitting series into different dimensions**
  In the PSC of the MR system, options are present that can be used to split series on export from the MR system to a remote system. Parameters for series splitting are: Echo, Phases, Image Types, Dynamic and Diffusion b-value. Only one dimension can be split in order of priority.
  Note that when several related split series are imported again from a remote node, these will be combined again into one series.
- **Converting images with color to color Secondary Capture images**
  If Enhanced MR sop class is supported, Grey Scale Images with COLOR LUT is always exported as Grey Scale Enhanced MR Image.

  If Enhanced MR Image sop class is not supported, then based on PSC option user can export it as Secondary Capture (RGB) or it can be sent as GreyScale MR Image.
  Conversion of COLOR LUT data to Secondary capture cannot be reversed.

  MR COLOR Image generated as RGB, will be exported as Secondary Capture Image irrespective of whether Enhanced MR SOP class is supported or not. It can be reversed back on Import.

**Archive Images**
The MR System Network AE implements the RWA Archive Images to store (as Storage SCU) and, if configured, commit (as Storage Commitment SCU) images on the configured remote archive (e.g. PACS) using the Storage and Storage Commitment Push Model SOP class.
After sending a series of images to the archive, the MR System will request a storage commitment from this archive for all exported images and related objects. The storage commitment status is indicated in the Patient Directory User Interface. Deleting image(s) is independent of commitment from the PACS on the local MR system.

#### 4.1.2.2. Functional Definition of MR System Print

The MR System Print AE as Print Management SCU implements the RWA Print Images to send and print images on a DICOM network printer using the Basic Grayscale Print Management Meta SOP class. After selecting the images, these can be sent to a DICOM network printer.

### 4.1.3. Sequencing of Real World Activities

#### 4.1.3.1. Description of specific Sequencing of Integrated Workflow as performed by the MR AE

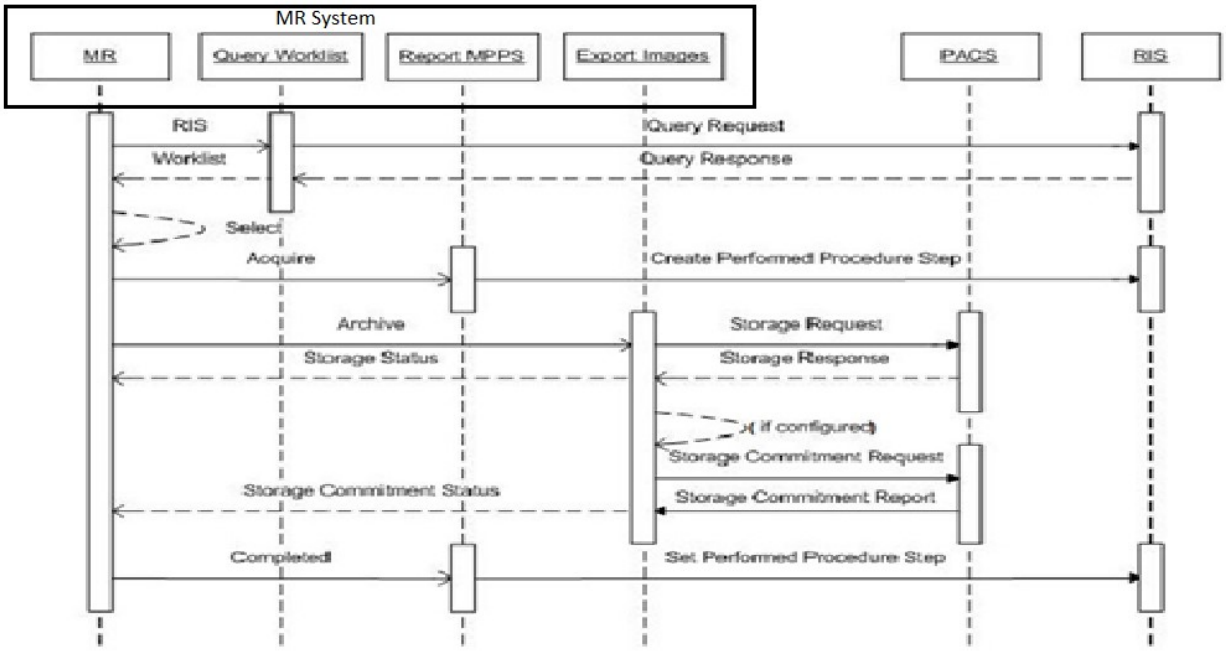


**Figure 3: Sequencing of Integrated Workflow**

Figure 3 shows a typical example of an integrated workflow (using a single acquisition, a single storage with commitment, without prefetching).

The MR System workflow is initiated by selecting the “RIS” device. After receiving the worklist data from the RIS the MR System will display the worklist on the user interface.

Then one may select a relevant patient record and add missing data or modify a restricted set of data only (as specified) before the received patient data is stored in the local database.
At the start and at the end of the acquisition/processing the configured MPPS system (RIS) is informed of the progress of the selected procedure step.

A remote system can send related images of one or more of the scheduled patients to the MR System (pre-fetching, for reference only).
After preparation of the scanner and the patient, the operator will perform the requested or locally planned procedure steps. Results may be MR images, Presentation State objects, object and screen-grabs stored as Secondary Capture images, MR Spectroscopy and Private Philips MR Series Data, images and other related objects; and data about the scan protocol and examcard data.

The created images are converted into DICOM objects that can be sent to the remote system, or can be written on local disk. After storage in a remote archive the MR System will request a storage commitment, if configured.

### 4.1.3.2. Description of specific Sequencing of Import Images per Query/Retrieve

Figure 4 shows a typical example of a sequence for import of a series of images per Query/Retrieve (e.g. pre-fetching).

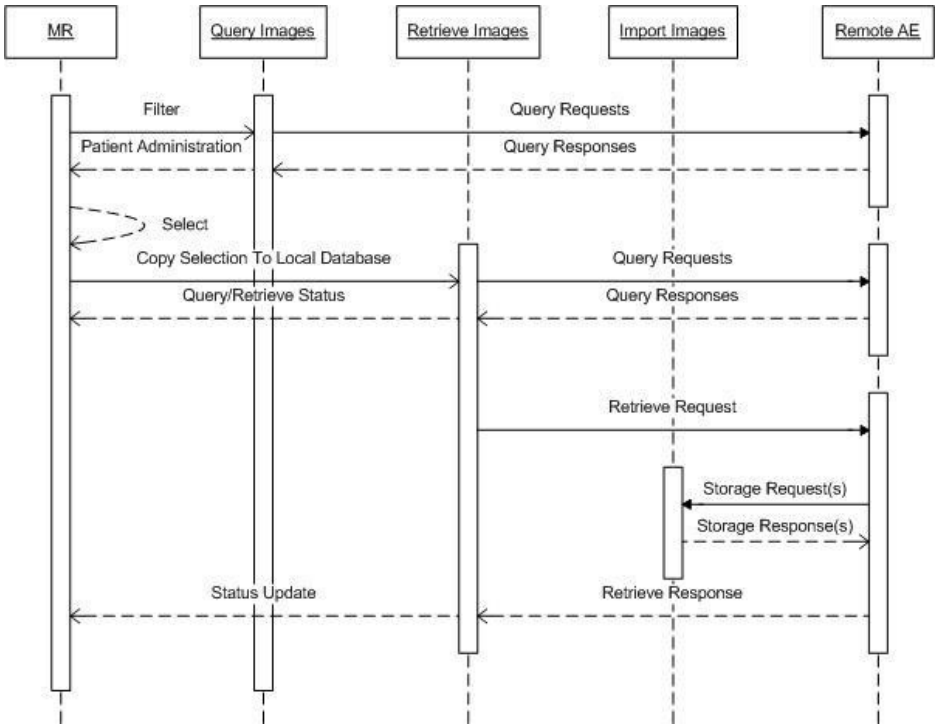


**Figure 4: Sequencing of import Images per Query/Retrieve**

The MR System sends initial query requests to the remote AE to find all Examinations matching the specified filter. After selecting the Examinations to be retrieved the copy selection to local database is initiated. This is followed by retrieve requests to the remote AE to move all required Series of Images. Then for each retrieve request the remote AE will store the related Images on the MR System. Query/Retrieve as SCP is supported by MR system.

Modality MR supports sending C-MOVE-RQ message with a move destination to its own AE only.

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

## 4.2. AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

### 4.2.1. MR AE

Detail of this specific Application Entity is specified in this section.

#### 4.2.1.1. SOP Classes

This MR Application Entity provides Standard Conformance to the SOP Classes mentioned in Table 5.

**Table 5: SOP Classes for MR AE**

| SOP Class Name | SOP Class UID | SCU | SCP |
|---|---|---|---|
| Verification SOP Class | 1.2.840.10008.1.1 | Yes | Yes |
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Yes | No |
| Modality Performed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 | Yes | No |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 | Yes | Yes |
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 | Yes | Yes |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 | Yes | Yes |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 | Yes | Yes |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 | Yes | Yes |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 | Yes | Yes |
| Study Root QR Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.1.2.2.1 | Yes | Yes |
| Study Root QR Information Model - MOVE SOP Class | 1.2.840.10008.5.1.4.1.2.2.2 | Yes | Yes |
| Modality Worklist Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.31 | Yes | No |
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 | Yes | Yes |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 | Yes | Yes |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 | Yes | Yes |

MR Series can be exported either as Enhanced MR Image Storage or as ‘classic’ MR Image Storage. If both are supported by the destination, the Enhanced MR Image storage is preferred. This is configurable via PSC.

**Note:**

- RAW Data Storage is used to store MR Series Data and MR Examcard data if this is supported by the destination even if the Philips private SOP classes are supported.
- Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

#### 4.2.1.2. Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

##### 4.2.1.2.1. General

The DICOM standard application context is specified in Table 6.

**Table 6: DICOM Application Context**

| Description | Value |
|---|---|
| Application Context Name | 1.2.840.10008.3.1.1.1 |

##### 4.2.1.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified in Table 7 and Table 8.

**Table 7: Number of associations as an Association Initiator for this AE**

| Description | Value |
|---|---|
| Maximum number of simultaneous associations | 4 (fixed) |

**Table 8: Number of associations as an Association Acceptor for this AE**

| Description | Value |
|---|---|
| Maximum number of simultaneous incoming associations | 50 (fixed) |

#### 4.2.1.2.3. Asynchronous Nature

The MR System Network AE supports both synchronous and asynchronous operations for Storage Commitment. User will be able to configure synchronous or asynchronous.

#### 4.2.1.2.4. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented in Table 9.

**Table 9: DICOM Implementation Class and Version for MR AE**

| | |
|---|---|
| Implementation Class UID | 1.3.46.670589.54.2.111.0 |
| Implementation Version Name | Philips MR 111.0 |

#### 4.2.1.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the next table.

**Table 10: Communication Failure Behavior**

| Exception | Behavior |
|---|---|
| ARTIM Timeout | Association setup failed and is closed. The reason is logged and reported to the user. |

### 4.2.1.3. Association Initiation Policy

The MR AE initiates associations as a result of the following events:
-The operator or a remote (Query/Retrieve) application copies selected images from the MR System.
-The operator requests to print selected images of the MR system database.
-The operator queries a remote database.
-The operator copies selected images from a remote database to another database.
-The archive requests storage commitment of images on a remote database.
The possible Reject Responses during Association are shown in Table 11.

**Table 11: Association Rejection response**

| Result | Source | Reason/Diagnosis | Behavior |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 - rejectedpermanent | 1 - DICOM UL service-user | 1 - no-reason-given | The user will be informed. The information is logged in central log file. |
| | | 2 - application-context-name-not supported | The user will be informed. The information is logged in central log file. |
| | | 3 - calling-AE-title-not-recognized | The user will be informed. The information is logged in central log file. |
| | | 7 - called-AE-title-not-recognized | The user will be informed. The information is logged in central log file. |
| | 2 - DICOM UL service-provider (ACSE related function) | 1 - no-reason-given | The user will be informed. The information is logged in central log file. |
| | | 2 - protocol-version-notsupported | The user will be informed. The information is logged in central log file. |
| | 3 - DICOM UL service-provider (Presentation related function) | 1 - temporary-congestion | The user will be informed. The information is logged in central log file. |
| | | 2 - local-limit-exceeded | The user will be informed. The information is logged in central log file. |
| 2 - rejectedtransient | 1 - DICOM UL service-user | 1 - no-reason-given | The user will be informed. The information is logged in central log file. |
| | | 2 - application-context-name-notsupported | The user will be informed. The information is logged in central log file. |
| | | 3 - calling-AE-title-not-recognized | The user will be informed. The information is logged in central log file. |
| | | 7 - called-AE-title-not-recognized | The user will be informed. The information is logged in central log file. |
| | 2 - DICOM UL service-provider (ACSE related function) | 1 - no-reason-given | The user will be informed. The information is logged in central log file. |
| | | 2 - protocol-version-notsupported | The user will be informed. The information is logged in central log file. |
| | 3 - DICOM UL service-provider (Presentation related function) | 1 - temporary-congestion | The user will be informed. The information is logged in central log file. |
| | | 2 - local-limit-exceeded | The user will be informed. The information is logged in central log file. |

The possible association Abort Responses is listed in Table 12.

**Table 12: Association Abort Handling**

| Source | Reason/Diagnosis | Behavior |
|---|---|---|
| 0 - DICOM UL service-user (initiated abort) | 0 - reason-not-specified | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- There are problems in SCU/SCP role negotiation.<br>- Any other problem than the ones specified for the MR System as SCU in the rows below.<br>- When received, the Network AE terminates the connection and logs the event. |
| **Source** | **Reason/Diagnosis** | **Behavior** |

| | | |
|---|---|---|
| 2 - DICOM UL service-provider (initiated abort) | 0 - reason-not-specified | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- There are problems in SCU/SCP role negotiation.<br>- Any other problem than the ones specified for the MR System as SCU in the rows below. |
| | 1 - unrecognized-PDU | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- An unrecognized PDU type is received. |
| | 2 - unexpected-PDU | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- The received PDU type is not expected in the current state of connection. |
| | 4 - unrecognized-PDUparameter | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- An unrecognized Associate PDU item is received. |
| | 5 - unexpected-PDUparameter | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- One of the Associate PDU items is received more than once.<br>- One of the Associate PDU items is received unexpectedly. |
| | 6 - invalid-PDU-parametervalue | When received, the Network AE terminates the connection and logs the event.<br>This is Sent when:<br>- One of the Associate PDU items is received more than once.<br>- One of the Associate PDU items is not received.<br>There is mismatch in the application context names between the SCU and the SCP.<br>- Illegal Asynchronous Operations Window invoke value is received.<br>- Illegal Asynchronous Operations Window perform value is received.<br>- Unknown presentation context id is received.<br>Unknown abstract syntax is received.<br>- The length or the format of a received PDU item is invalid. |

#### 4.2.1.3.1. (Real-World) Activity – Verification as SCU

##### 4.2.1.3.1.1. Description and Sequencing of Activities

As defined by the MR System RWA Verify, the Network AE acts as a Verification SCP for any remote Verification SCU.

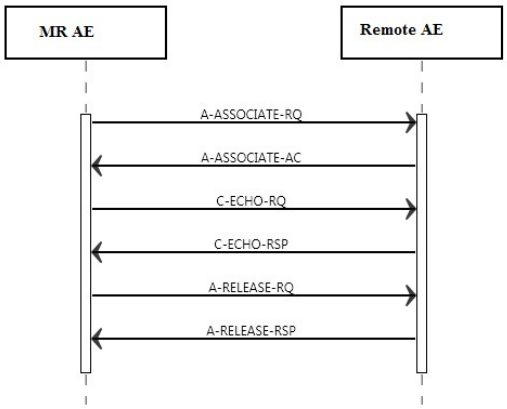


**Figure 5: Sequencing of Verify**

The Network AE accepts associations to verify application level communication using the C-ECHO command.

##### 4.2.1.3.1.2. Proposed Presentation Contexts

The presentation contexts for Verification are defined in Table 13.

**Table 13: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Verification SOP Class | 1.2.840.10008.1.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE and is chosen in case multiple Transfer Syntaxes are proposed in the Association Negotiation.
The MR System Network AE can accept multiple proposed Presentation Contexts with the same SOP class but different Transfer Syntaxes.
There is no check for duplicate contexts and these will therefore be accepted by MR. No extended negotiations supported by MR System Network AE.

#### 4.2.1.3.1.3. SOP Specific Conformance for Verification SOP Class

##### 4.2.1.3.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCU

The Dataset Specific Response behavior is as shown in Table 14.

**Table 14: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Confirmation | Message in log file. |

### 4.2.1.3.2. (Real-World) Activity – Modality worklist as SCU

#### 4.2.1.3.2.1. Description and Sequencing of Activities

The MR System RWA Query Worklist may be used to provide or update the worklist for the MR System.

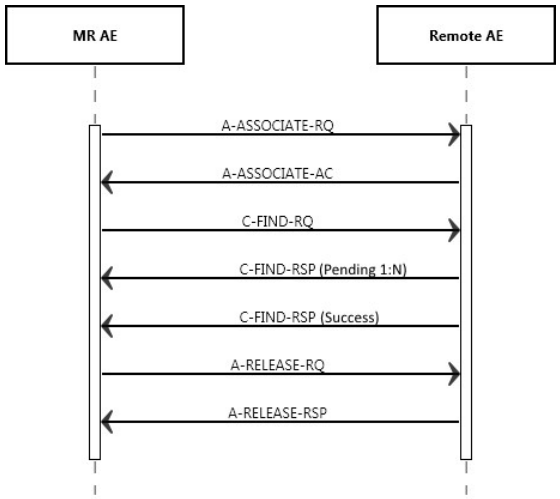


**Figure 6: Sequencing of Query Worklist**

The Query Worklist function is accessible through the MR System user interface. An association will be initiated to the configured remote system (typically a RIS) to send the worklist query. The RIS processes the query and returns the Worklist to the MR scanner. After receiving the Worklist the association will be released.

#### 4.2.1.3.2.2. Proposed Presentation Contexts

The proposed presentation contexts for Modality Worklist as SCU are defined in Table 15.

**Table 15: Proposed Presentation Contexts for (Real-World) Activity – Modality worklist as SCU**

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

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

#### 4.2.1.3.2.3. SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

The MR System provides the RIS dialog to enter criteria for the matching keys. The use of Specific Character Set is as specified in chapter 6, Support of Character Sets. Table 16 lists the attributes that are shown in the Patient Registration UI and provides the mapping of the DICOM attribute to the UI entry.

**Table 16: Mapping between UI Fields and DICOM Attributes for New Exam.**

| UI Entry | DICOM Element Name | DICOM Element Tag | Exam Entry Editable | |
|---|---|---|---|---|
| | | | Manual | RIS |
| Examination | | | | |
| Accession number | Accession Number | (0008,0050) | Yes | Yes* |
| Referring Physician | Referring Physician's Name | (0008,0090) | Yes | Yes* |

| | | | | |
|---|---|---|---|---|
| Performing Physician | Performing Physician | (0008,1050) | Yes | Yes |
| Patient's name | Patient's Name | (0010,0010) | Yes | Yes* |
| Registration ID | Patient ID | (0010,0020) | Yes | Yes* |
| | Other Patient IDs | (0010,1000) | Yes | No |
| Date of birth | Patient's Birth Date | (0010,0030) | Yes | Yes* |
| Sex | Patient's Sex | (0010,0040) | Yes | Yes* |
| Patient weight | Patient's Weight | (0010,1030) | Yes | Yes |
| | Scheduled Procedure Step Sequence | (0040,0100) | No | No |
| Study Description | Study Description | (0008,1030) | Yes | No |
| | > Scheduled Procedure Step Description of Scheduled Procedure Step *** | (0040,0007) | | |
| Exam date | Study Date | (0008,0020) | Yes | Yes |
| | Performed Procedure Step Start Date | (0040,0244) | Yes | Yes |
| | Performed Procedure Step End Date | (0040,0250) | Yes | Yes |
| Comments | Study Comments | (0032,4000) | Yes | Yes |
| | Comments on the Performed Procedure Step | (0040,0280) | Yes | Yes |
| Implant | Metal Implant Status | (2005,1578) | Yes | Yes |
| Allowed SAR Mode | SAR Operation Mode | (2005,1581) | Yes | Yes |
| Maximum SAR | MaxSAR | (2005,1575) | Yes | Yes |
| Max DB/dt | MaxDbDt | (2005,1574) | Yes | Yes |
| Maximum SAR B1+RMS | MRStudyB1rms | (2005,1587) | Yes | Yes |
| General Worklist (RIS) | | | | |
| Medical Alerts | Medical Alerts | (0010,2000) | Yes | Yes |
| Allergies | Contrast Allergies | (0010,2110) | Yes | Yes |
| Pregnancy Status | Pregnancy Status | (0010,21C0) | Yes | Yes |
| Requested Procedure | Requested Procedure Code Sequence | (0032,1064) | No | No |
| Code Value | > Code Value | (0008,0100) | No | No |
| Code Scheme Designator | > Coding Scheme Designator | (0008,0102) | No | No |
| Code Scheme Version | >Coding Scheme Version | (0008,0103) | No | No |
| Code Meaning | > Code Meaning | (0008,0104) | No | No |
| Procedure ID | Requested Procedure ID | (0040,1001) | No | No |
| Comments | Requested Procedure Comments | (0040,1400) | No | No |
| Procedure Step Description | > Scheduled Procedure Step Description | (0040,0007) | No | No |
| Scheduled Procedure Step | | | | |
| | Scheduled Procedure Step Sequence | (0040,0100) | No | No |
| Modality | > Modality | (0008,0060) | No | No |
| | > Scheduled Procedure Step Start Date | (0040,0002) | No | No |
| | > Scheduled Procedure Step Start Time | (0040,0003) | No | No |
| | > Scheduled Protocol Code Sequence | (0040,0008) | No | No |

| UI Entry | DICOM Element Name | DICOM Element Tag | Exam Entry Editable | |
|---|---|---|---|---|
| | | | Manual | RIS |
| Code Value | >> Code Value | (0008,0100) | No | No |
| Coding Scheme Designator | >> Coding Scheme Designator | (0008,0102) | No | No |
| Code Scheme Version | >> Coding Scheme Version | (0008,0103) | No | No |
| Code Meaning | >> Code Meaning | (0008,0104) | No | No |
| Procedure Step Description | > Scheduled Procedure Step Description | (0040,0007) | No | No |
| Procedure Step ID | > Scheduled Procedure Step ID | (0040,0009) | No | No |
| Pre-Medication | > Pre-Medication | (0040,0012) | No | No |
| Comments | > Comments on the Scheduled Procedure Step | (0040,0400) | No | No |
| Performed Procedure Step | | | | |
| | Performed Protocol Code Sequence | (0040,0260) | No | No |
| Code Value | >> Code Value | (0008,0100) | Yes | Yes |
| Coding Scheme Designator | >> Coding Scheme Designator | (0008,0102) | Yes | Yes |
| Code Scheme Version | >> Coding Scheme Version | (0008,0103) | Yes | Yes |
| Code Meaning | >> Code Meaning | (0008,0104) | Yes | Yes |
| Comments | Study Comments | (0032,4000) | Yes | Yes |
| | Comments on the Performed Procedure Step** | (0040,0280) | Yes | Yes |

*Date of birth is editable only if it comes empty from the RIS.
**Comments on the Performed Procedure Step are copied from the Comments on scheduled procedure Step.
***Study Description is copied from Scheduled Procedure Step Description of Scheduled Procedure Step

#### 4.2.1.3.2.3.1. Dataset Specific Conformance for Modality Worklist Information Model - FIND SOP Class C-FIND-SCU

**Table 17 should be read as follows:**

| | |
|---|---|
| Attribute Name: | Attributes supported to build a Modality Worklist Request Identifier. |
| Tag: | DICOM tag for this attribute. |
| VR: | DICOM VR for this attribute. |
| M: | Matching Keys for (automatic) Worklist Update. |
| R: | Return Keys. An "X" indicates that this attribute as matching key can be used. |
| Q: | Interactive Query Key. An "X" indicates that this attribute as matching key can be used. |
| D: | Displayed Keys. An "X" indicates that this attribute is displayed when registering a new patient in the New Exam window. |
| IOD: | An "X" indicates that this attribute is included in all exported images after execution of the related Procedure Step. |
| Type of matching: | The following types of matching exists:<br>Single Value Matching<br>List of UID Matching<br>Wild Card Matching<br>Range Matching<br>Sequence Matching<br>Universal Matching |

### Table 17: Worklist Request Identifier

| Attribute Name | Tag | VR | M | R | Q | | D | IOD | Type of Matching | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| **Patient Identification Module** | | | | | | | | | | |
| Other Patient IDs | 0010,1000 | LO | | X | | | | X | | |
| Patient's Name | 0010,0010 | PN | X | X | X | | X | X | | |
| Patient ID | 0010,0020 | LO | X | X | X | | X | X | Universal | Registration ID in UI |
| **Patient Demographic Module** | | | | | | | | | | |
| Ethnic Group | 0010,2160 | SH | | X | | | | X | | |
| Patient Comments | 0010,4000 | LT | | X | | | | X | | |
| Patient's Birth Date | 0010,0030 | DA | | X | | | X | X | Universal | |
| Patient's Sex | 0010,0040 | CS | | X | | | X | X | | |
| Patient's Weight | 0010,1030 | DS | | X | | | X | X | | |
| Patient's Size | 0010,1020 | DS | | X | | | | X | | |
| **Patient Medical Module** | | | | | | | | | | |
| Additional Patient History | 0010,21B0 | LT | | X | | | | X | | |
| Allergies | 0010,2110 | LO | | X | | | X | X | | |
| Medical Alerts | 0010,2000 | LO | | X | | | X | X | | |
| Pregnancy Status | 0010,21C0 | US | | X | | | X | X | | |
| Names of Intended Recipients of Results | 0040,1010 | PN | | X | | | | X | | |
| Patient's Institution Residence | 0038,0400 | LO | | X | | | | X | | |
| Study Comments | 0032,4000 | LT | | X | | | | X | | |
| Patient Comments | 0010,4000 | LT | | X | | | | X | | |
| Patient's Birth Time | 0010,0032 | TM | | X | | | | X | | |
| Performing Physician's Name | 0008,1050 | PN | | X | | | | X | | |
| Physician(s) of Record | 0008,1048 | PM | | X | | | | X | | |
| Study Description | 0008,1030 | LO | | X | | | | X | | |
| **Visit Status Module** | | | | | | | | | | |
| Current Patient Location | 0038,0300 | LO | | X | | | | | | |
| **SOP Common Module** | | | | | | | | | | |
| Specific Character Set | 0008,0005 | CS | | X | | | | X | | Required if expanded/replacement character set used. |
| **Scheduled Procedure Step Module** | | | | | | | | | | |
| Scheduled Procedure Step Sequence | 0040,0100 | SQ | | X | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| >Comments on the Scheduled Procedure Step | 0040,0400 | LT | | X | | | X | | | |
| >Modality | 0008,0060 | CS | X | X | X | | X | X | Single Value | Select * or MR.<br>Default value is empty |
| >Pre-Medication | 0040,0012 | LO | | X | | | | | | |
| >Requested Contrast Agent | 0032,1070 | LO | | X | | | | | | |
| >Scheduled Performing Physician's Name | 0040,0006 | PN | | X | X | | X | X | | |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | X | | | X | X | | |
| >Scheduled Procedure Step End Date | 0040,0004 | DA | | X | X | | X | X | Single Value | UI requires positive number of days excluding today Ex. 1 |
| >Scheduled Procedure Step End Time | 0040,0005 | TM | | X | | | | X | | |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | X | | | | X | | |
| >Scheduled Procedure Step Location | 0040,0011 | SH | | X | | | | | | |
| >Scheduled Procedure Step Start Date | 0040,0002 | DA | X | X | X | | X | X | Single Value | UI requires positive number of days including today. Ex 1 |
| >Scheduled Procedure Step Start Time | 0040,0003 | TM | | X | | | | X | | |
| >Scheduled Procedure Step Status | 0040,0020 | CS | | X | | | | | | |
| >Scheduled Station AE Title | 0040,0001 | AE | X | X | X | | X | | Single Value | Select one of the configured AE Titles. Default value is the local AE Title. |
| >Scheduled Station Name | 0040,0010 | SH | | X | | | | | | |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | X | | | | X | | |
| >>Code Meaning | 0008,0104 | LO | | X | | | | X | | |
| >>Code Value | 0008,0100 | SH | | X | | | | X | | |
| >>Coding Scheme Designator | 0008,0102 | SH | | X | | | | X | | |
| >>Coding Scheme Version | 0008,0103 | SH | | X | | | | X | | |
| **Requested Procedure Module** | | | | | | | | | | |
| Names of Intended Recipients of Results | 0040,1010 | PN | | X | | | | | | |
| Requested Procedure Comments | 0040,1400 | LT | | X | | | | X | | |
| Requested Procedure Description | 0032,1060 | LO | | X | | | | X | | |
| Requested Procedure ID | 0040,1001 | SH | X | X | X | | | X | | |
| Study Instance UID | 0020,000D | UI | | X | | | | X | | |
| Referenced Study Sequence | 0008,1110 | SQ | | X | | | | X | | |
| >Referenced SOP Class UID | 0008,1150 | UI | | X | | | | X | | |
| >Referenced SOP Instance UID | 0008,1155 | UI | | X | | | | X | | |
| Requested Procedure Code Sequence | 0032,1064 | SQ | | X | | | | | | |
| >Code Meaning | 0008,0104 | LO | | X | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| >Code Value | 0008,0100 | SH | | X | | | | | | |
| >Coding Scheme Designator | 0008,0102 | SH | | X | | | | | | |
| >Coding Scheme Version | 0008,0103 | SH | | X | | | | | | |
| > Mapping Resource | 0008,0105 | CS | | X | | | | | | |
| >Context Group Version | 0008,0106 | DT | | X | | | | | | |
| >Context Group Local Version | 0008,0107 | DT | | X | | | | | | |
| >Context Group Extension Creator UID | 0008,010D | UI | | | | | | | | |
| **Imaging Service Request Module** | | | | | | | | | | |
| Accession Number | 0008,0050 | SH | X | X | X | | X | X | Single Value | Any value, Default value is empty. |
| Imaging Service Request Comments | 0040,2400 | LT | | X | | | | | | |
| Referring Physician's Name | 0008,0090 | PN | | X | | | X | X | | |
| Requesting Physician | 0032,1032 | PN | | X | | | | X | | |
| Requesting Service | 0032,1033 | LO | | X | | | | X | | |

The possible Status Responses during a Worklist query are shown in Table 18.

**Table 18: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Matching is complete | The query results are displayed. The association is released. Report message in console. |
| Failed | A900 | Identifier does not match SOP | No query results are displayed. The association is released. The reason is logged and reported by message in console. |
| | Cxxx | Unable to process | No query results are displayed. The association is released. The reason is logged and reported by message in console. |
| Refused | A700 | Out of resources | No query results are displayed. The association is released. The reason is logged and reported by message in console. |
| Pending | FF00 | Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys | The Query Worklist job continues. |
| | FF01 | Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier | The Query Worklist job continues. |
| Cancel | FE00 | Matching terminated due to Cancel request | No query results are displayed. The association is released. The reason is logged and reported by message in console. |

The possible Communication Failures during a Worklist query are shown in Table 19.

**Table 19: DICOM Command Communication Failure Behavior.**

| Exception | Behavior |
|---|---|

| | |
|---|---|
| ARTIM Time-out | The Query Worklist job fails and the association is aborted. The reason is logged and reported to the user. |
| Association Time-out SCU | The association is released. |
| **Exception** | **Behavior** |
| Association Aborted | The query fails. The reason is logged and reported to the user. |

#### 4.2.1.3.3. (Real-World) Activity – Modality Performed Procedure Step as SCU

##### 4.2.1.3.3.1. Description and Sequencing of Activities

When the first scan of an examination is initiated the Network AE sets up an association to the MPPS server (typically a RIS) and sends an N-CREATE message with all appropriate information about the examination on the MR scanner; the status will be set to IN-PROGRESS.
After clicking the “Ready” or “Incomplete” button the Network AE will Archive Images that were acquired (only those that have not been archived yet) and send an N-SET message with the end date and end time and a status of respectively “COMPLETED” or “DISCONTINUED”. The MPPS function is independent of the use of storage commitment.
The sequence diagram in figure 7 shows the interaction for the MR System RWA Report MPPS.

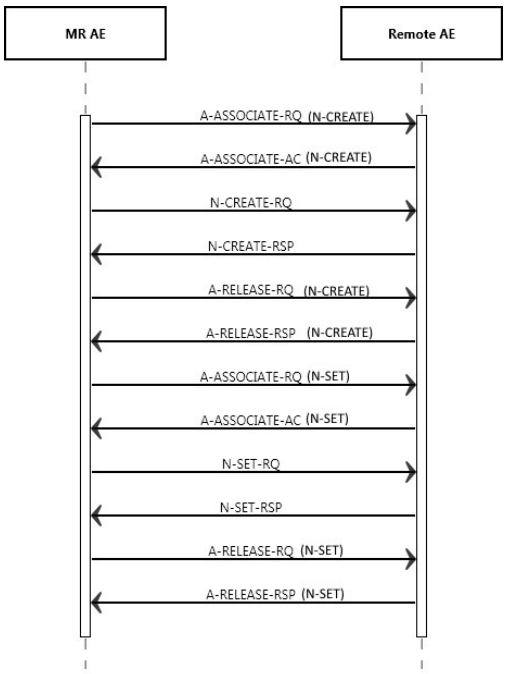


**Figure 7: Sequencing of Report MPPS**

##### 4.2.1.3.3.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Report MPPS is defined in Table 20.

**Table 20: Proposed Presentation Contexts for (Real-World) Activity – Modality Performed Procedure Step As SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Modality Performed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

Note that the order of the proposed transfer syntaxes is configurable.

#### 4.2.1.3.3.3. SOP Specific Conformance for Modality Performed Procedure Step SOP Class

The mapping of attributes for Report MPPS is specified in chapter 8.1.2.

##### 4.2.1.3.3.3.1. Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

The possible responses behavior for N-CREATE-RQ is shown in Table 21.

**Table 21: MPPS Request Identifiers for N-CREATE-RQ**

| Attribute Name | Tag | VR | Value | Comment |
|---|---|---|---|---|
| **SOP Common Module** | | | | |
| Specific Character Set | 0008,0005 | CS | Default: ISO_IR 100. GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 | Attribute required if expanded character set used |
| **Performed Procedure Step Relationship Module** | | | | |
| Patient ID | 0010,0020 | LO | | |
| Patient's Birth Date | 0010,0030 | DA | | |
| Patient's Name | 0010,0010 | PN | | |
| Patient's Sex | 0010,0040 | CS | F, M, O | |
| Referenced Patient Sequence | 0008,1120 | SQ | | |

| | | | | |
|---|---|---|---|---|
| Scheduled Step Attributes Sequence | 0040,0270 | SQ | | |
| >Accession Number | 0008,0050 | SH | | |
| >Requested Procedure Description | 0032,1060 | LO | | |
| >Requested Procedure ID | 0040,1001 | SH | | |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | |
| >Study Instance UID | 0020,000D | UI | | |
| >Referenced Study Sequence | 0008,1110 | SQ | | |
| >>Referenced SOP Class UID | 0008,1150 | UI | | |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | |
| >>Code Value | 0008,0100 | SH | | |
| >>Coding Scheme Designator | 0008,0102 | SH | | |
| >>Coding Scheme Version | 0008,0103 | SH | | |
| >>Code Meaning | 0008,0104 | LO | | |
| **Performed Procedure Step Information Module** | | | | |
| Performed Location | 0040,0243 | SH | | |
| Performed Procedure Step Description | 0040,0254 | LO | | |
| Performed Procedure Step End Date | 0040,0250 | DA | | |
| **Attribute Name** | **Tag** | **VR** | **Value** | **Comment** |
| Performed Procedure Step End Time | 0040,0251 | TM | | |
| Performed Procedure Step ID | 0040,0253 | SH | | |
| Performed Procedure Step Start Date | 0040,0244 | DA | | |
| Performed Procedure Step Start Time | 0040,0245 | TM | | |
| Performed Procedure Step Status | 0040,0252 | CS | IN PROGRESS | |
| Performed Procedure Type Description | 0040,0255 | LO | | |
| Performed Station AE Title | 0040,0241 | AE | | |
| Performed Station Name | 0040,0242 | SH | | |
| Performed Procedure Step Discontinuation Reason Code Sequence | 0040,0281 | SQ | | |
| Procedure Code Sequence | 0008,1032 | SQ | | |
| >Code Value | 0008,0100 | SH | | |
| >Coding Scheme Designator | 0008,0102 | SH | | |
| >Code Meaning | 0008,0104 | LO | | |
| **Image Acquisition Results Module** | | | | |
| Modality | 0008,0060 | CS | MR | Applied value: MR |
| Study ID | 0020,0010 | SH | | |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | |
| >Code Value | 0008,0100 | SH | | |
| >Coding Scheme Designator | 0008,0102 | SH | | |

| | | | | |
|---|---|---|---|---|
| >Coding Scheme Version | 0008,0103 | SH | | |
| >Code Meaning | 0008,0104 | LO | | |
| >Protocol Context Sequence | 0040,0440 | SQ | | |
| Performed Series Sequence | 0040,0340 | SQ | | Always EMPTY |
| >Code Value | 0008,0100 | SH | | |
| >Coding Scheme Designator | 0008,0102 | SH | | |
| >Coding Scheme Version | 0008,0103 | SH | | |
| >Code Meaning | 0008,0104 | LO | | |
| >Protocol Context Sequence | 0040,0440 | SQ | | |
| **Billing And Material Management Code Module** | | | | |
| Film Consumption Sequence | 0040,0321 | SQ | | Always EMPTY |

The possible status responses for N-CREATE-RQ actions are shown in Table 22.

**Table 22: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Conformation, Matching is complete | The SCU has successfully returned all matching information. The association will be released. Message in console. |
| Failed | xxxx | (any other failure) | The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Message in console. The reason is logged. |
| | 0110 | Performed procedure step object may no longer be updated | (Error ID A710) Message in console. The reason is logged. |
| Warning | 0116 | Attribute Value Out of Range | The MPPS operation is considered successful but the status meaning is logged. Additional information in the Response identifying the attributes out of range will be logged (i.e. Elements in the Modification List / Attribute List) |

#### 4.2.1.3.3.3.2. Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-SET-SCU

The possible responses behavior for N-SET-RQ is shown Table 23.

**Table 23: MPPS Request Identifiers for N-SET-RQ**

| Attribute Name | Tag | VR | Value | Comment |
|---|---|---|---|---|
| **Performed Procedure Step Information Module** | | | | |
| Performed Procedure Step Description | 0040,0254 | LO | | |
| Performed Procedure Step End Date | 0040,0250 | DA | | |
| Performed Procedure Type Description | 0040,0255 | LO | | |
| Performed Procedure Step End Time | 0040,0251 | TM | | |

| | | | | |
|---|---|---|---|---|
| Performed Procedure Step Status | 0040,0252 | CS | IN-PROGRESS<br>COMPLETED,<br>DISCONTINUED | |
| Specific Character Set | 0008,0005 | CS | | |
| Procedure Code Sequence | 0008,1032 | SQ | | |
| Code Value | 0008,0100 | SH | | |
| Coding Scheme Designator | 0008,0102 | SH | | |
| Coding Scheme Version | 0008,0103 | SH | | |
| Code Meaning | 0008,0104 | LO | | |
| **Image Acquisition Results Module** | | | | |
| Performed Series Sequence | 0040,0340 | SQ | | |
| >Operators' Name | 0008,1070 | PN | | |
| >Performing Physician's Name | 0008,1050 | PN | | |
| >Protocol Name | 0018,1030 | LO | | |
| >Retrieve AE Title | 0008,0054 | AE | | |
| >Series Description | 0008,103E | LO | | |
| >Series Instance UID | 0020,000E | UI | | |
| >Referenced Image Sequence | 0008,1140 | SQ | | |

Possible status responses from N-SET-RQ actions are shown in Table 24.

