DICOM
CONFORMANCE STATEMENT
FOR
MODEL TFS-01
(MIIMS0015EAC)

CANON MEDICAL SYSTEMS CORPORATION

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1 CONFORMANCE STATEMENT OVERVIEW

This product is a self-contained networked computer system used for archiving diagnostic medical images. It allows external systems to send images to it for permanent storage, retrieve information about such images, and retrieve the images themselves. The system conforms to the DICOM standard to allow the sharing of medical information with other digital imaging systems.

Table 1.1
NETWORK SERVICES

<table>
<thead>
<tr>
<th>SOP Classes</th>
<th>User of Service (SCU)</th>
<th>Provider of Service (SCP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verification</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CT Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MR Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>XA Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RF Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>NM Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PET Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Dose Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Structure Set Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RT Plan Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Secondary Capture Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Storage Commitment Push Model</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Key Object Selection Document</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Enhanced CT Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Enhanced MR Image Storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Query/Retrieve

| Study Root Q/R - FIND | No | Yes |
| Study Root Q/R - MOVE | No | Yes |

NOTE: Relational Queries are not supported either as an SCU or SCP.
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3 INTRODUCTION

3.1. REVISION HISTORY

Table 3-1 Revision History

<table>
<thead>
<tr>
<th>REV.</th>
<th>Date</th>
<th>Author</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>*</td>
<td>November 10, 2008</td>
<td>TMSC</td>
<td>Initial Version</td>
</tr>
<tr>
<td>C</td>
<td>January 4, 2018</td>
<td>Canon Medical Systems</td>
<td>Change of company name</td>
</tr>
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</table>

3.2. AUDIENCE

This document is intended for hospital staff, health system integrators, software designers, service staff, and implementers. It is assumed that the reader has a working understanding of DICOM.

3.3. REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of the intended information.

The scope of this Conformance Statement is to facilitate communication between the product and other vendors’ Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself, this Conformance Statement does not guarantee the desired interoperability and successful interconnectivity.

The user should be aware of the following important issues:

- Comparison of the different conformance statements is the first step towards assessing the interconnectivity between the product and other equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard is evolving to meet the future requirements of users. Canon Medical Systems Corporation is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue them.

3.4. TERMS AND DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
**Application Context** – the specification of the type of communication used between Application Entities. Example: DICOM network protocol.

**Association** – a network communication channel set up between Application Entities.

**Attribute** – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

**Information Object Definition (IOD)** – the specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

**Joint Photographic Experts Group (JPEG)** – a set of standardized image compression techniques, available for use by DICOM applications.

**Media Application Profile** – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

**Module** – a set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

**Negotiation** – first phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.

**Presentation Context** – the set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.

**Protocol Data Unit (PDU)** – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

**Security Profile** – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

**Service Class Provider (SCP)** – role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

**Service Class User (SCU)** – role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

**Service/Object Pair (SOP) Class** – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

**Service/Object Pair (SOP) Instance** – an information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific x-ray image.

**Tag** – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]
Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5. BASICS OF DICOM COMMUNICATION

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two Application Entities (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (Negotiation).

DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on Roles – which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

3.6. ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Application Entity</td>
</tr>
<tr>
<td>AET</td>
<td>Application Entity Title</td>
</tr>
<tr>
<td>CR</td>
<td>Computed Radiography</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography</td>
</tr>
<tr>
<td>DICOM</td>
<td>Digital Imaging and Communications in Medicine</td>
</tr>
<tr>
<td>IE</td>
<td>Information Entity</td>
</tr>
<tr>
<td>IOD</td>
<td>Information Object Definition</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>KO</td>
<td>Key Object Selection</td>
</tr>
<tr>
<td>MR</td>
<td>Magnetic Resonance</td>
</tr>
<tr>
<td>NM</td>
<td>Nuclear Medicine</td>
</tr>
<tr>
<td>PDU</td>
<td>Protocol Data Unit</td>
</tr>
</tbody>
</table>
PET  Positron Emission Tomography
RF   Radiofluoroscopy
PR   Presentation State
RTIMAGE Radiotherapy Image
RTDOSE Radiotherapy Dose
RTPLAN Radiotherapy Plan
RTRECORD RT Treatment Record
RTSTRUCT Radiotherapy Structure Set
SC   Secondary Capture
SCP  Service Class Provider
SCU  Service Class User
SOP  Service-Object Pair
TCP/IP Transmission Control Protocol/Internet Protocol
UID  Unique Identifier
US   Ultrasound
VM   Value Multiplicity
VR   Value Representation
XA   X-Ray Angiography

3.7. REFERENCES
4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

**Figure 4.1-1**
DICOM DATA FLOW DIAGRAM
— The STORAGE-SCU AE can send Composite SOP Instances. It sends DICOM images to the specified DICOM destination.

— The QUERY-RETRIEVE-SCP AE can handle incoming query and retrieve requests. It can handle external queries for Patient, Study, Series, and Image data, and also handle Image retrieval requests. The QUERY-RETRIEVE-SCP AE handles retrieval requests by issuing a command to the STORAGE-SCU AE to send the requested Images to the destination specified by the Remote AE. The QUERY-RETRIEVE-SCP AE functions as an SCP for C-FIND and C-MOVE requests.

— The STORAGE-SCP AE can receive incoming DICOM images and add them to the database. It can respond to external Storage and Verification Requests as a Service Class Provider (SCP) for C-STORE and C-ECHO requests. The STORAGE-SCP AE can also handle Storage Commitment Push Model Requests. It can thus be used to query whether the product will confirm ownership and responsibility for specific Composite SOP Instances. The STORAGE-SCP AE currently only supports image type Composite SOP Instances.

— The ECHO-SCU AE can send verification requests to the specified DICOM destination.

4.1.2. Functional Definition of AEs

4.1.2.1. Functional Definition of STORAGE-SCU AE

The STORAGE-SCU AE can be invoked by the QUERY-RETRIEVE-SCP AE to trigger the transfer of specific images to a remote destination AE. The STORAGE-SCU AE must be correctly configured with the host and port number of any external DICOM AE's that are to be C-MOVE retrieval destinations. Some conversion of the DICOM image objects is possible if the original Presentation Context is not supported by the remote destination AE or if compression is preferred.

4.1.2.2. Functional Definition of QUERY-RETRIEVE-SCP AE

The QUERY-RETRIEVE-SCP AE waits for another application to connect at the presentation address configured for its AE Title. When another application connects, QUERY-RETRIEVE-SCP AE expects it to be a DICOM application. QUERY-RETRIEVE-SCP AE will accept Associations with Presentation Contexts for SOP Classes of the DICOM Query-Retrieve Service Class, and Verification Service Class. It will handle query and retrieve requests on these Presentation Contexts and respond with data objects with values corresponding to the contents of the database. For C-MOVE requests the destination for the image objects is determined from the Destination AE Title contained in the C-MOVE request. When a retrieval request is received, the QUERY-RETRIEVE-SCP AE issues a command to the STORAGE-SCU AE to send the specified images to the C-MOVE Destination AE.

4.1.2.3. Functional Definition of STORAGE-SCP AE

The STORAGE-SCP AE waits for another application to connect at the presentation address configured for its AE Title. When another application connects, the STORAGE-SCP AE expects it to be a DICOM application. The STORAGE-SCP AE will accept Associations with Presentation Contexts for SOP Classes of the Verification, Storage, and Storage Commitment Service Classes. Any images received on such Presentation Contexts will be added to the database. If a Storage Commitment Push Model N-ACTION Request is received then the STORAGE-COMMITMENT-SCP AE will immediately check if the referenced Composite SOP Instances are in the database and return an N-EVENT-REPORT Notification. It will never ‘cache’ Storage Commitment Push Model Requests and wait for Composite SOP Instances to be received at a later time.

4.1.2.4. Functional Definition of ECHO-SCU AE

The ECHO-SCU AE sends a C-ECHO request and wait for response. The success or failure of operation is reported to the user. The operation is performed by a service tool.
4.1.3. Sequencing of Real-World Activities

Figure 4.1-2
SEQUENCING CONSTRAINTS
4.2. AE SPECIFICATIONS

4.2.1. STORAGE-SCU AE Specification

4.2.1.1. SOP Classes

The STORAGE-SCU AE provides Standard Conformance to the following DICOM V3.0 SOP Classes:

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.6.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
<td>1.2.840.10008.5.1.4.1.1.3.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>CT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>MR Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.4</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>XA Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.12.1</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>RF Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.12.2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>NM Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.120</td>
<td>Yes</td>
<td>No</td>
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<td>PET Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.128</td>
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<td>No</td>
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<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
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<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
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<td>No</td>
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<tr>
<td>RT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>RT Dose Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.2</td>
<td>Yes</td>
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<tr>
<td>RT Structure Set Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.3</td>
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<tr>
<td>RT Beams Treatment Record Storage</td>
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<td>RT Treatment Summary Record Storage</td>
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<td>RT Plan Storage</td>
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<td>Secondary Capture Image Storage</td>
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<td>Grayscale Softcopy Presentation State Storage</td>
<td>1.2.840.10008.5.1.4.1.1.11.1</td>
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<td>No</td>
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<td>Key Object Selection Document</td>
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<td>Enhanced CT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.2.1</td>
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<td>No</td>
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<td>Enhanced MR Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.4.1</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

4.2.1.2. Association Establishment Policies

4.2.1.2.1. General

The STORAGE-SCU AE can only form Associations when requested to do so by the QUERY-RETRIEVE-SCP AE. The STORAGE-SCU AE can only request the opening of an Association. It cannot accept requests to open Associations from external Application Entities.

The DICOM standard Application Context Name for DICOM is always proposed:
**Table 4.2-2**

| Application Context Name | 1.2.840.10008.3.1.1.1 |

**4.2.1.2.2. Number of Associations**

The maximum number of simultaneous Associations is configurable, but is usually limited to a maximum of 15. This configuration largely depends on whether relatively quick response to multiple simultaneous C-MOVE Destination AE’s is required or maximum throughput performance is required. If the latter is the case, then no simultaneous Associations are permitted, in order to reduce disk thrashing and thus maximize throughput. The STORAGE-SCU AE can initiate simultaneous Associations to a given external C-MOVE Destination AE up to the maximum number configured. There is no separate limit on the maximum number permitted to the same C-MOVE Destination AE.

If the first attempt to open an Association fails then the STORAGE-SCU AE will reschedule the task to attempt it again after a configurable time delay. The number of times to reattempt Association establishment is configurable, with the default being 1.

**Table 4.2-3**

| Maximum number of simultaneous Associations | 2 (Configurable) |

**4.2.1.2.3. Asynchronous Nature**

The STORAGE-SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association). All Association requests must be completed and acknowledged before a new operation can be initiated.

**Table 4.2-4**

| Maximum number of outstanding asynchronous transactions | 1 |

**4.2.1.2.4. Implementation Identifying Information**

**Table 4.2-5**

| Implementation Class UID | 1.2.392.200036.9116.7.28.1 |
| Implementation Version Name | TMSCR_TFS_1.0 |

Note that the STORAGE-SCU AE and QUERY-RETRIEVE-SCP AE use the same Implementation Class UID. All the product AE’s use the same Implementation Version Name. This Version Name is updated with each new release of the product software, as the different AE versions are never released independently.

**4.2.1.3. Association Initiation Policy**

**4.2.1.3.1. Activity – Send Images Requested by an External Peer AE**

**4.2.1.3.1.1. Description and Sequencing of Activity**

The STORAGE-SCU AE will initiate a new Association when the QUERY-RETRIEVE-SCP AE invokes the STORAGE-SCU AE to transmit images. The QUERY-RETRIEVE-SCP AE will issue such a command whenever it receives a valid C-MOVE Request. An Association Request is sent to
the specified C-MOVE Destination AE and upon successful negotiation of the required Presentation Context the image transfer is started. In all cases an attempt will be made to transmit all the indicated images in a single Association, but this may not always be possible. The Association will be released when all the images have been sent. If an error occurs during transmission over an open Association then the image transfer is halted. The STORAGE-SCU AE will not attempt to independently retry the image export.

Note that the STORAGE-SCU AE does not support the unsolicited sending of SOP Instances using the DICOM Storage Service Class. It will only send SOP Instances in response to a C-MOVE Request from a peer AE.

The following sequencing constraints illustrated in Figure 4.2-1 apply to the STORAGE-SCU AE:

1. Peer AE requests retrieval of Study, Series, or Images from QUERY-RETRIEVE-SCP AE (C-MOVE-RQ).
2. QUERY-RETRIEVE-SCP AE signals STORAGE-SCU AE to send the image Composite SOP Instances indicated in the C-MOVE-RQ to the C-MOVE Destination AE.
3. STORAGE-SCU AE opens a new Association with the indicated C-MOVE Destination AE.
4. STORAGE-SCU AE sends the indicated Composite SOP Instances.
5. STORAGE-SCU AE closes the Association.
6. The Verification Service is only supported as a utility function for Service staff. It is used only as a diagnostic tool.

### 4.2.1.3.1.2. Proposed Presentation Contexts

STORAGE-SCU AE will propose Presentation Contexts as shown in the following table:

| Table 4.2-6 | PROPOSED PRESENTATION CONTEXTS BY THE STORAGE-SCU AE |

Figure 4.2-1
SEQUENCING OF ACTIVITY - SEND IMAGES REQUESTED BY AN EXTERNAL PEER AE
<table>
<thead>
<tr>
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<th>UID</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext. Neg.</th>
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<td>DICOM Implicit VR Little Endian</td>
<td>SCU</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage 1.2.840.10008.5.1.4.1.1.4</td>
<td>DICOM Explicit VR</td>
<td>81.7</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>81.7 Big Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.4</td>
<td>DICOM Implicit VR</td>
<td>81.5</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>81.5 Little Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.4</td>
<td>DICOM Explicit VR</td>
<td>81.5</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>81.5 Big Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.4</td>
<td>DICOM Explicit VR</td>
<td>81.5</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>81.5 Big Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage 1.2.840.10008.5.1.4.1.1.1</td>
<td>DICOM Implicit VR</td>
<td>1.1</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>1.1 Little Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage 1.2.840.10008.5.1.4.1.1.1</td>
<td>DICOM Explicit VR</td>
<td>1.1</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>1.1 Big Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Object Selection Document 1.2.840.10008.5.1.4.1.1.8</td>
<td>DICOM Implicit VR</td>
<td>8.59</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>8.59 Little Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Object Selection Document 1.2.840.10008.5.1.4.1.1.8</td>
<td>DICOM Explicit VR</td>
<td>8.59</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>8.59 Big Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced CT Image Storage 1.2.840.10008.5.1.4.1.1.2</td>
<td>DICOM Implicit VR</td>
<td>1.2</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>.1 Little Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced MR Image Storage 1.2.840.10008.5.1.4.1.1.4</td>
<td>DICOM Implicit VR</td>
<td>1.2</td>
<td>SCU None</td>
<td></td>
</tr>
<tr>
<td>.1 Little Endian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2.1.3.1.3. **SOP Specific Conformance for Verification SOP Class**

Standard conformance is provided to the DICOM Verification Service Class as an SCU. The Verification Service as an SCU is actually only supported as a diagnostic service tool for network communication issues.

4.2.1.3.1.4. **SOP Specific Conformance for Image SOP Classes**

The STORAGE-SCU AE will exhibit the following Behavior according to the Status Code value returned in a C-STORE Response from a destination C-STORE SCP:

**Table 4.2-7**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>Success indication message is output to the Service Logs. No message is posted to the User Interface</td>
</tr>
<tr>
<td>Error</td>
<td>Cannot Understand</td>
<td>CXXX</td>
<td>Several retries are performed, but if errors continue to be detected, it is considered as a permanent failure. The association is terminated when the error occurs. A failure message is output to the Service Log. No messages are sent to the user interface.</td>
</tr>
<tr>
<td>Error</td>
<td>Failure</td>
<td>Status codes other than the above</td>
<td>Several retries are performed, but if errors continue to be detected, it is considered as a permanent failure. The association is terminated when the error occurs. A failure message is output to the Service Log. No messages are sent to the user interface.</td>
</tr>
</tbody>
</table>

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

**Table 4.2-8**

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout expiry for an expected DICOM Message Response (DIMSE level timeout).</td>
<td>The Association is aborted using a DICOM A-ABORT and a message is sent to the QUERY-RETRIEVE-SCP AE indicating an export failure. The QUERY-RETRIEVE-SCP AE will send an appropriate Status in the C-MOVE Response. Error indication message is output to the Service Logs. No message is posted to the User Interface.</td>
</tr>
<tr>
<td>Timeout expiry for an expected DICOM PDU or TCP/IP packet (Low-level timeout).</td>
<td>The Association is aborted using a DICOM A-ABORT and a message is sent to the QUERY-RETRIEVE-SCP AE indicating an export failure. The QUERY-RETRIEVE-SCP AE will send an appropriate Status in the C-MOVE Response. Error indication message is output to the Service Logs. No message is posted to the User Interface.</td>
</tr>
<tr>
<td>Association A-ABORTed by the SCP or the network layers indicate communication loss (i.e. low-level TCP/IP socket closure)</td>
<td>A message is sent to the QUERY-RETRIEVE-SCP AE indicating an export failure. The QUERY-RETRIEVE-SCP AE will send an appropriate Status in the C-MOVE Response.</td>
</tr>
</tbody>
</table>
4.2.1.4. Association Acceptance Policy  
The STORAGE-SCU AE does not accept Associations.

4.2.2. ECHO-SCU AE Specifications  
4.2.2.1. SOP Class  
The ECHO-SCU AE provides Standard Conformance to the following DICOM SOP classes:

<table>
<thead>
<tr>
<th>SOP Class</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification</td>
<td>1.2.840.10008.1.1</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

4.2.2.2. Association Establishment Policies  
4.2.2.2.1. General  
The ECHO-SCU AE can form associations via diagnostic service tool. The ECHO-SCU AE can only request the starting of an association. It cannot accept association start requests from external application entities. The DICOM Standard Application Context Names for DICOM is always accepted.