**Table 24: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Confirmation, The SCP has completed the operation successfully. | The association will be released. Message in console. The SCU has successfully returned all matching information |
| Failed | 0110 | Performed procedure step object may no longer be updated | (Error ID A710) Message in console. The reason is logged. |
| | xxxx | (Any other status code.) | The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Message in console. The reason is logged. |
| Warning | 0116 | Attribute Value Out of Range | The MPPS operation is considered successful but the status meaning is logged. Additional information in the Response identifying the attributes out of range will be logged (i.e. Elements in the Modification List/Attribute List) |

#### 4.2.1.3.4. (Real-World) Activity – FIND as SCU

##### 4.2.1.3.4.1. Description and Sequencing of Activities

The MR System RWA Find as SCU (Find Remote Images) involves the query of a remote system to find matching data in the remote database. The operator queries a remote database by means of the query tool in the MR System. After clicking the Patient Directory and selecting the configured PACS/Network, the window offers the possibility to enter the required matching keys. The operator clicks on the “Search PACS/Network” button to activate the specified filter settings.

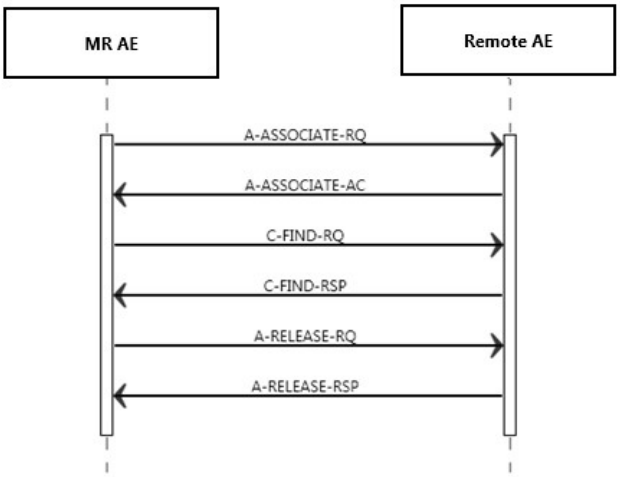


**Figure 8: (Real World) Activity – Find Remote Images**

The Network AE will try and request an association with the Query/Retrieve SCP. Then a query filter can be specified and the Network AE initiates a new association to send query requests (as specified in the Filter dialog) to the Query/Retrieve SCP for Study level query (for Study Root model)
The association is released when the execution of the query completes.

##### 4.2.1.3.4.2. Proposed Presentation Contexts

The proposed presentation contexts for FIND as SCU are defined in Table 25.

**Table 25: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Study Root QR Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.1.2.2.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, Non-Hierarchical, FOP(Process 14) | 1.2.840.10008.1.2.4.70 | | |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

The MR System does not support extended negotiations.

#### 4.2.1.3.4.3. SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

The MR System provides standard conformance to this SOP class. The MR System AE does not generate queries containing optional keys and it does not generate relational queries.

##### 4.2.1.3.4.3.1. Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

In table 26 the supported query keys for each query level are described. Universal matching is supported as default.

**Table 26: Supported Query Keys for Study Root Information Model**

| Study Root Information Model | | | | |
|---|---|---|---|---|
| **Attribute Name** | **Tag** | **VR** | **Matching Key Type** | **Comments** |
| Query/Retrieve Level | 0008,0052 | CS | | STUDY |
| **Q/R Study Level** | | | | |
| Study Date | 0008,0020 | DA | Wild Card, Range | |
| Study Time | 0008,0030 | TM | Wild Card | |
| Accession Number | 0008,0050 | SH | Wild Card, Single Value | |
| Modalities in Study | 0008,0061 | CS | Wild Card, Single Value | |
| Referring Physician's Name | 0008,0090 | PN | Wild Card | |
| Study Description | 0008,1030 | LO | Wild Card, Single Value | |
| Patient Name | 0010,0010 | PN | Wild Card, Single Value | |
| Patient ID | 0010,0020 | LO | Wild Card, Single Value | |
| Patient's Birth Date | 0010,0030 | DA | Wild Card, Single Value | |
| Patient's Birth Time | 0010,0032 | TM | Wild Card | |
| Patient's Sex | 0010,0040 | CS | Wild Card | |
| Study Instance UID | 0020,000D | UI | Wild Card | |
| Study ID | 0020,0010 | SH | Wild Card | |

The possible Status Responses for Study Root Information Model are shown in Table 27.

**Table 27: Status response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Matching is complete | The find results are displayed. |
| Refused | A700 | Out of Resources | No find results are displayed. The reason is logged. |

| | | | |
|---|---|---|---|
| Failed | A900 | Identifier does not match SOP class | No find results are displayed. The reason is logged. |
| | Cxxx | Unable to process | No find results are displayed. The reason is logged. |
| Cancel | FE00 | Matching terminated due to Cancel Request | No find results are displayed. The reason is logged. |
| Pending | FF00 | Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys | The find command continues. |
| | FF01 | Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier | The find command continues. |

The possible Communication Failures for Study Root Information Model are listed in Table 28.

**Table 28: DICOM Command Communication Failure Behavior for Study Root Information Model.**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | N/A |
| Reply Time-out | The query fails and the association is aborted. The reason is logged and reported to the user. |
| Association Time-out SCU | The association is released. |
| Association Aborted | The query fails. The reason is logged and reported to the user. |

#### 4.2.1.3.5. (Real-World) Activity – MOVE as SCU

##### 4.2.1.3.5.1. Description and Sequencing of Activities

The RWA Move as SCU (Move Remote Images) involves the retrieval of objects from a remote system by moving matching objects from the remote database to the local database or to another remote database.

The MR System Network AE initiates for each copy request an association to the selected remote DICOM node and uses this node to send the Retrieve (C-MOVE) request (and receives the associated responses). An examination may contain Images, Presentation states, Raw data objects or Private objects. For successfully operation all systems must be configured to make a Retrieve (C-MOVE) possible. In case the move is to a third station this must also be defined on both systems (MR system and system sending the objects). It is important that the definition on the MR system is consistent with the definition at the moving station.

The association is released after the final Retrieve (C-MOVE) response for the related request has been received (no more pending).

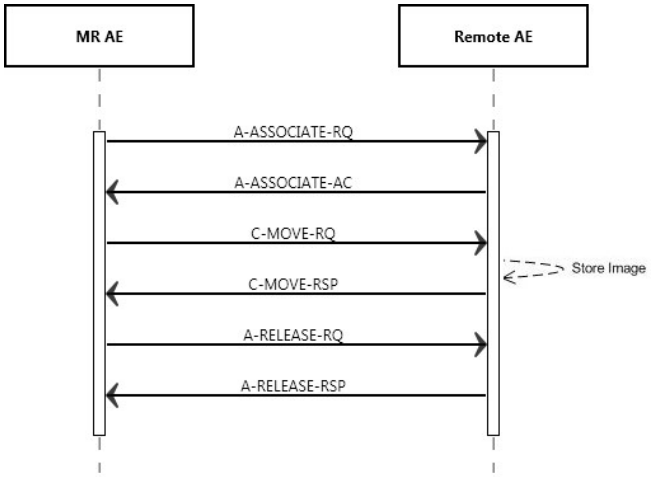

**Figure 9: (Real World) Activity – Move Remote Images**

#### 4.2.1.3.5.2. Proposed Presentation Contexts

The presentation contexts for MOVE as SCU are defined in table 29.

**Table 29: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Study Root QR Information Model - MOVE SOP Class | 1.2.840.10008.5.1.4.1.2.2.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE. The MR System AE does not support extended negotiations.

#### 4.2.1.3.5.3. SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

The MR System provides standard conformance to this SOP class.

##### 4.2.1.3.5.3.1. Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-SCU

The identifiers for C-MOVE as SCU are listed in Table 30.

**Table 30: Identifiers for MOVE Study Root Information Model as SCU**

| Study Root Information Model | | | |
|---|---|---|---|
| Attribute Name | Tag | VR | Comment |
| Query/Retrieve Level | 0008,0052 | CS | Applied value: STUDY |
| **Q/R Study level** | | | |
| Study Instance UID | 0020,000D | UI | |

The DICOM Status Response for C-MOVE-SCU is shown in Table 31.

**Table 31: Status response for Study Root Information Model C-MOVE-SCU.**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Success | 0000 | Sub-operations complete-No Failures | The move job is marked as completed. The association is released. |
| Refused | A701 | Out of Resources- Unable to calculate number of matches | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| | A702 | Out of Resources – Unable to perform sub-operations | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| | A801 | Move Destination unknown | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| Failed | A900 | Identifier does not match SOP class | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| | Cxxx | Unable to process | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| Cancel | FE00 | Sub-operations terminated due to Cancel Indication | The move job is marked as failed. The association is released. The reason is logged and reported to the user. |
| Warning | B000 | Sub-operations complete – One or more Failures | The move job is marked as completed. The association is released. |
| Pending | FF00 | Sub-operations are continuing. | The move job continues. |

The possible Communication Failures for C-MOVE-SCU are shown in table 32.

**Table 32: DICOM Command Communication Failure Behavior for Study Root Information Model C-MOVE-SCU**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The move job fails in case of association setup. The reason is logged and reported to the user. |
| Reply Time-out | The move job fails and the association is aborted. The reason is logged and reported to the user. |
| Association Time-out SCU | N/A |
| Association aborted | The move job fails. The reason is logged and reported to the user. |

#### 4.2.1.3.6. (Real-World) Activity – Image Export

##### 4.2.1.3.6.1. Description and Sequencing of Activities

As defined by the MR System RWA Archive Images, using the local patient database one may export Images to the selected network destination by clicking the ‘Export’ button. For each selected Examination the Network AE will successively do the following actions.

Note: - For any other DICOM node configured as others, use Network button.

The Network AE initiates an association with the configured PACS node. Over this association all images, presentation states and other related data are exported. When the storage job has finished, be it successfully or not, the Network AE releases the association. If the storage job failed then the storage job has to be executed over again.
If storage commitment is configured for each exported Series the Network AE requests storage commitment from the PACS. Each storage commitment request handles the storage commitment of one series of images over a separate association.

The Figure below shows the sequence diagram for the storage of an Examination containing one Series of images.

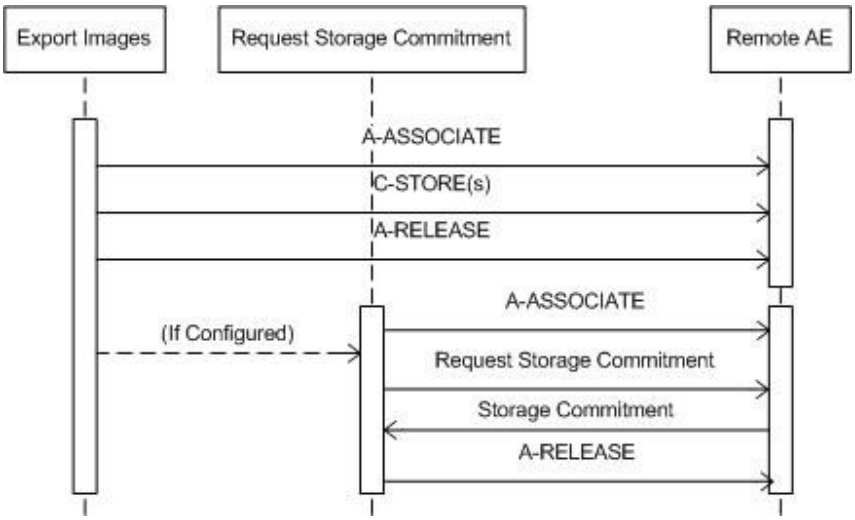


**Figure 10: (Real Word) Activity - Export Images**

### 4.2.1.3.6.2. Proposed Presentation Contexts

The presentation contexts proposed by Network AE for Image Export are defined in Table 33.

**Table 33: Proposed Presentation Contexts for (Real-World) Activity – Image Export**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| **Abstract Syntax** | | **Transfer Syntax** | | **Role** | **Extended Negotiation** |
| **Name** | **UID** | **Name List** | **UID List** | | |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 | JPEG Lossless, Non-Hierarchical, FOP (Process 14)<br>Explicit VR Big Endian<br>Explicit VR Little Endian<br>Implicit VR Little Endian<br>JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70<br>1.2.840.10008.1.2.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2<br>1.2.840.10008.1.2.4.70 | SCU | None |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Big Endian<br>Explicit VR Little Endian<br>Implicit VR Little Endian<br>JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2<br>1.2.840.10008.1.2.4.70 | SCU | None |
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 | Explicit VR Big Endian<br>Explicit VR Little Endian<br>Implicit VR Little Endian<br>JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2<br>1.2.840.10008.1.2.4.70 | SCU | None |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 | Explicit VR Big Endian<br>Explicit VR Little Endian<br>Implicit VR Little Endian<br>JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2<br>1.2.840.10008.1.2.4.70 | SCU | None |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 | Explicit VR Big Endian<br>Explicit VR Little Endian<br>Implicit VR Little Endian<br>JPEG Lossless, Non-Hierarchical, FOP (Process 14) | 1.2.840.10008.1.2.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2<br>1.2.840.10008.1.2.4.70 | SCU | None |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE. The MR System AE does not support extended negotiations.

#### 4.2.1.3.6.3. SOP Specific Conformance for Storage SOP Classes

As Grayscale Softcopy Presentation State objects are stored as separate series together with the images they belong to. The Network AE initiates committing those Series in the same association if negotiated for, one after the other.

##### 4.2.1.3.6.3.1. Dataset Specific Conformance for C-STORE-RQ

The possible Status Responses for the export Images storage are shown in table 34.

**Table 34: Status Response for C-STORE-RQ.**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Storage is complete. Successful stored | Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released. |
| Refused | A7xx | Out of Resources | The Export Images job fails and the association is released. The reason is logged and reported by message in console. |
| Error | A9xx | Data Set does not match SOP Class | The Export Images job fails and the association is released. The reason is logged and reported by message in console. |
| | Cxxx | Cannot understand | The store job fails and the association is released. The reason is logged and reported to the user. |
| Warning | B000 | Coercion of Data Elements | Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released. |
| | B006 | Elements Discard | Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released. |
| | B007 | Data Set does not match SOP Class | Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released. |

When receiving a C-STORE response with 'Refused' or 'Error' status the Network AE releases the association. All the images associated with the job will be considered by the Network AE to have failed to transfer. The Network AE has the ability to automatically recover from this situation and will attempt to send all the images at a later time.

The possible communication failures during a C-STORE-RQ are listed in Table 35.

**Table 35: DICOM Command Communication Failure Behavior for C-STORE-RQ.**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The store job fails in case of association setup. The reason is logged and reported to the user. |
| Reply Time-out | The store job fails in case of association setup. The reason is logged and reported to the user. |
| Association Time-out SCU | The association is released. |
| Association Aborted | The store job fails. The reason is logged and reported to the user. |

## 4.2.1.3.7. (Real-World) Activity – Storage Commitment Push Model as SCU

### 4.2.1.3.7.1. Description and Sequencing of Activities

The Network AE supports both synchronous and asynchronous storage commitment. When synchronous storage commitment is configured and the event report is not received within the configured time-out interval, the Network AE releases the association and the storage commitment continues asynchronously.
The Figure below shows the sequence diagram for the storage and asynchronous storage commitment of an Examination containing one Series of images.

If configured, Storage Commitment will be initiated in a new association after closing the storage of the related image storage (CSTORE). This new association will be open until the remote archive sends a storage commitment report (Synchronous) or when the configured maximum time is passed. When this maximum configured period is passed, it is the responsibility of the remote archive to setup a new association with MR System and send the storage commitment report (asynchronous behavior).

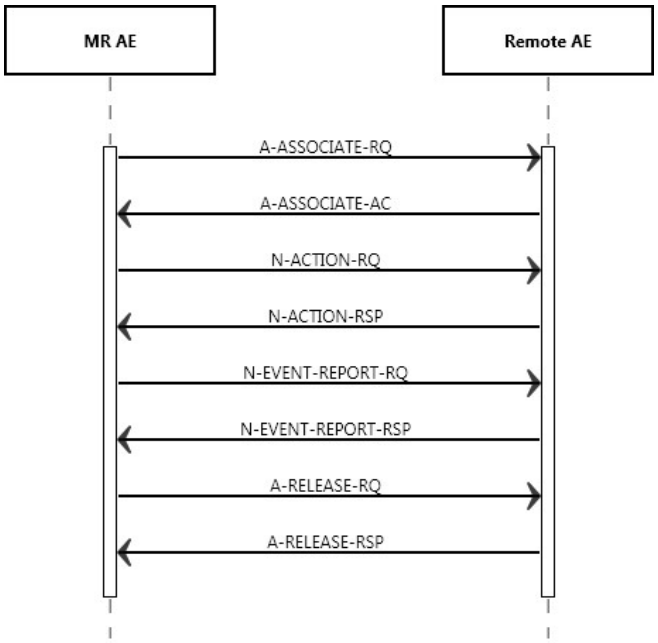


**Figure 11: Sequencing of Storage Export with Synchronous Storage Commitment**

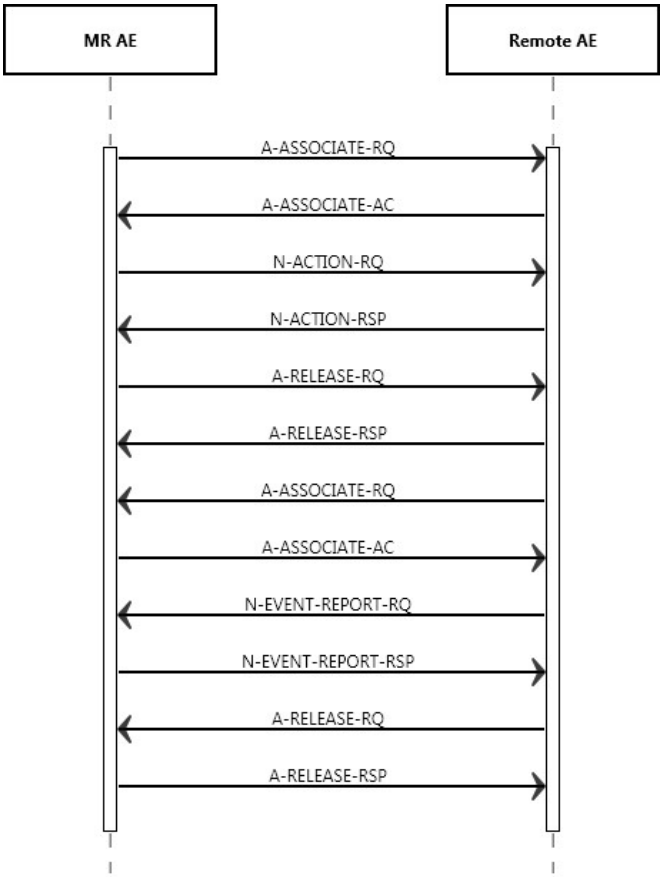


**Figure 12: Sequencing of Storage Export with Asynchronous Storage Commitment**

#### 4.2.1.3.7.2. Proposed Presentation Contexts

The proposed presentation contexts for Storage Commitment Push Model as SCU are defined in Table 36.

**Table 36: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model as SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Storage Commitment Push Model SOP Class | 1.2.840.10008.1.20.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE. The MR System AE does not support extended negotiations.

#### 4.2.1.3.7.3. SOP Specific Conformance for Storage Commitment Push Model SOP Class

MR System conforms to the standard Storage Commitment model.

As Grayscale Softcopy Presentation State objects are stored as separate series together with the images they belong to, the Network AE will initiate separate associations for committing those Series – one after the other.

Based on the configuration provided in PSC, if the storage commitment is set to True for the network device, N-ACTION-RQ is triggered once all the entity transfer status is validated and updated. The storage commitment status is shown in the Patient Directory. If the storage commitment failed, the operator is responsible for exporting the images again.
It is user decision to delete the objects once it is archived. User can delete the object from SUT (deletion is supported at study and series level).

Details regarding the response behavior for the Archive Images storage commitment request are described in the next sections.

##### 4.2.1.3.7.3.1. Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-EVENT-REPORT-SCP

Details regarding the Dataset Specific response behavior for Storage Commitment Attributes for N-EVENT-REPORT-RSP are described in this section.

On receiving a storage commitment result with Event Type ID 1 (Storage Commitment Request Successful) the archive status of the examination is updated in the Administration window of the MR scanner.
On receiving a storage commitment result with Event Type ID 2 (Storage Commitment Request Complete – Failures Exist) the Network AE behaves as summarized in Table 37.

**Table 37: Status Response for N-EVENT-REPORT.**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Operation complete | Continues with waiting for storage commitment. |
| Failure | xxxx | (any failure) | The reason is logged. |
| | 0110 | Processing failure | Retry storage commitment request. |
| | 0112 | No such object instance | Retry store and storage commitment request. |
| | 0119 | Class / Instance conflict | Inform user and abort. |

| | | | |
|---|---|---|---|
| | 0122 | Referenced SOP class not supported | Inform user and abort. |
| | 0131 | Duplicate transaction | UID Inform user and abort. |
| | 0213 | Resource limitation | Retry storage commitment request. |

The communication status behavior of the N-EVENT-REPORT is listed in Table 38.

**Table 38: DICOM Command Communication Failure Behavior for N-EVENT-REPORT.**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The reason is logged. |
| Network Reply Time-out | The association is released. Continues with waiting for storage commitment. |
| Association Time-out SCU | The association is released. Continues with waiting for storage commitment. |
| Association aborted | Continues with waiting for storage commitment. |

#### 4.2.1.3.7.3.2. Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-ACTION-SCU

This chapter describes the Dataset Specific response behavior for Storage Commitment Attribute N-ACTION-RQ.

**Table 39: Storage Commitment Attribute for N-ACTION-RQ**

| Storage Commitment Module | | |
|---|---|---|
| **Attribute Name** | **Tag** | **Comment** |
| Transaction UID | 0008,1195 | |
| Referenced SOP Sequence | 0008,1199 | |
| >Referenced SOP Class UID | 0008,1150 | |
| >Referenced SOP Instance UID | 0008,1155 | |

The possible status responses for N-ACTION-RQ are shown in Table 40.

**Table 40: Status Response for N-ACTION-RQ.**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Conformation. Operation complete | The association will be released. Message in console. |
| Failure | xxxx | (any failure) | Message in console. The reason is logged. |

The possible communication failures are shown in the below 41.

**Table 41: DICOM Command Communication Failure Behavior N-ACTION.**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The reason is logged. |
| Reply Time-out | The association is released. The Archive Images job expects storage commitment report. |
| Association Time-out SCU | The association is released. The Archive Images job expects storage commitment report. |
| Association Aborted | The Archive Images job expects storage commitment report. |

#### 4.2.1.4. Association Acceptance Policy

This section describes the conditions under which the MR system will accept an association from a remote system. The possible AE Association rejections are handled as shown in Table 42.

**Table 42: Association Reject Reasons Handling**

| Result | Source | Reason/Diagnosis | Behavior |
|---|---|---|---|
| 1 - rejected permanent | 1 - DICOM UL service-user | 1 – no reason given | Log entry. |
| | | 2 – application context name not supported | Log entry. |
| | | 3 – calling AE title not recognized | Log entry. |
| | 2 - DICOM UL service provider (ACSE related function) | 1 – no reason given | Log entry. |
| | | 2 – protocol version not supported | Log entry. |
| **Result** | **Source** | **Reason/Diagnosis** | **Behavior** |
| | 3 - DICOM UL service provider (Presentation related function) | 1 – temporary congestion | Log entry. |
| | | 2 – local limit exceeded | Log entry. |
| 2 - rejected-transient | 1 - DICOM UL service-user | 1 - no-reason-given | Log entry. |
| | | 2 – application context name not supported | Log entry. |
| | | 3 – calling AE title not recognized | Log entry. |
| | 2 - DICOM UL service provider (ACSE related function) | 1 – no reason given | Log entry. |
| | | 2 – protocol version not supported | Log entry. |
| | 3 - DICOM UL service provider (Presentation related function) | 1 – temporary congestion | Log entry. |
| | | 2 – local limit exceeded | Log entry. |

The possible Association aborts are handled as shown in Table 43.

**Table 43: Association Abort Policies Handling.**

| Source | Reason/Diagnosis | Behavior |
|---|---|---|
| 0 - DICOM UL service-user (initiated abort) | 0 - reason-not-specified | When received, the Network AE terminates the connection and logs the event. This is sent when:<br>- Association times out due to inactivity<br>- Any other problem than the ones specified for the MR System as SCP in the rows below. |
| 2 - DICOM UL service-provider (initiated abort) | 0 - reason-not-specified | When received, the Network AE terminates the connection and logs the event. This is sent when Import fails. |
| | 1 - unrecognized-PDU | When received, the Network AE terminates the connection and logs the event. This is sent when an unrecognized PDU type is received. |
| | 2 - unexpected-PDU | When received, the Network AE terminates the connection and logs the event. This is sent when the received PDU type is not expected in the current state of connection. |
| | 4 - unrecognized-PDU parameter | When received, the Network AE terminates the connection and logs the event. This is sent when an unrecognized Associate PDU item is received. |
| | 5 - unexpected-PDU parameter | When received, the Network AE terminates the connection and logs the event. This is sent when:<br>- One of the Associate PDU items is received more than once.<br>- One of the Associate PDU items is received unexpectedly. |

| | | |
|---|---|---|
| | 6 - invalid-PDU-parameter value | When received, the Network AE terminates the connection and logs the event.<br>This is sent when:<br>- One of the Associate PDU items is received more than once.<br>- One of the Associate PDU items is not received.<br>- Empty Called AE Title String (space-only) is received.<br>- Empty Calling AE Title String (space-only) is received.<br>- Unknown abstract syntax is received<br>- The length or the format of the received PDU item is invalid. |

#### 4.2.1.4.1. (Real-World) Activity – Verification as SCP

##### 4.2.1.4.1.1. Description and Sequencing of Activities

As defined by the MR System RWA Verify, the Network AE will act as a Verification SCP for any remote SCU.

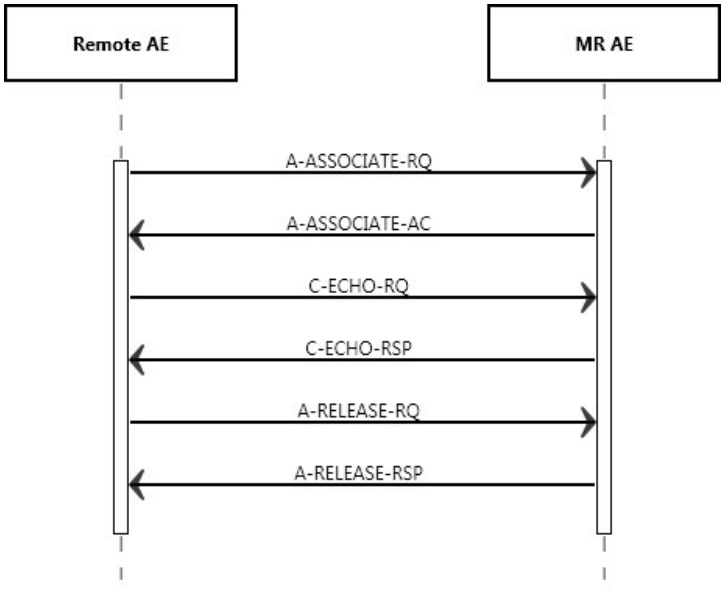


**Figure 13: (Real World) Activity – Request Verification**

The Network AE accepts associations to verify application level communication using the C-ECHO command.

##### 4.2.1.4.1.2. Accepted Presentation Contexts

The acceptable presentation contexts for Verification as SCP are defined in Table 44.

**Table 44: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Verification SOP Class | 1.2.840.10008.1.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE and shall be chosen in case multiple Transfer Syntaxes are proposed in the Association Negotiation.

The MR System does not support extended negotiations.

#### 4.2.1.4.1.3. SOP Specific Conformance for Verification SOP Class

The MR System provides standard conformance to Verification SOP class as an SCP.

##### 4.2.1.4.1.3.1. Dataset Specific Conformance for Verification C-ECHO RSP

This section describes the dataset specific response behavior for Verification C-ECHO-RSP.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 45: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Eg. Matching is complete | Eg. The SCP has successfully returned all matching information |

**Table 46: DICOM Command Communication Failure Behavior for C-ECHO RSP**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The verification request fails. The reason is logged. |
| Reply Time-out | The verification request fails and association is aborted. The reason is logged. |
| Association Time-out SCU | The association is released. |
| Association aborted | The verification request fails. The reason is logged. |

### 4.2.1.4.2. (Real-World) Activity – FIND as SCP

#### 4.2.1.4.2.1. Description and Sequencing of Activities

The query dialog is initiated by the Remote AE. The Remote AE request an association with the MR AE to send query requests to the MR AE, starting with Patient or Study level query (for Patient Root (preferred) or Study Root model respectively through to Series level queries (i.e. no Image level queries).

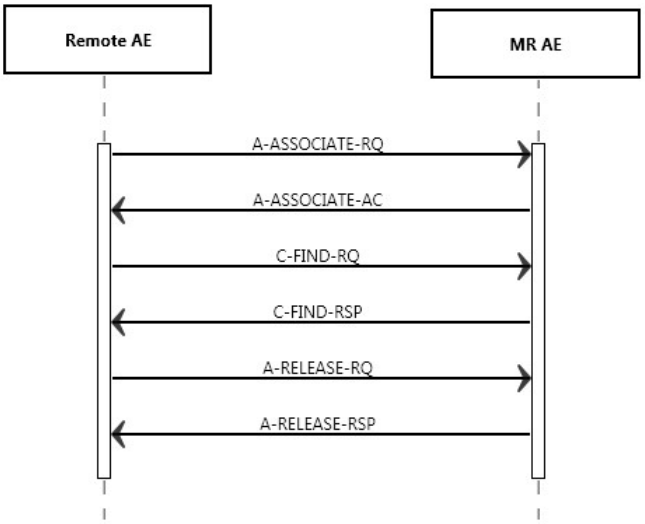


**Figure 14: Sequencing of Query Images**

#### 4.2.1.4.2.2. Accepted Presentation Contexts

The acceptable presentation contexts for FIND as SCP are defined in Table 47.

**Table 47: Acceptable Presentation Contexts for (Real-World) Activity – FIND as SCP**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Study Root QR Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.1.2.2.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

The MR AE accepts all contexts that are common in the proposed and acceptable Presentation Contexts. This means that the MR AE can accept multiple proposed presentation contexts with the same SOP class but different transfer syntaxes.

There is no check for duplicate contexts, and these will therefore be accepted.

The MR AE does not support extended negotiations.

#### 4.2.1.4.2.3. SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

The MR AE provides standard conformance to the Query/Retrieve service class. Relational queries are not supported. The MR AE can handle simultaneous C-FIND requests.

When queried with optional keys, the MR AE will respond successfully for available keys if queried for universal matching; otherwise MR AE will responds with warning.

When queried with optional keys with non-universal matching, the MR AE returns information using universal matching for those keys.

#### 4.2.1.4.2.3.1. Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-RSP

Available Query keys for C-FIND-RSP are listed in Table 48

**Table 48: Requested Query Keys for Study Root Information Model**

| Study Root Information Model | | | | |
|---|---|---|---|---|
| **Attribute Name** | **Tag** | **VR** | **Type Of Matching** | **Comment** |
| Query/Retrieve Level | 0008,0052 | CS | | |
| Specific Character Set | 0008,0005 | CS | | |
| **Q/R Study level** | | | | |
| Accession Number | 0008,0050 | SH | Single value, Universal, WildCard | |
| Ethnic Group | 0010,2160 | SH | Single value, Universal, WildCard | |
| Patient ID | 0010,0020 | LO | Single value, Universal, WildCard | |
| Patient's Birth Date | 0010,0030 | DA | Single value, Universal, Range | |
| Patient's Name | 0010,0010 | PN | Single value, Universal, WildCard | |
| Patient's Sex | 0010,0040 | CS | Single value, Universal, WildCard | |
| Study Date | 0008,0020 | DA | Single value, Universal, Range | |
| Study ID | 0020,0010 | SH | Single value, Universal, WildCard | |
| Study Instance UID | 0020,000D | UI | Single value, Universal, List of UID | |
| Study Time | 0008,0030 | TM | Single value, Universal, Range | |
| **Q/R Series level** | | | | |
| Body Part Examined | 0018,0015 | CS | Universal | |
| Modality | 0008,0060 | CS | Universal | MR |
| Series Date | 0008,0021 | DA | Single value, Universal, Range | |
| Series Instance UID | 0020,000E | UI | Single value, Universal, List of UID | |

| | | | | |
|---|---|---|---|---|
| Series Time | 0008,0031 | TM | Single value, Universal, Range | |

Table 49 shows the possible status response for the C-FIND-RSP.

**Table 49: Status Response for C-FIND-RSP**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Matching is complete | The C-FIND request handling is completed, no more C-FIND responses are sent. |
| Failed | A900 | Identifier does not match SOP class | N.A. |
| | C000 | Unable to process | The C-FIND request cannot be parsed. MR logs the reason. |
| Refused | A700 | Out of Resources | N.A. |
| Pending | FF00 | Matches are continuing | Current match is supplied and any optional keys were supported in the same manner as required keys The C-FIND responses are continuing. |
| | FF01 | Matches are continuing | Warning that one or more optional keys were not supported for existence and/or matching for this identifier The C-FIND responses are continuing. |
| Cancel | FE00 | Matching terminated due to Cancel Request | The C-FIND request is canceled, no more C-FIND responses are sent. |

The possible Communication Failures are shown in the below Table 50.

**Table 50: DICOM Command Communication Failure Behavior**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The query fails in case of association setup. The reason is logged. |
| Reply Time-out | The query fails and association is aborted. The reason is logged. |
| Association Time-out SCU | The association is released. |
| Association Aborted The query fails. | The query fails. The reason is logged. |

### 4.2.1.4.3. (Real-World) Activity – MOVE as SCP

#### 4.2.1.4.3.1. Description and Sequencing of Activities

The MR system shall accept associations from systems that wish to retrieve images from the MR database using the C-MOVE command. After MR Retrieve Local Images the MR Export Images is started. Figure 15 shows the sequencing of retrieved images.

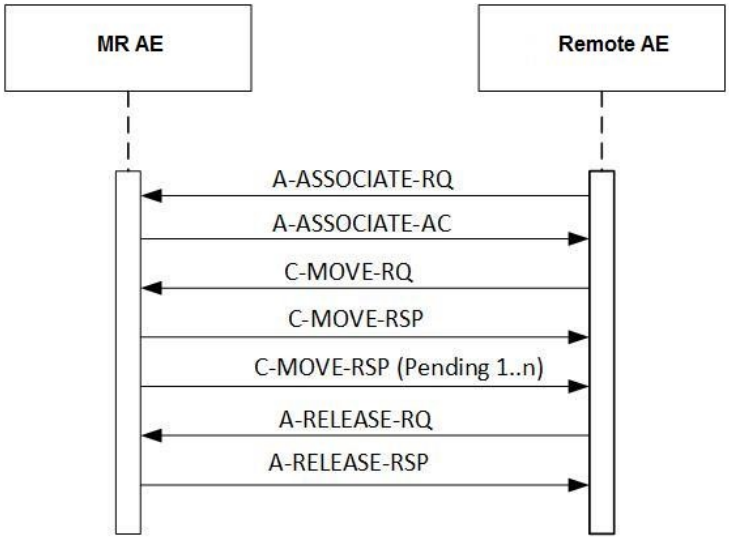


Figure 15: Sequencing of Retrieve Local Objects

#### 4.2.1.4.3.2. Accepted Presentation Contexts

The acceptable presentation contexts for MOVE as SCP are shown in Table 51.

Table 51: Acceptable Presentation Contexts for (Real-World) Activity – MOVE As SCP

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Study Root QR Information Model - MOVE SOP Class | 1.2.840.10008.5.1.4.1.2.2.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

The MR AE accepts all contexts that are common in the proposed and acceptable Presentation Contexts. This means that the MR AE can accept multiple proposed Presentation Contexts with the same SOP class but different Transfer Syntaxes.
The order of the proposed transfer syntaxes is configurable.
There is no check for duplicate contexts, and these will therefore be accepted.
The MR AE does not support extended negotiations for Patient Root QR Information Model MOVE SOP class and for Study Root QR Information Model - MOVE SOP Class.

#### 4.2.1.4.3.3. SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

The MR AE provides standard conformance to the MOVE SOP class as an SCP.

##### 4.2.1.4.3.3.1. Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-RSP

Table 52 shows the MOVE Identifiers for Study Root Information model.

**Table 52: Identifiers for MOVE Study Root Information Model as SCP**

| Study Root Information Model | | | |
|---|---|---|---|
| **Attribute Name** | **Tag** | **VR** | **Comment** |
| Query/Retrieve Level | 0008,0052 | CS | Applied value: SERIES |
| **Q/R Series level** | | | |
| Series Instance UID | 0020,000E | UI | |
| Study Instance UID | 0020,000D | UI | |
| Patient ID | 0010,0020 | LO | |

The possible status Responses for the C-MOVE-RSP are shown in Table 53.

**Table 53: Status Response for C-MOVE**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Sub-operations complete – No Failures | The C-MOVE command has been completed. |
| Refused | A701 | Out of Resources – Unable to calculate number of matches | N/A |
| | A702 | Out of Resources – Unable to perform Suboperations | N/A |
| Failed | A801 | Move Destination unknown | No C-STORE command will be sent. MR logs the reason. |
| | A900 | Identifier does not match SOP class | N/A |
| Cancel | C000 | Unable to process | The C-MOVE request cannot be parsed. No Store Command will be sent. MR logs the reason. |
| Warning | FE00 | Sub-operations terminated due to Cancel Indication | The C-MOVE request is canceled, no more C-MOVE responses are sent. |
| Pending | B000 | Sub-operations complete – One or more Failures | N/A |

The possible communication failures for C-MOVE are shown in Table 54.

**Table 54: DICOM Command Communication Failure Behavior for C-MOVE.**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The move job fails in case of association setup. The reason is logged. |
| Reply Time-out | The move job fails and association is aborted. The reason is logged. |
| Association Time-out SCU | The association is released. |
| Association aborted | The move job fails. The reason is logged. |

#### 4.2.1.4.4. (Real-World) Activity – Image Import

##### 4.2.1.4.4.1. Description and Sequencing of Activities

As defined by the MR System RWA Import Images, the Network AE acts as a Storage SCP for any remote Storage SCU that is configured on the MR System, using an accepted presentation context.

The MR AE accepts associations from other systems that wish to store images in the MR System database, using the C-STORE command.