<table>
<thead>
<tr>
<th>Application Context Name</th>
<th>SOP Class UID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2.840.10008.3.1.1.1</td>
</tr>
</tbody>
</table>

4.2.2.2.2. Number of Associations  
The maximum number of simultaneous Associations is configurable, but is usually limited to a maximum of 15.

| Maximum Number of Simultaneous Associations | 2 (Configurable) |

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

| Maximum Number of Outstanding Asynchronous Transactions | 1 |
4.2.2.4. Implementation Identification Information

Table 4.2-13
DICOM IMPLEMENTATION CLASS AND VERSION FOR ECHO-SCU AE

<table>
<thead>
<tr>
<th>Implementation Class UID</th>
<th>Implementation Version Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.392.200036.9116.7.28.1</td>
<td>TMSCR_TFS_1.0</td>
</tr>
</tbody>
</table>

All the product AEs have the same implementation version name. This version name is updated with each new software release; therefore, independent releases of different AE versions will not occur.

4.2.2.3. Association Initiation Policy

4.2.2.3.1. Activity - Verify Connectivity

4.2.2.3.1.1. Destination and Sequencing of Activity
The ECHO-SCU AE initiates association through user control.

![Figure 4.2-2](SEQUENCING OF ACTIVITY – ECHO)

The following sequencing restrictions, illustrated in figure 4.2-2, apply when the ECHO-SCU AE:

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

4.2.2.3.1.2. Proposed Presentation Context
The ECHO-SCU AE is capable of proposing the Presentation Contexts shown in the following table:

Table 4.2-14
PROPOSED PRESENTATION CONTEXTS BY THE ECHO-SCU AE

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Extended Negotiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>UID</td>
<td>Name</td>
<td>UID</td>
</tr>
<tr>
<td>Verification</td>
<td>1.2.840.10008.1.1</td>
<td>Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
</tbody>
</table>
4.2.2.3.1.3. SOP Specific Conformance for Verification SOP Class

The product monitors the status, and service log files can be used to diagnose problems that may occur. If an error occurs in DICOM transmission, an appropriate message will be entered into the service log.

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

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Detailed Meaning</th>
<th>Error Code</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>No message is posted to the User Interface.</td>
</tr>
<tr>
<td>Error</td>
<td>Cannot Understand</td>
<td>CXXX</td>
<td>Several retries are performed, but if errors continue to be detected, it is considered as a permanent failure. The association is terminated when the error occurs. A failure message is output to the Service Log. No messages are sent to the user interface.</td>
</tr>
<tr>
<td>Error</td>
<td>Failure</td>
<td>Status codes other than the above</td>
<td>Several retries are performed, it is considered as a permanent failure. The association is terminated when the error occurs. A failure message is output to the Service Log. No messages are sent to the user interface.</td>
</tr>
</tbody>
</table>

4.2.2.4. Association Acceptance Policy

The ECHO-SCU AE does not accept associations.
4.2.3. QUERY-RETRIEVE-SCP AE Specification

4.2.3.1. SOP Classes

The QUERY-RETRIEVE-SCP AE provides Standard Conformance to the following DICOM V3.0 SOP Classes:

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Root Q/R Information Model - FIND</td>
<td>1.2.840.10008.5.1.4.1.2.2.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Study Root Q/R Information Model - MOVE</td>
<td>1.2.840.10008.5.1.4.1.2.2.2</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### 4.2.3.2. Association Policies

#### 4.2.3.2.1. General

The DICOM standard Application Context Name for DICOM 3.0 is always accepted:

<table>
<thead>
<tr>
<th>DICOM APPLICATION CONTEXT FOR QUERY-RETRIEVE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Context Name</td>
</tr>
</tbody>
</table>

#### 4.2.3.2.2. Number of Associations

The QUERY-RETRIEVE-SCP AE can support up 15 Associations at a time

<table>
<thead>
<tr>
<th>NUMBER OF SIMULTANEOUS ASSOCIATIONS AS A SCP FOR QUERY-RETRIEVE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of simultaneous Associations</td>
</tr>
</tbody>
</table>

#### 4.2.3.2.3. Asynchronous Nature

The QUERY-RETRIEVE-SCP AE does not support asynchronous communication (multiple outstanding transactions over a single Association). All Association requests must be completed and acknowledged before a new operation can be initiated.

<table>
<thead>
<tr>
<th>ASYNCHRONOUS NATURE AS A SCP FOR QUERY-RETRIEVE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of outstanding asynchronous transactions</td>
</tr>
</tbody>
</table>

#### 4.2.3.2.4. Implementation Identifying Information

The implementation information for the AE is:

<table>
<thead>
<tr>
<th>DICOM IMPLEMENTATION CLASS AND VERSION FOR QUERY-RETRIEVE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Class UID</td>
</tr>
<tr>
<td>Implementation Version Name</td>
</tr>
</tbody>
</table>

4.2.3.3. Association Initiation Policy

The QUERY-RETRIEVE-SCP AE does not initiate Associations.
4.2.3.4. Association Acceptance Policy

4.2.3.4.1. Activity – Handling Query and Retrieval Requests

4.2.3.4.1.1. Description and Sequencing of Activity

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

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

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

![Sequential diagram](image-url)

**Figure 4.2-3**

**SEQUENCING OF ACTIVITY – HANDLING QUERY AND RETRIEVAL REQUESTS**

The following sequencing constraints illustrated in Figure 4.2-3 apply to the QUERY-RETRIEVE-SCP AE for handling queries (C-FIND-Requests):

1. Peer AE opens an Association with the QUERY-RETRIEVE-SCP AE.
2. Peer AE sends a C-FIND-RQ Message
3. QUERY-RETRIEVE-SCP AE returns a C-FIND-RSP Message to the peer AE with matching information. A C-FIND-RSP is sent for each entity matching the identifier specified in the C-FIND-RQ. A final C-FIND-RSP is sent indicating that the matching is complete.
4. Peer AE closes the Association. Note that the peer AE does not have to close the Association immediately. Further C-FIND or C-MOVE Requests can be sent over the Association before it is closed.

The following sequencing constraints illustrated in Figure 4.2-3 apply to the QUERY-RETRIEVE-SCP AE for handling retrievals (C-MOVE-Requests):

1. Peer AE opens an Association with the QUERY-RETRIEVE-SCP AE.
2. Peer AE sends a C-MOVE-RQ Message
3. QUERY-RETRIEVE-SCP AE notifies the STORAGE-SCU AE to send the Composite SOP Instances to the peer C-MOVE Destination AE as indicated in the C-MOVE-RQ.
4. After attempting to send a SOP Instance, the STORAGE-SCU AE indicates to the QUERY-RETRIEVE-SCP AE whether the transfer succeeded or failed. The QUERY-RETRIEVE-SCP AE then returns a C-MOVE-RSP indicating this success or failure.
5. Once the STORAGE-SCU AE has completed all attempts to transfer the SOP Instances to the C-MOVE Destination AE, or the first failure occurred, the QUERY-RETRIEVE-SCP AE sends a final C-MOVE-RSP indicating the overall success or failure of the retrieval.
6. Peer AE closes the Association. Note that the peer AE does not have to close the Association immediately. Further C-FIND or C-MOVE Requests can be sent over the Association before it is closed.

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

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

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diag</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – rejected-transient</td>
<td>c</td>
<td>2 – local-limit-exceeded</td>
<td>The (configurable) maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.</td>
</tr>
<tr>
<td>2 – rejected-transient</td>
<td>c</td>
<td>1 – temporary-congestion</td>
<td>Out of System resources.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>a</td>
<td>2 – application-context-name-not-supported</td>
<td>The Association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>a</td>
<td>7 – called-AE-title-not-recognized</td>
<td>The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.</td>
</tr>
</tbody>
</table>
| 1 – rejected-permanent | a      | 3 – calling-AE-title-not-recognized | The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the
4.2.3.4.1.2. Accepted Presentation Contexts

QUERY-RETRIEVE-SCP AE will accept Presentation Contexts as shown in the following table:

<table>
<thead>
<tr>
<th>Accepted Presentation Contexts by the QUERY-RETRIEVE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Study Root Q/R Information Model - FIND</td>
</tr>
<tr>
<td>Study Root Q/R Information Model - MOVE</td>
</tr>
</tbody>
</table>

4.2.3.4.1.3. SOP Specific Conformance for Query SOP Classes

The QUERY-RETRIEVE-SCP AE supports hierarchical queries and not relational queries. Those attributes requested in the query identifier are returned.