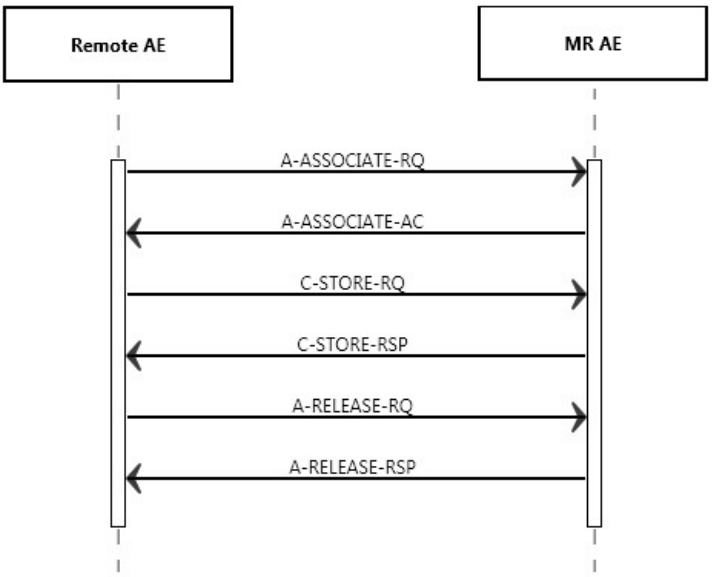


**Figure 16: (Real World) Activity - Import Images**

After the MR Network AE accepts an association from the remote Storage SCU the MR system will receive images from that remote Storage SCU, send store responses including the relevant status back, and releases the association on SCU request.
The MR supports a maximum number of incoming associations (default 4) for the set of SCP's. This number is configurable.

### 4.2.1.4.4.2. Accepted Presentation Contexts

The possible presentation contexts are shown in table 55.

**Table 55: Acceptable Presentation Contexts for (Real-World) Activity – Image Import**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |
| | | JPEG 2000 Image Compression (Lossless Only) | 1.2.840.10008.1.2.4.90 | | |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| | | JPEG Lossless, NonHierarchical, FOP (Process 14) | 1.2.840.10008.1.2.4.70 | | |

The MR System AE does not support extended negotiations for Image Import.
The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

#### 4.2.1.4.4.3. SOP Specific Conformance for Storage SOP Classes

The Network AE provides Level 2 (Full) conformance to the storage SOP classes.
Level 2 attributes indicates that all Type 1, Type 2, and Type 3

Attributes defined in the IOD etc. associated with the SOP Class, as well as any Standard Extended attributes (including private attributes) included in the SOP Instance, will be stored and may be accessed.

Secondary Capture images can be imported at any time and from any source.
However, the MR Network AE can only import MR images and belonging Presentation State objects that were created on a Philips System. These imported images may be used for reference only; successful further export is not guaranteed.

When the MR Network AE receives images that do not originate from a Philips MR System or no longer contain Philips MR Private tags, the MR Network AE responds with the success status (0000) but skips the objects since it is not understood by the system.

Images are considered to be originated from a Philips System if the SOP Class UID of the image begins with the prefix “1.3.46.670589” or the Manufacturer contains the value "Philips”.

#### 4.2.1.4.4.3.1. Dataset Specific Conformance for C-STORE-RSP

The possible Status Responses for C-STORE are shown in Table 56.

**Table 56: Status Response for C-STORE-RSP**

| Service Status | Error Code | Further Meaning | Behavior (sent when) |
|---|---|---|---|
| Refused | A700 | Out of resources | The local database is full; recovery from this condition is left to the SCU.<br>The MR System sends the failure response, logs the condition, and aborts the association. |
| Success | 0000 | Successful stored | The image(s) shall be stored in the local database. |
| Error | A900 | Data Set does not match SOP Class | The image(s) cannot be parsed.<br>The MR System sends the failure response, logs the condition, and aborts the association. |
| | 0117 | Invalid Object Instance | Study Instance UID/Series Instance UID is not present. |
| | C000 | Cannot understand | The image(s) cannot be parsed/ SOP Instance UID is not present.<br>The MR System sends the failure response, logs the condition. |
| Warning | B000 | Coercion of Data Elements | |
| | B007 | Data Set does not match SOP Class | The image(s) cannot be parsed.<br>The MR System sends the failure response, logs the condition, and aborts the association. |
| | B006 | Elements Discarded | |

Table 57 shows the possible communication failures for C-STORE-RSP.

**Table 57: DICOM Command Communication Failure Behavior for C-STORE-RSP**

| Exception | Behavior |
|---|---|
| ARTIM Time-out | The store job fails in case of association setup. The reason is logged. |
| Reply Time-out | The store job fails and association is aborted. The reason is logged. |
| Association Time-out SCU | The association is released. |
| Association aborted | The store job fails. The reason is logged. |

## 4.2.2. MR System Print

This chapter describes the Print AE in detail.

### 4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the SOP Classes shown in Table 58.

**Table 58: SOP Classes for MR System Print**

| SOP Class | | User of Service (SCU) | Provider of Service (SCP) |
|---|---|---|---|
| **Name** | **UID** | | |
| Basic Grayscale Print Management Meta SOP Class | 1.2.840.10008.5.1.1.9 | Yes | No |
| >Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Yes | No |
| >Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Yes | No |
| >Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 | Yes | No |
| >Printer SOP Class | 1.2.840.10008.5.1.1.16 | Yes | No |
| >Presentation LUT SOP Class | 1.2.840.10008.5.1.1.23 | Yes | No |
| Basic Color Print Management Meta SOP Class | 1.2.840.10008.5.1.1.18 | Yes | No |
| >Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Yes | No |
| >Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Yes | No |
| >Basic Color Image Box SOP Class | 1.2.840.10008.5.1.1.4.1 | Yes | No |
| >Printer SOP Class | 1.2.840.10008.5.1.1.16 | Yes | No |
| >Presentation LUT SOP Class | 1.2.840.10008.5.1.1.23 | Yes | No |

Note: Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

### 4.2.2.2. Association Policies

This chapter describes the establishment of an association and the acceptance policies of the Print AE.

#### 4.2.2.2.1. General

The following DICOM standard application context is specified.

**Table 59: DICOM Application Context**

| Description | Value |
|---|---|
| Application Context Name | 1.2.840.10008.3.1.1.1 |

#### 4.2.2.2.2. Number of Associations

The number of simultaneous associations that the Print AE supports is specified in Table 60. The Print AE does not accept any incoming associations.

**Table 60: Number of associations as an Association Initiator for this AE**

| Description | Value |
|---|---|
| Maximum number of simultaneous associations | 1 |

#### 4.2.2.2.3. Asynchronous Nature

The MR system does not support asynchronous operations and will not perform asynchronous window negotiation.

#### 4.2.2.2.4. Implementation Identifying Information

The following values are used for Implementation Class UID and Implementation Version Name.

**Table 61: DICOM Implementation Class and Version for MR System Print**

| | |
|---|---|
| Implementation Class UID | 1.3.46.670589.54.2.111.0 |
| Implementation Version Name | Philips MR 111.0 |

#### 4.2.2.2.5. Communication Failure Handling

The possible network communication failures are summarized in Table. 62

**Table 62: Communication Failure Behavior**

| Exception | Behavior |
|---|---|
| ARTIM Timeout | The Association setup fails, and using A-ABORT and the command is marked as failed. The reason is logged and reported to the user. |
| Association Aborted. | The Print Image job is marked as Failed. The reason is logged and reported to the user. |
| Association Time-Out SCU | The Association is Released. |
| Network reply Time-Out | The Association is Released. |

### 4.2.2.3. Association Initiation Policy

This section describes the conditions under which the Print AE initiates an Association.

The possible Status Responses are summarized in Table 63.

**Table 63: Response Status Handler Behavior**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Matching is complete, successful operation. | The SCP has successfully returned all matching information. The status is logged. |

The possible Association Rejection responses are listed in Table 64.

**Table 64: Association Rejection response**

| Result | Source | Reason/Diagnosis | Behavior |
|---|---|---|---|
| 1 - rejectedpermanent | 1 - DICOM UL service-user | 1 - no-reason-given | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - application-context-name-not supported | The user is notified. If applicable the command will be retried. Log entry. |
| | | 3 - calling-AE-title-not-recognized | The user is notified. If applicable the command will be retried. Log entry. |

| | | | |
|---|---|---|---|
| | | 7 - called-AE-title-not-recognized | The user is notified. If applicable the command will be retried. Log entry. |
| | 2 - DICOM UL service-provider (ACSE related function) | 1 - no-reason-given | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - protocol-version-notsupported | The user is notified. If applicable the command will be retried. Log entry. |
| | 3 - DICOM UL service-provider (Presentation related function) | 1 - temporary-congestion | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - local-limit-exceeded | The user is notified. If applicable the command will be retried. Log entry. |
| 2 - rejectedtransient | 1 - DICOM UL service-user | 1 - no-reason-given | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - application-context-name-notsupported | The user is notified. If applicable the command will be retried. Log entry. |
| | | 3 - calling-AE-title-not-recognized | The user is notified. If applicable the command will be retried. Log entry. |
| | | 7 - called-AE-title-not-recognized | The user is notified. If applicable the command will be retried. Log entry. |
| | 2 - DICOM UL service-provider (ACSE related function) | 1 - no-reason-given | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - protocol-version-notsupported | The user is notified. If applicable the command will be retried. Log entry. |
| | 3 - DICOM UL service-provider (Presentation related function) | 1 - temporary-congestion | The user is notified. If applicable the command will be retried. Log entry. |
| | | 2 - local-limit-exceeded | The user is notified. If applicable the command will be retried. Log entry. |

#### 4.2.2.3.1. (Real-World) Activity – Print Management as SCU

##### 4.2.2.3.1.1. Description and Sequencing of Activities

Before MR images can be printed, the Print AE must have an open association with the Printer. If no association is opened yet, the operator may initiate an association manually by enabling the selected printer in the “Print Job Control” window. If the association could not be established, the Print AE has a ‘Redo’ option in the job viewer to retry to establish an association. The received printer status is displayed in the Printer Status Tool.

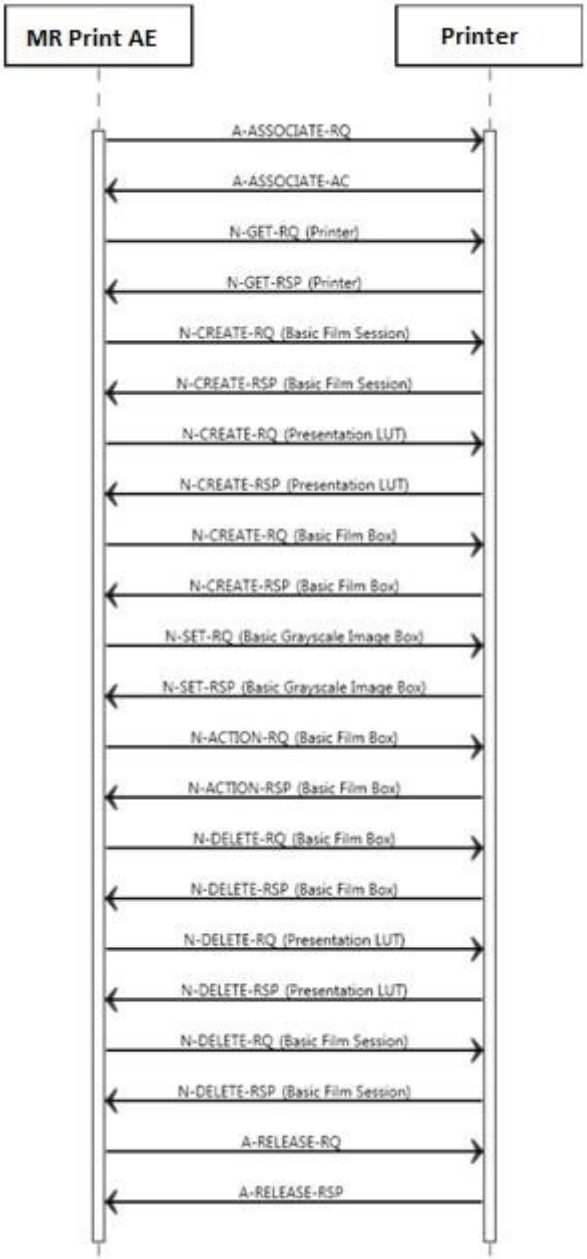


**Figure 17: Sequencing of Print Images**

Note that associations are proposed for grayscale and color printing. The following optional SOP classes from these Meta SOP classes are not supported:

- Print Job SOP class;
- Basic Annotation Box SOP class; - Reference Image Box SOP class.

The grayscale standard display function adjusts the brightness such that equal changes in P-Values will result in the same level of perceptibility.

The applied order of Print Service Elements (DIMSE's) is specified in Figure 4. Refer to the following sections for a description of the applied optional attributes in these Service Elements (i.e. non-mandatory attributes as Print SCU). Note that the Service Elements order is not specified by the DICOM standard. Overlay, Annotation (showing the values of some major identifying attributes) and Shutter information is processed in the images sent to the printer (i.e. burnt-in into the image).

The Status Codes of DIMSE Responses (Success, Warning, Failure) as returned by the printer will also be logged (for service purposes) and are mapped onto general print job status messages towards the operator. These User Interface messages indicate:

- "Job Completed" and has the meaning that the print job is accepted by the printer; the actual printing will be done afterwards. - "Print Error" indicating that a failure occurred during the DICOM Print. Also most warning messages (like default printer values applied on optional print attributes) are interpreted as a print error because this might result in a different content (print quality or print layout) than expected.

The following implementation remarks are important to achieve successful printing:

- The number of Film Boxes per Film Session is one.
- The number of images per Film Box is one.
- The images to be printed on one film are rendered by the Print AE into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image). A rough indication is 20 Mbytes for grayscale. One should take this into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).

The Print AE does not send an attribute list to the printer. Therefore, the mandatory attributes listed in the following sections are the only attributes that are required to be supported by the printer.

#### 4.2.2.3.1.2. Proposed Presentation Contexts

The presentation contexts for Print Management as SCU are defined in Table 65.

**Table 65: Proposed Presentation Contexts for (Real-World) Activity – Print Management as SCU**

| Presentation Context Table | | | | | |
|---|---|---|---|---|---|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name List | UID List | | |
| Basic Grayscale Print Management Meta SOP Class | 1.2.840.10008.5.1.1.9 | | | SCU | None |
| >Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Printer SOP Class | 1.2.840.10008.5.1.1.16 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Basic Grayscale Image Box SOP Class | 1.2.840.10008.5.1.1.4 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Presentation LUT SOP Class | 1.2.840.10008.5.1.1.23 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| Basic Color Print Management Meta SOP Class | 1.2.840.10008.5.1.1.18 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Basic Film Session SOP Class | 1.2.840.10008.5.1.1.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Basic Film Box SOP Class | 1.2.840.10008.5.1.1.2 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Basic Color Image Box SOP Class | 1.2.840.10008.5.1.1.4.1 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |
| >Presentation LUT SOP Class | 1.2.840.10008.5.1.1.23 | Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCU | None |
| | | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | | |

#### 4.2.2.3.1.3. SOP Specific Conformance for Basic Film Session SOP Class of the Basic Grayscale Print Management Meta SOP Class

This section specifies each IOD created (including private IOD's).

Abbreviations used in the Module table for the column "Presence of Value" are:

| | |
|---|---|
| ALWAYS | The attribute is always present with a value |
| EMPTY | The attribute is always present without any value (attribute sent zero length) |
| VNAP | The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present) |
| ANAP | The attribute is present under specified condition – if present then it will always have a value |

The abbreviations used in the Module table for the column "Source" are:

| | |
|---|---|
| AUTO | The attribute value is generated automatically |
| CONFIG | The attribute value source is a configurable parameter |
| COPY | The attribute value source is another SOP instance |
| FIXED | The attribute value is hard-coded in the application |
| IMPLICIT | The attribute value source is a user-implicit setting |
| MPPS | The attribute value is the same as that use for Modality Performed Procedure Step |
| MWL | The attribute value source is a Modality Worklist |
| USER | The attribute value source is explicit user input |

##### 4.2.2.3.1.3.1. Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section

**Table 66: Basic Film Session Presentation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Number of Copies | 2000,0010 | IS | 1 | ALWAYS | USER | 1-100 |
| Print Priority | 2000,0020 | CS | MED | ALWAYS | AUTO | |
| Medium Type | 2000,0030 | CS | BLUE FILM | ALWAYS | USER | PAPER,CLEAR FILM, BLUE FILM |

| | | | | | | |
|---|---|---|---|---|---|---|
| Film Destination | 2000,0040 | CS | - | ALWAYS | AUTO | Default value from Printer<br>ex: PROCESSOR |

The possible Status Responses are shown in Table 67.

**Table 67: Status Response for Basic Film Session N-CREATE-SCU**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film session successfully created. | The print job continues and completes. Status of the job is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B600 | Memory allocation not supported. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B601 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B604 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.3.1.3.2. Dataset Specific Conformance for Basic Film Session SOP Class N-DELETE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 68: Status Response for N-DELETE-SCU**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Success | 0000 | Successful operation. | The print job continues. |
| Failed | xxxx | (any failure) | The print job is marked as failed; the reason is reported and logged. Eventually the association is released. |
| Warning | xxxx | (any warning) | The print job continues, and the warning is logged. |

#### 4.2.2.3.1.4. SOP Specific Conformance for Presentation LUT SOP Class

##### 4.2.2.3.1.4.1. Dataset Specific Conformance for Presentation LUT SOP Class N-CREATE-SCU

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Presentation LUT Shape | 2050,0020 | CS | IDENTITY | ALWAYS | AUTO | |

#### 4.2.2.3.1.5. SOP Specific Conformance for Basic Film Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

##### 4.2.2.3.1.5.1. Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

**Table 69: Basic Film Box Presentation Module.**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Display Format | 2010,0010 | ST | STANDARD\1,1 | ALWAYS | AUTO | |
| Film Orientation | 2010,0040 | CS | PORTRAIT, LANDSCAPE | ALWAYS | USER | |
| Film Size ID | 2010,0050 | CS | 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN, A3, A4 | ALWAYS | USER | |
| Magnification Type | 2010,0060 | CS | REPLICATE, BILINEAR, CUBIC, NONE | OPTIONAL | AUTO | |
| Max Density | 2010,0130 | US | 300 | OPTIONAL | AUTO | |
| Trim | 2010,0140 | CS | NO, YES | ALWAYS | IMPLICIT/ CONFIG | |
| Configuration Information | 2010,0150 | ST | LUT=0,9 | OPTIONAL | AUTO | |
| Illumination | 2010,015E | US | | OPTIONAL | AUTO | |
| Reflected Ambient Light | 2010,0160 | US | | OPTIONAL | AUTO | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Referenced Film Session Sequence | 2010,0500 | SQ | | ALWAYS | AUTO | |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | |
| Referenced Presentation LUT Sequence | 2050,0500 | SQ | | ALWAYS | AUTO | |
| > Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | |
| > Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | |

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 70: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film session successfully created. | The print job continues and completes. Status of the job is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B600 | Memory allocation not supported. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B601 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B604 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.3.1.5.2. Dataset Specific Conformance for Printer SOP Class N-GET-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 71: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Successful command | The print job continues. |
| Failure | xxxx | (any failure) | The print job fails, the error is logged and the association is released. |
| Warning | 0001 | Requested optional attributes are not supported | The print job continues and the warning is logged. |
| | xxxx | (any warning) | Print job is terminated, the warning is logged, and the association is released. |

#### 4.2.2.3.1.6. SOP Specific Conformance for Basic Film Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

##### 4.2.2.3.1.6.1. Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 72: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film Box successfully created. | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B605 | Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead. | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B600 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B601 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |

| | | | |
|---|---|---|---|
| | B604 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.3.1.7. SOP Specific Conformance for Basic Grayscale Image Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

##### 4.2.2.3.1.7.1. Dataset Specific Conformance for Basic Grayscale Image Box SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behavior of Basic Grayscale Image Box SOP Class N-SET-SCU is reported in this section.

**Table 73: Image Box Pixel Presentation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Box Position | 2020,0010 | US | 1 | ALWAYS | AUTO | |
| Polarity | 2020,0020 | CS | NORMAL | ALWAYS | AUTO | |
| Basic Grayscale Image Sequence | 2020,0110 | SQ | | ALWAYS | AUTO | |
| >Samples per Pixel | 0028,0002 | US | | ALWAYS | AUTO | |
| >Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | AUTO | |
| >Rows | 0028,0010 | US | | ALWAYS | IMPLICIT | |
| >Columns | 0028,0011 | US | | ALWAYS | IMPLICIT | |
| >Bits Allocated | 0028,0100 | US | 16 | ALWAYS | AUTO | |
| >Bits Stored | 0028,0101 | US | 12 | ALWAYS | IMPLICIT | |
| >High Bit | 0028,0102 | US | 11 | ALWAYS | AUTO | |
| >Pixel Representation | 0028,0103 | US | | ALWAYS | AUTO | |
| >Pixel Data | 7FE0,0010 | OW/OB | | ALWAYS | AUTO | |

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 74: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Successful command | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B604 | Image size is larger than image box size, the image has been demagnified. | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B609 | Image size is larger than the image box size. The image has been cropped to fit. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | Image size or combined print image size is larger than the image box size. Image or combined print image has been decimated to fit. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B600 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B601 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

#### 4.2.2.3.1.8. SOP Specific Conformance for Basic Film Session SOP Class of the Basic Color Print Management Meta SOP Class

##### 4.2.2.3.1.8.1. Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

**Table 75: Basic Film Session Presentation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Number of Copies | 2000,0010 | IS | 1 | ALWAYS | USER | 1-100 |
| Print Priority | 2000,0020 | CS | MED | ALWAYS | AUTO | |
| Medium Type | 2000,0030 | CS | BLUE FILM | ALWAYS | USER | PAPER, CLEAR FILM, BLUE FILM |

| | | | | | | |
|---|---|---|---|---|---|---|
| Film Destination | 2000,0040 | CS | - | ALWAYS | AUTO | Default value from Printer<br>ex: PROCESSOR |

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 76: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film session successfully created. | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B600 | Memory allocation not supported. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail.. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B601 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B604 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.3.1.8.2. Dataset Specific Conformance for Basic Film Session SOP Class N-DELETE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 77: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Successful command | The print job continues. |
| Failure | xxxx | (any failure) | The print job fails, the error is logged and the association is released. |
| Warning | xxxx | (any warning) | The print job fails, the warning is logged and the association is released. |

#### 4.2.2.3.1.9. SOP Specific Conformance for Presentation LUT SOP Class

##### 4.2.2.3.1.9.1. Dataset Specific Conformance for Presentation LUT SOP Class N-CREATE-SCU

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Presentation LUT Shape | 2050,0020 | CS | IDENTITY | ALWAYS | AUTO | |

#### 4.2.2.3.1.10. SOP Specific Conformance for Basic Film Box SOP Class of the Basic Color Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

##### 4.2.2.3.1.10.1. Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

**Table 78: Basic Film Box Presentation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Display Format | 2010,0010 | ST | STANDARD\1,1 | ALWAYS | AUTO | |
| Film Orientation | 2010,0040 | CS | PORTRAIT, LANDSCAPE | ALWAYS | USER | |
| Film Size ID | 2010,0050 | CS | 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN, A3, A4 | ALWAYS | USER | |
| Magnification Type | 2010,0060 | CS | REPLICATE, BILINEAR, CUBIC, NONE | OPTIONAL | AUTO | Value from the printer template configuration |
| Max Density | 2010,0130 | US | 300 | OPTIONAL | AUTO | |
| Trim | 2010,0140 | CS | NO, YES | ALWAYS | IMPLICIT/ CONFIG | |
| Configuration Information | 2010,0150 | ST | LUT=0,9 | OPTIONAL | AUTO | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Illumination | 2010,015E | US | | OPTIONAL | AUTO | |
| Reflected Ambient Light | 2010,0160 | US | | OPTIONAL | AUTO | |
| Referenced Film Session Sequence | 2010,0500 | SQ | | ALWAYS | AUTO | |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | |
| Referenced Presentation LUT Sequence | 2050,0500 | SQ | | ALWAYS | AUTO | |
| > Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | |
| > Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | |

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 79: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film session successfully created. | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B600 | Memory allocation not supported. | |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B601 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B604 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.3.1.10.2. Dataset Specific Conformance for Printer SOP Class N-GET-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 80: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Successful command | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| **Service Status** | **Error Code** | **Further Meaning** | **Behavior** |
| Warning | 0001 | Requested optional attributes are not supported | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | xxxx | (any warning) | Print job is terminated, the warning is logged, and the association is released. |

### 4.2.2.3.1.11. SOP Specific Conformance for Basic Film Box SOP Class of the Basic Color Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

#### 4.2.2.3.1.11.1. Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 81: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|
| Success | 0000 | Film Box successfully created. | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B605 | Requested Min Density or Max Density outside of printer's operating range. The printer will use its respective minimum or maximum density value instead. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B600 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B601 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |

| | | | |
|---|---|---|---|
| | B603 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B604 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B609 | (not defined) | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

#### 4.2.2.3.1.12. SOP Specific Conformance for Basic Color Image Box SOP Class of the Basic Color Print Management Meta SOP Class

This section and sub-section include the manufacturer SOP and Dataset specific information as well the status codes and their corresponding behavior.

##### 4.2.2.3.1.12.1. Dataset Specific Conformance for Basic Color Image Box SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behavior will be reported in this section.

**Table 82: Image Box Pixel Presentation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Box Position | 2020,0010 | US | | ALWAYS | AUTO | |
| Polarity | 2020,0020 | CS | NORMAL | ALWAYS | AUTO | |
| Basic Grayscale Image Sequence | 2020,0110 | SQ | | ALWAYS | AUTO | |
| >Samples per Pixel | 0028,0002 | US | 3 | ALWAYS | AUTO | |
| >Photometric Interpretation | 0028,0004 | CS | RGB | ALWAYS | IMPLICIT | |
| >Rows | 0028,0010 | US | | ALWAYS | IMPLICIT | |
| >Columns | 0028,0011 | US | | ALWAYS | IMPLICIT | |
| >Bits Allocated | 0028,0100 | US | 8 | ALWAYS | AUTO | |
| >Bits Stored | 0028,0101 | US | 8 | ALWAYS | IMPLICIT | |
| >High Bit | 0028,0102 | US | 7 | ALWAYS | AUTO | |
| >Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | |
| >Pixel Data | 7FE0,0010 | OW/OB | | ALWAYS | AUTO | |

This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

**Table 83: Status Response**

| Service Status | Error Code | Further Meaning | Behavior |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Success | 0000 | Successful command | The print job continues and completes. Status is marked as 'Completed' in the Job viewer. |
| Failure | xxxx | (any failure) | Print job fails, the error is logged, and the association is released. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| Warning | B604 | Image size is larger than image box size, the image has been demagnified. | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B609 | Image size is larger than the image box size. The image has been cropped to fit. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B60A | Image size or combined print image size is larger than the image box size. Image or combined print image has been decimated to fit. | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | 0107 | (not defined) | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | 0116 | | The print job continues and the warning is logged. Status is marked as 'Completed' in the Job viewer. |
| | B600 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B601 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B602 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B603 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B605 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B606 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | B608 | | The print job is terminated and the warning is logged. Status is marked as 'Permanently Failed' in the Job viewer with detail. |
| | xxxx | (any other warning) | Print job is terminated, the warning is logged, and the association is released. |

Most of the warnings are treated as errors as the MR Print AE has no capability to recover from them producing a proper print.

#### 4.2.2.4. Association Acceptance Policy

The MR System Print AE does not accept any Associations.

## 4.3. Network Interfaces

### 4.3.1. Physical Network Interfaces

The MR System supports DICOM TCP/IP Network Communication as defined in PS 3.8 of the standard.

No OSI stack communications are provided with this implementation. TCP/IP is the only protocol stack supported.

The MR System supports Ethernet v2.0 and IEEE 802.3, 10/100/1000 Base-T.

The TCP/IP Stack as supported by the underlying Microsoft Windows Operating System.

## 4.3.2. Additional Protocols

Not applicable

## 4.3.3. IPv4 and IPv6 Support

MR supports both IPv4 and IPv6.

## 4.4. Configuration

The configuration of the various DICOM services on the MR system are determined at the time of installation. This can also be changed. This chapter describes all the relevant parameters.

## 4.4.1. AE Title/Presentation Address Mapping

The DICOM operation of the MR system is configured with the Service Application tool. This tool can be started after logging in to the operating system. It is password protected and intended to be used by Philips Customer Support Engineers only.

### 4.4.1.1. Local Network settings

The local network settings of the MR system can be made in two ways.

• Automatically via DHCP (hospital provided).
• By assigning a dedicated IP address, subnet mask, gateway and DNS server manually.
This is determined during the installation of the MR System. It is strongly advised to use only a manually assigned IP address.

The MR System host name is configured via the Computer Name in the MS operating system.

### 4.4.1.2. Local AE Titles and listen port

The local AE title mapping and configuration is as specified in Table 84.

**Table 84: AE Title configuration table**

| Application Entity | Default AE Title | Default TCP/IP Port |
|---|---|---|
| Network AE | NODENAME | 104* |
| Print AE | NODENAME | 104* |

* The default TCP/IP listen port number for Network AE and Print AE is 104. If needed this listen port number can be changed.

### 4.4.1.3. Remote AE Title/Presentation Address Mapping

This section describes the configuration of remote DICOM nodes on the MR system.

NOTE: For MOVE to a third node this node must be known at the MR system (that act as SCU) and also at the station that will start the STORE operation, as this information will be used by the MR system in the MOVE command to initiate the STORE action.

**Remote Association Acceptors (SCP) Configuration:**
All remote DICOM nodes that are able to accept an association from the MR System must be configured on the MR System with the following information:

• IP Address or Host name
• listening port number.
• AE Title.

**Remote Association Initiators (SCU) Configuration:**
All remote DICOM nodes that are able to initiate an association with the MR System (that act as SCP) must be configured on the MR System with the following information: • IP Address or Host name
• listening port number.
• AE Title.

## 4.4.2. Configurable parameters

This section describes all the parameters that can be configured on the MR system via the service application tool. These parameters are organized in the following groups:
- Parameters of the local MR AE.
- Parameters for the remote DICOM nodes.
- General Print Parameters.
- Printer Specific Print Parameters.

**Table 85: Configuration Parameters Table**

| Parameter | Configurable | Default Value |
|---|---|---|
| Local node Parameters | | |
| AE title | Yes | MySCU |
| Port Number | Yes | 104 |
| Maximum PDU Length (for incoming association) in Bytes | Yes | Default=16352 |
| Network Timeout (seconds) | No | 30 sec |
| Artim Timeout | Yes | 30 sec |
| Support SOP classes | No | (refer Table1 for supported SOP class) |
| Supported Transfer Syntaxes | No | ELE<br>ILE<br>EBE<br>JPEG Lossless Non-Hierarchical FOP (Process 14) In order in which these are listed above determines the prevalence. |
| Institution name. | Yes | Must be shorter than 64 characters |
| Automatic association timeout | No | 10 sec |
| Automatic association timeout SCP | No | QR=5sec / RIS=60 sec / other=3600 sec |
| Remote node Parameters | | |
| Size constraint in maximum object size (see note) | No | - |

| | | |
|---|---|---|
| Maximum data PDU Length (for associations initiated on the MR) in Bytes | Yes | 0 Bytes |
| Network reply timeout(SCU) | Yes | 3600 sec (set to 60 sec for MR Images SOP export) |
| Artim timeout | Yes | 60 sec |
| Supported SOP classes. | Yes | Depends on used template; SOP classes can be configured as per Table1 for sending and receiving. |
| Supported Transfer Syntaxes | Yes | ELE<br>EBE<br>ILE<br>JPEG Lossless Non-Hierarchical FOP (Process 14) In order in which these are listed above determines the prevalence. |
| Storage Commit Mode | Yes | Asynchronous Synchronous |
| Is Archive | Yes | If set to Yes then the network node is an archive. |
| Send Storage Commit Request | Yes | Only when 'IsArchive' is Yes. |
| Pure DICOM (Do not send private attributes: only standard attributes) | Yes | No (= send all attributes) |
| Write SQ Explicit Length | Yes | No |
| Verify Objects | Yes | NONE |
| Combine MR Rescaling for pixel calibration | Yes | Checkbox not checked |
| No LUT-2-RGB conversion | Yes | Checkbox is checked |
| ADC correction | Yes | Checkbox not checked |
| Splitting Series on export | Yes | Echo/Dynamic/Diffusion<br>Image Type / Scanning Sequence |
| General DICOM Print Parameters | | |
| The DICOM printers that may be selected by the operator | Yes | Per template |
| Printer Specific Print Parameters (Paper) | | |
| Name | Yes | New Printer |
| Printer Type | Yes | 3M-HQ969-DICOM |
| Host Name or IP Address | Yes | - |
| AE Tittle | Yes | AE_Print |
| Port Number | Yes | 3950 |
| Media Names | Yes | - (Depends on used template) |
| Type of Film | Yes | - (Depends on used template) |

The MR System can print to only one DICOM printer at a time.

Some remarks to configurable Parameters for Remote Systems:
- The Basic Worklist Management services may be configured for one or more RIS stations.
- Multiple MPPS nodes can be configured but MPPS message will only be sent to one node.
- PACS node will be configured with IsArchive set to true.
- With the MR System it is possible to 'auto-push' the MR images to a selected remote application. Whether or not to auto-push a scan is defined in the scan protocol.

# 5. Media Interchange

## 5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

### 5.1.1. Application Data Flow Diagram

Figure as below shows the Media Interchange Application Data Flow diagram presenting all of the Application Entities present in an implementation and graphically depicting the relationship of the AE's, use of DICOM to Real-World Activities.

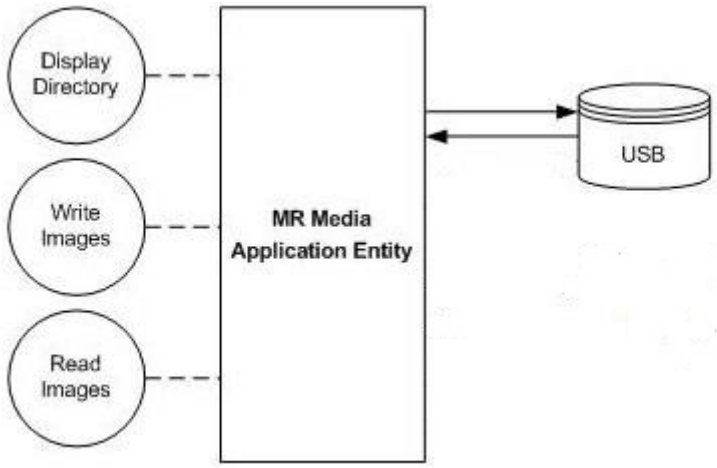


**Figure 18: Media Interchange Application Data Flow Diagram**

The supported DICOM Media Services are specified in Table 86.

**Table 86: Media Services**

| Media Storage Application Profile | File-set Creator (FSC) | File-set Updater (FSU) | File-set Reader (FSR) |
|---|---|---|---|
| **USB** | | | |
| General Purpose USB Media Interchange with JPEG | Yes | Yes | Yes |

**Table 87: Photometric interpretations supported by the MR AE**

| Photometric Interpretation | Import | Export | Viewing |
|---|---|---|---|
| RGB (only SC ) | YES | YES | YES |
| MONOCHROME2 | YES | YES | YES |

**Table 88: Transfer Syntaxes of Media supported by the MR AE**

| Abstract Syntax Name / UID | Transfer Syntax Name | Transfer Syntax UID | Role | Extended Negotiation |
|---|---|---|---|---|
| Any of the standard image storage and ILE | ELE | 1.2.840.10008.1.2.1 | SCU | None |

The MR system supports the Media transfer syntax listed in Table 88. The supported transfer syntax is ELE.

## 5.1.2. Functional Definitions of AE's

The Media AE is the one and only Media Application Entity within the MR System. It includes the following service class.

For USB the Media AE can perform in one or more of the following 3 roles:
- RWA Display Directory (as FSR);
- RWA Read Image (as FSR);
- RWA Write Image (as FSC and FSU).

Using initialized media, Write Images can be initiated by selecting the requested images and clicking the media copy button.

## 5.1.3. Sequencing of Real World Activities

Whenever media has to be written the Media AE first tries to read the DICOMDIR. Then the Media AE will write the images of the selected Examinations and the updated DICOMDIR to the DICOM media.

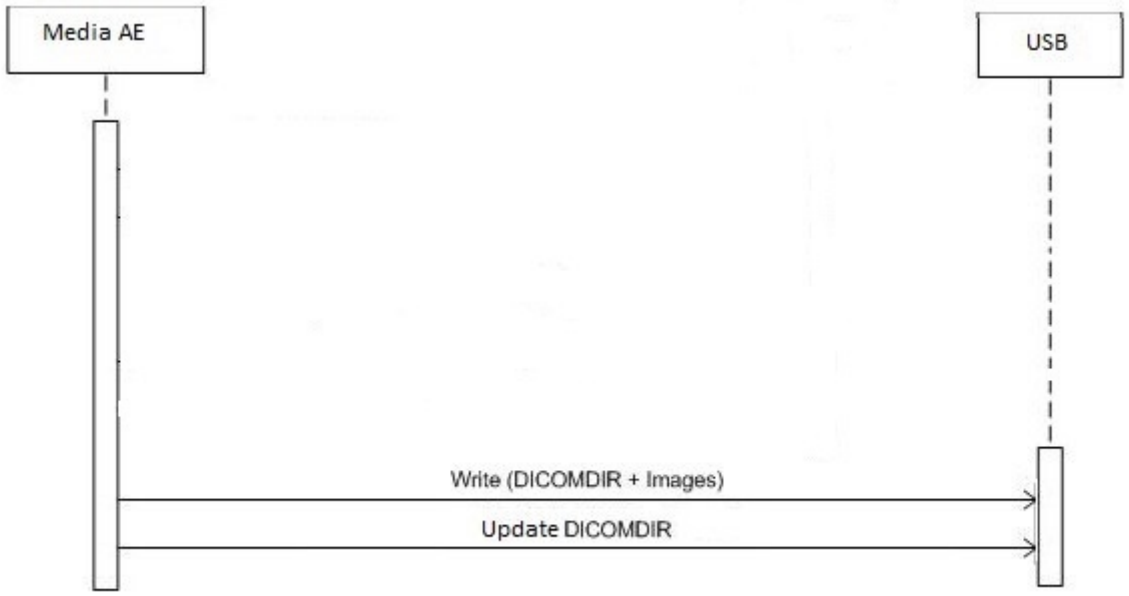


**Figure 19: Sequencing of RWA Write Image**

## 5.2. AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

## 5.2.1. MR Media AE - Specification

The Media AE provides standard conformance to the DICOM Media Storage Service and File Format ([DICOM] PS 3.10),

Media Storage Application Profiles STD-GEN-USB-JPEG ([DICOM] PS 3.11) for reading and writing.

For one or more Application Profiles, Table 89 shows the Real-World Activities and the roles of each of these Real-World Activities.

**Notes:**
- Read File-set = Display Directory, Read Image
- Create File-set = Write Image (using ELE only)
- Update File-set = Write Image (using ELE only)

**Table 89: AE MR Media AE related Application Profiles, RWA activities and roles**

| Supported Application Profile | Identifier | Real-World Activities | Roles |
|---|---|---|---|
| General Purpose USB Media Interchange with JPEG | STD-GEN-USB-JPEG | Create File-set | FSC |
| | | Read File-set | FSR |
| | | Update File-set | FSU |

#### 5.2.1.1. File Meta Information for the MR Media AE

The Implementation Class UID and the Implementation Version Name in the File Meta Header are as specified for networking.

The Media AE has no specific File Meta Information.

The following values are assigned to the File Meta Information attributes (see also PS 3.10) that pertain to the Implementation Class and Version.

**Table 90: File Meta Information for the MR Media AE**

| | |
|---|---|
| Implementation Class UID | 1.3.46.670589.54.2.111.0 |
| Implementation Version Name | Philips MR 111.0 |

#### 5.2.1.2. Real-World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

##### 5.2.1.2.1. RWA - Read File-set

The Media AE supports the FSR (File Set Reader) role to interchange stored data on DICOM media. (Display Directory and Read Image).

**Display Directory:**
When a database open action is initiated on the media then the Media AE acts as an FSR using the interchange option to read the DICOMDIR of the medium.
The MR System will act as a FSR when reading the directory (DICOMDIR) of the medium. This allows the System Integrator to see the results in an overview of the patients, studies, series presentation states and images.

The MR system will not access DICOM media when either:
- Patient ID is absent; or
- Study Instance UID has no value; or
- Series Instance UID has no value.

**Read Images**

The MR System Media AE will act as a FSR when reading all images of the selected Examinations from DICOM media. Only images made on a Philips MR System will be imported again; these imported images are to be used for reference only, it is not intended to export them again. Images without the Philips private attributes are not imported.

#### 5.2.1.2.1.1. Media Storage Application Profile

This chapter refers to the related Application Profiles in Table in section 5.2.1.

##### 5.2.1.2.1.1.1. Options

**Display Directory**
The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series, and Image.

**Read Image**
The mandatory attributes of the DICOM images are required for the successfully storage of the images in the MR System internal image database. For conformance see section 8.

### 5.2.1.2.2. RWA - Create File-set

This Media Application Entity has a File-set Creator functionality which is described here.

**Write Images**
The Media AE acts as an FSC when writing DICOM objects onto DICOM media. The Media AE can also store private attributes. The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

#### 5.2.1.2.2.1. Media Storage Application Profile

This chapter refers to the related Application Profiles in Table in section 5.2.1.

##### 5.2.1.2.2.1.1. Options

Implementation remarks and restriction:
• When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
- Patient ID;
- Study ID;
- Study Instance UID;
- Series Number;
- Series Instance UID;
- Image Number;
- SOP Instance UID.
• The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.
• The default value for the Pixel Intensity Relationship (0028,1040) is set to DISP.
• A number of attributes (e.g., Window Width and Window Centre) can be formatted as floating point numbers.

### 5.2.1.2.3. RWA - Update File-set

This Media Application Entity supports the File-set Updater functionality (FSU) for USB only.

The Media AE supports the FSU role to interchange stored data on DICOM media (Write Image).

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series and Image.

When the medium contains a DICOM file-set then the Media AE acts as a FSU. Thus it can merge new objects into the existing file-set or can remove objects from that file-set.

#### 5.2.1.2.3.1. Media Storage Application Profile

The Media AE will act as a FSC or FSU when writing all images of the selected Examinations onto the DICOM media.

The MR System Media AE will act as a FSC when writing all images of the selected Examinations to DICOM media. All Images made on an MR System can be exported. This results in writing the patients, studies, series and images on the MR System to the DICOM medium.

##### 5.2.1.2.3.1.1. Options

The mandatory DICOM attributes are verified before accepting imported SOP instances.

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

Implementation remarks and restriction:

- When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
  - Patient ID;
  - Study ID;
  - Study Instance UID;
  - Series Number;
  - Series Instance UID;
  - Image Number;
  - SOP Instance UID.
- The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.

## 5.3. Augmented and Private Application Profiles

Not applicable

## 5.4. Media Configuration

Not Applicable.

# 6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

**Table 91: Supported DICOM Character Sets**

| Character Set Description | Defined Term | ESC Sequence | ISO Registration Number | Code Element | Character Set |
|---|---|---|---|---|---|
| GB18030 | GB18030 | - | - | - | - |
| Latin alphabet No. 1 | ISO 2022 IR 100 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/01 | ISO-IR 100 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 2 | ISO 2022 IR 101 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/02 | ISO-IR 101 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 3 | ISO 2022 IR 109 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/03 | ISO-IR 109 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 4 | ISO 2022 IR 110 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/04 | ISO-IR 110 | G1 | Supplementary set of ISO 8859 |
| Greek | ISO 2022 IR 126 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/06 | ISO-IR 126 | G1 | Supplementary set of ISO 8859 |
| Arabic | ISO 2022 IR 127 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/07 | ISO-IR 127 | G1 | Supplementary set of ISO 8859 |
| Japanese | ISO 2022 IR 13 | ESC 02/08 04/10 | ISO-IR 14 | G0 | JIS X 0201: Romaji |
| | | ESC 02/09 04/09 | ISO-IR 13 | G1 | JIS X 0201: Katakana |
| Hebrew | ISO 2022 IR 138 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/08 | ISO-IR 138 | G1 | Supplementary set of ISO 8859 |
| Cyrillic | ISO 2022 IR 144 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/12 | ISO-IR 144 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 5 | ISO 2022 IR 148 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 04/13 | ISO-IR 148 | G1 | Supplementary set of ISO 8859 |
| Thai | ISO 2022 IR 166 | ESC 02/08 04/02 | ISO-IR 6 | G0 | ISO 646 |
| | | ESC 02/13 05/04 | ISO-IR 166 | G1 | TIS 620-2533 (1990) |
| Default repertoire | ISO IR 6 | - | ISO-IR 6 | G0 | ISO 646 |
| Latin alphabet No. 1 | ISO_IR 100 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 100 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 2 | ISO_IR 101 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 101 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 3 | ISO_IR 109 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 109 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 4 | ISO_IR 110 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 110 | G1 | Supplementary set of ISO 8859 |
| Greek | ISO_IR 126 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 126 | G1 | Supplementary set of ISO 8859 |

| | | | | | |
|---|---|---|---|---|---|
| Arabic | ISO_IR 127 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 127 | G1 | Supplementary set of ISO 8859 |
| Japanese | ISO_IR 13 | - | ISO-IR 14 | G0 | JIS X 0201: Romaji |
| | | - | ISO-IR 13 | G1 | JIS X 0201: Katakana |
| | ISO 2022 IR 87 | ESC 02/04 04/02 | ISO-IR 87 | G0 | JIS X 0208: Kanji |
| | ISO_IR 159 (does not exist, keep for legacy) | - | ISO-IR 159 | G0 | JIS X 0212: Kanji |
| Hebrew | ISO_IR 138 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 138 | G1 | Supplementary set of ISO 8859 |
| Cyrillic | ISO_IR 144 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 144 | G1 | Supplementary set of ISO 8859 |
| Latin alphabet No. 5 | ISO_IR 148 | - | ISO-IR 6 | G0 | ISO 646 |
| | | - | ISO-IR 148 | G1 | Supplementary set of ISO 8859 |
| Thai | ISO_IR 166 | - | ISO-IR 6 | G0 | ISO 646 |
| | | | ISO-IR 166 | G1 | TIS 620-2533 (1990) |
| Unicode in UTF-8 | ISO_IR 192 | - | - | - | - |
| Korean | ISO 2022 IR 149 | ESC 02/04 02/09 04/03 | ISO-IR 149 | G1 | KS X 1001: Hangul and Hanja |
| | | | | | |

The default character set for the MR System is ISO_IR 100. If nothing is defined the MR system uses ISO-IR 6, as per DICOM Standard.

When an unsupported character is received it shall be tried and decoded according the default repertoire. Otherwise unsupported characters shall be displayed as "?".
The MR System supports Japanese character sets only for use in the Patient's Name attribute (0010,0010).
Internally the MR System only uses Unicode characters. This implies that text will be displayed as Unicode too.

If RIS worklist contains a Specific Character Set attribute that is not empty and not supported according to Table 91 then the MR System will send a C-CANCEL request to the RIS and a "RIS ERROR" message will be displayed; the MR System will reject the RIS import.

# 7. Security

## 7.1. Security Profiles

If configured MR System supports the following security measures:
• Secure transport using TLS
• De-identification of data for export.
• Time Synchronization Profile.

### 7.1.1. Security use Profiles

Not applicable

### 7.1.2. DICOM TLS Secure Transport Connection Profile

Secure communication is a “mode of operation” of the MR System supported by the implementation of the DICOM TLS 1.2 Secure Transport Connection Profile. This functionality will be used by the nodes that can authenticate each other before they exchange DICOM information. For secure communication the TLS protocol v1.2 is used which provides message authentication, integrity, confidentiality, and replay protection. Confidentiality is optional and can be controlled by the encryption settings.
The MR System may communicate using the following Cipher Suites:

1. TLS_RSA_WITH_NULL_SHA (Node authentication without encryption)
2. TLS_RSA_WITH_3DES_SHA (Node authentication with encryption)
3. TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
4. TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
5. TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
6. TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384
7. TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384
8. TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
9. TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA
10. TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA
11. TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
12. TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA
13. TLS_RSA_WITH_AES_128_GCM_SHA256
14. TLS_RSA_WITH_AES_256_CBC_SHA256
15. TLS_RSA_WITH_AES_128_CBC_SHA256
16. TLS_RSA_WITH_AES_256_CBC_SHA
17. TLS_RSA_WITH_AES_128_CBC_SHA
18. TLS_RSA_WITH_3DES_EDE_CBC_SHA
19. TLS_DHE_RSA_WITH_AES_256_CBC_SHA
20. TLS_DHE_RSA_WITH_AES_128_CBC_SHA
21. TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA
22. TLS_RSA_WITH_RC4_128_SHA
23. TLS_RSA_WITH_RC4_128_MD5

The MR System supports X.509 certificates. The following TLS Certification checks will be done (TLS Handshake). The machine (either server or client) that will send its certificate will:

1. Choose the certificate according to Common Name (CN) value in the Subject-field. This name is case-sensitive. All present certificates should have unique CN names.
2. The server verifies
   - that the client certificate is a X.509 certificate which is not tampered with
   - that the client certificate is in the list of trusted certificates
   - that the client certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate).

- that the client certificate has the correct purpose (at least the Client Authentication purpose)

3. The client verifies
   - that the server certificate is a X.509 certificate which is not tampered with
   - that the server certificate is in the list of trusted certificates
   - that the server certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
   - that the server certificate has the correct purpose (at least Server Authentication purpose)

No verification is done on:

- revocation of certificates
- limiting the connection to a limited set of IP-addresses.

Node authentication with or without encryption is only possible when both nodes have:

- an access to their own private keys
- an access to a copy of the certificate of the other node containing its public key

The MR System can only read certificates from the certificate stores of the HKEY_LOCAL_MACHINE registry key. It is the responsibility of the Hospital to setup and maintain the certificate stores. This includes the removal of revoked certificates and certificate updates prior to their expiration. Since neither X.500 directories, Lightweight Directory Access Protocol (LDAP) nor Certificate Revocation Lists (CRLs) are supported, the whole certificate chain needs to be replaced after a security breach. Figure 20 presents the message flow of TLS handshake supported by the MR System.

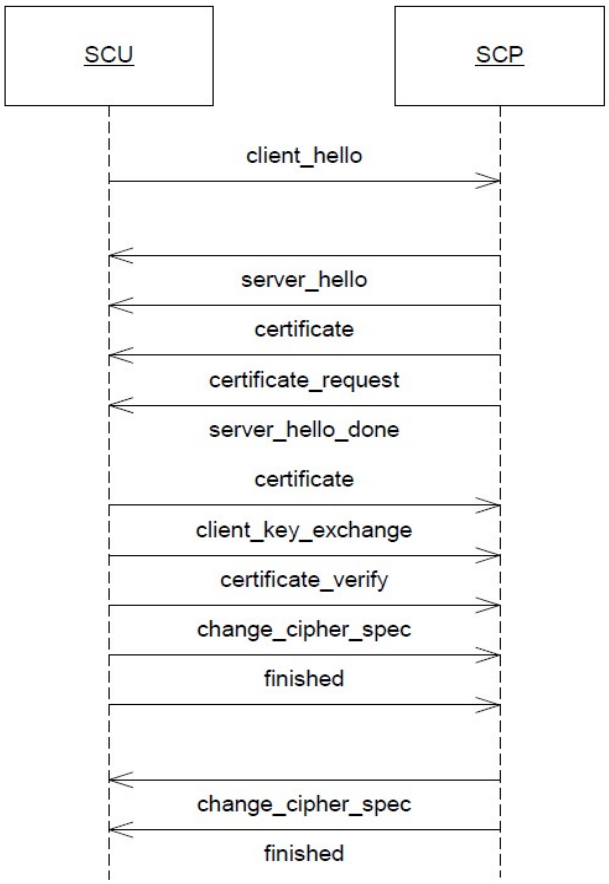


**Figure 20 Message flow of TLS handshake**

## 7.1.3. Digital Signature Profiles

Not applicable

## 7.1.4. Media Storage Security Profiles

Not applicable

## 7.1.5. Attribute Confidentiality Profiles

This functionality is targeted toward creating a special purpose, de-identified version of an already-existing Data Set. The de-identified SOP Instances are useful, for example, in creating teaching or research files, where the identity of the patient should be protected.
The MR System does not create instances of the Encrypted Attributes Data Set, therefore, reconstruction of the original Data Set will not be possible.
Table 92 presents all attributes that can be de-identified by the MR System. Each Attribute to be protected has its value replaced by a different “replacement value” which does not allow identification of the patient. Integrity of dummy values for references (such as SOP Instance UID, etc.) if multiple SOP instances are protected is ensured within the scope of one job.
The MR System does not ensure that identifying information that is burned in to the image pixel data is “blackened” (removed).

Table 92 specifies the attributes that are modified when de-identification is performed (Suppression). De-identification is only applicable when it concerns writing to USB/file.

**Table 92: Basic Application Level Confidentiality Profile Attributes**

| Attribute Name | Tag | Standard Basic Prof. | De-Identification support |
|---|---|---|---|
| Accession Number | (0008,0050) | Z | Z |
| Acquisition Context Sequence | (0040,0555) | X/Z | Z |
| Acquisition Date | (0008,0022) | X/Z | Z |
| Acquisition DateTime | (0008,002A) | X/Z/D | D |
| Acquisition Device Processing Description | (0018,1400) | X/D | D |
| Acquisition Time | (0008,0032) | X/Z | D |
| Concatenation UID | (0020,9161) | U | U |
| Consulting Physician's Name | (0008,009C) | Z | Z |
| Content Creator's Name | (0070,0084) | Z/D | D |
| Content Date | (0008,0023) | Z/D | D |
| Content Sequence | (0040,A730) | D | D |
| Content Time | (0008,0033) | Z/D | D |
| Contrast Bolus Agent | (0018,0010) | Z/D | D |
| Detector ID | (0018,700A) | X/D | D |
| Device Serial Number | (0018,1000) | X/Z/D | D |
| Device UID | (0018,1002) | U | U |
| Digital Signature UID | (0400,0100) | U | U |
| Dimension Organization UID | (0020,9164) | U | U |
| Dose Reference UID | (300A,0013) | U | U |
| End Acquisition DateTime | (0018,9517) | X/D | D |

| | | | |
|---|---|---|---|
| Failed SOP Instance UID List | (0008,0058) | U | U |
| Fiducial UID | (0070,031A) | U | U |
| Filler Order Number / Imaging Service Request | (0040,2017) | Z | D |
| First Treatment Date | (3008,0054) | X/D | D |
| Frame of Reference UID | (0020,0052) | U | U |
| Graphic Annotation Sequence | (0070,0001) | D | Z |
| Instance Creator UID | (0008,0014) | U | U |
| Institution Code Sequence | (0008,0082) | X/Z/D | Z |
| Institution Name | (0008,0080) | X/Z/D | Z |
| Irradiation Event UID | (0008,3010) | U | U |
| Media Storage SOP Instance UID | (0002,0003) | U | U |
| Most Recent Treatment Date | (3008,0056) | X/D | D |
| Observation Subject UID (Trial) | (0040,A402) | U | U |
| Observation UID | (0040,A171) | U | U |
| Operators' Identification Sequence | (0008,1072) | X/D | D |
| Operators' Name | (0008,1070) | X/Z/D | D |
| Palette Color Lookup Table UID | (0028,1199) | U | U |
| Patient's Birth Date | (0010,0030) | Z | Z |
| Patient's Name | (0010,0010) | Z | D |
| Patient's Sex | (0010,0040) | Z | Z |
| Patient ID | (0010,0020) | Z | D |
| Patient Sex Neutered | (0010,2203) | X/Z | Z |
| Person Identification Code Sequence | (0040,1101) | D | D |
| Person Name | (0040,A123) | D | D |
| Placer Order Number / Imaging Service Request | (0040,2016) | Z | Z |
| Presentation Display Collection UID | (0070,1101) | U | U |
| Presentation Sequence Collection UID | (0070,1102) | U | U |
| Referenced Dose Reference UID | (300A,0083) | U | U |
| Referenced Frame of Reference UID | (3006,0024) | U | U |
| Referenced General Purpose Scheduled Procedure Step Transaction UID | (0040,4023) | U | U |
| Referenced Image Sequence | (0008,1140) | X/Z/U | Z |
| Referenced Observation UID (Trial) | (0040,A172) | U | U |
| Referenced Performed Procedure Step Sequence | (0008,1111) | X/Z/D | D |
| Referenced SOP Instance UID | (0008,1155) | U | U |
| Referenced SOP Instance UID in File | (0004,1511) | U | U |
| Referenced Study Sequence | (0008,1110) | X/Z | Z |
| Referring Physician's Name | (0008,0090) | Z | Z |

| | | | |
|---|---|---|---|
| Related Frame of Reference UID | (3006,00C2) | U | U |
| Requested Procedure Description | (0032,1060) | X/Z | Z |
| Reviewer Name | (300E,0008) | X/Z | Z |
| RT Plan Date | (300A,0006) | X/D | D |
| RT Plan Label | (300A,0002) | D | D |
| RT Plan Time | (300A,0007) | X/D | D |
| Series Date | (0008,0021) | X/D | D |
| Series Instance UID | (0020,000E) | U | U |
| Series Time | (0008,0031) | X/D | D |
| SOP Instance UID | (0008,0018) | U | U |
| Source Image Sequence | (0008,2112) | X/Z/U | U |
| Source Serial Number | (3008,0105) | X/Z | Z |
| Start Acquisition DateTime | (0018,9516) | X/D | D |
| Station Name | (0008,1010) | X/Z/D | D |
| Storage Media File-set UID | (0088,0140) | U | U |
| Study Date | (0008,0020) | Z | D |
| Study ID | (0020,0010) | Z | Z |
| Study Instance UID | (0020,000D) | U | U |
| Study Time | (0008,0030) | Z | Z |
| Synchronization Frame of Reference UID | (0020,0200) | U | U |
| Target UID | (0018,2042) | U | U |
| Template Extension Creator UID | (0040,DB0D) | U | U |
| Template Extension Organization UID | (0040,DB0C) | U | U |
| Tracking UID | (0062,0021) | U | U |
| Transaction UID | (0008,1195) | U | U |
| Treatment Date | (3008,0250) | X/D | D |
| Treatment Time | (3008,0251) | X/D | D |
| UID | (0040,A124) | U | U |
| Verifying Observer Identification Code Sequence | (0040,A088) | Z | Z |
| Verifying Observer Name | (0040,A075) | D | D |
| Verifying Observer Sequence | (0040,A073) | D | D |
| Verifying Organization | (0040,A027) | D | D |

The following action codes are used in Table:

- D - replace with a non-zero length value that may be a dummy value and consistent with the VR
- Z - replace with a zero length value, or a non-zero length value that may be a dummy value and consistent with the VR
- X - remove
- U - replace with a non-zero length UID that is internally consistent within a set of Instances

For locally created data, Private attributes not containing personal data are retained during de-identification.

## 7.1.6. Network Address Management Profiles

Not applicable

## 7.1.7. Time Synchronization Profiles

MR System conforms to the Basic Time Synchronization Profile as NTP client.

## 7.1.8. Application Configuration Management Profiles

Not applicable

## 7.1.9. Audit Trail Profiles

### 7.1.9.1. Generation of Audit Records

The MR System can create audit messages according to the IHE Basic Security Integration Profile [IHE] to audit activities, to detect non-compliant behavior in the enterprise, and to facilitate detection of improper creation, access, modification and deletion of Protected Health Information (PHI). These messages may contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository according to the Syslog protocol [SYSLOG]:

The MR subsystem supports Audit events mentioned in below table

**Table 93: List of supported events**

| Audit Event Trigger | Description | Message DICOM PS 3.15 A.5.3 |
|---|---|---|
| Actor-start-stop | When application has started or is closed. | Application Activity |
| Audit-log-used | When audit logs are accessed. | Audit log used |
| Begin-storing-instances | Begin storing SOP Instances for a study to an external repository. | Begin Transferring DICOM Instances |
| Instances-Stored | Storage of SOP instances to a remote repository has been completed. | DICOM Instances Transferred |
| Node-Authentication-failure | A secure node authentication failure has occurred during TLS negotiation, e.g., invalid certificate. | Security Alert |
| Patient-record | Patient is created/Updated/Merged | Patient record |
| PHI-export | Any export of PHI to media. | Export |
| PHI-import | Any import of PHI from media. | Import |
| Query Information | A query has been initiated from patient directory to a remote node. | Query |
| Security Alert | When software, security or networking configuration of the system is changed via the field service functionality. | Security Alert |
| Instances-deleted | SOP Instances are deleted from a specific study. One event covers all instances deleted for the particular study. | DICOM Instances Accessed" or "DICOM Study Deleted |
| Study-used | SOP Instances from a specific study are created or accessed. One event covers all instances used for the particular study. | DICOM Instances Accessed |

If the central Audit Record Repository is not available, the audit trail record will be stored by the MR System in a local buffer. Once the central Audit Record Repository is available again, the content of that buffer will be transferred to the central Audit Record Repository. The time that is part of the audit message will be the local time of the MR System. This time will be synchronized with a Time Server. The Time Server and central Audit Record Repository are elements of the Hospital infrastructure.

## 7.2. Association Level Security

The MR System accepts associations only from known applications or an application whose “calling AE Title” is defined in its configuration file. The MR System will reject association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application entity (AE) is known if – and only if – it is defined during configuration of the MR System, which is done via the configuration application.

## 7.3. Application Level Security

The MR System allows the use of either DIMSE secure or non-secure communication, the secure communication is based on the Transport Layer Security (TLS) protocol [TLS]. If configured, the MR System supports security measures for:

1. secure authentication of a node
2. integrity and confidentiality of transmitted data
3. replay protection
4. generation of audit trail records
5. Access control and user authentication.

# 8. Annexes of application "MR System Network AE"

## 8.1. IOD Contents

### 8.1.1. Created SOP Instance

This section specifies each IOD created by this application.

Used abbreviations are:
**For module and macro Usage**

| | |
|---|---|
| ALWAYS | the module is always present |
| CONDITIONAL | the module is used under specified condition |

**For attribute Definition**
The first value is about the presence of the attribute and the next value(s) tell something about the source. In case the source contains multiple values, then either one of these may be applicable depending on the use of the system.

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.

Abbreviations used in the IOD tables for the column "Presence of Module" are:

| | |
|---|---|
| ALWAYS | The module is always present |
| CONDITIONAL | The module is used under specified condition |

Abbreviations used in the Module table for the column "Presence of Value" are:

| | |
|---|---|
| ALWAYS | The attribute is always present with a value |
| EMPTY | The attribute is always present without any value (attribute sent zero length) |
| VNAP | The attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present) |
| ANAP | The attribute is present under specified condition |

The abbreviations used in the Module table for the column "Source" are:

| | |
|---|---|
| AUTO | The attribute value is generated automatically |
| CONFIG | The attribute value source is a configurable parameter |
| COPY | The attribute value source is another SOP instance |
| FIXED | The attribute value is hard-coded in the application |
| IMPLICIT | The attribute value source is a user-implicit setting |
| MPPS | The attribute value is the same as that use for Modality Performed Procedure Step |
| MWL | The attribute value source is a Modality Worklist |
| USER | The attribute value source is explicit user input |

#### 8.1.1.1. List of created SOP Classes

**Table 94: List of created SOP Classes**

| SOP Class Name | SOP Class UID |
|---|---|
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 |

| | |
|---|---|
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 |
| Media Storage Directory SOP Class | 1.2.840.10008.1.3.10 |

### 8.1.1.2. MR Image Storage SOP Class

**Table 95: IOD of Created MR Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Frame of Reference | Frame of Reference Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| Image | General Image Module | ALWAYS |
| Image | Image Plane Module | ALWAYS |
| Image | Image Pixel Module | ALWAYS |
| Image | Contrast/Bolus Module | CONDITIONAL |
| Image | MR Image Module | ALWAYS |
| Image | Overlay Plane Module | CONDITIONAL |
| Image | VOI LUT Module | CONDITIONAL |
| Image | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

**Table 96: Patient Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | MWL, USER | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | MWL, USER | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | MWL, USER | - |
| Patient's Birth Time | 0010,0032 | TM | | ANAP | MWL, USER | |
| Patient's Sex | 0010,0040 | CS | | ALWAYS | MWL, USER | - |
| Other Patient IDs | 0010,1000 | LO | | VNAP | MWL, USER | Only present when supplied by the RIS. |
| Ethnic Group | 0010,2160 | SH | | ANAP | MWL, USER | Only present when supplied by the RIS. |
| Patient Comments | 0010,4000 | LT | | ANAP | MWL | Only present when supplied by the RIS. |

### Table 97: General Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | AUTO, MWL | - |
| Study Time | 0008,0030 | TM | | ALWAYS | MWL | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | AUTO, MWL, USER | - |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | MWL, USER | - |
| Study Description | 0008,1030 | LO | | VNAP | MWL, USER | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ANAP | MWL, USER | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | AUTO | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | AUTO | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | AUTO | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | AUTO | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | AUTO | - |
| Physician(s) of Record | 0008,1048 | PN | | ANAP | AUTO | - |
| Name of Physician(s) Reading Study | 0008,1060 | PN | | ANAP | AUTO | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ANAP | AUTO, MWL | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO, MWL | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO, MWL | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO, MWL | - |
| Study ID | 0020,0010 | SH | | ALWAYS | AUTO | - |
| Requesting Service | 0032,1033 | LO | | ANAP | | - |

### Table 98: Patient Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Age | 0010,1010 | AS | | ANAP | COPY | - |
| Patient's Size | 0010,1020 | DS | | VNAP | MWL | -- |
| Patient's Weight | 0010,1030 | DS | | ALWAYS | MWL, USER | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Occupation | 0010,2180 | SH | | ANAP | MWL | Only present when patient demographics received from RIS. |
| Additional Patient History | 0010,21B0 | LT | | VNAP | MWL | |
| Allergies | 0010,2110 | LO | | ALWAYS | MWL, USER | - |
| Pregnancy Status | 0010,21C0 | US | | ALWAYS | MWL, USER | - |

### Table 99: General Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Modality | 0008,0060 | CS | | ALWAYS | FIXED | Applied value: MR |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Performing Physician's Name | 0008,1050 | PN | | ANAP | AUTO | - |
| Operators' Name | 0008,1070 | PN | | ANAP | AUTO, USER | - |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ALWAYS | AUTO | - |
| Body Part Examined | 0018,0015 | CS | | ANAP | AUTO | If ExamCard scan. |
| Protocol Name | 0018,1030 | LO | | ALWAYS | USER | Scan name |
| Patient Position | 0018,5100 | CS | | ALWAYS | AUTO | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | Generated by MR System. |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | Created dynamically at export. Contains the combination of the acquisition number and the private reconstruction number. |
| Laterality | 0020,0060 | CS | | ANAP | USER | - |
| Request Attributes Sequence | 0040,0275 | SQ | | VNAP | MWL | - |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | MWL | - |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | ANAP | MWL, USER | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | MWL | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | MWL | - |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ALWAYS | AUTO | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Performed Procedure Step ID | 0040,0253 | SH | | ALWAYS | AUTO | - |
| Performed Procedure Step Description | 0040,0254 | LO | | ANAP | AUTO | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | ANAP | AUTO | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Code meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | VNAP | MWL | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | maximum of 64 characters |
| Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | MWL, USER | - |
| Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | MWL, USER | - |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | MWL, USER | - |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | MWL, USER | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | MWL, USER | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | MWL, USER | - |
| Performed Procedure Step End Date | 0040,0250 | DA | | ALWAYS | MWL, USER | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ALWAYS | MWL, USER | - |

**Table 100: Frame of Reference Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | - |
| Position Reference Indicator | 0020,1040 | LO | | EMPTY | FIXED | - |

**Table 101: General Equipment Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | FIXED | Applied value: Philips |
| Institution Name | 0008,0080 | LO | | ALWAYS | CONFIG | Configured on the system. |
| Institution Address | 0008,0081 | ST | | VNAP | CONFIG | |
| Station Name | 0008,1010 | SH | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Institutional Department Name | 0008,1040 | LO | | ALWAYS | CONFIG | - |
| Manufacturer's Model Name | 0008,1090 | LO | | ANAP | AUTO | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | FIXED | System serial number. |
| Software Version(s) | 0018,1020 | LO | | ALWAYS | FIXED | The release text of the original image. |
| | | | | | | |

**Table 102: General Image Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | | ALWAYS | AUTO | - |
| Acquisition Date | 0008,0022 | DA | | ALWAYS | AUTO, COPY | Same as Content Date. |
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | - |
| Acquisition Datetime | 0008,002A | DT | | ANAP | AUTO | - |
| Acquisition Time | 0008,0032 | TM | | ALWAYS | AUTO, COPY | Same as Content Time. |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | - |
| Referenced Image Sequence | 0008,1140 | SQ | | VNAP | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | IMPLICIT | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | IMPLICIT | - |
| Acquisition Number | 0020,0012 | IS | | ALWAYS | AUTO | Scan Number on UI. |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Patient Orientation | 0020,0020 | CS | | ANAP | AUTO | - |
| Lossy Image Compression | 0028,2110 | CS | | ANAP | FIXED | Applied value: 00 |
| Presentation LUT Shape | 2050,0020 | CS | | ANAP | FIXED | Applied value: IDENTITY |
| Real World Value Mapping Sequence | 0040,9096 | SQ | | ANAP | AUTO | - |
| >LUT Explanation | 0028,3003 | LO | | ANAP | AUTO | - |
| > Measurement Units Code Sequence | 0040,08EA | | | SQ | | - |
| >>Code value | 0008,0100 | SH | | ANAP | AUTO | - |
| >>Coding Scheme Designator | 0008,0102 | SH | | ANAP | AUTO | - |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>Context UID | 0008,0117 | UI | | ANAP | AUTO | - |
| >LUT Label | 0040,9210 | SH | | ALWAYS | AUTO | - |
| >Real World Value Last Value Mapped | 0040,9211 | US | | ANAP | AUTO | - |
| >Real World Value First Value Mapped | 0040,9216 | US | | ANAP | AUTO | - |
| >Real World Value Intercept | 0040,9224 | FD | | ANAP | AUTO | - |
| >Real World Value Slope | 0040,9225 | FD | | ANAP | AUTO | - |

### Table 103: Image Plane Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Spacing Between Slices | 0018,0088 | DS | | ALWAYS | IMPLICIT, USER | - Spacing Between Slices |
| Slice Thickness | 0018,0050 | DS | | ALWAYS | AUTO | - |
| Image Position (Patient) | 0020,0032 | DS | | ALWAYS | AUTO | - |
| Image Orientation (Patient) | 0020,0037 | DS | | ALWAYS | AUTO | - |
| Slice Location | 0020,1041 | DS | | ALWAYS | AUTO | Value is the distance for the plane to a fixed point. Taking direction into account. |
| Pixel Spacing | 0028,0030 | DS | | ALWAYS | AUTO | - |

### Table 104: Image Pixel Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | | ALWAYS | AUTO | - |
| Photometric Interpretation | 0028,0004 | CS | | ALWAYS | AUTO | - |
| Planar Configuration | 0028,0006 | US | | ANAP | AUTO | - |
| Rows | 0028,0010 | US | | ALWAYS | IMPLICIT | Applied values: min: 64 - max: 2048 |
| Columns | 0028,0011 | US | | ALWAYS | IMPLICIT | Applied values: min: 64 - max: 2048 |
| Pixel Aspect Ratio | 0028,0034 | IS | | ANAP | FIXED | - |
| Bits Allocated | 0028,0100 | US | | ALWAYS | IMPLICIT | - |
| Bits Stored | 0028,0101 | US | | ALWAYS | IMPLICIT | - |
| High Bit | 0028,0102 | US | | ALWAYS | IMPLICIT | - |
| Pixel Representation | 0028,0103 | US | | ALWAYS | IMPLICIT | Applied value: 0 |
| Pixel Data | 7FE0,0010 | O W/ OB | | ALWAYS | IMPLICIT | - |

**Table 105: Contrast/Bolus Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Contrast/Bolus Agent | 0018,0010 | LO | | ANAP | USER, IMPLICIT | Will have value only if contrast is applied for scans<br>Present if contrast bolus is present in the image, values:<br>Gadolinium,<br>Iodamide meglumine,<br>Iodipamide,<br>Iodixanol,<br>Iodized oil,<br>Iodoalphionic acid,<br>Iodophthalein,<br>Iodopyracet,<br>Iohexol,<br>Ionic iodinated contrast agent,<br>Iopamidol,<br>Iopanoic acid,<br>Iophendylate,<br>Iophenoxic acid,<br>Iothalamate,<br>Ioversol,<br>Ioxaglate,<br>Ipodate,<br>Mangafodipir trisodium,<br>Meglumine diatrizoate,<br>Meglumine iodipamide,<br>Metrizamide,<br>Metrizoate,<br>Non radiopaque medium,<br>Non-ionic iodinated contrast agent,<br>Oxygen,<br>Propyliodone,<br>Radiopaque medium,<br>Sodium acetriozate,<br>Sodium diatrizoate,<br>Sodium diprotrizoate,<br>Sodium iodipamide,<br>Sodium iodomethamate,<br>Sodium tyropanate,<br>Water not present when no contrast agent is present in the image. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Contrast/Bolus Route | 0018,1040 | LO | | ANAP | AUTO | Applied Values:<br>Intravenous route,<br>Intra-arterial route,<br>Intramuscular route,<br>Subcutaneous route,<br>Intracutaneous route,<br>Intraperitoneal route,<br>Intramedullary route,<br>Intrathecal route,<br>Intra-articular route,<br>Intraepithelial route,<br>Topical route,<br>Oral route,<br>Transluminal route,<br>Intraluminal route,<br>Extraluminal route,<br>By inhalation,<br>Per rectum,<br>Vaginal route |
| Contrast/Bolus Volume | 0018,1041 | DS | | ANAP | IMPLICIT | - |
| Contrast/Bolus Start Time | 0018,1042 | TM | | ANAP | IMPLICIT | - |
| Contrast/Bolus Total Dose | 0018,1044 | DS | | ANAP | IMPLICIT | - |
| Contrast/Bolus Ingredient | 0018,1048 | CS | | ANAP | AUTO | Applied Values:<br>AIR, BARIUM,<br>CARBON DIOXIDE,<br>GADOLINIUM,<br>IODINE, IRON,<br>OXYGEN, WATER,<br>XENON. |
| Contrast/Bolus Ingredient Concentration | 0018,1049 | DS | | ANAP | IMPLICIT | - |

**Table 106: MR Image Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | | ALWAYS | AUTO | Applied values: ({ORIGINAL, DERIVED}, PRIMARY, {METABOLITE_MAP, REALTIME, VELOCITY, KTRANS, KEP, M_FFE, B0, B0_MAP, VE, VP,APTW_SE, M, R, I, P, CR, T0, T1, T2, RHO, SPECTRO, DERIVED, ADC, RCBV, RCBF, MTT, TTP, FA, EADC, DELAY, , MAXRELENH, RELENH, MAXENH, WASHIN, WASHOUT, BREVENH, AREACURV, ANATOMIC, T_TEST, STD_DEVIATION, PERFUSION, T2_STAR, R2, R2_STAR, W, IP, OP, F, KTRANS, KEP, SPARE1, SPARE2, AD, RD, RA, SW_M, , SW_P, FF, STIFF, WAVE, APT, SUM, SENC_STRAIN, SENC_ANATOMY, CDWI, RELCBV, RELCBF, D, D_STAR, PF, GOODNESS , F FIT, K, REFVOXELS, RCBVCORR, RCBVUNCORR, K2, K1, FIBER, FAD, FMRI, AUC}, {ADC, B0, DELAYED_IMAGE, DELAYED_RECON, DIFFUSION, DIFFUSION_ANISO, ENHANCEMENT, FLOW_ENCODED, FLUID_ATTENUATED, FOV_FUSION, INVERSE_RECON, M, MAXIMUM, MIXED, MTT, NONE, PERFUSION, PROTON_DENSITY, RCBF, RCBV, RESAMPLED, SPECTRO, STIR, SUBTRACTION, T1, T2, T2_STAR, TAGGING, TOF, TTP, UNKNOWN, R2, R2_STAR, W, F, IP, OP, KTRANS, KEP, VE, VP,STIFF,WAVE,APTW, SUM, SENC_STRAIN, SENC_ANATOMY, R, I, P, CR, T0, RHO, SPECTRO, DERIVED, RCBV, RCBF, MTT, TTP, FA, EADC, DELAY, , MAXRELENH, RELENH, MAXENH, WASHIN, WASHOUT, BREVENH, AREACURV, ANATOMIC, T_TEST, STD_DEVIATION, PERFUSION, F, SPARE1, SPARE2, AD, RD, RA, SW_M, , SW_P, FF, APT, CDWI, RELCBV, RELCBF, D, D_STAR, PF, GOODNESS , F FIT, K, REFVOXELS, RCBVCORR, RCBVUNCORR, K2, K1, |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | METABOLITE MAP, FIBER, FAD, FMRI, AUC}, {FFE,MRE,NONE, NSPECIFIED,SE}) |
| Scanning Sequence | 0018,0020 | CS | | ALWAYS | AUTO | - |
| Sequence Variant | 0018,0021 | CS | | ALWAYS | AUTO | - |
| Scan Options | 0018,0022 | CS | | VNAP | IMPLICIT | - |
| MR Acquisition Type | 0018,0023 | CS | | ALWAYS | AUTO | - |
| Sequence Name | 0018,0024 | SH | | ANAP | AUTO | - |
| Angio Flag | 0018,0025 | CS | | ANAP | AUTO | - |
| Repetition Time | 0018,0080 | DS | | ANAP | IMPLICIT, USER | - |
| Echo Time | 0018,0081 | DS | | ALWAYS | IMPLICIT, USER | - |
| Inversion Time | 0018,0082 | DS | | ANAP | IMPLICIT, USER | - |
| Number of Averages | 0018,0083 | DS | | ALWAYS | IMPLICIT, USER | - |
| Imaging Frequency | 0018,0084 | DS | | ALWAYS | IMPLICIT | - |
| Imaged Nucleus | 0018,0085 | SH | | ALWAYS | IMPLICIT | - |
| Echo Number(s) | 0018,0086 | IS | | VNAP | IMPLICIT | - |
| Magnetic Field Strength | 0018,0087 | DS | | VNAP | CONFIG | - |
| Number of Phase Encoding Steps | 0018,0089 | IS | | VNAP | IMPLICIT, USER | - |
| Echo Train Length | 0018,0091 | IS | | VNAP | IMPLICIT, USER | - |
| Percent Sampling | 0018,0093 | DS | | VNAP | IMPLICIT, USER | - |
| Percent Phase Field of View | 0018,0094 | DS | | VNAP | IMPLICIT, USER | - |
| Pixel Bandwidth | 0018,0095 | DS | | ALWAYS | AUTO | - |
| Trigger Time | 0018,1060 | DS | | ANAP | USER | Will only have a value if Dynamic Series (2001,1012) Equals 1 |
| Nominal Interval | 0018,1062 | IS | | ANAP | AUTO | - |
| Beat Rejection Flag | 0018,1080 | CS | | ANAP | AUTO | - |
| Low R-R Value | 0018,1081 | IS | | ANAP | IMPLICIT | - |
| High R-R Value | 0018,1082 | IS | | ANAP | IMPLICIT | - |
| Intervals Acquired | 0018,1083 | IS | | ANAP | IMPLICIT | - |
| Intervals Rejected | 0018,1084 | IS | | ANAP | IMPLICIT | - |
| PVC Rejection | 0018,1085 | LO | | ANAP | AUTO | - |
| Skip Beats | 0018,1086 | IS | | ANAP | AUTO | - |
| Heart Rate | 0018,1088 | IS | | ANAP | IMPLICIT, USER | - |
| Cardiac Number of Images | 0018,1090 | IS | | ANAP | AUTO | - |
| Trigger Window | 0018,1094 | IS | | ANAP | IMPLICIT | - |
| Reconstruction Diameter | 0018,1100 | DS | | VNAP | CONFIG | Value is a copy of the largest value of the Field of View |
| Receive Coil Name | 0018,1250 | SH | | ALWAYS | IMPLICIT, USER | - |
| Transmit Coil Name | 0018,1251 | SH | | ANAP | IMPLICIT, USER | - |
| Acquisition Matrix | 0018,1310 | US | | VNAP | IMPLICIT | - |
| In-plane Phase Encoding Direction | 0018,1312 | CS | | VNAP | IMPLICIT | - |
| Flip Angle | 0018,1314 | DS | | VNAP | IMPLICIT, USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Variable Flip Angle Flag | 0018,1315 | CS | | ANAP | AUTO | - |
| SAR | 0018,1316 | DS | | VNAP | IMPLICIT, USER | - |
| dB/dt | 0018,1318 | DS | | ANAP | AUTO | - |
| B1rms | 0018,1320 | FL | | ALWAYS | FIXED | - |
| Temporal Position Identifier | 0020,0100 | IS | | VNAP | IMPLICIT | - |
| Number of Temporal Positions | 0020,0105 | IS | | VNAP | IMPLICIT, USER | - |
| Temporal Resolution | 0020,0110 | DS | | ANAP | AUTO | - |
| Samples per Pixel | 0028,0002 | US | | ALWAYS | FIXED | Applied value: 1 |
| Photometric Interpretation | 0028,0004 | CS | MONOCHROME2 | ALWAYS | FIXED | Applied value: MONOCHROME2 |
| Bits Allocated | 0028,0100 | US | | ALWAYS | FIXED | Applied value: 16 |
| Bits Stored | 0028,0101 | US | | ALWAYS | FIXED | Applied value: 12 |
| High Bit | 0028,0102 | US | | ALWAYS | FIXED | Applied value: 11 |