Study Root Information Model

All the required search keys on each of the three levels (Study, Series, and Image) are supported.
### Table 4.2-23

<table>
<thead>
<tr>
<th>Level Name</th>
<th>Tag</th>
<th>VR</th>
<th>Types of Matching</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOP Common</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Character Set</td>
<td>0008,0005</td>
<td>CS</td>
<td>NONE</td>
</tr>
<tr>
<td><strong>Study Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient's Name</td>
<td>0010,0010</td>
<td>PN</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Patient ID</td>
<td>0010,0020</td>
<td>LO</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Patient's Birth Date</td>
<td>0010,0030</td>
<td>DA</td>
<td>S,U</td>
</tr>
<tr>
<td>Patient's Sex</td>
<td>0010,0040</td>
<td>CS</td>
<td>S,U</td>
</tr>
<tr>
<td>Patient's Comments</td>
<td>0010,4000</td>
<td>LT</td>
<td>NONE</td>
</tr>
<tr>
<td>Study Date</td>
<td>0008,0020</td>
<td>TM</td>
<td>S,R,*,U</td>
</tr>
<tr>
<td>Study Time</td>
<td>0008,0030</td>
<td>SH</td>
<td>R,*,U</td>
</tr>
<tr>
<td>Accession Number</td>
<td>0008,0050</td>
<td>SH</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Modality in Study</td>
<td>0008,0061</td>
<td>CS</td>
<td>S,U,L</td>
</tr>
<tr>
<td>Study Description</td>
<td>0008,1030</td>
<td>LO</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Study ID</td>
<td>0020,0010</td>
<td>SH</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Study Instance UID</td>
<td>0020,000D</td>
<td>UI</td>
<td>S,U,L</td>
</tr>
<tr>
<td><strong>Series Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modality</td>
<td>0008,0060</td>
<td>CS</td>
<td>S,U</td>
</tr>
<tr>
<td>Series Number</td>
<td>0020,0011</td>
<td>IS</td>
<td>S,*,U</td>
</tr>
<tr>
<td>Series Instance UID</td>
<td>0020,000E</td>
<td>UI</td>
<td>S,U,L</td>
</tr>
<tr>
<td><strong>Image Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instance Number</td>
<td>0020,0013</td>
<td>IS</td>
<td>S,*,U</td>
</tr>
<tr>
<td>SOP Instance UID</td>
<td>0008,0018</td>
<td>UI</td>
<td>S,U,L</td>
</tr>
</tbody>
</table>

The tables should be read as follows:

- **Attribute Name**: Attributes supported for returned C-FIND Responses.
- **Tag**: Appropriate DICOM tag for this attribute.
- **VR**: Appropriate DICOM VR for this attribute.
- **Types of Matching**: The types of Matching supported by the C-FIND SCP. A "S" indicates the identifier attribute can specify Single Value Matching, a "R" will indicate Range Matching, a "*" will denote wildcard matching, an 'U' will indicate universal matching, and 'L' will indicate that UID lists are supported for matching. "NONE" indicates that no matching is supported, but that values for this Element in the database can be returned.
### Table 4.2-24
**QUERY-RETRIEVE-SCP AE C-FIND RESPONSE STATUS RETURN BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>Matching is complete. No final identifier is supplied.</td>
</tr>
<tr>
<td>Refused</td>
<td>Out of Resources</td>
<td>A700</td>
<td>Out of System resources.</td>
</tr>
<tr>
<td>Failed</td>
<td>Identifier does not match SOP Class</td>
<td>A900</td>
<td>The C-FIND query identifier contains invalid Elements or values, or is missing mandatory Elements or values for the specified SOP Class. Error message is output to the Service Log.</td>
</tr>
<tr>
<td></td>
<td>Unable to process</td>
<td>C001</td>
<td>The C-FIND query identifier is valid for the specified SOP Class but cannot be used to query the database. Error message is output to the Service Log.</td>
</tr>
<tr>
<td>Pending</td>
<td>Matches are continuing and current match is supplied.</td>
<td>FF00</td>
<td>Indicates that the search for further matches is continuing. This is returned when each successful match is returned and when further matches are orthcoming. This status code is returned if all Optional keys in the query identifier are actually supported.</td>
</tr>
</tbody>
</table>

### 4.2.3.4.1.4. SOP Specific Conformance for Retrieval SOP Classes

The QUERY-RETRIEVE-SCP AE will convey to the STORAGE-SCU AE that an Association with a DICOM AE named by the external C-MOVE SCU (through a MOVE Destination AE Title) should be established. It will also convey to the STORAGE-SCU AE to perform C-STORE operations on specific images requested by the external C-MOVE SCU. One or more of the Image Storage Presentation Contexts listed in table 4.2-6 will be negotiated.

An initial C-MOVE Response is always sent after confirming that the C-MOVE Request itself can be processed. After this, the QUERY-RETRIEVE-SCP AE will return a response to the C-MOVE SCU after the STORAGE-SCU AE has attempted to send each image.

### Table 4.2-25
**QUERY-RETRIEVE-SCP AE C-MOVE RESPONSE STATUS RETURN BEHAVIOR**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Sub-operations complete – No Failures</td>
<td>0000</td>
<td>All the Composite SOP Instances have been successfully sent to the C-MOVE Destination AE.</td>
</tr>
<tr>
<td>Refused</td>
<td>Out of Resources – Unable to calculate number of matches</td>
<td>A701</td>
<td>Number of matches cannot be determined due to system failure. Error message is output to the Service Log.</td>
</tr>
<tr>
<td></td>
<td>Out of Resources – Unable to perform sub-operations</td>
<td>A702</td>
<td>C-STORE sub-operations cannot be performed due to failure to access Composite SOP Instances in archive, or failure of a C-STORE Request. Error message is output to the Service Log.</td>
</tr>
</tbody>
</table>
Move destination unknown  | A801 | The Destination AE named in the C-MOVE Request is unknown to Query-Retrieve SCP AE. Error message is output to the Service Log.

Failed  | Identifier does not match SOP Class  | A900 | The C-MOVE identifier contains invalid Elements or values, or is missing mandatory Elements or values for the specified SOP Class or retrieval level. Error message is output to the Service Log.

Warning  | Suboperations Complete – One or more Failures  | B000 | Image transmission is considered successful. It will send the appropriate PENDING or SUCCESS Status in the C-MOVE Response. Warning message is output to the Service Log.

Pending  | Sub-operations are continuing  | FF00 | A Response with this Status Code is sent every time a Composite SOP Instance has been successfully sent to the C-MOVE Destination AE.

### Table 4.2-26
**QUERY-RETRIEVE-SCP AE COMMUNICATION FAILURE BEHAVIOR**

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout expiry for an expected DICOM Message Request (DIMSE level timeout). I.e. The QUERY-RETRIEVE-SCP AE is waiting for the next C-FIND or C-MOVE Request on an open Association but the timer expires.</td>
<td>The Association is aborted by issuing a DICOM A-ABORT. Error message is output to the Service Log.</td>
</tr>
<tr>
<td>Timeout expiry for an expected DICOM PDU or TCP/IP packet (Low-level timeout). I.e. The QUERY-RETRIEVE-SCP AE is waiting for the next message PDU but the timer expires.</td>
<td>The Association is aborted by issuing a DICOM A-ABORT. Error message is output to the Service Log.</td>
</tr>
<tr>
<td>Association aborted by the SCU or the network layers indicate communication loss (i.e. low-level TCP/IP socket closure)</td>
<td>Error message is output to the Service Log.</td>
</tr>
</tbody>
</table>

### 4.2.4. STORAGE-SCP AE Specification

#### 4.2.4.1. SOP Classes

The STORAGE-SCP AE provides Standard Conformance to the following DICOM V3.0 SOP Classes:

### Table 4.2-27
**SOP CLASSES FOR STORAGE-SCP AE**

<table>
<thead>
<tr>
<th>SOP Class Name</th>
<th>SOP Class UID</th>
<th>SCU</th>
<th>SCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification</td>
<td>1.2.840.10008.1.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Storage Commitment Push Model</td>
<td>1.2.840.10008.1.20.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>US Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.6.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
<td>1.2.840.10008.5.1.4.1.1.3.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.1</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.2</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>MR Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.4</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>XA Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.12.1</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
**4.2.4.2. Association Policies**

**4.2.4.2.1. General**

The STORAGE-SCP AE can both accept and propose Association Requests. The STORAGE-SCP AE will accept Association Requests for the Verification, Storage, and Storage Commitment Push Model Services. It will propose Associations only for the Storage Commitment Push Model Service.

The DICOM standard Application Context Name for DICOM 3.0 is always accepted and proposed:

<table>
<thead>
<tr>
<th>DICOM APPLICATION CONTEXT FOR STORAGE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Context Name</td>
</tr>
<tr>
<td>1.2.840.10008.3.1.1.1</td>
</tr>
</tbody>
</table>

**4.2.4.2.2. Number of Associations**

The STORAGE-SCP AE can support up 5 Associations at a time.

The STORAGE-SCP AE initiates one Association at a time for sending Storage Commitment Push Model N-EVENT-REPORTs to peer AEs.