### Table 107: Overlay Plane Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Overlay Rows | 6000,0010 | US | | ALWAYS | AUTO | - |
| Overlay Columns | 6000,0011 | US | | ALWAYS | AUTO | - |
| Overlay Description | 6000,0022 | LO | | ANAP | AUTO | - |
| Overlay Type | 6000,0040 | CS | | ALWAYS | AUTO | - |
| Overlay Subtype | 6000,0045 | LO | | ANAP | AUTO | - |
| Overlay Origin | 6000,0050 | SS | | ALWAYS | AUTO | - |
| Overlay Bits Allocated | 6000,0100 | US | | ALWAYS | AUTO | - |
| Overlay Bit Position | 6000,0102 | US | | ALWAYS | AUTO | - |
| ROI Area | 6000,1301 | IS | | ANAP | AUTO | - |
| ROI Mean | 6000,1302 | DS | | ANAP | AUTO | - |
| ROI Standard Deviation | 6000,1303 | DS | | ANAP | AUTO | - |
| Overlay Label | 6000,1500 | LO | | EMPTY | FIXED | - |
| Overlay Data | 6000,3000 | OW/OB | | ALWAYS | AUTO | - |

### Table 108: VOI LUT Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Window Center | 0028,1050 | DS | | ALWAYS | AUTO | - |
| Window Width | 0028,1051 | DS | | ALWAYS | AUTO | - |

**Table 109: SOP Common Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100. GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| SOP Class UID | 0008,0016 | UI | | ALWAYS | FIXED | - |
| | | | | | | |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | - |
| Timezone Offset From UTC | 0008,0201 | SH | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Instance Origin Status | 0400,0600 | CS | | ALWAYS | AUTO | - |
| | | | | | | |

### 8.1.1.3. Enhanced MR Image Storage SOP Class

**Table 110: IOD of Created Enhanced MR Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Series | MR Series Module | ALWAYS |
| Frame of Reference | Frame of Reference Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |

| | | |
|---|---|---|
| Equipment | Enhanced General Equipment Module | ALWAYS |
| Image | Image Pixel Module | ALWAYS |
| Image | Enhanced Contrast/Bolus Module | CONDITIONAL |
| Image | Acquisition Context Module | ALWAYS |
| Image | Multi-frame Functional Groups Module (Enhanced MR Image) | ALWAYS |
| Image | Multi-frame Dimension Module | ALWAYS |
| Image | Cardiac Synchronization Module | CONDITIONAL |
| Image | Respiratory Synchronization Module | CONDITIONAL |
| Image | Bulk Motion Synchronization Module | CONDITIONAL |
| Image | Enhanced MR Image Module | ALWAYS |
| Image | MR Pulse Sequence Module | CONDITIONAL |
| Image | Supplemental Palette Color Table Lookup Module | CONDITIONAL |
| Image | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

### Table 111: Patient Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | MWL, USER | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | MWL, USER | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | MWL, USER | - |
| Patient's Birth Time | 0010,0032 | TM | | ANAP | MWL, USER | - |
| Patient's Sex | 0010,0040 | CS | | ANAP | MWL, USER | - |
| Other Patient IDs | 0010,1000 | LO | | ANAP | MWL | Only present when present in patient demographics received from RIS |
| Ethnic Group | 0010,2160 | SH | | ANAP | MWL, USER | Only present when present in patient demographics received from RIS |
| Patient Comments | 0010,4000 | LT | | ANAP | MWL | Only present when present in patient demographics received from RIS |

### Table 112: General Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | AUTO | - |
| Study time | 0008,0030 | TM | | ANAP | MWL, USER | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | AUTO, MWL, USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Referring Physician's Name | 0008,0090 | PN | | VNAP | MWL, USER | - |
| Study Description | 0008,1030 | LO | | ANAP | MWL, USER | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ANAP | MWL, USER | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ANAP | AUTO, MWL | As received from RIS. |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO, MWL | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO, MWL | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO, MWL | - |
| Study ID | 0020,0010 | SH | | ALWAYS | AUTO | - |
| Requesting services | 0032,1033 | LO | | ANAP | MWL, USER | - |

**Table 113: Patient Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Size | 0010,1020 | DS | | VNAP | MWL | - |
| Patient's Weight | 0010,1030 | DS | | ALWAYS | MWL, USER | - |
| Occupation | 0010,2180 | SH | | ANAP | MWL | Only present when present in patient demographics received from RIS |
| Additional Patient History | 0010,21B0 | LT | | VNAP | MWL | - |
| Patient's Age | 0010, 1010 | AS | | ANAP | MWL, USER | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Allergies | 0010,2110 | LO | | ANAP | MWL, USER | - |
| Pregnancy status | 0010,21C0 | US | | ANAP | MWL, USER | - |

**Table 114: General Series Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Modality | 0008,0060 | CS | | ALWAYS | MWL, AUTO | - |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Performing Physician's Name | 0008,1050 | PN | | ANAP | MWL, USER | |
| Operators' Name | 0008,1070 | PN | | EMPTY | FIXED | - |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ALWAYS | MWL, USER | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | MWL, USER | |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | MWL, USER | |
| >Instance Creation Date | 0008,0012 | DA | | ALWAYS | MWL, USER | |
| > Instance Creation Time | 0008,0013 | TM | | ALWAYS | MWL, USER | |
| > Instance Creator UID | 0008,0014 | UI | | ALWAYS | MWL, USER | |
| > Instance Number | 0020,0013 | IS | | ALWAYS | MWL, USER | |
| >MR Implementer ID for element 14 | 2005,0014 | LO | Philips MR Imaging DD 005 | ALWAYS | MWL, USER | |
| >Number of Exam Specific Character set | 2005,1404 | SS | | ALWAYS | MWL, USER | |
| >Number of blobset Specific Character Set | 2005,1406 | SS | | ALWAYS | MWL, USER | |
| Body Part Examined | 0018,0015 | CS | | ANAP | AUTO | |
| Protocol Name | 0018,1030 | LO | | ALWAYS | USER | Scan name. |
| Patient Position | 0018,5100 | CS | | ALWAYS | AUTO | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | Generated by MR system. |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number. |
| Laterality | 0020,0060 | CS | | ANAP | USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Request Attributes Sequence | 0040,0275 | SQ | | VNAP | MWL | Only present when patient demographics received from RIS |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | MWL | - |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | ANAP | MWL, USER | - |
| >>Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >>Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >>Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >>Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >>Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >>Context Group Extension Flag | 0008,010B | CS | | ANAP | MWL | - |
| >>Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >>Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | MWL | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | MWL | - |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | AUTO | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | AUTO | - |
| Performed Procedure Step End Date | 0040,0250 | DA | | ANAP | MWL, USER | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ANAP | MWL, USER | - |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | AUTO | - |
| Performed Procedure Step Description | 0040,0254 | LO | | VNAP | MWL, USER | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | ANAP | MWL, USER | |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | VNAP | MWL | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | Only present when present in patient demographics received from RIS Maximum of 64 characters. |

### Table 115: MR Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | | ALWAYS | FIXED | MR |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ALWAYS | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | Applied value: 1.2.840.10008.3.1.2.3.3 |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | MWL, USER | - |
| >Instance Creation Date | 0008,0012 | DA | | ALWAYS | MWL, USER | - |
| >Instance Creation Time | 0008,0013 | TM | | ALWAYS | MWL, USER | - |
| >Instance creator UID | 0008,0014 | UI | | ALWAYS | MWL, USER | - |
| >Instance Number | 0020,0013 | IS | | ALWAYS | MWL, USER | - |
| | 2005,0014 | LO | | ALWAYS | MWL, USER | - |
| | 2005,1404 | SS | | ALWAYS | MWL, USER | - |
| | 2005,1406 | SS | | ALWAYS | MWL, USER | - |

### Table 116: Frame of Reference Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | - |
| Position Reference Indicator | 0020,1040 | LO | | EMPTY | FIXED | - |

### Table 117: General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | CONFIG | - |
| Institution Name | 0008,0080 | LO | | ANAP | CONFIG | Configured in the system |

| | | | | | | |
|---|---|---|---|---|---|---|
| Institution Address | 0008,0081 | ST | | VNAP | CONFIG | - |
| Station Name | 0008,1010 | SH | | ALWAYS | CONFIG | Same as the Hostname |
| Institutional Department Name | 0008,1040 | LO | | ALWAYS | CONFIG | - |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | AUTO | - |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | FIXED | - |
| Software Versions | 0018,1020 | LO | | ALWAYS | FIXED | - |

### Table 118: Enhanced General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | FIXED | Applied value: Philips |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | FIXED | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | FIXED | System serial number |
| Software Version(s) | 0018,1020 | LO | | ALWAYS | FIXED | The release text of the original Image. |

### Table 119: Image Pixel Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Rows | 0028,0010 | US | | ALWAYS | AUTO | |
| Columns | 0028,0011 | US | | ALWAYS | AUTO | |
| Pixel Aspect Ratio | 0028,0034 | IS | Value 1: 1 | ANAP | AUTO | |
| Pixel Representation | 0028,0103 | US | 0 | ALWAYS | AUTO | Applied value: 0000 |
| Pixel Data | 7FE0,0010 | O W/ OB | | ALWAYS | AUTO | - |

### Table 120: Enhanced Contrast/Bolus Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Contrast/Bolus Agent Sequence | 0018,0012 | SQ | | ANAP | AUTO | |
| > Code Value | 0008,0100 | US | | ANAP | COPY | Code value from contrast agent applied. |
| > Coding Scheme Designator | 0008,0102 | IS | | ANAP | COPY | Code Scheme Designator from contrast agent applied. |
| > Code Meaning | 0008,0104 | US | | ANAP | COPY | Default value: Contrast Agent. |
| > Context UID | 0008,0117 | OW/ OB | | ANAP | FIXED | 1.2.840.10008.6.1.10 |
| > Contrast/Bolus Administration Route Sequence | 0018,0014 | SQ | | ANAP | AUTO | |

| | | | | | | |
|---|---|---|---|---|---|---|
| >> Code Value | 0008,0100 | SH | | ANAP | COPY | Code value from contrast route applied. |
| >> Coding Scheme Designator | 0008,0102 | SH | | ANAP | COPY | Code Scheme Designator from contrast route applied. |
| >> Code Meaning | 0008,0104 | LO | | ANAP | COPY | Contrast route value |
| >> Context UID | 0008,0117 | UI | | ANAP | FIXED | 1.2.840.10008.6.1.9 |
| > Contrast/Bolus Volume | 0018,1041 | DS | | ANAP | USER | - |
| > Contrast/Bolus Ingredient Concentration | 0018,1049 | DS | | ANAP | USER | - |
| > Contrast/Bolus Agent Number | 0018,9337 | US | | ANAP | - | |
| > Contrast/Bolus Ingredient Code Sequence | 0018,9338 | SQ | | ANAP | AUTO | |
| >> Code Value | 0008,0100 | SH | | ANAP | AUTO, COPY | Code value from contrast Ingredient applied. |
| >> Coding Scheme Designator | 0008,0102 | SH | | ANAP | AUTO, COPY | Code Scheme Designator from contrast Ingredient applied. |
| >> Code Meaning | 0008,0104 | LO | | ANAP | AUTO, COPY | Contrast Ingredient value |
| >> Context UID | 0008,0117 | UI | | ANAP | FIXED | 1.2.840.10008.6.1.11 |

**Table 121: Acquisition Context Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Acquisition Context Sequence | 0040,0555 | SQ | | EMPTY | FIXED | - |

**Table 122: Multi-frame Functional Groups Module (Enhanced MR Image)**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | - |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | - |
| Shared Functional Groups Sequence | 5200,9229 | SQ | | ALWAYS | AUTO | - |
| >Pixel Measures Sequence | 0028,9110 | SQ | | ALWAYS | AUTO | - |
| >>Slice Thickness | 0018,0050 | DS | | ANAP | AUTO | - |
| >>Pixel Spacing | 0028,0030 | DS | | ANAP | AUTO | - |
| >Plane Position Sequence | 0020,9113 | SQ | | ALWAYS | AUTO | - |
| >>Image Position (Patient) | 0020,0032 | DS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Plane Orientation Sequence | 0020,9116 | SQ | | ALWAYS | AUTO | - |
| >>Image Orientation (Patient) | 0020,0037 | DS | | ANAP | AUTO | - |
| >Cardiac Synchronization Sequence | 0018,9118 | SQ | | ANAP | AUTO | - |
| >>Nominal Cardiac Trigger Delay Time | 0020,9153 | FD | | ALWAYS | AUTO | - |
| >>R - R Interval Time Nominal | 0020,9251 | FD | | ANAP | AUTO | - |
| >Pixel Value Transformation Sequence | 0028,9145 | SQ | | ALWAYS | AUTO | - |
| >>Rescale Intercept | 0028,1052 | DS | | ALWAYS | AUTO | - |
| >>Rescale Slope | 0028,1053 | DS | | ALWAYS | AUTO | - |
| >>Rescale Type | 0028,1054 | LO | | ALWAYS | AUTO | no units, Normalized, US, cm/s, mrad, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s , 10^-6 mm^2/s |
| >Frame VOI LUT Sequence | 0028,9132 | SQ | | ALWAYS | AUTO | - |
| >>Window Center | 0028,1050 | DS | | ALWAYS | AUTO | - |
| >>Window Width | 0028,1051 | DS | | ALWAYS | AUTO | - |
| >Frame Anatomy Sequence | 0020,9071 | SQ | | ALWAYS | AUTO | - |
| >>Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | value from examcard. |
| >>Anatomic Region Sequence | 0008,2218 | SQ | | ALWAYS | AUTO | - |
| >>>Anatomic Region Modifier Sequence | 0008,2220 | SQ | | ALWAYS | AUTO | - |
| >>>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | AUTO | |
| >>Purpose of Reference Code Sequence | 0040,A170 | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>Referenced Frame Number | 0008,1160 | IS | | ANAP | AUTO | - |
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >Real World Value Mapping Sequence | 0040,9096 | SQ | | ANAP | AUTO | - |
| >>LUT Explanation | 0028,3003 | LO | | ALWAYS | AUTO | - |
| >>Measurement Units Code Sequence | 0040,08EA | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>LUT Label | 0040,9210 | SH | | ALWAYS | AUTO | - |
| >>Real World Value Last Value Mapped | 0040,9211 | US /SS | | ALWAYS | AUTO | - |
| >>Real World Value First Value Mapped | 0040,9216 | US /SS | | ALWAYS | AUTO | - |
| >>Real World Value Intercept | 0040,9224 | FD | | ANAP | AUTO | - |
| >>Real World Value Slope | 0040,9225 | FD | | ANAP | AUTO | - |
| >Respiratory Synchronization Sequence | 0020,9253 | SQ | | ANAP | AUTO | - |
| >>Respiratory Interval Time | 0020,9254 | FD | | ALWAYS | AUTO | - |
| >>Nominal Respiratory Trigger Delay Time | 0020,9255 | FD | | ALWAYS | AUTO | - |
| >MR Image Frame Type Sequence | 0018,9226 | SQ | | ALWAYS | AUTO | - |
| >>Frame Type | 0008,9007 | CS | | ALWAYS | AUTO | - |
| >>Pixel Presentation | 0008,9205 | CS | | ALWAYS | AUTO | - |
| >>Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| >>Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | Applied values: MAX_IP, MPR, NONE |
| >>Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| >>Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | - |
| >MR Timing and Related Parameters Sequence | 0018,9112 | SQ | | ALWAYS | AUTO | - |
| >>Repetition Time | 0018,0080 | DS | | ANAP | AUTO | - |
| >>Echo Train Length | 0018,0091 | IS | | ANAP | AUTO | - |
| >>Flip Angle | 0018,1314 | DS | | ANAP | AUTO | - |
| >>Operating Mode Sequence | 0018,9176 | SQ | | ANAP | AUTO | - |
| >>>Operating Mode Type | 0018,9177 | CS | | ALWAYS | AUTO | - |
| >>>Operating Mode | 0018,9178 | CS | | ALWAYS | AUTO | - |
| >>Gradient Output Type | 0018,9180 | CS | | ANAP | AUTO | - |
| >>Gradient Output | 0018,9182 | FD | | ANAP | AUTO | - |
| >>Specific Absorption Rate Sequence | 0018,9239 | SQ | | ANAP | AUTO | - |
| >>>Specific Absorption Rate Definition | 0018,9179 | CS | | ALWAYS | AUTO | - |
| >>>Specific Absorption Rate Value | 0018,9181 | FD | | ALWAYS | AUTO | - |
| >>RF Echo Train Length | 0018,9240 | US | | ANAP | AUTO | - |
| >>Gradient Echo Train Length | 0018,9241 | US | | ANAP | AUTO | |
| >MR Echo Sequence | 0018,9114 | SQ | | ALWAYS | AUTO | - |
| >>Effective Echo Time | 0018,9082 | FD | | ANAP | AUTO | - |
| >MR Modifier Sequence | 0018,9115 | SQ | | ALWAYS | AUTO | - |
| >>Inversion Recovery | 0018,9009 | CS | | ANAP | AUTO | - |
| >>Flow Compensation | 0018,9010 | CS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Spoiling | 0018,9016 | CS | | ANAP | AUTO | - |
| >>T2 Preparation | 0018,9021 | CS | | ANAP | AUTO | - |
| >>Spectrally Selected Excitation | 0018,9026 | CS | | ANAP | AUTO | - |
| >>Spatial Pre-saturation | 0018,9027 | CS | | ANAP | AUTO | - |
| >>Partial Fourier Direction | 0018,9036 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Inplane | 0018,9069 | FD | | ANAP | AUTO | - |
| >>Parallel Acquisition | 0018,9077 | CS | | ANAP | AUTO | - |
| >>Parallel Acquisition Technique | 0018,9078 | CS | | ANAP | AUTO | - |
| >>Inversion Times | 0018,9079 | FD | | ANAP | AUTO | - |
| >>Partial Fourier | 0018,9081 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor outof-plane | 0018,9155 | FD | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Second In-plane | 0018,9168 | FD | | ANAP | AUTO | - |
| >>Flow Compensation Direction | 0018,9183 | CS | | ANAP | AUTO | - |
| >MR FOV/Geometry Sequence | 0018,9125 | SQ | | ALWAYS | AUTO | - |
| >>Percent Sampling | 0018,0093 | DS | | ANAP | AUTO | - |
| >>Percent Phase Field of View | 0018,0094 | DS | | ANAP | AUTO | - |
| >>In-plane Phase Encoding Direction | 0018,1312 | CS | | ANAP | AUTO | - |
| >>MR Acquisition Frequency Encoding Steps | 0018,9058 | US | | ANAP | AUTO | - |
| >>MR Acquisition Phase Encoding Steps in-plane | 0018,9231 | US | | ANAP | AUTO | - |
| >>MR Acquisition Phase Encoding Steps out-of-plane | 0018,9232 | US | | ANAP | AUTO | - |
| >MR Imaging Modifier Sequence | 0018,9006 | SQ | | ALWAYS | AUTO | - |
| >>Pixel Bandwidth | 0018,0095 | DS | | ANAP | AUTO | - |
| >>Tag Angle First Axis | 0018,9019 | FD | | ANAP | AUTO | - |
| >>Magnetization Transfer | 0018,9020 | CS | | ANAP | AUTO | - |
| >>Blood Signal Nulling | 0018,9022 | CS | | ANAP | AUTO | - |
| >>Tagging | 0018,9028 | CS | | ANAP | AUTO | - |
| >>Tag Spacing First Dimension | 0018,9030 | FD | | ANAP | AUTO | - |
| >>Tag Thickness | 0018,9035 | FD | | ANAP | AUTO | - |
| >>Transmitter Frequency | 0018,9098 | FD | | ANAP | AUTO | - |
| >>Tag Spacing Second Dimension | 0018,9218 | FD | | ANAP | AUTO | - |
| >>Tag Angle Second Axis | 0018,9219 | SS | | ANAP | AUTO | - |
| >MR Receive Coil Sequence | 0018,9042 | SQ | | ALWAYS | AUTO | - |
| >>Receive Coil Name | 0018,1250 | SH | | EMPTY | AUTO | - |
| >>Receive Coil Manufacturer Name | 0018,9041 | LO | | ANAP | AUTO | - |
| >>Receive Coil Type | 0018,9043 | CS | | ANAP | AUTO | - |
| >>Quadrature Receive Coil | 0018,9044 | CS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Multi-Coil Definition Sequence | 0018,9045 | SQ | | ANAP | AUTO | - |
| >>>Multi-Coil Element Name | 0018,9047 | SH | | ALWAYS | AUTO | - |
| >>>Multi-Coil Element Used | 0018,9048 | CS | | ALWAYS | AUTO | - |
| >MR Transmit Coil Sequence | 0018,9049 | SQ | | ALWAYS | AUTO | - |
| >>Transmit Coil Name | 0018,1251 | SH | | ALWAYS | AUTO | - |
| >>Transmit Coil Manufacturer Name | 0018,9050 | LO | | EMPTY | FIXED | - |
| >>Transmit Coil Type | 0018,9051 | CS | | ANAP | AUTO | - |
| >MR Diffusion Sequence | 0018,9117 | SQ | | ANAP | AUTO | - |
| >>Diffusion Directionality | 0018,9075 | CS | | ANAP | AUTO | - |
| >>Diffusion Gradient Direction Sequence | 0018,9076 | SQ | | ANAP | AUTO | - |
| >>>Diffusion Gradient Orientation | 0018,9089 | FD | | ANAP | AUTO | - |
| >>Diffusion b-value | 0018,9087 | FD | | ANAP | AUTO | - |
| >>Diffusion Anisotropy Type | 0018,9147 | CS | | ANAP | AUTO | - |
| >MR Averages Sequence | 0018,9119 | SQ | | ALWAYS | AUTO | - |
| >>Number of Averages | 0018,0083 | DS | | ANAP | AUTO | - |
| >MR Spatial Saturation Sequence | 0018,9107 | SQ | | ANAP | AUTO | if slab information is present |
| >>Slab Thickness | 0018,9104 | FD | | ALWAYS | AUTO | - |
| >>Slab Orientation | 0018,9105 | FD | | ALWAYS | AUTO | - |
| >>Mid Slab Position | 0018,9106 | FD | | ALWAYS | AUTO | - |
| >MR Metabolite Map Sequence | 0018,9152 | SQ | | ANAP | AUTO | - |
| >>Metabolite Map Description | 0018,9080 | ST | | ANAP | AUTO | - |
| >MR Velocity Encoding Sequence | 0018,9197 | SQ | | ANAP | AUTO | - |
| >>Velocity Encoding Direction | 0018,9090 | FD | | ANAP | AUTO | - |
| >>Velocity Encoding Minimum Value | 0018,9091 | FD | | ANAP | AUTO | Applied value: 0.0 |
| >>Velocity Encoding Maximum Value | 0018,9217 | FD | | ANAP | AUTO | - |
| Per-frame Functional Groups Sequence | 5200,9230 | SQ | | ALWAYS | | - |
| >Pixel Measures Sequence | 0028,9110 | SQ | | ALWAYS | AUTO | - |
| >>Slice Thickness | 0018,0050 | DS | | ANAP | AUTO | - |
| >>Pixel Spacing | 0028,0030 | DS | | ANAP | AUTO | - |
| >Frame Content Sequence | 0020,9111 | SQ | | ALWAYS | AUTO | - |
| >>Frame Acquisition Datetime | 0018,9074 | DT | | ANAP | AUTO | - |
| >>Frame Reference Datetime | 0018,9151 | DT | | ANAP | AUTO | - |
| >>Frame Acquisition Duration | 0018,9220 | FD | | ANAP | AUTO | - |
| >>Stack ID | 0020,9056 | SH | | ANAP | AUTO | |
| >>In-Stack Position Number | 0020,9057 | UL | | ANAP | AUTO | - |
| >>Dimension Index Values | 0020,9157 | UL | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Plane Position Sequence | 0020,9113 | SQ | | ALWAYS | AUTO | - |
| >>Image Position (Patient) | 0020,0032 | DS | | ANAP | AUTO | - |
| >Plane Orientation Sequence | 0020,9116 | SQ | | ALWAYS | AUTO | - |
| >>Image Orientation (Patient) | 0020,0037 | DS | | ANAP | AUTO | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | AUTO | if scan was planned on another scan |
| >>Purpose of Reference Code Sequence | 0040,A170 | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>Referenced Frame Number | 0008,1160 | IS | | ANAP | AUTO | - |
| >Cardiac Synchronization Sequence | 0018,9118 | SQ | | ANAP | AUTO | - |
| >>Nominal Cardiac Trigger Delay Time | 0020,9153 | FD | | ALWAYS | AUTO | - |
| >>R - R Interval Time Nominal | 0020,9251 | FD | | ANAP | AUTO | - |
| >Pixel Value Transformation Sequence | 0028,9145 | SQ | | ALWAYS | AUTO | - |
| >>Rescale Intercept | 0028,1052 | DS | | ALWAYS | AUTO | - |
| >>Rescale Slope | 0028,1053 | DS | | ALWAYS | AUTO | - |
| >>Rescale Type | 0028,1054 | LO | | ALWAYS | AUTO | no units, Normalized , US, cm/s, mrad, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s , 10^-6 mm^2/s |
| >Frame VOI LUT Sequence | 0028,9132 | SQ | | ALWAYS | AUTO | - |
| >>Window Center | 0028,1050 | DS | | ALWAYS | AUTO | - |
| >>Window Width | 0028,1051 | DS | | ALWAYS | AUTO | - |
| >Real World Value Mapping Sequence | 0040,9096 | SQ | | ANAP | AUTO | - |
| >>LUT Explanation | 0028,3003 | LO | | ALWAYS | AUTO | - |
| >>Measurement Units Code Sequence | 0040,08EA | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>LUT Label | 0040,9210 | SH | | ALWAYS | AUTO | - |
| >>Real World Value Last Value Mapped | 0040,9211 | US /SS | | ALWAYS | AUTO | - |
| >>Real World Value First Value Mapped | 0040,9216 | US /SS | | ALWAYS | AUTO | - |
| >>Real World Value Intercept | 0040,9224 | FD | | ALWAYS | AUTO | - |
| >>Real World Value Slope | 0040,9225 | FD | | ALWAYS | AUTO | - |
| >Respiratory Synchronization Sequence | 0020,9253 | SQ | | ANAP | AUTO | - |
| >>Respiratory Interval Time | 0020,9254 | FD | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Nominal Respiratory Trigger Delay Time | 0020,9255 | FD | | ALWAYS | AUTO | - |
| >MR Image Frame Type Sequence | 0018,9226 | SQ | | ALWAYS | AUTO | - |
| >>Frame Type | 0008,9007 | CS | | ALWAYS | AUTO | - |
| >>Pixel Presentation | 0008,9205 | CS | | ALWAYS | AUTO | - |
| >>Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| >>Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | Applied values: MAX_IP, MPR, NONE |
| >>Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| >>Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | - |
| >MR Timing and Related Parameters Sequence | 0018,9112 | SQ | | ALWAYS | AUTO | - |
| >>Repetition Time | 0018,0080 | DS | | ANAP | AUTO | - |
| >>Echo Train Length | 0018,0091 | IS | | ANAP | AUTO | - |
| >>Flip Angle | 0018,1314 | DS | | ANAP | AUTO | - |
| >>Operating Mode Sequence | 0018,9176 | SQ | | ANAP | AUTO | - |
| >>>Operating Mode Type | 0018,9177 | CS | | ALWAYS | AUTO | - |
| >>>Operating Mode | 0018,9178 | CS | | ALWAYS | AUTO | - |
| >>Gradient Output Type | 0018,9180 | CS | | ANAP | AUTO | - |
| >>Gradient Output | 0018,9182 | FD | | ANAP | AUTO | - |
| >>Specific Absorption Rate Sequence | 0018,9239 | SQ | | ANAP | AUTO | - |
| >>>Specific Absorption Rate Definition | 0018,9179 | CS | | ALWAYS | AUTO | - |
| >>>Specific Absorption Rate Value | 0018,9181 | FD | | ALWAYS | AUTO | - |
| >>RF Echo Train Length | 0018,9240 | US | | ANAP | AUTO | - |
| >>Gradient Echo Train Length | 0018,9241 | US | | ANAP | AUTO | - |
| >MR FOV/Geometry Sequence | 0018,9125 | SQ | | ALWAYS | AUTO | - |
| >>Percent Sampling | 0018,0093 | DS | | ANAP | AUTO | - |
| >>Percent Phase Field of View | 0018,0094 | DS | | ANAP | AUTO | - |
| >>In-plane Phase Encoding Direction | 0018,1312 | CS | | ANAP | AUTO | - |
| >>MR Acquisition Frequency Encoding Steps | 0018,9058 | US | | ANAP | AUTO | - |
| >>MR Acquisition Phase Encoding Steps in-plane | 0018,9231 | US | | ANAP | AUTO | - |
| >>MR Acquisition Phase Encoding Steps out-of-plane | 0018,9232 | US | | ANAP | AUTO | - |
| >MR Echo Sequence | 0018,9114 | SQ | | ALWAYS | AUTO | - |
| >>Effective Echo Time | 0018,9082 | FD | | ANAP | AUTO | - |
| >MR Modifier Sequence | 0018,9115 | SQ | | ALWAYS | AUTO | - |
| >>Inversion Recovery | 0018,9009 | CS | | ANAP | AUTO | - |
| >>Flow Compensation | 0018,9010 | CS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Spoiling | 0018,9016 | CS | | ANAP | AUTO | - |
| >>T2 Preparation | 0018,9021 | CS | | ANAP | AUTO | - |
| >>Spectrally Selected Excitation | 0018,9026 | CS | | ANAP | AUTO | - |
| >>Spatial Pre-saturation | 0018,9027 | CS | | ANAP | AUTO | - |
| >>Partial Fourier Direction | 0018,9036 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Inplane | 0018,9069 | FD | | ANAP | AUTO | - |
| >>Parallel Acquisition | 0018,9077 | CS | | ANAP | AUTO | - |
| >>Parallel Acquisition Technique | 0018,9078 | CS | | ANAP | AUTO | - |
| >>Inversion Times | 0018,9079 | FD | | ANAP | AUTO | - |
| >>Partial Fourier | 0018,9081 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor outof-plane | 0018,9155 | FD | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Second In-plane | 0018,9168 | FD | | ANAP | AUTO | - |
| >>Flow Compensation Direction | 0018,9183 | CS | | ANAP | AUTO | - |
| >MR Imaging Modifier Sequence | 0018,9006 | SQ | | ANAP | AUTO | - |
| >>Pixel Bandwidth | 0018,0095 | DS | | ANAP | AUTO | - |
| >>Tag Angle First Axis | 0018,9019 | FD | | ANAP | AUTO | - |
| >>Magnetization Transfer | 0018,9020 | CS | | ANAP | AUTO | - |
| >>Blood Signal Nulling | 0018,9022 | CS | | ANAP | AUTO | - |
| >>Tagging | 0018,9028 | CS | | ANAP | AUTO | - |
| >>Tag Spacing First Dimension | 0018,9030 | FD | | ANAP | AUTO | - |
| >>Tag Thickness | 0018,9035 | FD | | ANAP | AUTO | Applied value: 0.0 |
| >>Transmitter Frequency | 0018,9098 | FD | | ANAP | AUTO | - |
| >>Tag Spacing Second Dimension | 0018,9218 | FD | | ANAP | AUTO | - |
| >>Tag Angle Second Axis | 0018,9219 | SS | | ANAP | AUTO | - |
| >MR Receive Coil Sequence | 0018,9042 | SQ | | ALWAYS | AUTO | - |
| >>Receive Coil Name | 0018,1250 | SH | | ANAP | AUTO | - |
| >>Receive Coil Manufacturer Name | 0018,9041 | LO | | EMPTY | FIXED | - |
| >>Receive Coil Type | 0018,9043 | CS | | ANAP | AUTO | - |
| >>Quadrature Receive Coil | 0018,9044 | CS | | ANAP | AUTO | - |
| >>Multi-Coil Definition Sequence | 0018,9045 | SQ | | ANAP | AUTO | - |
| >>>Multi-Coil Element Name | 0018,9047 | SH | | ALWAYS | AUTO | - |
| >>>Multi-Coil Element Used | 0018,9048 | CS | | ALWAYS | AUTO | - |
| >MR Transmit Coil Sequence | 0018,9049 | SQ | | ALWAYS | AUTO | - |
| >>Transmit Coil Name | 0018,1251 | SH | | ALWAYS | AUTO | - |
| >>Transmit Coil Manufacturer Name | 0018,9050 | LO | | EMPTY | FIXED | - |
| >>Transmit Coil Type | 0018,9051 | CS | | ANAP | AUTO | - |
| >MR Diffusion Sequence | 0018,9117 | SQ | | ANAP | AUTO | - |

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|---|---|---|---|---|---|---|
| >>Diffusion Directionality | 0018,9075 | CS | | ANAP | AUTO | - |
| >>Diffusion Gradient Direction Sequence | 0018,9076 | SQ | | ANAP | AUTO | - |
| >>>Diffusion Gradient Orientation | 0018,9089 | FD | | ANAP | AUTO | - |
| >>Diffusion b-value | 0018,9087 | FD | | ANAP | AUTO | - |
| >>Diffusion Anisotropy Type | 0018,9147 | CS | | ANAP | AUTO | Applied value: FRACTIONAL |
| >MR Averages Sequence | 0018,9119 | SQ | | ALWAYS | AUTO | - |
| >>Number of Averages | 0018,0083 | DS | | ANAP | AUTO | - |
| >MR Spatial Saturation Sequence | 0018,9107 | SQ | | ANAP | AUTO | if slab information is present |
| >>Slab Thickness | 0018,9104 | FD | | ALWAYS | AUTO | - |
| >>Slab Orientation | 0018,9105 | FD | | ALWAYS | AUTO | - |
| >>Mid Slab Position | 0018,9106 | FD | | ALWAYS | AUTO | - |
| >MR Metabolite Map Sequence | 0018,9152 | SQ | | ANAP | AUTO | - |
| >>Metabolite Map Description | 0018,9080 | ST | | ANAP | AUTO | - |
| >MR Velocity Encoding Sequence | 0018,9197 | SQ | | ANAP | AUTO | - |
| >>Velocity Encoding Direction | 0018,9090 | FD | | ANAP | AUTO | - |
| >>Velocity Encoding Minimum Value | 0018,9091 | FD | | ANAP | AUTO | Applied value: 0.0 |
| >>Velocity Encoding Maximum Value | 0018,9217 | FD | | ANAP | AUTO | - |
| >Frame Anatomy Sequence | 0020,9071 | SQ | | ALWAYS | AUTO | - |
| >>Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | - |
| >>Anatomic Region Sequence | 0008,2218 | SQ | | ALWAYS | AUTO | - |
| >>>Anatomic Region Modifier Sequence | 0008,2220 | SQ | | ALWAYS | AUTO | - |
| >>>>Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >>>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >>>>Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | Value from examcard from STANDARD table, possibly translated |
| Per-frame Functional Groups Sequence | 5200,9230 | SQ | | ALWAYS | AUTO | |
| > Contrast/Bolus Usage Sequence | 0018,9341 | SQ | | ANAP | AUTO | Required if the Enhanced Contrast/Bolus Module is present YES, if the selected agent had begun by the time frame acquired else NO. |
| >> Contrast/Bolus Agent Number | 0018,9337 | US | | ANAP | AUTO | |
| >> Contrast/Bolus Agent Administered | 0018,9342 | CS | | ANAP | AUTO | - |
| >> Contrast/Bolus Agent Detected | 0018,9343 | CS | | ANAP | AUTO | - |
| >> Contrast/Bolus Agent Phase | 0018,9344 | CS | | ANAP | AUTO | IMMEDIATE if Contrast/Bolus Route (0018,1040) is Intravenous Route. |

Note: Shared Functional Groups Sequence is always present in combination with the Per-frame Functional Groups Sequence (5200,9230)

**Table 123 : Multi-frame Dimension Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Dimension Organization Sequence | 0020,9221 | SQ | | VNAP | AUTO | - |
| >Dimension Organization UID | 0020,9164 | UI | | ALWAYS | AUTO | - |
| Dimension Index Sequence | 0020,9222 | SQ | | VNAP | AUTO | - |
| >Dimension Organization UID | 0020,9164 | UI | | ALWAYS | AUTO | - |
| >Dimension Index Pointer | 0020,9165 | AT | | ALWAYS | AUTO | - |
| >Functional Group Pointer | 0020,9167 | AT | | ANAP | AUTO | - |
| >Dimension Index Private Creator | 0020,9213 | LO | | ANAP | AUTO | - |
| >Functional Group Private Creator | 0020,9238 | LO | | ANAP | AUTO | - |
| >Dimension Description Label | 0020,9421 | LO | | ANAP | AUTO | Free text description that explains the meaning of the dimension. |

**Table 124: Cardiac Synchronization Module**

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

**Table 125: Respiratory Synchronization Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Respiratory Motion Compensation Technique | 0018,9170 | CS | | ANAP | AUTO | - |
| Respiratory Signal Source | 0018,9171 | CS | | ANAP | AUTO | - |
| Respiratory Trigger Delay Threshold | 0020,9256 | FD | | ANAP | AUTO | - |

**Table 126: Bulk Motion Synchronization Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Bulk Motion Compensation Technique | 0018,9172 | CS | | ANAP | AUTO | Applied value: NONE |

**Table 127: Enhanced MR Image Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | | ALWAYS | AUTO | Applied values:<br>({ORIGINAL, DERIVED},<br>PRIMARY,<br>{METABOLITE_MAP, REALTIME,<br>VELOCITY, KTRANS, KEP, M_FFE,<br>B0, B0_MAP, VE, VP,APTW_SE, M, R,<br>I, P, CR, T0, T1, T2, RHO, SPECTRO,<br>DERIVED, ADC, RCBV, RCBF, MTT,<br>TTP, FA, EADC, DELAY, ,<br>MAXRELENH, RELENH, MAXENH, WASHIN,<br>WASHOUT, BREVENH,<br>AREACURV, ANATOMIC, T_TEST,<br>STD_DEVIATION, PERFUSION,<br>T2_STAR, R2, R2_STAR, W, IP, OP, F,<br>SPARE1, SPARE2, AD, RD, RA,<br>SW_M, , SW_P, FF, STIFF, WAVE,<br>APT, SUM, SENC_STRAIN,<br>SENC_ANATOMY, CDWI, RELCBV,<br>RELCBF, D, D_STAR, PF,<br>GOODNESS , F FIT, K, REFVOXELS,<br>RCBVCORR, RCBVUNCORR, K2, K1,<br>FIBER, FAD, FMRI, AUC},<br>{ADC, B0, DELAYED_IMAGE,<br>DELAYED_RECON, DIFFUSION,<br>DIFFUSION_ANISO, ENHANCEMENT,<br>FLOW_ENCODED,<br>FLUID_ATTENUATED, FOV_FUSION,<br>INVERSE_RECON, M, MAXIMUM,<br>MIXED, MTT, NONE, PERFUSION,<br>PROTON_DENSITY, RCBF, RCBV,<br>RESAMPLED, SPECTRO, STIR,<br>SUBTRACTION, T1, T2, T2_STAR,<br>TAGGING, TOF, TTP, UNKNOWN, R2,<br>R2_STAR, W, F, IP, OP, KTRANS,<br>KEP, VE,<br>VP,STIFF,WAVE,APTW,SUM, R, I, P,<br>CR, T0, RHO, SPECTRO, DERIVED,<br>RCBV, RCBF, TTP, FA, EADC,<br>DELAY, , MAXRELENH, RELENH,<br>MAXENH, WASHIN, WASHOUT,<br>BREVENH, AREACURV, ANATOMIC,<br>T_TEST, STD_DEVIATION,<br>PERFUSION, W, IP, OP, F, KTRANS,<br>KEP, VE, VP, SPARE1, SPARE2, AD,<br>RD, RA, SW_M, , SW_P, FF, STIFF,<br>WAVE, APT, SUM, SENC_STRAIN,<br>SENC_ANATOMY, CDWI, RELCBV,<br>RELCBF, D, D_STAR, PF,<br>GOODNESS , F FIT, K, REFVOXELS,<br>RCBVCORR, RCBVUNCORR, K2, K1,<br>METABOLITE MAP, FIBER, FAD,<br>FMRI, AUC},<br>{FFE,MRE,NONE, UNSPECIFIED,SE}) |
| B1rms | 0018,1320 | FL | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| k-space Filtering | 0018,9064 | CS | | ALWAYS | AUTO | - |
| Spacing Between Slices | 0018,0088 | DS | | ANAP | AUTO | - |
| Samples per Pixel | 0028,0002 | US | | ALWAYS | FIXED | - |
| Photometric Interpretation | 0028,0004 | CS | | ALWAYS | FIXED | - |
| Bits Allocated | 0028,0100 | US | | ALWAYS | IMPLICIT | - |
| Bits Stored | 0028,0101 | US | | ALWAYS | IMPLICIT | - |
| High Bit | 0028,0102 | US | | ALWAYS | AUTO | - |
| Burned In Annotation | 0028,0301 | CS | NO | ALWAYS | AUTO | Applied value: NO |
| Lossy Image Compression | 0028,2110 | CS | 00 | ALWAYS | AUTO | Applied value: 00 |
| Presentation LUT Shape | 2050,0020 | CS | | ALWAYS | AUTO | - |
| Acquisition Datetime | 0008,002A | DT | | ANAP | AUTO | - |
| Source Image Evidence Sequence | 0008,9154 | SQ | | ANAP | AUTO | - |
| >Referenced Series Sequence | 0008,1115 | SQ | | ANAP | AUTO | - |
| >>Referenced SOP Sequence | 0008,1199 | SQ | | ANAP | AUTO | - |
| >>>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >>Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | - |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | - |
| Magnetic Field Strength | 0018,0087 | DS | | ANAP | AUTO | - |
| Content Qualification | 0018,9004 | CS | | ALWAYS | AUTO | - |
| k-space Filtering | 0018,9064 | CS | None | ANAP | AUTO | Applied values: COSINE, COSINE_SQUARED, FERMI, GAUSSIAN, HAMMING, HANNING, LORENTZIAN, LRNTZ_GSS_TRNSFM, NONE, RIESZ, TUKEY, USER_DEFINED |
| Acquisition Duration | 0018,9073 | FD | | ANAP | AUTO | - |
| Resonant Nucleus | 0018,9100 | CS | | ANAP | AUTO | Applied values: 129XE, 13C, 19F, 1H, 23NA, 31P, 3HE, 7LI, 17O, OTHER |
| Applicable Safety Standard Agency | 0018,9174 | CS | | ANAP | AUTO | - |
| Applicable Safety Standard Description | 0018,9175 | LO | | ANAP | AUTO | - |
| Acquisition Number | 0020,0012 | IS | | ANAP | AUTO | - |
| Image Comments | 0020,4000 | LT | | ANAP | USER | - |
| Pixel Presentation | 0008,9205 | CS | | ALWAYS | AUTO | - |
| Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | Applied values: MAX_IP, MPR, NONE |
| Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | - |

### Table 128: MR Pulse Sequence Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| MR Acquisition Type | 0018,0023 | CS | 1D | ANAP | AUTO | Applied values: 1D, 2D, 3D, UNKNOWN |
| Pulse Sequence Name | 0018,9005 | SH | | ANAP | AUTO | - |
| Echo Pulse Sequence | 0018,9008 | CS | | ANAP | AUTO | - |
| Multiple Spin Echo | 0018,9011 | CS | | ANAP | AUTO | - |
| Multi-planar Excitation | 0018,9012 | CS | | ANAP | AUTO | - |
| Phase Contrast | 0018,9014 | CS | | ANAP | AUTO | - |
| Time of Flight Contrast | 0018,9015 | CS | | ANAP | AUTO | - |
| Steady State Pulse Sequence | 0018,9017 | CS | | ANAP | AUTO | - |
| Echo Planar Pulse Sequence | 0018,9018 | CS | | ANAP | AUTO | - |
| Saturation Recovery | 0018,9024 | CS | | ANAP | AUTO | - |
| Spectrally Selected Suppression | 0018,9025 | CS | | ANAP | AUTO | - |
| Oversampling Phase | 0018,9029 | CS | | ANAP | AUTO | - |
| Geometry of k-Space Traversal | 0018,9032 | CS | | ANAP | AUTO | - |
| Segmented k-Space Traversal | 0018,9033 | CS | | ANAP | AUTO | - |
| Rectilinear Phase Encode Reordering | 0018,9034 | CS | CENTRIC | ANAP | AUTO | Applied values: CENTRIC, LINEAR, REVERSE_CENTRIC, REVERSE_LINEAR, SEGMENTED, UNKNOWN |
| Number of k-Space Trajectories | 0018,9093 | US | | ANAP | AUTO | - |
| Coverage of k-Space | 0018,9094 | CS | | ANAP | AUTO | - |

### Table 129: Supplemental Palette Color Table Lookup Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Red Palette Color Lookup Table Descriptor | 0028,1101 | US /SS | | ALWAYS | AUTO | - |
| Green Palette Color Lookup Table Descriptor | 0028,1102 | US /SS | | ALWAYS | AUTO | - |
| Blue Palette Color Lookup Table Descriptor | 0028,1103 | US /SS | | ALWAYS | AUTO | - |
| Red Palette Color Lookup Table Data | 0028,1201 | O W | | ALWAYS | AUTO | - |
| Green Palette Color Lookup Table Data | 0028,1202 | O W | | ALWAYS | AUTO | - |
| Blue Palette Color Lookup Table Data | 0028,1203 | O W | | ALWAYS | AUTO | - |

**Table 130: SOP Common Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100. GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| SOP Class UID | 0008,0016 | UI | | ALWAYS | AUTO | - |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | - |
| Content Qualification | 0018,9004 | CS | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |

### 8.1.1.4. MR Spectroscopy Storage SOP Class

**Table 131: IOD of Created MR Spectroscopy Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Series | MR Series Module | ALWAYS |
| Frame of Reference | Frame of Reference Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| Equipment | Enhanced General Equipment Module | ALWAYS |
| MR Spectroscopy | Acquisition Context Module | ALWAYS |
| MR Spectroscopy | Multi-frame Functional Groups Module (MR Spectroscopy) | ALWAYS |
| MR Spectroscopy | Multi-frame Dimension Module | ALWAYS |
| MR Spectroscopy | Cardiac Synchronization Module | CONDITIONAL |
| MR Spectroscopy | Respiratory Synchronization Module | CONDITIONAL |
| MR Spectroscopy | Bulk Motion Synchronization Module | CONDITIONAL |
| MR Spectroscopy | MR Spectroscopy Module | ALWAYS |
| MR Spectroscopy | MR Spectroscopy Pulse Sequence Module | CONDITIONAL |
| MR Spectroscopy | MR Spectroscopy Data Module | ALWAYS |

| | | |
|---|---|---|
| MR Spectroscopy | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

### Table 132: Patient Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | MWL, USER | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | COPY, MWL, USER | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | MWL, USER | - |
| Patient's Birth Time | 0010,0032 | TM | | ANAP | MWL, USER | - |
| Patient's Sex | 0010,0040 | CS | | ALWAYS | COPY, MWL, USER | - |
| Other Patient IDs | 0010,1000 | LO | | ANAP | MWL | Only present when patient demographics received from RIS. |
| Ethnic Group | 0010,2160 | SH | | ANAP | COPY, MWL, USER | Only present when patient demographics received from RIS. |
| Patient Comments | 0010,4000 | LT | | ANAP | MWL | Only present when patient demographics received from RIS. |

### Table 133: General Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | AUTO, MWL | - |
| Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | AUTO, MWL, USER | - |
| Modality | 0008,0060 | CS | | ALWAYS | AUTO | - |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | MWL, USER | - |
| Study Description | 0008,1030 | LO | | VNAP | MWL, USER | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ALWAYS | AUTO, MWL, USER | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | AUTO, MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO, MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | AUTO, MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO, MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ALWAYS | AUTO, MWL | As received from RIS or else default. |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO, MWL | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO, MWL | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO, MWL | - |
| Study ID | 0020,0010 | SH | | ALWAYS | AUTO | - |

**Table 134: Patient Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Size | 0010,1020 | DS | | VNAP | MWL | - |
| Patient's Weight | 0010,1030 | DS | | ANAP | COPY, MWL, USER | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Occupation | 0010,2180 | SH | | ANAP | MWL | As received from RIS or else default (Empty). |
| Additional Patient History | 0010,21B0 | LT | | VNAP | MWL | - |

**Table 135: General Series Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Operators' Name | 0008,1070 | PN | | ANAP | FIXED | - |
| Body Part Examined | 0018,0015 | CS | | ANAP | AUTO | - |
| Protocol Name | 0018,1030 | LO | | ALWAYS | USER | Scan name. |
| Patient Position | 0018,5100 | CS | | ALWAYS | AUTO | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | Generated by MR system. |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number. |
| Laterality | 0020,0060 | CS | | ANAP | USER | - |
| Request Attributes Sequence | 0040,0275 | SQ | | ANAP | MWL | Only present when patient demographics received from RIS. |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | MWL | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | MWL | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | MWL | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Performed Procedure Step Start Date | 0040,0244 | DA | | ANAP | AUTO | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ANAP | AUTO | - |
| Performed Procedure Step ID | 0040,0253 | SH | | ANAP | AUTO | - |
| Performed Procedure Step Description | 0040,0254 | LO | | VNAP | MWL, USER | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | ANAP | AUTO, MWL | Only present when patient demographics received from RIS. |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO, MWL | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | VNAP | MWL | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | Only present when patient demographics received from RIS. Maximum of 64 characters. |

### Table 136: MR Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | | ALWAYS | FIXED | applied value: MR |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ALWAYS | AUTO | - |
| >Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| >Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | - |
| >Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| >Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | MPPS | - |

### Table 137: Frame of Reference Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | - |
| Position Reference Indicator | 0020,1040 | LO | | EMPTY | FIXED | - |

### Table 138: General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Institution Name | 0008,0080 | LO | | ANAP | CONFIG | Configured on the system. |
| Station Name | 0008,1010 | SH | | ANAP | CONFIG | Same as the Host Name. |
| Institutional Department Name | 0008,1040 | LO | | ANAP | CONFIG | - |

### Table 139: Enhanced General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | FIXED | Applied value: Philips |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | FIXED | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | FIXED | System serial number. |
| Software Version(s) | 0018,1020 | LO | | ALWAYS | FIXED | The release text of the original Image. |

### Table 140: Acquisition Context Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Acquisition Context Sequence | 0040,0555 | SQ | | EMPTY | FIXED | - |

### Table 141: Multi-frame Functional Groups Module (MR Spectroscopy)

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | - |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | - |
| Shared Functional Groups Sequence | 5200,9229 | SQ | | VNAP | AUTO | Always present in combination with the Per-frame Functional Groups Sequence (5200,9230) |
| >Pixel Measures Sequence | 0028,9110 | SQ | | ALWAYS | AUTO | - |
| >>Slice Thickness | 0018,0050 | DS | | ANAP | AUTO | - |
| >>Pixel Spacing | 0028,0030 | DS | | ANAP | AUTO | - |
| >Plane Position Sequence | 0020,9113 | SQ | | ALWAYS | AUTO | - |
| >>Image Position (Patient) | 0020,0032 | DS | | ANAP | AUTO | - |
| >Plane Orientation Sequence | 0020,9116 | SQ | | ALWAYS | AUTO | - |
| >>Image Orientation (Patient) | 0020,0037 | DS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | AUTO | if scan was planned on another scan. |
| >>Purpose of Reference Code Sequence | 0040,A170 | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>Referenced Frame Number | 0008,1160 | IS | | ANAP | AUTO | - |
| >Cardiac Synchronization Sequence | 0018,9118 | SQ | | ANAP | AUTO | - |
| >>Nominal Cardiac Trigger Delay Time | 0020,9153 | FD | | ALWAYS | AUTO | - |
| >>R - R Interval Time Nominal | 0020,9251 | FD | | ANAP | AUTO | - |
| >Respiratory Synchronization Sequence | 0020,9253 | SQ | | ANAP | AUTO | - |
| >>Respiratory Interval Time | 0020,9254 | FD | | ALWAYS | AUTO | - |
| >>Nominal Respiratory Trigger Delay Time | 0020,9255 | FD | | ALWAYS | AUTO | - |
| >MR Spectroscopy Frame Type Sequence | 0018,9227 | SQ | | ALWAYS | AUTO | - |
| >>Frame Type | 0008,9007 | CS | | ALWAYS | AUTO | - |
| >>Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| >>Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | - |
| >>Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| >>Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | - |
| >MR Timing and Related Parameters Sequence | 0018,9112 | SQ | | ALWAYS | AUTO | - |
| >>Repetition Time | 0018,0080 | DS | | ANAP | AUTO | - |
| >>Echo Train Length | 0018,0091 | IS | | ANAP | AUTO | - |
| >>Flip Angle | 0018,1314 | DS | | ANAP | AUTO | - |
| >>Operating Mode Sequence | 0018,9176 | SQ | | ANAP | AUTO | - |
| >>>Operating Mode Type | 0018,9177 | CS | | ALWAYS | AUTO | - |
| >>>Operating Mode | 0018,9178 | CS | | ALWAYS | AUTO | - |
| >>Gradient Output Type | 0018,9180 | CS | | ANAP | AUTO | - |
| >>Gradient Output | 0018,9182 | FD | | ANAP | AUTO | - |
| >>Specific Absorption Rate Sequence | 0018,9239 | SQ | | ANAP | AUTO | - |
| >>>Specific Absorption Rate Definition | 0018,9179 | CS | | ALWAYS | AUTO | - |
| >>>Specific Absorption Rate Value | 0018,9181 | FD | | ALWAYS | AUTO | - |
| >>RF Echo Train Length | 0018,9240 | US | | ANAP | AUTO | - |
| >>Gradient Echo Train Length | 0018,9241 | US | | ANAP | AUTO | - |
| >MR Spectroscopy FOV/Geometry Sequence | 0018,9103 | SQ | | ALWAYS | AUTO | - |
| >>Percent Sampling | 0018,0093 | DS | | ANAP | AUTO | - |
| >>Percent Phase Field of View | 0018,0094 | DS | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Phase Rows | 0018,9095 | UL | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Spectroscopy Acquisition Data Columns | 0018,9127 | UL | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Out-ofplane Phase Steps | 0018,9159 | UL | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Phase Columns | 0018,9234 | UL | | ANAP | AUTO | - |
| >MR Echo Sequence | 0018,9114 | SQ | | ALWAYS | AUTO | - |
| >>Effective Echo Time | 0018,9082 | FD | | ANAP | AUTO | - |
| >MR Modifier Sequence | 0018,9115 | SQ | | ALWAYS | AUTO | - |
| >>Inversion Recovery | 0018,9009 | CS | | ANAP | AUTO | - |
| >>Flow Compensation | 0018,9010 | CS | | ANAP | AUTO | - |
| >>Spoiling | 0018,9016 | CS | | ANAP | AUTO | - |
| >>T2 Preparation | 0018,9021 | CS | | ANAP | AUTO | - |
| >>Spectrally Selected Excitation | 0018,9026 | CS | | ANAP | AUTO | - |
| >>Spatial Pre-saturation | 0018,9027 | CS | | ANAP | AUTO | - |
| >>Partial Fourier Direction | 0018,9036 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor In-plane | 0018,9069 | FD | | ANAP | AUTO | - |
| >>Parallel Acquisition | 0018,9077 | CS | | ANAP | AUTO | - |
| >>Parallel Acquisition Technique | 0018,9078 | CS | | ANAP | AUTO | - |
| >>Inversion Times | 0018,9079 | FD | | ANAP | AUTO | - |
| >>Partial Fourier | 0018,9081 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor out-ofplane | 0018,9155 | FD | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Second In-plane | 0018,9168 | FD | | ANAP | AUTO | - |
| >>Flow Compensation Direction | 0018,9183 | CS | | ANAP | AUTO | - |
| >MR Receive Coil Sequence | 0018,9042 | SQ | | ALWAYS | AUTO | - |
| >>Receive Coil Name | 0018,1250 | SH | | ANAP | AUTO | - |
| >>Receive Coil Manufacturer Name | 0018,9041 | LO | | EMPTY | AUTO | - |
| >>Receive Coil Type | 0018,9043 | CS | | ANAP | AUTO | - |
| >>Quadrature Receive Coil | 0018,9044 | CS | | ANAP | AUTO | - |
| >>Multi-Coil Definition Sequence | 0018,9045 | SQ | | ANAP | AUTO | - |
| >>>Multi-Coil Element Name | 0018,9047 | SH | | ALWAYS | AUTO | - |
| >>>Multi-Coil Element Used | 0018,9048 | CS | | ALWAYS | AUTO | - |
| >MR Transmit Coil Sequence | 0018,9049 | SQ | | ANAP | | - |
| >>Transmit Coil Name | 0018,1251 | SH | | ALWAYS | AUTO | - |
| >>Transmit Coil Manufacturer Name | 0018,9050 | LO | | EMPTY | FIXED | - |
| >>Transmit Coil Type | 0018,9051 | CS | | ANAP | AUTO | - |
| | | | | | | |
| >MR Diffusion Sequence | 0018,9117 | SQ | | ANAP | AUTO | - |
| >>Diffusion Directionality | 0018,9075 | CS | | ANAP | AUTO | - |
| >>Diffusion Gradient Direction Sequence | 0018,9076 | SQ | | ANAP | AUTO | - |
| >>>Diffusion Gradient Orientation | 0018,9089 | FD | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Diffusion b-value | 0018,9087 | FD | | ANAP | AUTO | - |
| >>Diffusion Anisotropy Type | 0018,9147 | CS | | ANAP | AUTO | Applied value: FRACTIONAL |
| >>Diffusion b-matrix Sequence | 0018,9601 | SQ | | ANAP | AUTO | - |
| >MR Averages Sequence | 0018,9119 | SQ | | ALWAYS | AUTO | - |
| >>Number of Averages | 0018,0083 | DS | | ANAP | AUTO | - |
| >MR Spatial Saturation Sequence | 0018,9107 | SQ | | ANAP | AUTO | if slab information is present |
| >>Slab Thickness | 0018,9104 | FD | | ALWAYS | AUTO | - |
| >>Slab Orientation | 0018,9105 | FD | | ALWAYS | AUTO | - |
| >>Mid Slab Position | 0018,9106 | FD | | ALWAYS | AUTO | - |
| >MR Velocity Encoding Sequence | 0018,9197 | SQ | | ANAP | AUTO | - |
| >>Velocity Encoding Direction | 0018,9090 | FD | | ANAP | AUTO | - |
| >>Velocity Encoding Minimum Value | 0018,9091 | FD | | ANAP | AUTO | Applied value: 0.0 |
| >>Velocity Encoding Maximum Value | 0018,9217 | FD | | ANAP | AUTO | - |
| >Frame Anatomy Sequence | 0020,9071 | SQ | | ANAP | AUTO | - |
| >>Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | Value from examcard. |
| >>Anatomic Region Sequence | 0008,2218 | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | Value from examcard from STANDARD table, possibly translated. |
| Per-frame Functional Groups Sequence | 5200,9230 | SQ | | ALWAYS | AUTO | Always present in combination with the Shared Functional Groups Sequence (5200,9229) |
| >Pixel Measures Sequence | 0028,9110 | SQ | | ALWAYS | AUTO | - |
| >>Slice Thickness | 0018,0050 | DS | | ANAP | AUTO | - |
| >>Pixel Spacing | 0028,0030 | DS | | ANAP | AUTO | - |
| >Frame Content Sequence | 0020,9111 | SQ | | ALWAYS | AUTO | - |
| >>Frame Acquisition Datetime | 0018,9074 | DT | | ANAP | AUTO | - |
| >>Frame Reference Datetime | 0018,9151 | DT | | ANAP | AUTO | - |
| >>Frame Acquisition Duration | 0018,9220 | FD | | ANAP | AUTO | - |
| >>Stack ID | 0020,9056 | SH | | ANAP | AUTO | - |
| >>In-Stack Position Number | 0020,9057 | UL | | ANAP | AUTO | - |
| >Plane Position Sequence | 0020,9113 | SQ | | ALWAYS | AUTO | - |
| >>Image Position (Patient) | 0020,0032 | DS | | ANAP | AUTO | - |
| >Plane Orientation Sequence | 0020,9116 | SQ | | ALWAYS | AUTO | - |
| >>Image Orientation (Patient) | 0020,0037 | DS | | ANAP | AUTO | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | AUTO | if scan was planned on another scan. |
| >>Purpose of Reference Code Sequence | 0040,A170 | SQ | | ALWAYS | AUTO | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |
| >>Referenced Frame Number | 0008,1160 | IS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Cardiac Synchronization Sequence | 0018,9118 | SQ | | ALWAYS | AUTO | - |
| >>Nominal Cardiac Trigger Delay Time | 0020,9153 | FD | | ALWAYS | AUTO | - |
| >>R - R Interval Time Nominal | 0020,9251 | FD | | ANAP | AUTO | - |
| >MR Timing and Related Parameters Sequence | 0018,9112 | SQ | | ALWAYS | AUTO | - |
| >>Repetition Time | 0018,0080 | DS | | ANAP | AUTO | - |
| >>Echo Train Length | 0018,0091 | IS | | ANAP | AUTO | - |
| >>Flip Angle | 0018,1314 | DS | | ANAP | AUTO | - |
| >>Operating Mode Sequence | 0018,9176 | SQ | | ANAP | AUTO | - |
| >>>Operating Mode Type | 0018,9177 | CS | | ALWAYS | AUTO | - |
| >>>Operating Mode | 0018,9178 | CS | | ALWAYS | AUTO | - |
| >>Gradient Output Type | 0018,9180 | CS | | ANAP | AUTO | - |
| >>Gradient Output | 0018,9182 | FD | | ANAP | AUTO | - |
| >>Specific Absorption Rate Sequence | 0018,9239 | SQ | | ANAP | AUTO | - |
| >>>Specific Absorption Rate Definition | 0018,9179 | CS | | ALWAYS | AUTO | - |
| >>>Specific Absorption Rate Value | 0018,9181 | FD | | ALWAYS | AUTO | - |
| >>RF Echo Train Length | 0018,9240 | US | | ANAP | AUTO | - |
| >>Gradient Echo Train Length | 0018,9241 | US | | ANAP | AUTO | - |
| >MR Echo Sequence | 0018,9114 | SQ | | ALWAYS | AUTO | - |
| >>Effective Echo Time | 0018,9082 | FD | | ANAP | AUTO | - |
| >Respiratory Synchronization Sequence | 0020,9253 | SQ | | ANAP | AUTO | - |
| >>Respiratory Interval Time | 0020,9254 | FD | | ALWAYS | AUTO | - |
| >>Nominal Respiratory Trigger Delay Time | 0020,9255 | FD | | ALWAYS | AUTO | - |
| >MR Modifier Sequence | 0018,9115 | SQ | | ALWAYS | AUTO | - |
| >>Inversion Recovery | 0018,9009 | CS | | ANAP | AUTO | - |
| >>Flow Compensation | 0018,9010 | CS | | ANAP | AUTO | - |
| >>Spoiling | 0018,9016 | CS | | ANAP | AUTO | - |
| >>T2 Preparation | 0018,9021 | CS | | ANAP | AUTO | - |
| >>Spectrally Selected Excitation | 0018,9026 | CS | | ANAP | AUTO | - |
| >>Spatial Pre-saturation | 0018,9027 | CS | | ANAP | AUTO | - |
| >>Partial Fourier Direction | 0018,9036 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor In-plane | 0018,9069 | FD | | ANAP | AUTO | - |
| >>Parallel Acquisition | 0018,9077 | CS | | ANAP | AUTO | - |
| >>Parallel Acquisition Technique | 0018,9078 | CS | | ANAP | AUTO | - |
| >>Inversion Times | 0018,9079 | FD | | ANAP | AUTO | - |
| >>Partial Fourier | 0018,9081 | CS | | ANAP | AUTO | - |
| >>Parallel Reduction Factor out-ofplane | 0018,9155 | FD | | ANAP | AUTO | - |
| >>Parallel Reduction Factor Second In-plane | 0018,9168 | FD | | ANAP | AUTO | - |
| >>Flow Compensation Direction | 0018,9183 | CS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >MR Receive Coil Sequence | 0018,9042 | SQ | | ANAP | | - |
| >>Receive Coil Name | 0018,1250 | SH | | ALWAYS | AUTO | - |
| >>Receive Coil Manufacturer Name | 0018,9041 | LO | | EMPTY | FIXED | - |
| >>Receive Coil Type | 0018,9043 | CS | | ANAP | AUTO | - |
| >>Quadrature Receive Coil | 0018,9044 | CS | | ANAP | AUTO | - |
| >>Multi-Coil Definition Sequence | 0018,9045 | SQ | | ANAP | AUTO | - |
| >>>Multi-Coil Element Name | 0018,9047 | SH | | ALWAYS | AUTO | - |
| >>>Multi-Coil Element Used | 0018,9048 | CS | | ALWAYS | AUTO | - |
| >MR Transmit Coil Sequence | 0018,9049 | SQ | | ALWAYS | AUTO | - |
| >>Transmit Coil Name | 0018,1251 | SH | | ALWAYS | AUTO | - |
| >>Transmit Coil Manufacturer Name | 0018,9050 | LO | | EMPTY | FIXED | - |
| >>Transmit Coil Type | 0018,9051 | CS | | ANAP | AUTO | - |
| >MR Diffusion Sequence | 0018,9117 | SQ | | ANAP | AUTO | - |
| >>Diffusion Directionality | 0018,9075 | CS | | ANAP | AUTO | - |
| >>Diffusion Gradient Direction Sequence | 0018,9076 | SQ | | ANAP | AUTO | - |
| >>>Diffusion Gradient Orientation | 0018,9089 | FD | | ANAP | AUTO | - |
| >>Diffusion b-value | 0018,9087 | FD | | ANAP | AUTO | - |
| >>Diffusion Anisotropy Type | 0018,9147 | CS | | ANAP | AUTO | - |
| >Frame Anatomy Sequence | 0020,9071 | SQ | | ALWAYS | AUTO | - |
| >>Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | Value from examcard. |
| >>Anatomic Region Sequence | 0008,2218 | SQ | | ALWAYS | COPY | - |
| >>>Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >>>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >>>Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | Value from examcard from STANDARD table, possibly translated. |
| >MR Spectroscopy Frame Type Sequence | 0018,9227 | SQ | | ALWAYS | AUTO | - |
| >>Frame Type | 0008,9007 | CS | | ALWAYS | AUTO | - |
| >>Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| >>Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | - |
| >>Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| >>Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | - |
| >MR Spectroscopy FOV/Geometry Sequence | 0018,9103 | SQ | | ALWAYS | AUTO | - |
| >>Percent Sampling | 0018,0093 | DS | | ANAP | AUTO | - |
| >>Percent Phase Field of View | 0018,0094 | DS | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Phase Rows | 0018,9095 | UL | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Data Columns | 0018,9127 | UL | | ANAP | AUTO | - |
| >>Spectroscopy Acquisition Out-ofplane Phase Steps | 0018,9159 | UL | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Spectroscopy Acquisition Phase Columns | 0018,9234 | UL | | ANAP | AUTO | - |
| >MR Averages Sequence | 0018,9119 | SQ | | ALWAYS | AUTO | - |
| >>Number of Averages | 0018,0083 | DS | | ANAP | AUTO | - |
| >MR Spatial Saturation Sequence | 0018,9107 | SQ | | ANAP | AUTO | if slab information is present |
| >>Slab Thickness | 0018,9104 | FD | | ALWAYS | AUTO | - |
| >>Slab Orientation | 0018,9105 | FD | | ALWAYS | AUTO | - |
| >>Mid Slab Position | 0018,9106 | FD | | ALWAYS | AUTO | - |
| >MR Velocity Encoding Sequence | 0018,9197 | SQ | | ANAP | AUTO | - |
| >>Velocity Encoding Direction | 0018,9090 | FD | | ANAP | AUTO | - |
| >>Velocity Encoding Minimum Value | 0018,9091 | FD | | ANAP | AUTO | Applied value: 0.0 |
| >>Velocity Encoding Maximum Value | 0018,9217 | FD | | ANAP | AUTO | - |

### Table 142: Multi-frame Dimension Module

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

### Table 143: Cardiac Synchronization Module

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

### Table 144: Respiratory Synchronization Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Respiratory Motion Compensation Technique | 0018,9170 | CS | | ANAP | AUTO | - |
| Respiratory Signal Source | 0018,9171 | CS | | ANAP | AUTO | - |
| Respiratory Trigger Delay Threshold | 0020,9256 | FD | | ANAP | AUTO | - |

### Table 145: Bulk Motion Synchronization Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Bulk Motion Compensation Technique | 0018,9172 | CS | | ANAP | AUTO | Applied value: NONE |

### Table 146: MR Spectroscopy Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Spectral Width | 0018,9052 | FD | | ANAP | AUTO | - |
| Chemical Shift Reference | 0018,9053 | FD | | ANAP | AUTO | - |
| Volume Localization Technique | 0018,9054 | CS | | ANAP | AUTO | - |
| De-coupling | 0018,9059 | CS | | ANAP | AUTO | Enumerated Values: YES, NO |
| De-coupled Nucleus | 0018,9060 | CS | | ANAP | AUTO | - |
| De-coupling Frequency | 0018,9061 | FD | | ANAP | AUTO | - |
| De-coupling Method | 0018,9062 | CS | | ANAP | AUTO | Defined Terms: MLEV, WALTZ, NARROWBAND. Required if De-coupling (0018,9059) equals YES. |
| De-coupling Chemical Shift Reference | 0018,9063 | FD | | ANAP | AUTO | - |
| Time Domain Filtering | 0018,9065 | CS | | ANAP | AUTO | - |
| Number of Zero fills | 0018,9066 | US | | ANAP | AUTO | - |
| Baseline Correction | 0018,9067 | CS | | ANAP | AUTO | - |
| Transmitter Frequency | 0018,9098 | FD | | ANAP | AUTO | - |
| Frequency Correction | 0018,9101 | CS | | ANAP | AUTO | - |
| Volume Localization Sequence | 0018,9126 | SQ | | ANAP | | - |
| >Slab Thickness | 0018,9104 | FD | | ALWAYS | AUTO | - |
| >Slab Orientation | 0018,9105 | FD | | ALWAYS | AUTO | - |
| >Mid Slab Position | 0018,9106 | FD | | ANAP | AUTO | - |
| First Order Phase Correction | 0018,9198 | CS | | ANAP | AUTO | - |
| Water Referenced Phase Correction | 0018,9199 | CS | | ANAP | AUTO | - |
| Acquisition Datetime | 0008,002A | DT | | ANAP | AUTO | - |
| Source Image Evidence Sequence | 0008,9154 | SQ | | ANAP | AUTO | - |
| >Referenced Series Sequence | 0008,1115 | SQ | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Referenced SOP Sequence | 0008,1199 | SQ | | ALWAYS | AUTO | - |
| >>>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >>Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | - |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO | - |
| Magnetic Field Strength | 0018,0087 | DS | | ANAP | AUTO | - |
| Content Qualification | 0018,9004 | CS | | ALWAYS | AUTO | - |
| k-space Filtering | 0018,9064 | CS | | ANAP | AUTO | - |
| Acquisition Duration | 0018,9073 | FD | | ANAP | AUTO | - |
| Resonant Nucleus | 0018,9100 | CS | | ANAP | AUTO | Applied values: 129XE, 13C, 19F, 1H, 23NA, 31P, 3HE, 7LI, 17O, OTHER |
| Applicable Safety Standard Agency | 0018,9174 | CS | | ALWAYS | AUTO | - |
| Acquisition Number | 0020,0012 | IS | | ANAP | AUTO | - |
| Image Comments | 0020,4000 | LT | | ANAP | AUTO | - |
| Image Type | 0008,0008 | CS | | ALWAYS | AUTO | |
| Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | - |
| Complex Image Component | 0008,9208 | CS | | ALWAYS | AUTO | - |
| Acquisition Contrast | 0008,9209 | CS | | ALWAYS | AUTO | Applied values: MIXED, PROTON_DENSITY, SPECTROSCOPY, T1, T2, UNKNOWN |

### Table 147: MR Spectroscopy Pulse Sequence Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Pulse Sequence Name | 0018,9005 | SH | | ANAP | AUTO | - |
| Echo Pulse Sequence | 0018,9008 | CS | | ANAP | AUTO | - |
| Multiple Spin Echo | 0018,9011 | CS | | ANAP | AUTO | - |
| Multi-planar Excitation | 0018,9012 | CS | | ANAP | AUTO | - |
| Steady State Pulse Sequence | 0018,9017 | CS | | ANAP | AUTO | - |
| Echo Planar Pulse Sequence | 0018,9018 | CS | | ANAP | AUTO | - |
| Spectrally Selected Suppression | 0018,9025 | CS | | ANAP | AUTO | - |
| Geometry of k-Space Traversal | 0018,9032 | CS | | ANAP | AUTO | - |
| Segmented k-Space Traversal | 0018,9033 | CS | | ANAP | AUTO | - |
| Rectilinear Phase Encode Reordering | 0018,9034 | CS | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number of k-Space Trajectories | 0018,9093 | US | | ANAP | AUTO | - |
| Coverage of k-Space | 0018,9094 | CS | | ANAP | AUTO | - |
| MR Spectroscopy Acquisition Type | 0018,9200 | CS | | ANAP | AUTO | - |

**Table 148: MR Spectroscopy Data Module**

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

**Table 149: SOP Common Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100.<br>GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ANAP | AUTO | - |
| Instance Creation Time | 0008,0013 | TM | | ANAP | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ANAP | AUTO | - |
| SOP Class UID | 0008,0016 | UI | | ALWAYS | AUTO | - |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | FIXED | - |

### 8.1.1.5. Secondary Capture Image Storage SOP Class

**Table 150: IOD of Created Secondary Capture Image Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Equipment | General Equipment Module | CONDITIONAL |
| Equipment | SC Equipment Module | ALWAYS |
| Image | General Image Module | ALWAYS |
| Image | Image Pixel Module | ALWAYS |
| Image | SC Image Module | ALWAYS |
| Image | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

**Table 151: Patient Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | COPY | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | COPY | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | CONFIG | - |
| Patient’s Birth Time | 0010,0032 | TM | | ANAP | COPY | - |
| Patient's Sex | 0010,0040 | CS | | ALWAYS | COPY | - |
| Other Patient IDs | 0010,1000 | LO | | ANAP | COPY | - |

**Table 152: General Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | - |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | COPY | - |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | - |
| Study Description | 0008,1030 | LO | | VNAP | COPY | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ANAP | COPY | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | COPY | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | COPY | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | COPY | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | COPY | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ANAP | COPY | if present in original study. |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | COPY | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | COPY | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | COPY | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | - |
| Study ID | 0020,0010 | SH | | ALWAYS | COPY | - |

**Table 153: Patient Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Age | 0010,1010 | AS | | ANAP | COPY | - |
| Patient's Size | 0010,1020 | DS | | ANAP | COPY | - |
| Patient's Weight | 0010,1030 | DS | | ALWAYS | COPY | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | COPY | |
| Additional Patient History | 0010,21B0 | LT | | ANAP | COPY | - |