<table>
<thead>
<tr>
<th>NUMBER OF SIMULTANEOUS ASSOCIATIONS AS AN SCP FOR STORAGE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of simultaneous Associations requested by peer AEs</td>
</tr>
<tr>
<td>Maximum number of simultaneous Associations proposed by STORAGE-SCP AE</td>
</tr>
</tbody>
</table>
4.2.4.2.3. Asynchronous Nature

The STORAGE-SCP AE does not support asynchronous communication (multiple outstanding transactions over a single Association). The STORAGE-SCP AE does permit an SCU to send multiple Storage Commitment Push Model Requests before it has sent back any N-EVENT-REPORT Notifications. However, the STORAGE-SCP AE must send an N-ACTION Response before permitting another N-ACTION Request to be received so the DICOM communication itself is not truly asynchronous.

<table>
<thead>
<tr>
<th>Table 4.2-30</th>
<th>ASYNCHRONOUS NATURE AS A SCP FOR STORAGE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of outstanding asynchronous transactions</td>
<td>1 (Not Configurable)</td>
</tr>
</tbody>
</table>

There is no limit on the number of outstanding Storage Commitment Push Model Requests that can be received and acknowledged before the STORAGE-SCP AE has responded with the corresponding N-EVENT-REPORT Notifications.

<table>
<thead>
<tr>
<th>Table 4.2-31</th>
<th>OUTSTANDING STORAGE COMMITMENT PUSH MODEL REQUESTS FOR STORAGE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of outstanding Storage Commitment Requests for which no N-EVENT Notification has been sent</td>
<td>No Maximum Limit</td>
</tr>
</tbody>
</table>

4.2.4.2.4. Implementation Identifying Information

The implementation information for this AE is:

<table>
<thead>
<tr>
<th>Table 4.2-32</th>
<th>DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCP AE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Class UID</td>
<td>1.2.392.200036.9116.7.28.1</td>
</tr>
<tr>
<td>Implementation Version Name</td>
<td>TMSCR_TFS_1.0</td>
</tr>
</tbody>
</table>

4.2.4.3. Association Initiation Policy

4.2.4.3.1. Activity – Send Storage Commitment Notification over new Association

4.2.4.3.1.1. Description and Sequencing of Activity

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

The STORAGE-SCP AE always open a new Association before sending a Storage Commitment Push Model Notifications (N-EVENT-REPORT), in which case the sequencing illustrated in Figure 4.2-4 will always be followed.
The following sequencing constraints illustrated in Figure 4.2-4 apply to the STORAGE-SCP AE for handling Storage Commitment Push Model Requests using a new Association:

1. Peer AE opens an Association with the STORAGE-SCP AE.
2. Peer AE sends zero or more Composite SOP Instances.
3. Peer AE requests Storage Commitment of Composite SOP Instance(s) (peer sends N-ACTION-RQ and STORAGE-SCP AE responds with N-ACTION-RSP to indicate that it received the request).
4. Peer AE closes the Association before the STORAGE-SCP AE can successfully send the Storage Commitment Push Model Notification (N-EVENT-REPORT-RQ).
5. STORAGE-SCP AE opens an Association with the peer AE.
6. STORAGE-SCP AE sends Storage Commitment Push Model Notification (N-EVENT-REPORT). More than one can be sent over a single Association if multiple Notifications are outstanding.
7. STORAGE-SCP AE closes the Association with the peer AE.

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

- a – DICOM UL service-user
- b – DICOM UL service-provider (ASCE related function)
- c – DICOM UL service-provider (Presentation related function)
Table 4.2-33

ASSOCIATION REJECTION REASONS

<table>
<thead>
<tr>
<th>Result</th>
<th>Source</th>
<th>Reason/Diag</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – rejected-transient</td>
<td>c</td>
<td>2 – local-limit-exceeded</td>
<td>The (configurable) maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.</td>
</tr>
<tr>
<td>2 – rejected-transient</td>
<td>c</td>
<td>1 – temporary-congestion</td>
<td>Out of System resources.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>a</td>
<td>2 – application-context-name-not-supported</td>
<td>The Association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>a</td>
<td>7 – called-AE-title-not-recognized</td>
<td>The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>a</td>
<td>3 – calling-AE-title-not-recognized</td>
<td>The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the Association initiator.</td>
</tr>
<tr>
<td>1 – rejected-permanent</td>
<td>b</td>
<td>1 – no-reason-given</td>
<td>The Association request could not be parsed. An Association request with the same format will not succeed at a later time.</td>
</tr>
</tbody>
</table>

4.2.4.3.1.2. Accepted Presentation Contexts

The default Behavior of the Storage SCP AE supports the Implicit VR Little Endian and Explicit VR Big Endian and Explicit VR Little Endian Transfer Syntaxes.

If the both Transfer Syntaxes are proposed per Presentation Context then the Storage SCP AE will select Explicit VR Big Endian Transfer Syntax.

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

Table 4.2-34

ACCEPTED PRESENTATION CONTEXTS BY THE STORAGE-SCP AE

<table>
<thead>
<tr>
<th>Presentation Context Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Verification</td>
</tr>
<tr>
<td>US Image Storage</td>
</tr>
<tr>
<td>US Image Storage</td>
</tr>
<tr>
<td>US Image Storage</td>
</tr>
<tr>
<td>Presentation Context Table</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td><strong>Abstract Syntax</strong></td>
</tr>
<tr>
<td>US Image Storage</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
</tr>
<tr>
<td>CT Image Storage</td>
</tr>
<tr>
<td>CT Image Storage</td>
</tr>
<tr>
<td>CT Image Storage</td>
</tr>
<tr>
<td>CT Image Storage</td>
</tr>
<tr>
<td>MR Image Storage</td>
</tr>
<tr>
<td>MR Image Storage</td>
</tr>
<tr>
<td>MR Image Storage</td>
</tr>
<tr>
<td>MR Image Storage</td>
</tr>
<tr>
<td>Secondary Capture Image Storage</td>
</tr>
<tr>
<td>Secondary</td>
</tr>
<tr>
<td>Capture Image Storage</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Secondary Capture Image Storage</td>
</tr>
<tr>
<td>XA Image Storage</td>
</tr>
<tr>
<td>XA Image Storage</td>
</tr>
<tr>
<td>XA Image Storage</td>
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<tr>
<td>XA Image Storage</td>
</tr>
<tr>
<td>RF Image Storage</td>
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<tr>
<td>RF Image Storage</td>
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<tr>
<td>RF Image Storage</td>
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<tr>
<td>RF Image Storage</td>
</tr>
<tr>
<td>NM Image Storage</td>
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<tr>
<td>NM Image Storage</td>
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<tr>
<td>NM Image Storage</td>
</tr>
<tr>
<td>NM Image Storage</td>
</tr>
<tr>
<td>PET Image Storage</td>
</tr>
<tr>
<td>PET Image Storage</td>
</tr>
<tr>
<td>PET Image Storage</td>
</tr>
<tr>
<td>PET Image Storage</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Endian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Endian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lossless, Non-Hierarchical, First-Order Prediction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation Context Table</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Abstract Syntax</strong></td>
<td><strong>Transfer Syntax</strong></td>
<td><strong>Role</strong></td>
<td><strong>Ext.</strong></td>
</tr>
<tr>
<td>For Presentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.1</td>
<td>DICOM JPEG Lossless, Non-Hierarchical, First-Order Prediction</td>
<td>1.2.840.10008.1.2.4.70</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.2</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.2</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.2</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.2</td>
<td>DICOM JPEG Lossless, Non-Hierarchical, First-Order Prediction</td>
<td>1.2.840.10008.1.2.4.70</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.3</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.3</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.3</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td>1.2.840.10008.5.1.4.1.1.1.3</td>
<td>DICOM JPEG Lossless, Non-Hierarchical, First-Order Prediction</td>
<td>1.2.840.10008.1.2.4.70</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
</tr>
<tr>
<td>RT Image Storage</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>DICOM JPEG Lossless, Non-Hierarchical, First-Order Prediction</td>
<td>1.2.840.10008.1.2.4.70</td>
</tr>
<tr>
<td>RT Dose</td>
<td>1.2.840.10008.5.1.4.1.1.481.1</td>
<td>DICOM Implicit VR</td>
<td>1.2.840.10008.1.2</td>
</tr>
<tr>
<td>Abstract Syntax</td>
<td>Transfer Syntax</td>
<td>Role</td>
<td>Ext.</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td>Storage 2</td>
<td>Little Endian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Dose Storage 1.2.840.10008.5.1.4.1.1.481.2</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Dose Storage 1.2.840.10008.5.1.4.1.1.481.2</td>
<td>DICOM Explicit VR Little Endian 1.2.840.10008.1.2.2</td>
<td>SCP</td>
<td>None</td>
</tr>
<tr>
<td>RT Structure Set Storage 1.2.840.10008.5.1.4.1.1.481.3</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Structure Set Storage 1.2.840.10008.5.1.4.1.1.481.3</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Structure Set Storage 1.2.840.10008.5.1.4.1.1.481.3</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage 1.2.840.10008.5.1.4.1.1.481.4</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage 1.2.840.10008.5.1.4.1.1.481.4</td>
<td>DICOM Explicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage 1.2.840.10008.5.1.4.1.1.481.4</td>
<td>DICOM Explicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage 1.2.840.10008.5.1.4.1.1.481.7</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage 1.2.840.10008.5.1.4.1.1.481.7</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage 1.2.840.10008.5.1.4.1.1.481.7</td>
<td>DICOM Implicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.481.5</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.481.5</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>RT Plan Storage 1.2.840.10008.5.1.4.1.1.481.5</td>
<td>DICOM Implicit VR Big Endian</td>
<td>1.2.840.10008.1.2.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage 1.2.840.10008.5.1.4.1.1.11.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage 1.2.840.10008.5.1.4.1.1.11.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Key Object Selection Document 1.2.840.10008.5.1.4.1.1.88.5</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Key Object Selection Document 1.2.840.10008.5.1.4.1.1.88.5</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2.1</td>
<td>SCP</td>
</tr>
<tr>
<td>Enhanced CT Image Storage 1.2.840.10008.5.1.4.1.1.2.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Enhanced MR Image Storage 1.2.840.10008.5.1.4.1.1.4.1</td>
<td>DICOM Implicit VR Little Endian</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
<tr>
<td>Storage 1.2.840.10008.1.20.1</td>
<td>DICOM Implicit VR</td>
<td>1.2.840.10008.1.2</td>
<td>SCP</td>
</tr>
</tbody>
</table>
### Presentation Context Table