**Table 154: General Series Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Performing Physician's Name | 0008,1050 | PN | | ANAP | AUTO | - |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ANAP | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| Body Part Examined | 0018,0015 | CS | | ANAP | COPY | - |
| Protocol Name | 0018,1030 | LO | | ALWAYS | COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Patient Position | 0018,5100 | CS | | ANAP | AUTO | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | - |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | - |
| Laterality | 0020,0060 | CS | | ANAP | COPY | - |
| Smallest Pixel Value in Series | 0028,0108 | US/ SS | | ANAP | AUTO | - |
| Largest Pixel Value in Series | 0028,0109 | US/ SS | | ANAP | AUTO | - |
| Request Attributes Sequence | 0040,0275 | SQ | | ANAP | COPY | - |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | CONFIG | - |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | ANAP | COPY | - |
| >>Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >>Coding Scheme Version | 0008,0103 | SH | | ANAP | COPY | - |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | - |
| >>Mapping Resource | 0008,0105 | CS | | ANAP | COPY | - |
| >>Context Group Version | 0008,0106 | DT | | ANAP | COPY | - |
| >>Context Group Local Version | 0008,0107 | DT | | ANAP | COPY | - |
| >>Context Group Extension Flag | 0008,010B | CS | | ANAP | COPY | - |
| >>Context Group Extension Creator UID | 0008,010D | UI | | ANAP | COPY | - |
| >>Context Identifier | 0008,010F | CS | | ANAP | COPY | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | COPY | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | COPY | - |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ALWAYS | COPY | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ALWAYS | COPY | - |
| Performed Procedure Step End Date | 0040,0250 | DA | | ANAP | COPY | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ANAP | COPY | - |
| Performed Procedure Step ID | 0040,0253 | SH | | ALWAYS | COPY | - |
| Performed Procedure Step Description | 0040,0254 | LO | | VNAP | COPY | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | ANAP | COPY | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | COPY | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | COPY | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | COPY | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | COPY | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | Maximum of 64 characters |

### Table 155: General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | AUTO | Applied value: Philips |
| Institution Name | 0008,0080 | LO | | ALWAYS | CONFIG | - |
| Institution Address | 0008,0081 | ST | | VNAP | CONFIG | - |
| Station Name | 0008,1010 | SH | | ALWAYS | AUTO | - |
| Institutional Department Name | 0008,1040 | LO | | ALWAYS | CONFIG | - |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | AUTO | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | - |
| Software Version(s) | 0018,1020 | LO | | ANAP | AUTO | - |

### Table 156: SC Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | | ALWAYS | AUTO | Applied value: MR |
| Conversion Type | 0008,0064 | CS | | ALWAYS | AUTO | Applied Values: SYN, WSD |
| Secondary Capture Device Manufacturer | 0018,1016 | LO | | ANAP | AUTO | - |
| Secondary Capture Device Manufacturer's Model Name | 0018,1018 | LO | | ANAP | AUTO | - |
| Secondary Capture Device Software Version(s) | 0018,1019 | LO | | ANAP | AUTO | - |

### Table 157: General Image Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Type | 0008,0008 | CS | | ALWAYS | AUTO | DERIVED\SECONDARY |
| Acquisition Date | 0008,0022 | DA | | ANAP | AUTO | |
| Acquisition Time | 0008,0032 | TM | | ANAP | AUTO | |
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | - |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | - |
| Acquisition Number | 0020,0012 | IS | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Patient Orientation | 0020,0020 | CS | | EMPTY | AUTO | - |
| Lossy Image Compression | 0028,2110 | CS | | ANAP | AUTO | Applied value: 00 |
| Burned In Annotation | 0028,0301 | CS | | | | |

### Table 158: Image Pixel Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Samples per Pixel | 0028,0002 | US | | ALWAYS | AUTO | Applied value: 1, 3 |
| Photometric Interpretation | 0028,0004 | CS | | ALWAYS | IMPLICIT | Applied values: MONOCHROME2, RGB |
| Planar Configuration | 0028,0006 | US | | ANAP | AUTO | - |
| Rows | 0028,0010 | US | | ALWAYS | AUTO | - |
| Columns | 0028,0011 | US | | ALWAYS | AUTO | - |
| Pixel Aspect Ratio | 0028,0034 | IS | | ALWAYS | AUTO | Applied value: (1,1) |
| Bits Allocated | 0028,0100 | US | | ALWAYS | AUTO | - |
| Bits Stored | 0028,0101 | US | | ALWAYS | AUTO | - |
| High Bit | 0028,0102 | US | | ALWAYS | AUTO | - |
| Pixel Representation | 0028,0103 | US | | ANAP | AUTO | - |
| Pixel Data | 7FE0,0010 | O W/ OB | | ALWAYS | AUTO | - |

### Table 159: SC Image Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Date of Secondary Capture | 0018,1012 | DA | | ANAP | AUTO | - |
| Time of Secondary Capture | 0018,1014 | TM | | ANAP | AUTO | - |

### Table 160: SOP Common Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100. GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| SOP Class UID | 0008,0016 | UI | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | - |

## 8.1.1.6. Grayscale Softcopy Presentation State Storage SOP Class

**Table 161: IOD of Created Grayscale Softcopy Presentation State Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Series | Presentation Series Module | ALWAYS |
| Equipment | General Equipment Module | ALWAYS |
| Presentation State | Presentation State Identification Module | ALWAYS |
| Presentation State | Presentation State Relationship Module | ALWAYS |
| Presentation State | Display Shutter Module | CONDITIONAL |
| Presentation State | Overlay Plane Module | CONDITIONAL |
| Presentation State | Overlay Activation Module | CONDITIONAL |
| Presentation State | Displayed Area Module | CONDITIONAL |
| Presentation State | Graphic Annotation Module | CONDITIONAL |
| Presentation State | Spatial Transformation Module | CONDITIONAL |
| Presentation State | Graphic Layer Module | CONDITIONAL |
| Presentation State | Modality LUT Module | CONDITIONAL |
| Presentation State | Softcopy VOI LUT Module | CONDITIONAL |
| Presentation State | Softcopy Presentation LUT Module | ALWAYS |
| Presentation State | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

**Table 162: Patient Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | COPY | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | COPY | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | COPY | - |
| Patient’s Birth Time | 0010,0032 | TM | | ANAP | COPY | - |
| Patient's Sex | 0010,0040 | CS | | ALWAYS | COPY | - |
| Other Patient IDs | 0010,1000 | LO | | VNAP | COPY | - |
| Ethnic Group | 0010,2160 | SH | | ANAP | COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Patient Comments | 0010,4000 | LT | | ANAP | COPY | - |

**Table 163: General Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | COPY | - |
| Study Time | 0008,0030 | TM | | ALWAYS | COPY | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | COPY | - |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | COPY | - |
| Study Description | 0008,1030 | LO | | VNAP | COPY | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ANAP | COPY | If present in original study |
| >Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | COPY | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | COPY | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | COPY | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | COPY | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | COPY | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | COPY | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | COPY | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ANAP | AUTO | If present in original study. |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | COPY | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | COPY | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | COPY | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | - |
| Study ID | 0020,0010 | SH | | ALWAYS | COPY | - |

**Table 164: Patient Study Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Size | 0010,1020 | DS | | VNAP | COPY | - |
| Patient's Weight | 0010,1030 | DS | | ALWAYS | COPY | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Occupation | 0010,2180 | SH | | ANAP | COPY | - |
| Additional Patient History | 0010,21B0 | LT | | ANAP | COPY | - |

### Table 165: General Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Operators' Name | 0008,1070 | PN | | EMPTY | AUTO | - |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ALWAYS | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| Body Part Examined | 0018,0015 | CS | | ANAP | COPY | - |
| Protocol Name | 0018,1030 | LO | | ANAP | COPY | - |
| Patient Position | 0018,5100 | CS | | ANAP | COPY | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | - |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | - |
| Laterality | 0020,0060 | CS | | ANAP | COPY | - |
| Request Attributes Sequence | 0040,0275 | SQ | | ANAP | COPY | - |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | COPY | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | COPY | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | COPY | - |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ALWAYS | COPY | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ALWAYS | COPY | - |
| Performed Procedure Step ID | 0040,0253 | SH | | ALWAYS | COPY | - |
| Performed Procedure Step Description | 0040,0254 | LO | | ANAP | AUTO | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | VNAP | COPY | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | COPY | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | COPY | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Context Group Local Version | 0008,0107 | DT | | ANAP | COPY | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | COPY | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | COPY | - |
| >Context Identifier | 0008,010F | CS | | ANAP | AUTO | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | Maximum of 64 characters, Comments added on MR |

### Table 166: Presentation Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Modality | 0008,0060 | CS | | ALWAYS | AUTO | - |

### Table 167: General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | AUTO | applied value: Philips |
| Institution Name | 0008,0080 | LO | | ALWAYS | CONFIG | - |
| Station Name | 0008,1010 | SH | | ALWAYS | AUTO | Same as the host Name. |
| Institutional Department Name | 0008,1040 | LO | | ALWAYS | CONFIG | - |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | AUTO | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | - |
| Software Version(s) | 0018,1020 | LO | | ALWAYS | AUTO | - |

### Table 168: Presentation State Identification Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Presentation Creation Date | 0070,0082 | DA | | ALWAYS | AUTO | - |
| Presentation Creation Time | 0070,0083 | TM | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| Content Label | 0070,0080 | CS | | ALWAYS | AUTO | applied values: AS LAST SEEN, NEW AT IMPORT |
| Content Description | 0070,0081 | LO | | VNAP | AUTO | |
| Content Creator's Name | 0070,0084 | PN | | VNAP | AUTO | Same as Manufacturer's Model name. |

### Table 169: Presentation State Relationship Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Referenced Series Sequence | 0008,1115 | SQ | | ALWAYS | AUTO | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | - |

**Table 170: Display Shutter Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Shutter Presentation Value | 0018,1622 | US | | ANAP | AUTO | Applied value: 0 |

**Table 171: Overlay Plane Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Overlay Rows | 6000,0010 | US | | ALWAYS | AUTO | - |
| Overlay Columns | 6000,0011 | US | | ALWAYS | AUTO | - |
| Overlay Description | 6000,0022 | LO | | ANAP | AUTO | - |
| Overlay Type | 6000,0040 | CS | | ALWAYS | AUTO | - |
| Overlay Subtype | 6000,0045 | LO | | ANAP | AUTO | - |
| Overlay Origin | 6000,0050 | SS | | ALWAYS | AUTO | - |
| Overlay Bits Allocated | 6000,0100 | US | | ALWAYS | AUTO | - |
| Overlay Bit Position | 6000,0102 | US | | ALWAYS | AUTO | - |
| ROI Area | 6000,1301 | IS | | ANAP | AUTO | - |
| ROI Mean | 6000,1302 | DS | | ANAP | AUTO | - |
| ROI Standard Deviation | 6000,1303 | DS | | ANAP | AUTO | - |
| Overlay Label | 6000,1500 | LO | | EMPTY | AUTO | - |
| Overlay Data | 6000,3000 | O W/ OB | | ALWAYS | AUTO | - |

**Table 172: Overlay Activation Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Overlay Activation Layer | 6000,1001 | CS | | ANAP | AUTO | applied value: 1 |

### Table 173: Displayed Area Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Displayed Area Selection Sequence | 0070,005A | SQ | | ALWAYS | IMPLICIT | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | IMPLICIT | - |
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | IMPLICIT | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | IMPLICIT | - |
| >Displayed Area Top Left Hand Corner | 0070,0052 | SL | | ALWAYS | IMPLICIT | - |
| >Displayed Area Bottom Right Hand Corner | 0070,0053 | SL | | ALWAYS | IMPLICIT | - |
| >Presentation Size Mode | 0070,0100 | CS | | ALWAYS | IMPLICIT | Applied values: MAGNIFY, SCALE TO FIT |
| >Presentation Pixel Spacing | 0070,0101 | DS | | ANAP | IMPLICIT | Applied values: (0.0, 0.0) |
| >Presentation Pixel Aspect Ratio | 0070,0102 | IS | | ANAP | IMPLICIT | - |
| >Presentation Pixel Magnification Ratio | 0070,0103 | FL | | ANAP | IMPLICIT | Applied value: 1.0 |
| >Zoom Mode | 2001,103F | CS | | VNAP | IMPLICIT | - |

### Table 174: Graphic Annotation Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Graphic Annotation Sequence | 0070,0001 | SQ | | ALWAYS | IMPLICIT | - |
| >Referenced Image Sequence | 0008,1140 | SQ | | ANAP | IMPLICIT | - |
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | IMPLICIT | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | IMPLICIT | - |
| >Graphic Layer | 0070,0002 | CS | | ALWAYS | IMPLICIT | - |
| >Text Object Sequence | 0070,0008 | SQ | | ANAP | IMPLICIT | - |
| >>Anchor Point Annotation Units | 0070,0004 | CS | | ALWAYS | IMPLICIT | - |
| >>Unformatted Text Value | 0070,0006 | ST | | ALWAYS | IMPLICIT | - |
| >>Anchor Point | 0070,0014 | FL | | ALWAYS | IMPLICIT | - |
| >>Anchor Point Visibility | 0070,0015 | CS | | ALWAYS | IMPLICIT | - |
| >Graphic Object Sequence | 0070,0009 | SQ | | ANAP | AUTO | - |
| >>Graphic Annotation Units | 0070,0005 | CS | | ALWAYS | IMPLICIT | - |
| >>Graphic Dimensions | 0070,0020 | US | | ALWAYS | IMPLICIT | - |
| >>Number of Graphic Points | 0070,0021 | US | | ALWAYS | IMPLICIT | - |
| >>Graphic Data | 0070,0022 | FL | | ALWAYS | IMPLICIT | - |
| >>Graphic Type | 0070,0023 | CS | | ALWAYS | IMPLICIT | - |
| >>Graphic Filled | 0070,0024 | CS | | ANAP | IMPLICIT | - |

### Table 175: Spatial Transformation Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Image Horizontal Flip | 0070,0041 | CS | | ALWAYS | IMPLICIT | - |
| Image Rotation | 0070,0042 | US | | ALWAYS | IMPLICIT | - |

### Table 176: Graphic Layer Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Graphic Layer Sequence | 0070,0060 | SQ | | ALWAYS | IMPLICIT | - |
| >Graphic Layer | 0070,0002 | CS | | ALWAYS | IMPLICIT | - |
| >Graphic Layer Order | 0070,0062 | IS | | ALWAYS | IMPLICIT | - |

### Table 177: Modality LUT Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Rescale Intercept | 0028,1052 | DS | | ALWAYS | COPY | - |
| Rescale Slope | 0028,1053 | DS | | ALWAYS | COPY | - |
| Rescale Type | 0028,1054 | LO | | ALWAYS | COPY | - |

### Table 178: Softcopy VOI LUT Module

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

**Table 179: Softcopy Presentation LUT Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Presentation LUT Sequence | 2050,0010 | SQ | | ANAP | AUTO | Present if Presentation LUT Shape not present |
| >LUT Descriptor | 0028,3002 | US /SS | | ALWAYS | AUTO | - |
| >LUT Data | 0028,3006 | US /OW | | ALWAYS | AUTO | - |
| Presentation LUT Shape | 2050,0020 | CS | | ALWAYS | AUTO | - |

**Table 180: SOP Common Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100. GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| SOP Class UID | 0008,0016 | UI | 1.2.840.10008.5.1.4.1.1.1.1.1 | ALWAYS | AUTO | Applied Value(s): 1.2.840.10008.5.1.4.1.1.11.1 |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | - |

## 8.1.1.7. Raw Data Storage SOP Class

**Table 181: IOD of Created Raw Data Storage SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| Patient | Patient Module | ALWAYS |
| Study | General Study Module | ALWAYS |
| Study | Patient Study Module | CONDITIONAL |
| Series | General Series Module | ALWAYS |
| Frame of Reference | Frame of Reference Module | CONDITIONAL |
| Frame of Reference | Synchronization Module | CONDITIONAL |

| | | |
|---|---|---|
| Equipment | General Equipment Module | ALWAYS |
| Raw Data | Acquisition Context Module | ALWAYS |
| Raw Data | Raw Data Module | ALWAYS |
| Raw Data | SOP Common Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

### Table 182: Patient Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Name | 0010,0010 | PN | | ALWAYS | MWL, USER | - |
| Patient ID | 0010,0020 | LO | | ALWAYS | MWL, USER | - |
| Patient's Birth Date | 0010,0030 | DA | | ALWAYS | MWL, USER | - |
| Patient's Birth Time | 0010,0032 | TM | | ANAP | MWL, USER | - |
| Patient's Sex | 0010,0040 | CS | | ALWAYS | MWL, USER | - |
| Patient's Age | 0010,1010 | AS | | ANAP | COPY | - |
| Other Patient IDs | 0010,1000 | LO | | VNAP | MWL, USER | - |
| Ethnic Group | 0010,2160 | SH | | ANAP | MWL, USER | - |
| Patient Comments | 0010,4000 | LT | | ANAP | MWL | - |

### Table 183: General Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Study Date | 0008,0020 | DA | | ALWAYS | AUTO, MWL | - |
| Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Accession Number | 0008,0050 | SH | | ALWAYS | MWL, USER | - |
| Referring Physician's Name | 0008,0090 | PN | | VNAP | MWL, USER | - |
| Study Description | 0008,1030 | LO | | VNAP | MWL, USER | - |
| Procedure Code Sequence | 0008,1032 | SQ | | ANAP | MWL, USER | - |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| Referenced Study Sequence | 0008,1110 | SQ | | ANAP | MWL | If received from RIS |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO, MWL | - |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO, MWL | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | AUTO, MWL | - |
| Study Instance UID | 0020,000D | UI | | ALWAYS | AUTO, MWL | - |
| Study ID | 0020,0010 | SH | | ALWAYS | AUTO | - |

### Table 184: Patient Study Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Patient's Size | 0010,1020 | DS | | ANAP | MWL | - |
| Patient's Weight | 0010,1030 | DS | | ALWAYS | MWL, USER | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Occupation | 0010,2180 | SH | | ANAP | MWL | - |
| Additional Patient History | 0010,21B0 | LT | | ANAP | COPY | - |

### Table 185: General Series Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Series Date | 0008,0021 | DA | | ALWAYS | AUTO | - |
| Series Time | 0008,0031 | TM | | ALWAYS | AUTO | - |
| Modality | 0008,0060 | CS | | ALWAYS | AUTO | Applied value: MR |
| Series Description | 0008,103E | LO | | ANAP | AUTO, USER | - |
| Performing Physician's Name | 0008,1050 | PN | | ANAP | AUTO | - |
| Operators' Name | 0008,1070 | PN | | VNAP | AUTO | - |
| Referenced Performed Procedure Step Sequence | 0008,1111 | SQ | | ANAP | AUTO | - |
| >Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | Applied value: 1.2.840.10008.3.1.2.3.3 |
| >Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| Body Part Examined | 0018,0015 | CS | | ANAP | AUTO | If ExamCard scan |
| Protocol Name | 0018,1030 | LO | | ALWAYS | USER | Scan name |
| Patient Position | 0018,5100 | CS | | ANAP | AUTO | - |
| Series Instance UID | 0020,000E | UI | | ALWAYS | AUTO | Generated by MR system |
| Series Number | 0020,0011 | IS | | ALWAYS | AUTO | Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Laterality | 0020,0060 | CS | | ANAP | USER | - |
| Request Attributes Sequence | 0040,0275 | SQ | | ANAP | MWL | - |
| >Scheduled Procedure Step Description | 0040,0007 | LO | | VNAP | MWL | - |
| >Scheduled Protocol Code Sequence | 0040,0008 | SQ | | ANAP | MWL, USER | - |
| >>Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >>Coding Scheme Version | 0008,0103 | SH | | ANAP | USER | - |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >>Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >>Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >>Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >>Context Group Extension Flag | 0008,010B | CS | | ANAP | MWL | - |
| >>Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >>Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| >Scheduled Procedure Step ID | 0040,0009 | SH | | ALWAYS | MWL | - |
| >Requested Procedure ID | 0040,1001 | SH | | ALWAYS | MWL | - |
| Performed Procedure Step Start Date | 0040,0244 | DA | | ALWAYS | AUTO | - |
| Performed Procedure Step Start Time | 0040,0245 | TM | | ALWAYS | AUTO | - |
| Performed Procedure Step ID | 0040,0253 | SH | | ALWAYS | AUTO | - |
| Performed Procedure Step Description | 0040,0254 | LO | | VNAP | MWL, USER | - |
| Performed Protocol Code Sequence | 0040,0260 | SQ | | ANAP | MWL, USER | When retrieved from RIS, otherwise empty. |
| >Code Value | 0008,0100 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | MWL, USER | - |
| >Coding Scheme Version | 0008,0103 | SH | | ANAP | MWL, USER | - |
| >Code Meaning | 0008,0104 | LO | | ALWAYS | MWL, USER | - |
| >Mapping Resource | 0008,0105 | CS | | ANAP | MWL | - |
| >Context Group Version | 0008,0106 | DT | | ANAP | MWL | - |
| >Context Group Local Version | 0008,0107 | DT | | ANAP | MWL | - |
| >Context Group Extension Flag | 0008,010B | CS | | ALWAYS | MWL | - |
| >Context Group Extension Creator UID | 0008,010D | UI | | ANAP | MWL | - |
| >Context Identifier | 0008,010F | CS | | ANAP | MWL | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ANAP | COPY | Only present when patient demographics received from RIS. Maximum of 64 characters |

### Table 186: Frame of Reference Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Frame of Reference UID | 0020,0052 | UI | | ALWAYS | AUTO | - |
| Position Reference Indicator | 0020,1040 | LO | | EMPTY | AUTO | - |

### Table 187: Synchronization Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Synchronization Trigger | 0018,106A | CS | | ALWAYS | AUTO | - |
| Acquisition Time Synchronized | 0018,1800 | CS | | ALWAYS | AUTO | - |
| Synchronization Frame of Reference UID | 0020,0200 | UI | | ALWAYS | AUTO | - |

### Table 188: General Equipment Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Manufacturer | 0008,0070 | LO | | ALWAYS | AUTO | Applied value: Philips |
| Institution Name | 0008,0080 | LO | | ALWAYS | CONFIG | Configured on the system. |
| Station Name | 0008,1010 | SH | | ALWAYS | CONFIG | Same as the Host Name. |
| Institutional Department Name | 0008,1040 | LO | | ALWAYS | CONFIG | - |
| Manufacturer's Model Name | 0008,1090 | LO | | ALWAYS | AUTO | |
| Device Serial Number | 0018,1000 | LO | | ALWAYS | AUTO | System serial number. |
| Software Version(s) | 0018,1020 | LO | | ALWAYS | AUTO | The release text of the original Image. |

### Table 189: Acquisition Context Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Acquisition Context Sequence | 0040,0555 | SQ | | ALWAYS | AUTO | Empty |

### Table 190: Raw Data Module

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Content Date | 0008,0023 | DA | | ALWAYS | AUTO | - |
| Acquisition Datetime | 0008,002A | DT | | ANAP | AUTO | - |
| Content Time | 0008,0033 | TM | | ALWAYS | AUTO | - |
| Creator-Version UID | 0008,9123 | UI | | ALWAYS | AUTO | - |
| Instance Number | 0020,0013 | IS | | VNAP | AUTO | - |

**Table 191: SOP Common Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Specific Character Set | 0008,0005 | CS | | ALWAYS | AUTO | Default: ISO_IR 100.<br>GB18030, ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 126, ISO 2022 IR 127, ISO 2022 IR 13, ISO 2022 IR 138, ISO 2022 IR 144, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 166, ISO 2022 IR 6, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 127, ISO_IR 13, ISO 2022 IR 87, ISO_IR 138, ISO_IR 144, ISO_IR 148, ISO_IR 166, ISO_IR 192 |
| Instance Creation Date | 0008,0012 | DA | | ALWAYS | AUTO | - |
| Instance Creation Time | 0008,0013 | TM | | ALWAYS | AUTO | - |
| Instance Creator UID | 0008,0014 | UI | | ALWAYS | AUTO | - |
| SOP Class UID | 0008,0016 | UI | | ALWAYS | AUTO | Applied value: 1.2.840.10008.5.1.4.1.1.66 |
| SOP Instance UID | 0008,0018 | UI | | ALWAYS | AUTO | - |

## 8.1.1.8. Media Storage Directory SOP Class

**Table 192: IOD of Created Media Storage Directory SOP Class Instances**

| Information Entity | Module | Presence Of Module |
|---|---|---|
| | File-set Identification Module | ALWAYS |
| | Directory Information Module | ALWAYS |
| | Extended DICOM and Private attributes | ALWAYS |

**Table 193: File-set Identification Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| File-set ID | 0004,1130 | CS | | ALWAYS | AUTO | - |
| Specific Character Set of Fileset Descriptor File | 0004,1142 | CS | | ANAP | AUTO, USER | Required to specify the expanded or replacement character set |

**Table 194: Directory Information Module**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Offset of the First Directory Record of the Root Directory Entity | 0004,1200 | UL | | ALWAYS | AUTO | - |
| Offset of the Last Directory Record of the Root Directory Entity | 0004,1202 | UL | | ALWAYS | AUTO | - |
| File-set Consistency Flag | 0004,1212 | US | | ALWAYS | AUTO | Default 0x0000=0 |
| Directory Record Sequence | 0004,1220 | SQ | | VNAP | AUTO | - |
| >Offset of the Next Directory Record | 0004,1400 | UL | | ALWAYS | AUTO | - |
| >Record In-use Flag | 0004,1410 | US | | ALWAYS | AUTO | - |
| >Offset of Referenced Lower-Level Directory Entity | 0004,1420 | UL | | ALWAYS | AUTO | - |
| >Directory Record Type | 0004,1430 | CS | | ANAP | AUTO | - |
| >Private Record UID | 0004,1432 | UI | | ANAP | AUTO | - |
| >Referenced File ID | 0004,1500 | CS | | ANAP | AUTO | - |
| >Referenced SOP Class UID in File | 0004,1510 | UI | | ANAP | AUTO | - |
| >Referenced SOP Instance UID in File | 0004,1511 | UI | | ANAP | AUTO | - |
| >Referenced Transfer Syntax UID in File | 0004,1512 | UI | | ANAP | AUTO | - |
| >Specific Character Set | 0008,0005 | CS | | ANAP | AUTO | - |
| >Image Type | 0008,0008 | CS | | ANAP | AUTO | - |
| >SOP Instance UID | 0008,0018 | UI | | ANAP | AUTO | - |
| >Study Date | 0008,0020 | DA | | ALWAYS | AUTO | - |
| >Series Date | 0008,0021 | DA | | VNAP | COPY | - |
| >Study Time | 0008,0030 | TM | | ALWAYS | COPY | - |
| >Series Time | 0008,0031 | TM | | VNAP | COPY | - |
| >Accession Number | 0008,0050 | SH | | VNAP | COPY | - |
| >Modality | 0008,0060 | CS | | ALWAYS | COPY | - |
| >Study Description | 0008,1030 | LO | | VNAP | COPY | - |
| >Referenced Series Sequence | 0008,1115 | SQ | | VNAP | COPY | - |
| >Patient's Name | 0010,0010 | PN | | ALWAYS | COPY | - |
| >Patient ID | 0010,0020 | LO | | ALWAYS | COPY | - |
| >Patient's Birth Date | 0010,0030 | DA | | ALWAYS | COPY | - |
| >Patient's Sex | 0010,0040 | CS | | ALWAYS | COPY | - |
| >Protocol Name | 0018,1030 | LO | | VNAP | COPY | - |
| >Study Instance UID | 0020,000D | UI | | ALWAYS | COPY | - |
| >Series Instance UID | 0020,000E | UI | | ALWAYS | COPY | - |
| >Study ID | 0020,0010 | SH | | ALWAYS | COPY | - |
| >Series Number | 0020,0011 | IS | | ALWAYS | COPY | - |
| >Instance Number | 0020,0013 | IS | | ALWAYS | AUTO | - |
| >Image Position (Patient) | 0020,0032 | DS | | VNAP | COPY | - |
| >Image Orientation (Patient) | 0020,0037 | DS | | VNAP | COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Frame of Reference UID | 0020,0052 | UI | | VNAP | COPY | - |
| >Performed Procedure Step Start Date | 0040,0244 | DA | | VNAP | COPY | - |
| >Performed Procedure Step Description | 0040,0254 | LO | | VNAP | COPY | - |
| >Content Label | 0070,0080 | CS | | ALWAYS | COPY | - |
| >Content Description | 0070,0081 | LO | | VNAP | COPY | - |
| >Presentation Creation Date | 0070,0082 | DA | | ALWAYS | COPY | - |
| >Presentation Creation Time | 0070,0083 | TM | | ALWAYS | COPY | - |
| >Content Creator's Name | 0070,0084 | PN | | VNAP | COPY | - |
| >Icon Image Sequence | 0088,0200 | SQ | | ANAP | AUTO | - |
| >>Pixel Spacing | 0028,0030 | DS | | VNAP | COPY | - |
| >>Samples per Pixel | 0028,0002 | US | | VNAP | COPY | - |
| >>Photometric Interpretation | 0028,0004 | CS | | VNAP | AUTO | - |
| >>Rows | 0028,0010 | US | | VNAP | AUTO | - |
| >>Columns | 0028,0011 | US | | VNAP | AUTO | - |
| >>Pixel Aspect Ratio | 0028,0034 | IS | | ANAP | AUTO | - |
| >>Bits Allocated | 0028,0100 | US | | VNAP | COPY | - |
| >>Bits Stored | 0028,0101 | US | | VNAP | COPY | - |
| >>High Bit | 0028,0102 | US | | VNAP | COPY | - |
| >>Pixel Representation | 0028,0103 | US | | VNAP | COPY | - |

## 8.1.2. Attribute Mapping

The following table shows the relation between MWL, MPPS and image Storage attributes.

**Table 195: Attribute mapping during Modality Workflow**

| Nr | Level | Attribute Name | MWL Find Tag | MPPS Create Tag | Related Store Tag | MPPS Set Tag |
|---|---|---|---|---|---|---|
| 1 | Patient | Patient's Name | 0010,0010 | 0010,0010 | 0010,0010 | - |
| 2 | | Patient ID | 0010,0020 | 0010,0020 | 0010,0020 | - |
| 3 | | Patient's Birth Date | 0010,0030 | 0010,0030 | 0010,0030 | - |
| 4 | | Patient's Sex | 0010,0040 | 0010,0040 | 0010,0040 | - |
| 5 | Study | Accession number | 0008,0050 | 0008,0050 | 0008,0050 | - |
| 6 | | Patient's Weight | 0010,1030 | - | 0010,1030 | - |
| 7 | | Study Instance UID | 0020,000D | 0020,000D | 0020,000D | - |
| 8 | | Request Procedure Description | 0032,1060 | 0032,1060 | 0032,1060 | - |
| 9 | | Scheduled Performing Physician's Name | 0040,0006 | - | 0040,0006 | - |
| 10 | | Request Procedure ID | 0040,1001 | 0040,1001 | 0040,1001 | - |
| 11 | Exam | Scheduled Procedure Step Start Date | 0040,0002 | 0040,0244 | 0008,0020 | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | | | | 0040,0250 | | |
| 13 | | Scheduled Procedure Step Description | 0040,0007 | 0040,0007 | 0040,0007 | - |
| - | | Performed Protocol Code Sequence | 0040,0008 | 0040,0260 | 0040,0260<br>0040,0008 | 0040,0260 |
| 14 | | > Code Value | 0008,0100 | 0008,0100 | 0008,0100 | 0008,0100 |
| 15 | | > Code Scheme Designator | 0008,0102 | 0008,0102 | 0008,0102 | 0008,0102 |
| 16 | | > Coding Scheme Version | 0008,0103 | 0008,0103 | 0008,0103 | 0008,0103 |
| 17 | | > Code Meaning | 0008,0104 | 0008,0104 | 0008,0104 | 0040,0004 |
| 18 | | Scheduled Procedure Step ID | 0040,0009 | 0040,0009 | 0040,0009 | - |
| - | | Scheduled Procedure Step Sequence | 0040,0100 | - | - | - |
| 19 | | > Comments on the Scheduled Procedure Step | 0040,0400 | - | 0032,4000 | - |
| 20 | | | - | - | 0040,0280 | - |
| 21 | | Performed Procedure Step ID | - | 0040,0253 | 0040,0253 | - |
| | | Study ID | - | - | 0020,0010 | - |
| - | Series/ Image / Grayscale Softcopy | Performed Series Sequence | - | - | - | 0040,0340 |
| | | > Referenced Image Sequence | - | - | - | 0008,1140 |
| 22 | | >> Referenced SOP Class UID | - | - | 0008,0016 | 0008,1150 |
| 23 | | >> Referenced SOP Instance UID | - | - | 0008,0018 | 0008,1155 |
| - | | > Referenced Stand Alone SOP Inst. Seq for the grayscale softcopy presentation state objects | - | - | - | 0040,0220 |
| 24 | | >> Referenced SOP Class UID | - | - | 0008,0016 | 0008,1150 |
| 25 | | >> Referenced SOP Instance UID | - | - | 0008,0018 | 0008,1155 |
| 26 | | > Series Protocol Name | - | - | 0018,1030 | 0018,1030 |
| 27 | | > Series Description | - | - | 0008,103E | 0008,103E |
| 28 | | > Series Instance UID | - | - | 0020,000E | 0020,000E |

## 8.1.3. Coerced/Modified fields

The Network AE will only import MR images and Presentation State objects that were created on an MR System. These imported images may be modified and are to be used for reference only; it is not the intention to export them again. Secondary capture images are always accepted.

## 8.2. Data Dictionary of Private Attributes

Not Applicable.

## 8.3. Coded Terminology and Templates

Not Applicable.

### 8.3.1. Context Groups

Not Applicable.

### 8.3.2. Template Specifications

Not Applicable.

### 8.3.3. Private code definitions

Not Applicable.

## 8.4. Grayscale Image consistency

The display monitor of the MR system is calibrated according to the Grayscale Standard Display Function (GSDF).
As described in the object definitions the Presentation LUT shape (2050, 0020) is always IDENTITY.
Consequently receiving stations must be calibrated according the GSDF and use the standard DICOM P-LUT.

## 8.5. Standard Extended/Specialized/Private SOPs

The MR supports the following standard Specialized SOP classes.

**Table 196: List of Standard Specialized SOP Classes.**

| SOP Class Name | SOP Class UID |
|---|---|
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 |

The following standard extensions are applied for the MR Image Storage SOP class. See also the overview of the applied MR Image IOD in section 8.1.1.

**Table 197: Applied Standard Extentions**

| IOD | Module | Note |
|---|---|---|
| MR Image | Patient Medical Module | - |
| MR Image | Study Classification Module | - |
| MR Image | Study Scheduling Module | - |
| MR Image | Requested Procedure Module | Additional attribute:<br>Requested Contrast Agent |

| | | |
|---|---|---|
| MR Image | Imaging Service Request Module | - |
| MR Image | Performed Procedure Step Information Module | - |
| MR Image | Billing and Material Management Code Module | - |
| MR Image | General Series Module | Additional attributes in Referenced Performed Procedure Step Sequence: >Specific Character Set<br>>Instance Creation Date<br>>Instance Creation Time<br>>Instance Creator UID<br>>Instance Number |
| MR Image | Modality LUT Module | Present if configured.<br>Must be applied when viewing the image. |
| MR Image | Private Group | Private MR attributes. |
| All storage | General Study Module | Additional attribute:<br>Scheduled Performing Physician's Name |

The MR System supports private SOP classes; for the C-STORE services these private SOP classes are listed in the following table.

**Table 198: Supported Private SOP Classes as SCU and SCP.**

| SOP Class Name | UID |
|---|---|
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 |

**Table 199: List of created SOP Classes**

| SOP Class Name | SOP Class UID |
|---|---|
| MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4 |
| Enhanced MR Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.1 |
| MR Spectroscopy Storage SOP Class | 1.2.840.10008.5.1.4.1.1.4.2 |
| Secondary Capture Image Storage SOP Class | 1.2.840.10008.5.1.4.1.1.7 |
| Grayscale Softcopy Presentation State Storage SOP Class | 1.2.840.10008.5.1.4.1.1.11.1 |
| Raw Data Storage SOP Class | 1.2.840.10008.5.1.4.1.1.66 |
| Philips Private MR Spectrum Storage | 1.3.46.670589.11.0.0.12.1 |
| Philips Private MR Series Data Storage | 1.3.46.670589.11.0.0.12.2 |
| Philips Private MR Examcard Storage | 1.3.46.670589.11.0.0.12.4 |
| Media Storage Directory SOP Class | 1.2.840.10008.1.3.10 |

## 8.5.1. Standard Extended/Specialized/Private SOP Instance

### 8.5.1.1. MR Image Storage SOP Class

**Table 200: Extended DICOM and private attributes for MR Image Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Derivation Image Sequence | 0008,9124 | SQ | | ANAP | AUTO | - |
| >Source Image Sequence | 0008,2112 | SQ | | ALWAYS | AUTO | - |
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >Derivation Code Sequence | 0008,9215 | SQ | | ALWAYS | AUTO | - |
| >>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | From CID 7203 |
| >>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | From CID 7203 |
| >>Coding Scheme Version | 0008,0103 | SH | | ANAP | AUTO | From CID 7203 |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | From CID 7203 |
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Allergies | 0010,2110 | LO | | ANAP | MWL, USER | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | MWL, USER | - |
| Acquisition Duration | 0018,9073 | FD | | ANAP | AUTO | - |
| Diffusion b-value | 0018,9087 | FD | | ANAP | AUTO | - |
| Diffusion Gradient Orientation | 0018,9089 | FD | | ANAP | AUTO | - |
| Rescale Intercept | 0028,1052 | DS | | ALWAYS | AUTO | When a value is present, then this value shall be used in the scaling calculation for the correct Window setting. |
| Rescale Slope | 0028,1053 | DS | | ALWAYS | AUTO | When a value is present, then this value shall be used in the scaling calculation for the correct Window setting. |
| Rescale Type | 0028,1054 | LO | 10^-6 mm^2/s | ALWAYS | AUTO | normalized, US, cm/s, mrad, ms, mm^2/s, s,%,/s, S/m, kPa, mmol, ppm, Hz, um^2/sec, 10^-3 mm^2/s,10^-6 mm^2/ |
| Requesting Physician | 0032,1032 | PN | | VNAP | MWL | - |
| Requesting Service | 0032,1033 | LO | | VNAP | MWL | - |
| Requested Procedure Description | 0032,1060 | LO | | VNAP | MWL | - |
| Requested Contrast Agent | 0032,1070 | LO | | VNAP | MWL | - |
| Study Comments (retired) | 0032,4000 | LT | | VNAP | COPY | Maximally 32 characters copied from (0040,0280) Comments on the Performed Procedure Steps. |
| Special Needs | 0038,0050 | LO | | ANAP | MWL | Only present when patient demographics received from RIS. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scheduled Performing Physician's Name | 0040,0006 | PN | | VNAP | MWL | - |
| Performed Station AE Title | 0040,0241 | AE | | ALWAYS | CONFIG | - |
| Performed Station Name | 0040,0242 | SH | | ANAP | CONFIG | - |
| Performed Location | 0040,0243 | SH | | ANAP | CONFIG | - |
| Performed Procedure Step End Date | 0040,0250 | DA | | VNAP | AUTO | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | VNAP | AUTO | - |
| Performed Procedure Step Status | 0040,0252 | CS | | ANAP | IMPLICIT | if MPPS applied |
| Film Consumption Sequence | 0040,0321 | SQ | | EMPTY | AUTO | - |
| Requested Procedure ID | 0040,1001 | SH | | VNAP | MWL | - |
| Reason for the Requested Procedure | 0040,1002 | LO | | VNAP | MWL | - |
| Requested Procedure Priority | 0040,1003 | SH | | VNAP | MWL | - |
| Patient Transport Arrangements | 0040,1004 | LO | | VNAP | MWL | - |
| Requested Procedure Location | 0040,1005 | LO | | VNAP | MWL | - |
| Requested Procedure Comments | 0040,1400 | LT | | VNAP | MWL | - |
| Reason for the Imaging Service Request (retired) | 0040,2001 | LO | | VNAP | MWL | - |
| Issue Date of Imaging Service Request | 0040,2004 | DA | | VNAP | MWL | - |
| Issue Time of Imaging Service Request | 0040,2005 | TM | | VNAP | MWL | - |
| Order Enterer's Location | 0040,2009 | SH | | VNAP | MWL | - |
| Order Callback Phone Number | 0040,2010 | SH | | VNAP | MWL | - |
| Imaging Service Request Comments | 0040,2400 | LT | | VNAP | MWL | - |
| Real World Value Mapping Sequence | 0040,9096 | SQ | | ALWAYS | AUTO | - |
| >Real World Value Intercept | 0040,9224 | FD | | ALWAYS | AUTO | - |
| >Real World Value Slope | 0040,9225 | FD | | ALWAYS | AUTO | - |
| Private Creator Group 2001 | 2001,0010 | LO | | ALWAYS | FIXED | Applied value: Philips Imaging DD 001 |
| Chemical Shift | 2001,1001 | FL | | ANAP | USER | Only applicable for spectro 2dsi. |
| Chemical Shift Number MR | 2001,1002 | IS | | ANAP | IMPLICIT | Only applicable for spectro 2dsi. |
| Diffusion B-Factor | 2001,1003 | FL | | ANAP | USER | Only applicable for spectro 2dsi. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Diffusion Direction | 2001,1004 | CS | | ANAP | USER | Possible values:P (Preparation Direction), M (Measurement Direction),S (Selection Direction),O (Oblique Direction),I (Isotropic),Only applicable for diffusion scans. |
| Image Enhanced | 2001,1006 | CS | | VNAP | IMPLICIT, USER | - |
| Image Type ED ES | 2001,1007 | CS | | VNAP | IMPLICIT, USER | - |
| Phase Number | 2001,1008 | IS | | VNAP | IMPLICIT | When cardiac synchronization used. |
| Image Prepulse Delay | 2001,1009 | FL | | ALWAYS | AUTO | - |
| Slice Number MR | 2001,100A | IS | | VNAP | IMPLICIT, USER | - |
| Slice Orientation | 2001,100B | CS | | ALWAYS | MWL, USER | - |
| Arrhythmia Rejection | 2001,100C | CS | | ALWAYS | AUTO | - |
| Cardiac Cycled | 2001,100E | CS | | ALWAYS | AUTO | - |
| Cardiac Gate Width | 2001,100F | SS | | ALWAYS | AUTO | - |
| Cardiac Sync | 2001,1010 | CS | | ALWAYS | AUTO | - |
| Diffusion Echo Time | 2001,1011 | FL | | ANAP | IMPLICIT | Only applicable for diffusion scans. |
| Dynamic Series | 2001,1012 | CS | | VNAP | USER | - |
| EPI Factor | 2001,1013 | SL | | ALWAYS | IMPLICIT, USER | - |
| Number of Echoes | 2001,1014 | SL | | VNAP | USER | - |
| Number of Locations | 2001,1015 | SS | | VNAP | IMPLICIT, USER | - |
| Number of PC Directions | 2001,1016 | SS | | VNAP | USER | - |
| Number of Phases MR | 2001,1017 | SL | | VNAP | IMPLICIT, USER | - |
| Number of Slices MR | 2001,1018 | SL | | VNAP | IMPLICIT, USER | - |
| Partial Matrix Scanned | 2001,1019 | CS | | VNAP | IMPLICIT, USER | - |
| PC Velocity | 2001,101A | FL | | ALWAYS | IMPLICIT, USER | - |
| Prepulse Delay | 2001,101B | FL | | VNAP | IMPLICIT, USER | - |
| Prepulse Type | 2001,101C | CS | | VNAP | USER | - |
| Reconstruction Number MR | 2001,101D | IS | | VNAP | IMPLICIT | - |
| Respiration Sync | 2001,101F | CS | | VNAP | USER | - |
| Scanning Technique | 2001,1020 | LO | | ALWAYS | AUTO | - |
| SPIR | 2001,1021 | CS | | VNAP | USER | - |
| Water Fat Shift | 2001,1022 | FL | | VNAP | IMPLICIT, USER | - |
| Flip Angle Philips | 2001,1023 | DS | | ALWAYS | IMPLICIT, USER | - |
| Series is Interactive | 2001,1024 | CS | | VNAP | USER | - |
| Echo Time Display | 2001,1025 | SH | | VNAP | USER | - |
| Contrast Transfer Taste | 2001,1058 | UL | | ALWAYS | IMPLICIT | - |
| Number of Stacks | 2001,1060 | SL | | VNAP | USER | - |
| Series Transmitted | 2001,1061 | CS | | VNAP | AUTO | - |
| acquisition_no | 2001,107B | IS | | ALWAYS | IMPLICIT | - |
| no_dynamic_scans | 2001,1081 | IS | | VNAP | IMPLICIT, USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| IsrawImage | 2001,10A1 | CS | | ANAP | AUTO | - |
| Prospective Motion Correction | 2001,10F1 | FL | | ANAP | AUTO | Only applicable if retrospective correction is done on the data. |
| Retrospective Motion Correction | 2001,10F2 | FL | | ANAP | AUTO | Only applicable if retrospective correction is done on the data. |
| Private Creator Group 2005 | 2005,0010 | LO | | ALWAYS | FIXED | Applied value: Philips MR Imaging DD 001 |
| Number of Chemical Shift | 2005,1020 | SL | | ANAP | USER | Only applicable for spectro 2dsi. |
| Syncra Scan Type | 2005,10A1 | CS | | ANAP | USER | If syncra scan. Applied values: SENSE, SYN_CLASSIC, SYN_COCA |
| Diffusion Direction RL | 2005,10B0 | FL | | ANAP | AUTO | Only applicable if Diffusion Direction is Oblique. |
| Diffusion Direction AP | 2005,10B1 | FL | | ANAP | AUTO | Only applicable if Diffusion Direction is Oblique. |
| Diffusion Direction FH | 2005,10B2 | FL | | ANAP | AUTO | Only applicable if Diffusion Direction is Oblique. |
| Private Creator Group 2005 | 2005,0014 | LO | | ANAP | | Applied value: Philips MR Imaging DD 005 |
| Private Creator Group 2005 | 2005,0015 | LO | | ALWAYS | AUTO | Applied value: Philips MR Imaging DD 006 |
| Specific Energy Dose | 2005,1492 | FL | | ALWAYS | AUTO | |
| MRE Frequency | 2005,1553 | FL | | ANAP | AUTO | - |
| MRE Amplitude | 2005,1554 | FL | | ANAP | AUTO | - |
| MREMEG Frequency | 2005,1555 | FL | | ANAP | AUTO | - |
| MREMEG Pairs | 2005,1556 | FL | | ANAP | AUTO | - |
| MREMEG Direction | 2005,1557 | CS | | ANAP | AUTO | - |
| MREMEG Amplitude | 2005,1558 | FL | | ANAP | AUTO | - |
| MRE Number of Phase Delays | 2005,1559 | FL | | ANAP | AUTO | This parameter should be used as Integer although VR is specified and stored as Float |
| MRE Number of Motion Cycles | 2005,1560 | IS | | ANAP | AUTO | - |
| MRE Motion Meg Phase Delay | 2005,1561 | FL | | ANAP | AUTO | - |
| MRE Inversion Algorithm Version | 2005,1562 | LT | | ANAP | AUTO | - |
| MRE Phase Delay Number | 2005,1568 | IS | | ANAP | AUTO | - |
| Sagittal Slice Order | 2005,1563 | CS | | ANAP | AUTO, COPY | - |
| Coronal Slice Order | 2005,1564 | CS | | ANAP | AUTO, COPY | - |
| Transversal Slice Order | 2005,1565 | CS | | ANAP | AUTO, COPY | - |
| Series Orientation | 2005,1566 | CS | | ANAP | AUTO, COPY | - |
| MR Stack Reverse | 2005,1567 | IS | | ANAP | AUTO, COPY | - |
| Orientation Mirror Flip | 2005,1579 | CS | | ANAP | AUTO, COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number Of Inversion Delays | 2005,1571 | IS | | ANAP | AUTO, COPY | - |
| Inversion Delay Time | 2005,1572 | FL | | ANAP | AUTO, COPY | - |
| Inversion Delay Number | 2005,1573 | IS | | ANAP | AUTO, COPY | - |
| Max DB DT | 2005,1574 | DS | | ANAP | AUTO, COPY | - |
| Max SAR | 2005,1575 | DS | | ANAP | AUTO, COPY | - |
| PIIM_GRADIENT_SLEW_RATE | 2005,1585 | DS | | ANAP | USER | |
| PIIM_MR_STUDY_B1RMS | 2005,1587 | DS | | ANAP | USER | |
| SAR Type | 2005,1576 | LT | | ANAP | AUTO, COPY | - |
| Metal Implant Status | 2005,1578 | CS | | ANAP | AUTO, COPY | - |
| SAR Operation Mode | 2005,1581 | CS | | ANAP | AUTO, COPY | - |
| Spatial Gradient | 2005,1582 | IS | | ANAP | AUTO, COPY | - |
| Additional Constraints | 2005,1583 | LT | | ANAP | AUTO, COPY | - |
| Contrast Information Sequence | 2005,1592 | SQ | | ANAP | USER | - |
| Diffusion2KDTI | 2005,1595 | CS | | ANAP | AUTO | - |
| DiffusionOrder | 2005,1596 | IS | | ANAP | AUTO | - |
| IMPLEMENTOR_ID | 2001 0011 | LO | | Always | MWL, USER | - |
| PIIM_ICAPMR_ADA_selected algorithm | 2001 1189 | LO | | Always | MWL, USER | - |
| PIIM_ICAPMR_ADA_ selected _B_values | 2001 118A | FL | | Always | MWL, USER | - |
| MRSeriesNrOfDiffOrder | 2005,1599 | SL | | VNAP | AUTO | - |
| SencEnable | 2005,1600 | SL | | 1C VNAP | AUTO | - |
| SencLowTuningFreq | 2005,1601 | SL | | VNAP | AUTO | - |
| SencHighTuningFreq | 2005,1602 | SL | | VNAP | AUTO | - |
| SencModulationFreq | 2005,1603 | SL | | VNAP | AUTO | - |

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|---|---|---|---|---|---|---|
| > Contrast/Bolus Agent | 0018,0010 | LO | | ANAP | USER, IMPLICIT | Will have value only if contrast is applied for scans Present if contrast bolus is present in the image, values:<br>Gadolinium,<br>Iodamide meglumine,<br>Iodipamide,<br>Iodixanol,<br>Iodized oil,<br>Iodoalphionic acid,<br>Iodophthalein,<br>Iodopyracet,<br>Iohexol,<br>Ionic iodinated contrast agent, Iopamidol,<br>Iopanoic acid,<br>Iophendylate,<br>Iophenoxic acid,<br>Iothalamate,<br>Ioversol,<br>Ioxaglate,<br>Ipodate,<br>Mangafodipir trisodium,<br>Meglumine diatrizoate,<br>Meglumine iodipamide,<br>Metrizamide,<br>Metrizoate,<br>Non radiopaque medium,<br>Non-ionic iodinated contrast agent,<br>Oxygen,<br>Propyliodone,<br>Radiopaque medium,<br>Sodium acetriozate,<br>Sodium diatrizoate,<br>Sodium diprotrizoate,<br>Sodium iodipamide,<br>Sodium iodomethamate,<br>Sodium tyropanate, Water<br>not present when no contrast agent is present in the image. |
| >Contrast/Bolus Route | 0018,1040 | LO | | ANAP | AUTO | Applied Values:(Intravenous route,Intra-arterial route,Intramuscular route,,Subcutaneous route,Intracutaneous route,Intraperitoneal route,Intramedullary route,Intrathecal route,Intraarticular route,Intraepithelial route,Topical route,Oral route,Transluminal route,Intraluminal route,Extraluminal route,By inhalation,Per rectum,Vaginal route) |
| >Contrast/Bolus Volume | 0018,1041 | DS | | ANAP | IMPLICIT | - |
| >Contrast/Bolus Start Time | 0018,1042 | TM | | ANAP | IMPLICIT | - |
| >Contrast/Bolus Total Dose | 0018,1044 | DS | | ANAP | IMPLICIT | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Contrast/Bolus Ingredient | 0018,1048 | CS | | ANAP | AUTO | Applied Values :(AIR, BARIUM, CARBON DIOXIDE, GADOLINIUM, IODINE, IRON, OXYGEN, WATER, XENON.) |
| >Contrast/Bolus Ingredient Concentration | 0018,1049 | DS | | ANAP | IMPLICIT | - |
| Series Level Contrast Flag | 2005,1705 | CS | | ANAP | AUTO | - |
| Series Geo Name | 2005,1706 | LO | | ANAP | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Parallel Reconstruction Technique | 2005,1710 | CS | | VNAP | AUTO | Indicates Parallel reconstruction technique |
| Private Creator Group 2029 | 2029,0010 | LO | | ALWAYS | FIXED | Applied value: Philips DINxGen DD 001 |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.2. Enhanced MR Image Storage SOP Class

**Table 201: Extended DICOM and private attributes for Enhanced MR Image Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Medical Alerts | 0010,2000 | LO | | ANAP | MWL, USER | - |
| Allergies | 0010,2110 | LO | | ANAP | MWL, USER | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | MWL, USER | - |
| Acquisition Duration | 0018,9073 | FD | | ANAP | AUTO | - |
| Special Needs | 0038,0050 | LO | | ANAP | MWL | Only present when patient demographics received from RIS. |
| Platform Implementer ID for element 11 | 2001 0011 | LO | | Always | MWL, USER | - |
| CDWI selected algorithm | 2001 1189 | LO | | Always | MWL, USER | - |
| CDWI selected B values | 2001 118A | FL | | Always | MWL, USER | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scheduled Performing Physician's Name | 0040,0006 | PN | | VNAP | MWL | - |
| Private Creator Group 2005 | 2005,0014 | LO | | ANAP | | Applied value: Philips MR Imaging DD 005 |
| Private Creator Group 2005 | 2005,0015 | LO | | ALWAYS | AUTO | Applied value: Philips MR Imaging DD 006 |
| Specific Energy Dose | 2005,1492 | FL | | ALWAYS | AUTO | |
| MRE Frequency | 2005,1553 | FL | | ANAP | AUTO | - |
| MRE Amplitude | 2005,1554 | FL | | ANAP | AUTO | - |
| MREMEG Frequency | 2005,1555 | FL | | ANAP | AUTO | - |
| MREMEG Pairs | 2005,1556 | FL | | ANAP | AUTO | - |
| MREMEG Direction | 2005,1557 | CS | | ANAP | AUTO | - |
| MREMEG Amplitude | 2005,1558 | FL | | ANAP | AUTO | - |
| MRE Number of Phase Delays | 2005,1559 | FL | | ANAP | AUTO | This parameter should be used as Integer although VR is specified and stored as Float |
| MRE Number of Motion Cycles | 2005,1560 | IS | | ANAP | AUTO | - |
| MRE Motion Meg Phase Delay | 2005,1561 | FL | | ANAP | AUTO | - |
| MRE Inversion Algorithm Version | 2005,1562 | LT | | ANAP | AUTO | - |
| MRE Phase Delay Number | 2005,1568 | IS | | ANAP | AUTO | - |
| Sagittal Slice Order | 2005,1563 | CS | | ANAP | AUTO, COPY | - |
| Coronal Slice Order | 2005,1564 | CS | | ANAP | AUTO, COPY | - |
| Transversal Slice Order | 2005,1565 | CS | | ANAP | AUTO, COPY | - |
| Series Orientation | 2005,1566 | CS | | ANAP | AUTO, COPY | - |
| MR Stack Reverse | 2005,1567 | IS | | ANAP | AUTO, COPY | - |
| Orientation Mirror Flip | 2005,1579 | CS | | ANAP | AUTO, COPY | - |
| Number Of Inversion Delays | 2005,1571 | IS | | ANAP | AUTO, COPY | - |
| Inversion Delay Time | 2005,1572 | FL | | ANAP | AUTO, COPY | - |
| Inversion Delay Number | 2005,1573 | IS | | ANAP | AUTO, COPY | - |
| Max DB DT | 2005,1574 | DS | | ANAP | AUTO, COPY | - |
| Max SAR | 2005,1575 | DS | | ANAP | AUTO, COPY | - |
| PIIM_GRADIENT_SLEW_RATE | 2005,1585 | DS | | ANAP | USER | |
| PIIM_MR_STUDY_B1RMS | 2005,1587 | DS | | ANAP | USER | |
| SAR Type | 2005,1576 | LT | | ANAP | AUTO, COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Metal Implant Status | 2005,1578 | CS | | ANAP | AUTO, COPY | - |
| SAR Operation Mode | 2005,1581 | CS | | ANAP | AUTO, COPY | - |
| Spatial Gradient | 2005,1582 | IS | | ANAP | AUTO, COPY | - |
| Additional Constraints | 2005,1583 | LT | | ANAP | AUTO, COPY | - |
| Contrast Information Sequence | 2005,1592 | SQ | | ANAP | USER | - |
| > Contrast/Bolus Agent | 0018,0010 | LO | | AUTO | USER, IMPLICIT | Will have value only if contrast is applied for scans<br>Present if contrast bolus is present in the image, values:<br>Gadolinium,<br>Iodamide meglumine,<br>Iodipamide,<br>Iodixanol,<br>Iodized oil,<br>Iodoalphionic acid,<br>Iodophthalein,<br>Iodopyracet,<br>Iohexol,<br>Ionic iodinated contrast agent,<br>Iopamidol,<br>Iopanoic acid,<br>Iophendylate,<br>Iophenoxic acid,<br>Iothalamate,<br>Ioversol,<br>Ioxaglate,<br>Ipodate,<br>Mangafodipir trisodium,<br>Meglumine diatrizoate,<br>Meglumine iodipamide,<br>Metrizamide,<br>Metrizoate,<br>Non radiopaque medium,<br>Non-ionic iodinated contrast agent,<br>Oxygen,<br>Propyliodone,<br>Radiopaque medium,<br>Sodium acetriozate,<br>Sodium diatrizoate,<br>Sodium diprotrizoate,<br>Sodium iodipamide,<br>Sodium iodomethamate,<br>Sodium tyropanate,<br>Water not present when no contrast agent is present in the image. |

| | | | | | | |
|---|---|---|---|---|---|---|
| >Contrast/Bolus Route | 0018,1040 | LO | | ANAP | AUTO | Applied Values:(Intravenous route,<br>Intra-arterial route,<br>Intramuscular route,<br>Subcutaneous route,<br>Intracutaneous route,<br>Intraperitoneal route,<br>Intramedullary route,<br>Intrathecal route,<br>Intra-articular route,<br>Intraepithelial route,<br>Topical route,<br>Oral route,<br>Transluminal route,<br>Intraluminal route,<br>Extraluminal route,<br>By inhalation,<br>Per rectum,<br>Vaginal route) |
| >Contrast/Bolus Volume | 0018,1041 | DS | | ANAP | IMPLICIT | - |
| >Contrast/Bolus Start Time | 0018,1042 | TM | | ANAP | IMPLICIT | - |
| >Contrast/Bolus Total Dose | 0018,1044 | DS | | ANAP | IMPLICIT | - |
| >Contrast/Bolus Ingredient | 0018,1048 | CS | | ANAP | AUTO | Applied Values:( AIR, BARIUM, CARBON DIOXIDE, GADOLINIUM, IODINE, IRON, OXYGEN, WATER, XENON.) |
| >Contrast/Bolus Ingredient Concentration | 0018,1049 | DS | | ALWAYS | IMPLICIT | - |
| Bulk Motion Compensation Technique | 0018,9172 | CS | | VNAP | AUTO | Applied technique to reduce bulk or other physiology motion artifacts. |
| Series Level Contrast Flag | 2005,1705 | CS | | ANAP | AUTO | - |
| Series Geo Name | 2005,1706 | LO | | ANAP | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Parallel Reconstruction Technique | 2005,1710 | CS | | VNAP | AUTO | Indicates Parallel reconstruction technique |
| Private Creator Group 2029 | 2029,0010 | LO | | ANAP | AUTO | Applied value: Philips DINxGen DD 001 |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.3. MR Spectroscopy Storage SOP Class

**Table 202: Extended DICOM and private attributes for MR Spectroscopy Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Derivation Image Sequence | 0008,9124 | SQ | | ANAP | AUTO | - |
| >Source Image Sequence | 0008,2112 | SQ | | ALWAYS | AUTO | - |
| >>Referenced SOP Class UID | 0008,1150 | UI | | ALWAYS | AUTO | - |
| >>Referenced SOP Instance UID | 0008,1155 | UI | | ALWAYS | AUTO | - |
| >Derivation Code Sequence | 0008,9215 | SQ | | ALWAYS | AUTO | - |
| >>Code Value | 0008,0100 | SH | | ALWAYS | AUTO | from CID 7203 |
| >>Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | from CID 7203 |
| >>Coding Scheme Version | 0008,0103 | SH | | ANAP | AUTO | from CID 7203 |
| >>Code Meaning | 0008,0104 | LO | | ALWAYS | AUTO | from CID 7203 |
| Medical Alerts | 0010,2000 | LO | | ANAP | AUTO, USER | - |
| Allergies | 0010,2110 | LO | | ANAP | COPY, MWL, USER | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | MWL, USER | - |
| Special Needs | 0038,0050 | LO | | ANAP | MWL | Only present when patient demographics received from RIS. |
| Scheduled Performing Physician's Name | 0040,0006 | PN | | VNAP | AUTO, MWL | - |
| Private Creator Group 2005 | 2005,0015 | LO | | ALWAYS | AUTO | Applied value: Philips MR Imaging DD 006 |
| MRE Frequency | 2005,1553 | FL | | ANAP | AUTO | - |
| MRE Amplitude | 2005,1554 | FL | | ANAP | AUTO | - |
| MREMEG Frequency | 2005,1555 | FL | | ANAP | AUTO | - |
| MREMEG Pairs | 2005,1556 | FL | | ANAP | AUTO | - |
| MREMEG Direction | 2005,1557 | CS | | ANAP | AUTO | - |
| MREMEG Amplitude | 2005,1558 | FL | | ANAP | AUTO | - |
| MRE Number of Phase Delays | 2005,1559 | FL | | ANAP | AUTO | This parameter should be used as Integer although VR is specified and stored as Float |
| MRE Number of Motion Cycles | 2005,1560 | IS | | ANAP | AUTO | - |
| MRE Motion Meg Phase Delay | 2005,1561 | FL | | ANAP | AUTO | - |
| MRE Inversion Algorithm Version | 2005,1562 | LT | | ANAP | AUTO | - |
| MRE Phase Delay Number | 2005,1568 | IS | | ANAP | AUTO | - |
| Sagittal Slice Order | 2005,1563 | CS | | ANAP | AUTO, COPY | - |
| Coronal Slice Order | 2005,1564 | CS | | ANAP | AUTO, COPY | - |
| Transversal Slice Order | 2005,1565 | CS | | ANAP | AUTO, COPY | - |
| Series Orientation | 2005,1566 | CS | | ANAP | AUTO, COPY | - |
| MR Stack Reverse | 2005,1567 | IS | | ANAP | AUTO, COPY | - |
| Orientation Mirror Flip | 2005,1579 | CS | | ANAP | AUTO, COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number Of Inversion Delays | 2005,1571 | IS | | ANAP | AUTO, COPY | - |
| Inversion Delay Time | 2005,1572 | FL | | ANAP | AUTO, COPY | - |
| Inversion Delay Number | 2005,1573 | IS | | ANAP | AUTO, COPY | - |
| Max DB DT | 2005,1574 | DS | | ANAP | AUTO, COPY | - |
| Max SAR | 2005,1575 | DS | | ANAP | AUTO, COPY | - |
| PIIM_GRADIENT_SLEW_RATE | 2005,1585 | DS | | ANAP | USER | - |
| PIIM_MR_STUDY_B1RMS | 2005,1587 | DS | | ANAP | USER | - |
| SAR Type | 2005,1576 | LT | | ANAP | AUTO, COPY | - |
| Metal Implant Status | 2005,1578 | CS | | ANAP | AUTO, COPY | - |
| SAR Operation Mode | 2005,1581 | CS | | ANAP | AUTO, COPY | - |
| Spatial Gradient | 2005,1582 | IS | | ANAP | AUTO, COPY | - |
| Additional Constraints | 2005,1583 | LT | | ANAP | AUTO, COPY | - |
| IsJEditingSeries | 2005,1597 | CS | | ANAP | AUTO | - |
| MRSpectrumEditingType | 2005,1598 | SS | | ANAP | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Private Creator Group 2029 | 2029,0010 | LO | | ANAP | AUTO | Applied value: Philips DINxGen DD 001 |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.4. Secondary Capture Image Storage SOP Class

**Table 203: Extended DICOM and private attributes for Secondary Capture Image Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Medical Alerts | 0010,2000 | LO | | ANAP | COPY | - |
| Allergies | 0010,2110 | LO | | ANAP | COPY | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | COPY | - |
| Special Needs | 0038,0050 | LO | | ANAP | COPY | - |
| Scheduled Performing Physician's Name | 0040,0006 | PN | | ANAP | MWL | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Performed Station AE Title | 0040,0241 | AE | | ALWAYS | AUTO | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ALWAYS | AUTO | - |
| Comments on the Performed Procedure Step | 0040,0280 | ST | | ALWAYS | COPY | - |
| Film Consumption Sequence | 0040,0321 | SQ | | EMPTY | AUTO | - |
| Private Creator Group 2001 | 2001,0010 | LO | | ALWAYS | AUTO | - |
| Series Transmitted | 2001,1061 | CS | | ALWAYS | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Private Creator Group 2029 | 2029,0010 | LO | | ANAP | AUTO | - |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.5. Grayscale Softcopy Presentation State Storage SOP Class

**Table 204: Extended DICOM and private attributes for Grayscale Softcopy Presentation State Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Medical Alerts | 0010,2000 | LO | | ANAP | COPY | - |
| Allergies | 0010,2110 | LO | | ANAP | COPY | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | COPY | - |
| Requesting Physician | 0032,1032 | PN | | VNAP | COPY | - |
| Requesting Service | 0032,1033 | LO | | VNAP | COPY | - |
| Requested Procedure Description | 0032,1060 | LO | | ALWAYS | AUTO | - |
| Study Comments (retired) | 0032,4000 | LT | | ANAP | AUTO, USER | Comments added on MR |
| Special Needs | 0038,0050 | LO | | ANAP | COPY | - |
| Scheduled Performing Physician's Name | 0040,0006 | PN | | ANAP | AUTO | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ALWAYS | AUTO | - |
| Performed Procedure Step Status | 0040,0252 | CS | | ALWAYS | AUTO | - |
| Requested Procedure ID | 0040,1001 | SH | | ALWAYS | AUTO | - |
| Requested Procedure Comments | 0040,1400 | LT | | ALWAYS | MWL, USER | - |
| Imaging Service Request Comments | 0040,2400 | LT | | ALWAYS | MWL, USER | - |
| Private Creator Group 2001 | 2001,0010 | LO | | ALWAYS | AUTO | - |
| Private Creator Group 2001 (90) | 2001,0090 | LO | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Presentation State Subtraction Active | 2001,1026 | CS | | ALWAYS | AUTO | - |
| Series Transmitted | 2001,1061 | CS | | ALWAYS | AUTO | - |
| Series Committed | 2001,1062 | CS | | ALWAYS | AUTO | - |
| Examination Source | 2001,1063 | CS | | ALWAYS | AUTO | - |
| LinearPresentationGLTrafoshapesub | 2001,1067 | CS | | VNAP | AUTO | - |
| GL TrafoType | 2001,1077 | CS | | ALWAYS | AUTO | - |
| Pixel Processing Kernel Size | 2001,109F | US | | ALWAYS | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Private Creator Group 2029 | 2029,0010 | LO | | ANAP | AUTO | Applied value: Philips DINxGen DD 001 |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.6. Raw Data Storage SOP Class

**Table 205: Extended DICOM and private attributes for Raw Data Storage SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Code Value | 0008,0100 | SH | | VNAP | AUTO | - |
| Coding Scheme Designator | 0008,0102 | SH | | ALWAYS | AUTO | - |
| Code Meaning | 0008,0104 | LO | | VNAP | AUTO | - |
| Pixel Presentation | 0008,9205 | CS | | ALWAYS | AUTO | - |
| Volumetric Properties | 0008,9206 | CS | | ALWAYS | AUTO | - |
| Volume Based Calculation Technique | 0008,9207 | CS | | ALWAYS | AUTO | - |
| Medical Alerts | 0010,2000 | LO | | ANAP | AUTO | - |
| Allergies | 0010,2110 | LO | | ANAP | COPY | - |
| Pregnancy Status | 0010,21C0 | US | | VNAP | COPY | - |
| Pixel Bandwidth | 0018,0095 | DS | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pulse Sequence Name | 0018,9005 | SH | | ALWAYS | AUTO | - |
| Echo Pulse Sequence | 0018,9008 | CS | | ALWAYS | AUTO | - |
| Multiple Spin Echo | 0018,9011 | CS | | ALWAYS | AUTO | - |
| Multi-planar Excitation | 0018,9012 | CS | | ALWAYS | AUTO | - |
| Phase Contrast | 0018,9014 | CS | | ALWAYS | AUTO | - |
| Time of Flight Contrast | 0018,9015 | CS | | ALWAYS | AUTO | - |
| Spoiling | 0018,9016 | CS | | ALWAYS | AUTO | - |
| Steady State Pulse Sequence | 0018,9017 | CS | | ALWAYS | AUTO | - |
| Echo Planar Pulse Sequence | 0018,9018 | CS | | ALWAYS | AUTO | - |
| Magnetization Transfer | 0018,9020 | CS | | ALWAYS | AUTO | - |
| T2 Preparation | 0018,9021 | CS | | ALWAYS | AUTO | - |
| Blood Signal Nulling | 0018,9022 | CS | | ALWAYS | AUTO | - |
| Saturation Recovery | 0018,9024 | CS | | ALWAYS | AUTO | - |
| Spectrally Selected Suppression | 0018,9025 | CS | | ALWAYS | AUTO | - |
| Spatial Pre-saturation | 0018,9027 | CS | | ALWAYS | AUTO | - |
| Tagging | 0018,9028 | CS | | ALWAYS | AUTO | - |
| Oversampling Phase | 0018,9029 | CS | | ALWAYS | AUTO | - |
| Geometry of k-Space Traversal | 0018,9032 | CS | | ALWAYS | AUTO | - |
| Segmented k-Space Traversal | 0018,9033 | CS | | ALWAYS | AUTO | - |
| Rectilinear Phase Encode Reordering | 0018,9034 | CS | | ALWAYS | AUTO | - |
| Tag Thickness | 0018,9035 | FD | | ALWAYS | AUTO | - |
| Partial Fourier Direction | 0018,9036 | CS | | ALWAYS | AUTO | - |
| Cardiac Synchronization Technique | 0018,9037 | CS | | ALWAYS | AUTO | - |
| Transmit Coil Type | 0018,9051 | CS | | ALWAYS | AUTO | - |
| Chemical Shift Reference | 0018,9053 | FD | | ALWAYS | AUTO | - |
| MR Acquisition Frequency Encoding Steps | 0018,9058 | US | | ALWAYS | AUTO | - |
| Velocity Encoding Direction | 0018,9090 | FD | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Velocity Encoding Minimum Value | 0018,9091 | FD | | ALWAYS | AUTO | - |
| Number of k-Space Trajectories | 0018,9093 | US | | ALWAYS | AUTO | - |
| Frequency Correction | 0018,9101 | CS | | ALWAYS | AUTO | - |
| Parallel Reduction Factor out-ofplane | 0018,9155 | FD | | ALWAYS | AUTO | - |
| Parallel Reduction Factor Second In-plane | 0018,9168 | FD | | ALWAYS | AUTO | - |
| Respiratory Motion Compensation Technique | 0018,9170 | CS | | ALWAYS | AUTO | - |
| Respiratory Signal Source | 0018,9171 | CS | | ALWAYS | AUTO | - |
| Bulk Motion Compensation Technique | 0018,9172 | CS | | ALWAYS | AUTO | - |
| Applicable Safety Standard Agency | 0018,9174 | CS | | ALWAYS | AUTO | - |
| Specific Absorption Rate Definition | 0018,9179 | CS | | ALWAYS | AUTO | - |
| Gradient Output Type | 0018,9180 | CS | | ALWAYS | AUTO | - |
| Specific Absorption Rate Value | 0018,9181 | FD | | ALWAYS | AUTO | - |
| Gradient Output | 0018,9182 | FD | | ALWAYS | AUTO | - |
| Water Referenced Phase Correction | 0018,9199 | CS | | ALWAYS | AUTO | - |
| MR Spectroscopy Acquisition Type | 0018,9200 | CS | | VNAP | AUTO | - |
| MR Acquisition Phase Encoding Steps in-plane | 0018,9231 | US | | ALWAYS | AUTO | - |
| RF Echo Train Length | 0018,9240 | US | | ALWAYS | AUTO | - |
| Gradient Echo Train Length | 0018,9241 | US | | ALWAYS | AUTO | - |
| Frame Laterality | 0020,9072 | CS | | ALWAYS | AUTO | - |
| Respiratory Interval Time | 0020,9254 | FD | | ALWAYS | AUTO | - |
| Nominal Respiratory Trigger Delay Time | 0020,9255 | FD | | ALWAYS | AUTO | - |
| Number of Frames | 0028,0008 | IS | | ALWAYS | AUTO | - |
| LUT Explanation | 0028,3003 | LO | | ALWAYS | AUTO | Philips Real World Value Mapping |
| Data Point Rows | 0028,9001 | UL | | ALWAYS | AUTO | - |
| Data Point Columns | 0028,9002 | UL | | ALWAYS | AUTO | - |
| Requesting Physician | 0032,1032 | PN | | ALWAYS | AUTO | - |
| Requesting Service | 0032,1033 | LO | | ALWAYS | AUTO | - |
| Requested Procedure Description | 0032,1060 | LO | | ALWAYS | AUTO | - |
| Study Comments (retired) | 0032,4000 | LT | | ALWAYS | AUTO | Comments added on MR |
| Special Needs | 0038,0050 | LO | | ANAP | AUTO | - |
| Scheduled Performing Physician's Name | 0040,0006 | PN | | VNAP | AUTO | - |
| Performed Station AE Title | 0040,0241 | AE | | ALWAYS | AUTO | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Performed Procedure Step End Date | 0040,0250 | DA | | ALWAYS | AUTO | - |
| Performed Procedure Step End Time | 0040,0251 | TM | | ALWAYS | AUTO | - |
| Performed Procedure Step Status | 0040,0252 | CS | | ALWAYS | AUTO | |
| Film Consumption Sequence | 0040,0321 | SQ | | EMPTY | AUTO | - |
| Requested Procedure ID | 0040,1001 | SH | | ALWAYS | AUTO | - |
| Requested Procedure Comments | 0040,1400 | LT | | ALWAYS | AUTO | - |
| Imaging Service Request Comments | 0040,2400 | LT | | ALWAYS | AUTO | - |
| LUT Label | 0040,9210 | SH | | ALWAYS | AUTO | - |
| Private Creator Group 2001 | 2001,0010 | LO | | ALWAYS | AUTO | |
| Private Creator Group 2005 4 | 2005,0013 | LO | | ALWAYS | AUTO | |
| Private Creator Group 2005 (14) | 2005,0014 | LO | | ALWAYS | AUTO | |
| Private Creator Group 2005 | 2005,0015 | LO | | ALWAYS | AUTO | Applied value: Philips MR Imaging DD 006 |
| MIP protocol | 2005,101E | SH | | ALWAYS | AUTO | - |
| MPR Protocol | 2005,101F | SH | | ALWAYS | AUTO | - |
| Series Level Contrast Flag | 2005,1705 | CS | | ANAP | AUTO | - |
| Series Geo Name | 2005,1706 | LO | | ANAP | AUTO | - |
| Study Level Breath Hold Flag | 2005,1707 | CS | | ANAP | AUTO | - |
| Study Level Contrast Flag | 2005,1708 | CS | | ANAP | AUTO | - |
| Private Creator Group 2029 | 2029,0010 | LO | | ANAP | AUTO | Applied value: Philips DINxGen DD 001 |
| Study Creation Time | 2029,1001 | DT | | ANAP | AUTO | - |
| Study Level Modification Flag | 2029,1002 | CS | | ANAP | AUTO | - |
| Study Suspended Time | 2029,1003 | DT | | ANAP | AUTO | - |
| Merged Accession Number | 2029,1004 | ST | | ANAP | AUTO | - |
| Work ItemId | 2029,1005 | ST | | ANAP | AUTO | - |
| Study Contrast State | 2029,1007 | CS | | ANAP | AUTO | - |
| Merged Study Description | 2029,1009 | LT | | ANAP | AUTO | - |
| Auto Voice Information | 2029,1011 | LT | | ANAP | AUTO | - |
| Study Operator Notes | 2029,1012 | LT | | ANAP | AUTO | - |

### 8.5.1.7. Media Storage Directory SOP Class

**Table 206: Extended DICOM and private attributes for Media Storage Directory SOP Class Instances**

| Attribute Name | Tag | VR | Value | Presence of Value | Source | Comment |
|---|---|---|---|---|---|---|
| Private Creator Group 2001 | 2001,0010 | LO | | ALWAYS | AUTO | - |
| Number of Echoes | 2001,1014 | SL | | VNAP | COPY | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Number of Phases MR | 2001,1017 | SL | | VNAP | COPY | - |
| Number of Slices MR | 2001,1018 | SL | | VNAP | COPY | - |
| Reconstruction Number MR | 2001,101D | IS | | VNAP | COPY | - |
| Scanning Technique | 2001,1020 | LO | | VNAP | COPY | - |
| Echo Time Display | 2001,1025 | SH | | VNAP | COPY | - |
| Stack Sequence | 2001,105F | SQ | | VNAP | COPY | - |
| >Number of Stack Slices | 2001,102D | SS | | VNAP | COPY | - |
| >Stack Radial Angle | 2001,1032 | FL | | VNAP | COPY | - |
| >Stack Radial Axis | 2001,1033 | CS | | VNAP | COPY | - |
| >Stack Slice Number | 2001,1035 | SS | | VNAP | COPY | - |
| >Stack Type | 2001,1036 | CS | | VNAP | COPY | - |
| Examination Source | 2001,1063 | CS | | VNAP | COPY | - |
| Private Creator Group 2005 | 2005,0010 | LO | | ALWAYS | AUTO | - |
| Number of Chemical Shift | 2005,1020 | SL | | VNAP | COPY | - |
| Syncra Scan Type | 2005,10A1 | CS | | VNAP | COPY | - |

## 8.6. Private Transfer Syntaxes

The MR System does not support any private transfer syntaxes.

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