<table>
<thead>
<tr>
<th>Abstract Syntax</th>
<th>Transfer Syntax</th>
<th>Role</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment Push Model</td>
<td>Little Endian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Commitment Push Model</td>
<td>DICOM Explicit VR Little Endian</td>
<td>SCP</td>
<td>None</td>
</tr>
</tbody>
</table>

4.2.4.3.1.3. **SOP Specific Conformance for Verification SOP Class**

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

4.2.4.3.1.4. **SOP Specific Conformance for Storage SOP Class**

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

**Table 4.2-35**

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The Composite SOP Instance was successfully received, verified, and stored in the system database.</td>
</tr>
<tr>
<td>Refused</td>
<td>Out of Resources</td>
<td>A700</td>
<td>Indicates that there was not enough disk space to store the image. Error message is output to the Service Log. The SOP Instance will not be saved.</td>
</tr>
<tr>
<td>Error</td>
<td>Data Set does not match SOP Class</td>
<td>A900</td>
<td>Indicates that the Data Set does not encode a valid instance of the SOP Class specified. This status is returned if the DICOM Object stream can be successfully parsed but does not contain values for one or more mandatory Elements of the SOP Class. The STORAGE-SCP AE does not perform a comprehensive check, as it only checks a subset of required Elements. In addition, if the SOP Class is for a type of image but the SOP Instance does not contain values necessary for its display then this status is returned. Error message is output to the Service Log.</td>
</tr>
<tr>
<td>Cannot understand</td>
<td></td>
<td>C000</td>
<td>Indicates that the STORAGE-SCP AE cannot parse the Data Set into Elements. Error message is output to the Service Log.</td>
</tr>
</tbody>
</table>

4.2.4.3.1.5. **SOP Specific Conformance for Storage Commitment SOP Class**

The associated Activity with the Storage Commitment Push Model service is the communication by the STORAGE-SCP AE to peer AEs that it has committed to permanently store Composite SOP Instances that have been sent to it. It thus allows peer AEs to determine whether the product has taken responsibility for the archiving of specific SOP Instances so that they can be flushed from the peer AE system.

The STORAGE-SCP AE takes the list of Composite SOP Instance UIDs specified in a Storage Commitment Push Model N-ACTION Request and checks if they are present in the product database. As long as the Composite SOP Instance UIDs are present in the database, the STORAGE-SCP AE will consider those Composite SOP Instance UIDs to be successfully archived. The STORAGE-SCP
AE does not require the Composite SOP Instances to actually be successfully written to archive media in order to commit to responsibility for maintaining these SOP Instances.

Once the STORAGE-SCP AE has checked for the existence of the specified Composite SOP Instances, it will then attempt to send the Notification request (N-EVENT-REPORT-RQ). The default behavior is to attempt to send this Notification over the new Association that was used by the peer AE to send the original N-ACTION Request.

The STORAGE-SCP AE will not cache Storage Commitment Push Model N-ACTION Requests that specify Composite SOP Instances that have not yet been transferred to the product. If a peer AE sends a Storage Commitment Push Model N-ACTION Request before the specified Composite SOP Instances are later sent over the same Association, the STORAGE-SCP AE will not commit to responsibility for such SOP Instances.

The STORAGE-SCP AE does not support the optional Storage Media File-Set ID & UID attributes in the N-ACTION.

This product never automatically deletes Composite SOP Instances from the archive. The absolute persistence of SOP Instances and the maximum archiving capacity for such SOP Instances is dependent on the archiving media and capacity used by the product and is dependent on the actual specifications of the purchased system. It is necessary to check the actual system specifications to determine these characteristics.

The STORAGE-SCP AE will support Storage Commitment Push Model requests for SOP Instances of any of the Storage SOP Classes that are also supported by the STORAGE-SCP AE:

<table>
<thead>
<tr>
<th>Supported Referenced SOP Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Image Storage</td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
</tr>
<tr>
<td>CT Image Storage</td>
</tr>
<tr>
<td>MR Image Storage</td>
</tr>
<tr>
<td>Secondary Capture Image Storage</td>
</tr>
<tr>
<td>XA Image Storage</td>
</tr>
<tr>
<td>RF Image Storage</td>
</tr>
<tr>
<td>NM Image Storage</td>
</tr>
<tr>
<td>PET Image Storage</td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
</tr>
<tr>
<td>RT Image Storage</td>
</tr>
<tr>
<td>RT Dose Storage</td>
</tr>
<tr>
<td>RT Structure Set Storage</td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage</td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage</td>
</tr>
<tr>
<td>RT Plan Storage</td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage</td>
</tr>
</tbody>
</table>
The STORAGE-SCP AE will return the following Status Code values in N-ACTION Responses:

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCP has successfully received the Storage Commitment Push Model N-ACTION Request and can process the commitment request for the indicated SOP Instances.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code</td>
<td>This is treated as a permanent Failure. Error indication message is output to the Service Logs. No message is posted to the User.</td>
</tr>
</tbody>
</table>

The STORAGE-SCP AE will exhibit the following Behavior according to the Status Code value returned in an N-EVENT-REPORT Response from a destination Storage Commitment Push Model SCU:

<table>
<thead>
<tr>
<th>Service Status</th>
<th>Further Meaning</th>
<th>Error Code</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Success</td>
<td>0000</td>
<td>The SCU has successfully received the Storage Commitment Push Model N-EVENT-REPORT Request. Success indication message is output to the Service Logs. No message is posted to the User Interface.</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>Any other status code</td>
<td>This is treated as a permanent Failure. Error indication message is output to the Service Logs. No message is posted to the User Interface.</td>
</tr>
</tbody>
</table>

All Status Codes indicating an error or refusal are treated as a permanent failure. The STORAGE-SCP AE can be configured to automatically reattempt the sending of Storage Commitment Push Model N-EVENT-REPORT Requests if an error Status Code is returned or a communication failure occurs. The maximum number of times to attempt sending as well as the time to wait between attempts is configurable.

<table>
<thead>
<tr>
<th>Exception</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeout expiry for an expected DICOM Message Request (DIMSE level timeout). I.e. The STORAGE-SCP AE is waiting for the next N-</td>
<td>The Association is aborted by issuing a DICOM A-ABORT. If some Composite SOP Instances have been successfully received over the same Association via the Storage Service then they are maintained in the database. They are not automatically</td>
</tr>
</tbody>
</table>
| **ACTION Request on an open Association but the timer expires.** | discarded because of a later Storage Commitment messaging failure.  
Any previously received Storage Commitment Push Model N-ACTION Requests will still be fully processed.  
Error indication message is output to the Service Logs.  
No message is posted to the User Interface. |
| --- | --- |
| **Timeout expiry for an expected DICOM Message Response (DIMSE level timeout).** | The Association is aborted by issuing a DICOM A-ABORT.  
If some Composite SOP Instances have been successfully received over the same Association via the Storage Service then they are maintained in the database. They are not automatically discarded because of a later Storage Commitment messaging failure.  
Any previously received Storage Commitment Push Model N-ACTION Requests will still be fully processed.  
Error indication message is output to the Service Logs.  
No message is posted to the User Interface. |
| **Timeout expiry for an expected DICOM PDU or TCP/IP packet (Low-level timeout).** | The Association is aborted by issuing a DICOM A-ABORT.  
If some Composite SOP Instances have been successfully received over the same Association via the Storage Service then they are maintained in the database. They are not automatically discarded because of a later Storage Commitment messaging failure.  
Any previously received Storage Commitment Push Model N-ACTION Requests will still be fully processed.  
Error indication message is output to the Service Logs.  
No message is posted to the User Interface. |
| **Association A-ABORTed by the SCU or the network layers indicate communication loss (i.e. low-level TCP/IP socket closure)** | The TCP/IP socket is closed.  
If some Composite SOP Instances have been successfully received over the same Association via the Storage Service then they are maintained in the database. They are not automatically discarded because of a later Storage Commitment messaging failure.  
Any previously received Storage Commitment Push Model N-ACTION Requests will still be fully processed.  
Error indication message is output to the Service Logs.  
No message is posted to the User Interface. |
4.3. NETWORK INTERFACES

4.3.1. Physical Network Interface

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

<table>
<thead>
<tr>
<th>Supported Physical Network Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet 1000baseT</td>
</tr>
<tr>
<td>Ethernet 100baseTX</td>
</tr>
<tr>
<td>Ethernet 10baseT</td>
</tr>
</tbody>
</table>

4.3.2. Additional Protocols

This product conforms to the System Management Profiles listed in Table 4.3-2. All requested transactions for the listed profiles and actors are supported. It does not support any optional transactions.

<table>
<thead>
<tr>
<th>Supported System Management Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile Name</td>
</tr>
<tr>
<td>Network Address Management</td>
</tr>
<tr>
<td>DHCP Client</td>
</tr>
<tr>
<td>DNS Client</td>
</tr>
<tr>
<td>Protocols Used</td>
</tr>
<tr>
<td>DHCP</td>
</tr>
<tr>
<td>DNS</td>
</tr>
<tr>
<td>Optional Transactions</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>Security Support</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supported DHCP Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP Parameter</td>
</tr>
<tr>
<td>IP Address</td>
</tr>
<tr>
<td>Hostname</td>
</tr>
<tr>
<td>List of NTP servers</td>
</tr>
<tr>
<td>List of DNS servers</td>
</tr>
<tr>
<td>Routers</td>
</tr>
<tr>
<td>Static routes</td>
</tr>
<tr>
<td>Domain name</td>
</tr>
<tr>
<td>Default Value</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Requested machine name</td>
</tr>
<tr>
<td>Empty list</td>
</tr>
<tr>
<td>Empty list</td>
</tr>
<tr>
<td>Empty list</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

4.3.3. IPv4 and IPv6 Support

This product only supports IPv4 connections.
4.4. CONFIGURATION

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

The mapping from AE Title to TCP/IP addresses and ports is configurable and set at the time of installation by Installation Personnel.

<p>| Table 4.4-1 |
| DEFAULT AE CHARACTERISTICS |</p>
<table>
<thead>
<tr>
<th>AE</th>
<th>Role</th>
<th>Default AE Title</th>
<th>Default TCP/IP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>STORAGE-SCU</td>
<td>SCU</td>
<td>TM_OT_TFS_01</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>STORAGE-SCP</td>
<td>SCP</td>
<td>TM_OT_TFS_01</td>
<td>104</td>
</tr>
<tr>
<td>QUERY-RETRIEVE-SCP</td>
<td>SCP</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>ECHO-SCU</td>
<td>SCU</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>

4.4.1.2. Remote AE Title/Presentation Address Mapping

The AE Titles, host names and port numbers of remote applications are configured using the Service/Installation Tool.
### 4.4.2. Parameters

<table>
<thead>
<tr>
<th>Table 4.4-2</th>
<th>CONFIGURATION PARAMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
<td><strong>Configurable</strong></td>
</tr>
<tr>
<td>Maximum PDU size I can receive</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum PDU size I can send</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-out waiting for a acceptance or rejection response to an Association Request (Application Level Timeout)</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-out waiting for a response to an Association release request (Application Level Timeout)</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-out waiting for completion of a TCP/IP connect request (Low-level timeout)</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-out awaiting a Response to a DIMSE Request (Low-Level Timeout)</td>
<td>Yes</td>
</tr>
<tr>
<td>Time-out for waiting for data between TCP/IP packets (Low Level Timeout)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**STORAGE-SCU AE Parameters**

| Maximum number of simultaneous Associations | Yes | 2 |
| Supported Transfer Syntaxes (separately configurable for each remote AE) | No | - |

**STORAGE-SCP AE Parameters**

| Maximum PDU Size | Yes | 64kbytes |
| Time-out waiting on an open Association for the next Request message (C-STORE-RQ, Association Close Request. etc.) (DIMSE timeout) | Yes | 15s |
| Maximum number of simultaneous Associations | Yes | 5 |
| Always open a new Association to send a Storage Commitment Push Model Notification request (N-EVENT-REPORT-RQ). | No | TRUE |

**QUERY-RETRIEVE-SCP AE Parameters**

| Maximum PDU Size | Yes | 64kbytes |
| Maximum number of simultaneous Associations | Yes | 15 |
5 MEDIA INTERCHANGE

This product does not support Media Storage.

6 SUPPORT OF EXTENDED CHARACTER SETS

This product supports the following character sets:

- ISO-IR 6 (default) ISO 646
- ISO-IR 13 (Japanese)(Option) JIS X 0201 (Katakana)
- ISO-IR 14 (Japanese)(Option) JIS X 0201 (Romaji)
- ISO-IR 87 (Japanese) JIS X 0208 (Kanji)

The product can also receive and transmit images containing character sets other than those listed above, but the image viewer bundled with the product can correctly display only the character sets listed above.

Character sets ISO-IR 13, ISO-IR 14 and ISO-IR 87 can be set to the tags listed in the Table below:

Table 6-1
TAG LISTS FOR ISO-IR 13/14/87

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Tag ID</th>
<th>VR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution Name</td>
<td>(0008,0080)</td>
<td>LO</td>
</tr>
<tr>
<td>Referring Physician’s Name</td>
<td>(0008,0090)</td>
<td>PN</td>
</tr>
<tr>
<td>Study Description</td>
<td>(0008,1030)</td>
<td>LO</td>
</tr>
<tr>
<td>Series Description</td>
<td>(0008,103E)</td>
<td>LO</td>
</tr>
<tr>
<td>Patient’s Name</td>
<td>(0010,0010)</td>
<td>PN</td>
</tr>
<tr>
<td>Patient Comments</td>
<td>(0010,4000)</td>
<td>LT</td>
</tr>
<tr>
<td>Protocol Name</td>
<td>(0018,1030)</td>
<td>LO</td>
</tr>
<tr>
<td>Image Comments</td>
<td>(0020,4000)</td>
<td>LT</td>
</tr>
<tr>
<td>Requesting Physician</td>
<td>(0032,1032)</td>
<td>PN</td>
</tr>
<tr>
<td>Requesting Service</td>
<td>(0032,1033)</td>
<td>LO</td>
</tr>
</tbody>
</table>
7 SECURITY

7.1. SECURITY PROFILES

This product does not support any specific security measures.

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

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

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

c) Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

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

7.2. ASSOCIATION LEVEL SECURITY

The QUERY-RETRIEVE-SCP AE and the STORAGE-SCP AE can both be configured to check the following DICOM values when determining whether to accept Association Open Requests:

- Calling AE Title
- Called AE Title
- Application Context

Each SCP AE can be configured to accept Association Requests from only a limited list of Calling AE Titles. They SCP AEs can have different lists. Each SCP AE can be configured to check that the Association requestor specifies the correct Called AE Title for the SCP.

In addition the IP address of the requestor can be checked. The SCP AEs can be constrained to only accept Association Requests from a configured list of IP addresses. The SCP AE’s can have different lists.
8 ANNEXES

8.1. IOD CONTENTS

8.1.1. Storage-SCP AE Element Use

The following Elements of Composite SOP Instances received by the STORAGE-SCP AE are either stored to the permanent database or of particular importance in the received images.

SOP Instances conforming to the following Composite Image SOP Classes are fully supported for display on the system workstations.

<table>
<thead>
<tr>
<th>Table 8.1-1</th>
<th>SUPPORTED COMPOSITE IMAGE SOP CLASSES FOR DISPLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Image Storage</td>
<td></td>
</tr>
<tr>
<td>US Multi-frame Storage</td>
<td></td>
</tr>
<tr>
<td>Computed Radiography Image Storage</td>
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</tr>
<tr>
<td>CT Image Storage</td>
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<tr>
<td>MR Image Storage</td>
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<tr>
<td>Secondary Capture Image Storage</td>
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<td>XA Image Storage</td>
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<tr>
<td>RF Image Storage</td>
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<tr>
<td>NM Image Storage</td>
<td></td>
</tr>
<tr>
<td>PET Image Storage</td>
<td></td>
</tr>
<tr>
<td>Digital X-Ray Image Storage - For Presentation</td>
<td></td>
</tr>
<tr>
<td>Digital Mammography X-Ray Image Storage - For Presentation</td>
<td></td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td></td>
</tr>
<tr>
<td>Digital Intra-oral X-Ray Image Storage - For Presentation</td>
<td></td>
</tr>
<tr>
<td>RT Image Storage</td>
<td></td>
</tr>
<tr>
<td>RT Dose Storage</td>
<td></td>
</tr>
<tr>
<td>RT Structure Set Storage</td>
<td></td>
</tr>
<tr>
<td>RT Beams Treatment Record Storage</td>
<td></td>
</tr>
<tr>
<td>RT Treatment Summary Record Storage</td>
<td></td>
</tr>
<tr>
<td>RT Plan Storage</td>
<td></td>
</tr>
<tr>
<td>Grayscale Softcopy Presentation State Storage</td>
<td></td>
</tr>
<tr>
<td>Key Object Selection Document</td>
<td></td>
</tr>
<tr>
<td>Enhanced CT Image Storage</td>
<td></td>
</tr>
<tr>
<td>Enhanced MR Image Storage</td>
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</tr>
</tbody>
</table>
### Table 8.1-2
SIGNIFICANT ELEMENTS IN RECEIVED COMPOSITE SOP INSTANCES

<table>
<thead>
<tr>
<th>Module</th>
<th>Attribute Name</th>
<th>Tag ID</th>
<th>Type</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient</strong></td>
<td>Patient Name</td>
<td>(0010,0010)</td>
<td>Opt</td>
<td>The received Patient Name can be changed. The value is saved to the database.</td>
</tr>
<tr>
<td></td>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td>Mand</td>
<td>Must be provided. The received Patient ID can be changed. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Patient’s Birth Date</td>
<td>(0010,0030)</td>
<td>Opt</td>
<td>The received Patient’s Birth Date can be changed. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Patient’s Sex</td>
<td>(0010,0040)</td>
<td>Opt</td>
<td>The received Patient’s Sex can be changed. The value is saved to database.</td>
</tr>
<tr>
<td><strong>General Study</strong></td>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td>Mand</td>
<td>Must be provided. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Study Date</td>
<td>(0008,0020)</td>
<td>Mand</td>
<td>Must be provided. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Accession Number</td>
<td>(0008,0050)</td>
<td>Opt</td>
<td>STORAGE-SCP AE can be configured to apply a default value if there is no value specified. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Study Description</td>
<td>(0008,1030)</td>
<td>Opt</td>
<td>The received Study Description can be changed. The value is saved to database.</td>
</tr>
<tr>
<td><strong>General Series</strong></td>
<td>Modality</td>
<td>(0008,0060)</td>
<td>Mand</td>
<td>Must be provided. The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Series Description</td>
<td>(0008,103E)</td>
<td>Opt</td>
<td>The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Body Part Examined</td>
<td>(0018,0015)</td>
<td>Opt</td>
<td>The value is saved to database.</td>
</tr>
<tr>
<td></td>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td>Mand</td>
<td>Must be provided The value is saved to database.</td>
</tr>
<tr>
<td><strong>SOP Common</strong></td>
<td>SOP Instance UID</td>
<td>(0008,0018)</td>
<td>Mand</td>
<td>Must be provided The value is saved to database.</td>
</tr>
</tbody>
</table>
8.1.2. Storage-SCU AE Element modification
The following table contains a list of all Elements that can have a value modified by the STORAGE-SCU at the time of export using the Storage Service depending on the capabilities of the receiver:

<table>
<thead>
<tr>
<th>Module</th>
<th>Attribute Name</th>
<th>Tag ID</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Image Module</td>
<td>Derivation Description</td>
<td>(0008,2111)</td>
<td>Set the compression algorithm and its parameters.</td>
</tr>
<tr>
<td>Lossy Image Compression</td>
<td>(0028,2110)</td>
<td></td>
<td>Set '01'.</td>
</tr>
<tr>
<td>Lossy Image Compression Ratio</td>
<td>(0028,2112)</td>
<td></td>
<td>Set the compression ratio.</td>
</tr>
<tr>
<td>Image Module</td>
<td>Image Type</td>
<td>(0008,0008)</td>
<td>Values 1 and 2 are modified. (Need Only at Lossy Data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Value1: DERIVED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Value2: SECONDARY</td>
</tr>
</tbody>
</table>

8.1.3. Elements Modifiable by Field Mapping
The Field Mapping function can change values of received image elements.

The following table contains a list of all elements that can have a value modified by the Field Mapping function:

<table>
<thead>
<tr>
<th>Module</th>
<th>Attribute Name</th>
<th>Tag ID</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Module</td>
<td>Patient's Name</td>
<td>(0010,0010)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient ID</td>
<td>(0010,0020)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient's Birth Date</td>
<td>(0010,0030)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient’s Sex</td>
<td>(0010,0040)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Patient IDs</td>
<td>(0010,1000)</td>
<td></td>
</tr>
<tr>
<td>Patient Demographic Module</td>
<td>Military Rank</td>
<td>(0010,1080)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Branch of Service</td>
<td>(0010,1081)</td>
<td></td>
</tr>
<tr>
<td>General Study Module</td>
<td>Study Date</td>
<td>(0008,0020)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study Time</td>
<td>(0008,0030)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accession Number</td>
<td>(0008,0050)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Referring Physician Name</td>
<td>(0008,0090)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study Description</td>
<td>(0008,1030)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name of Physicians Reading Study</td>
<td>(0008,1060)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study Instance UID</td>
<td>(0020,000D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study ID</td>
<td>(0020,0010)</td>
<td></td>
</tr>
<tr>
<td>Patient Study Module</td>
<td>Admitting Diagnosis Description</td>
<td>(0008,1080)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient’s Age</td>
<td>(0010,1010)</td>
<td></td>
</tr>
<tr>
<td>Module</td>
<td>Tag</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------------------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>Study Classification Module</td>
<td>Study Status ID</td>
<td>(0032,000A)</td>
<td></td>
</tr>
<tr>
<td>Study Priority ID</td>
<td>(0032,000C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Comments</td>
<td>(0032,4000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requested Procedure Module</td>
<td>Confidentiality Code</td>
<td>(0040,1008)</td>
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</tr>
<tr>
<td>General Series Module</td>
<td>Modality</td>
<td>(0008,0060)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Series Date</td>
<td>(0008,0021)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Series Time</td>
<td>(0008,0031)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Series Description</td>
<td>(0008,103E)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performing Physician Name</td>
<td>(0008,1050)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operator's Name</td>
<td>(0008,1070)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body Part Examined</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Series Instance UID</td>
<td>(0020,000E)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Series Number</td>
<td>(0020,0011)</td>
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<tr>
<td></td>
<td>Requested Procedure ID</td>
<td>(0040,1001)</td>
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</tr>
<tr>
<td>General Equipment Module</td>
<td>Manufacturer</td>
<td>(0008,0070)</td>
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<td></td>
<td>Institution Name</td>
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<td>Station Name</td>
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<td></td>
<td>Institutional Department Name</td>
<td>(0008,1040)</td>
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<td></td>
<td>Manufacturer Model Name</td>
<td>(0008,1090)</td>
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<td>General Image Module</td>
<td>Image Type</td>
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<td></td>
<td>Instance Number</td>
<td>(0020,0013)</td>
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<tr>
<td>Visit Status Module</td>
<td>Current Patient Location</td>
<td>(0038,0300)</td>
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<tr>
<td>Study Scheduling Module</td>
<td>Reason for Study</td>
<td>(0032,1030)</td>
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<td></td>
<td>Requesting Physician</td>
<td>(0032,1032)</td>
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<td>Requesting Service</td>
<td>(0032,1033)</td>
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<td>SOP Common Module</td>
<td>Specific Character Set</td>
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<td>SOP Class UID</td>
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<tr>
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<td>SOP Instance UID</td>
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<td>General Image Module</td>
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<td>Acquisition Time</td>
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<td>Exposure</td>
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<td>CT Image Module</td>
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<td>Slice Spacing</td>
<td>(0018,0088)</td>
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<td>Module</td>
<td>Attribute</td>
<td>Tag</td>
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<td>XA Position Module</td>
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<td>(0018,0060)</td>
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<td>(0018,1152)</td>
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<tr>
<td>Frame of Reference Module</td>
<td>Frame of Reference UID</td>
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<tr>
<td>Multi-Frame Module</td>
<td>Number of Frames</td>
<td>(0028,0008)</td>
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<tr>
<td>Image Plan Module</td>
<td>Slice Thickness</td>
<td>(0018,0050)</td>
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<td>Image Position Patient</td>
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<td>Image Orientation Patient</td>
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<td>(0028,0004)</td>
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<td>Bits Stored</td>
<td>(0028,0101)</td>
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</tr>
</tbody>
</table>

### 8.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES

Not applicable to this product.

### 8.3. CONTROLLED TERMINOLOGY AND TEMPLATES

Not applicable to this product

### 8.4. GRAYSCALE IMAGE CONSISTENCY

Not applicable to this product

### 8.5. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

Not applicable to this product

### 8.6. PRIVATE TRANSFER SYNTAXES

Not applicable to this product