

# **Philips Medical Systems**

## **DICOM CONFORMANCE STATEMENT**

**Eleva EDI  
Release 1**

Document Number 4512-133-39321

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## 1. INTRODUCTION

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

### 1.1. Scope and Field of Application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices. This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

### 1.2. Intended Audience

This Conformance Statement is intended for:

- (potential) customers
- system integrators of medical equipment
- marketing staff interested in system functionality
- software designers implementing DICOM interfaces

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

### 1.3. Contents and Structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

### 1.4. Used Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.

The word Philips in this document refers to Philips Medical Systems.

### 1.5. References

#### 1.5.1. [DICOM] The Digital Imaging and Communications in Medicine

(DICOM) standard (NEMA PS 3.X):  
National Electrical Manufacturers Association (NEMA)  
Publication Sales 1300 N. 17<sup>th</sup> Street, Suite 1847  
Rosslyn, Va. 22209, United States of America

## 1.6. Important Note to the Reader

This Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

### ➤ Interoperability

Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.

It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

### ➤ Validation

Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.

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

### ➤ New versions of the DICOM Standard

The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.

The user should ensure that any non-Philips provider linking to Philips equipment, also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).



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## 1.7. General Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

- ACC American College of Cardiology
- AE Application Entity
- ACR American College of Radiology
- ANSI American National Standard Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- ELE Explicit VR Little Endian
- EBE Explicit VR Big Endian
- FSC File Set Creator
- FSR File Set Reader
- FSU File Set Updater
- ILE Implicit VR Little Endian
- IOD Information Object Definition
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- RIS Radiology Information System
- RWA Real World Activity
- SCU Service Class User
- SCP Service Class Provider
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet protocol
- UID Unique Identifier



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## 2. IMPLEMENTATION MODEL

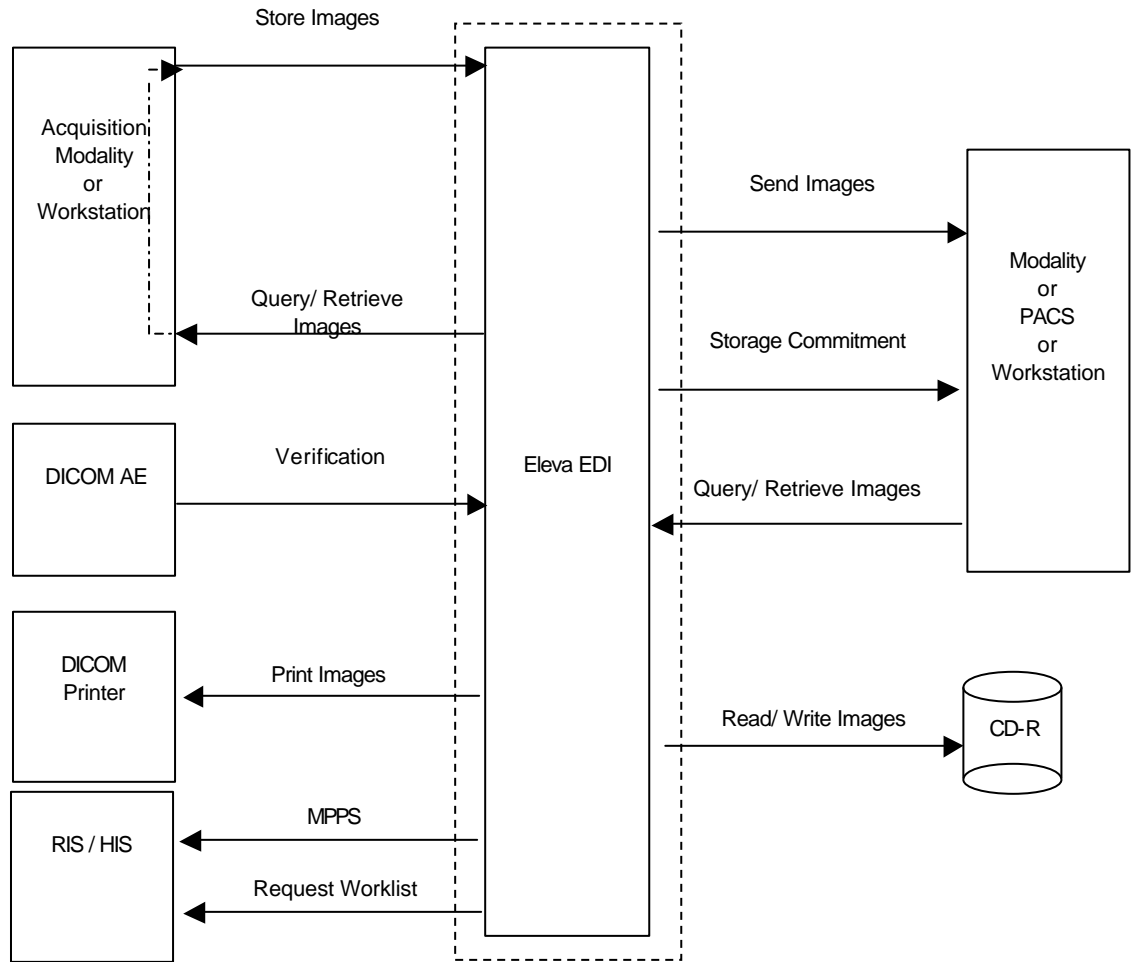
The Eleva EDI Release 1.0 system contains a Eleva Examination Control a Eleva DI 1.1.1 with auto-push and a ViewForum 3.1. The Eleva EDI is a digital fluorography modality. It is part of an Xray system. Depending on the purchased options and chosen configuration the functions are:

- Request Worklist
- Issue Procedure information to RIS / HIS system
- Image acquisition and display
- Image review and processing
- Image handling, storage and networking,
- Administration of patient, physician and examination data.
- Read and write DICOM CD-R disks.
- Print Images on a DICOM printer
- Copy images from the local database to remote databases and vice versa.
- Import images for viewing.
- Storage Commitment function

The main application areas are:

- R/F examinations
- vascular and non-vascular examinations
- angiography and tomography examinations
- interventional procedures



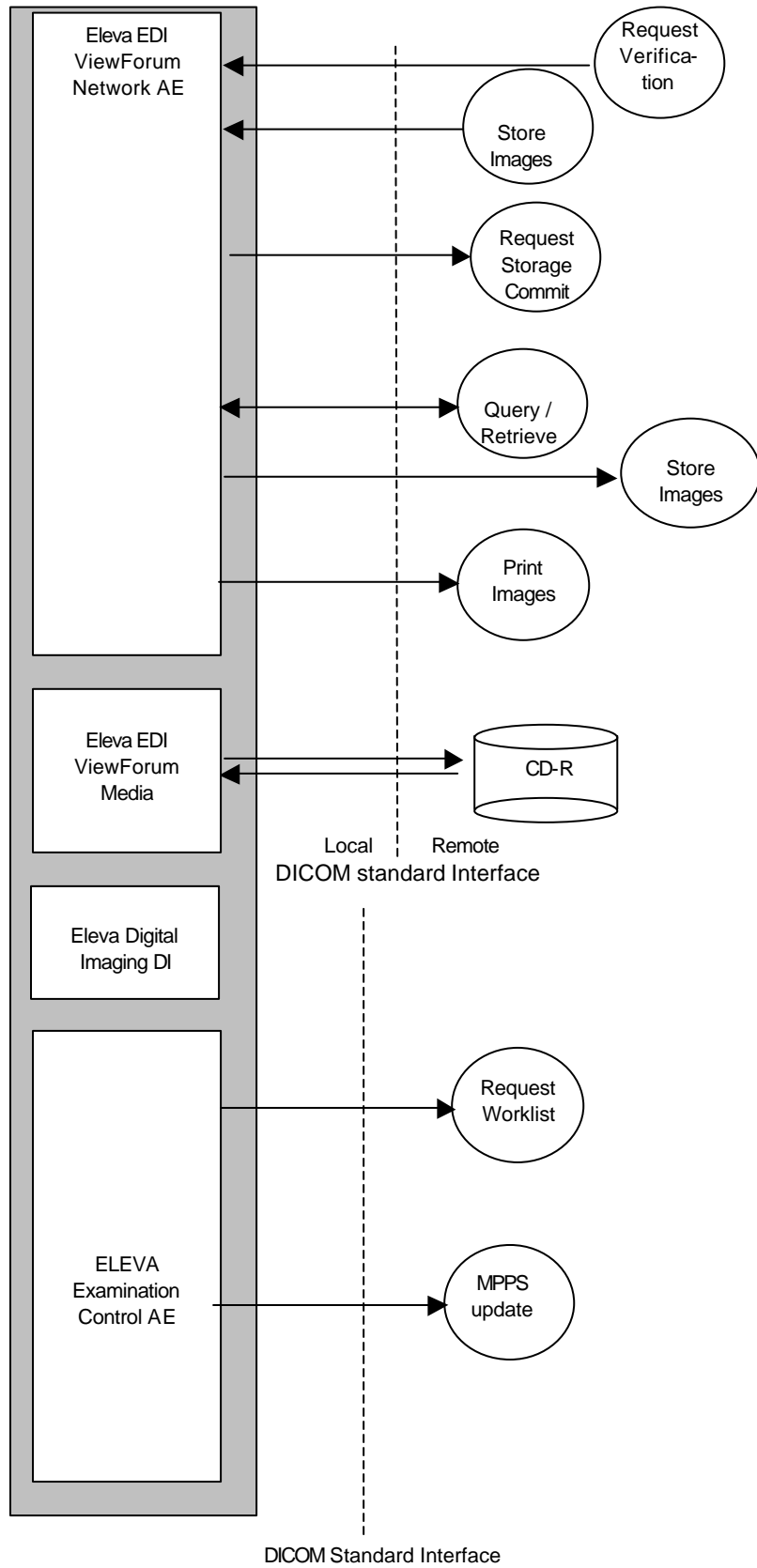


**Figure 1. Eleva EDI in a DICOM network**

Eleva EDI allows the operator also to view, analyze and process the images stored in the database.

## 2.1. Application Data Flow Diagram

The Eleva EDI system behaves as a single Application Entity. Its related Implementation Model is shown in Figure 2.



**Figure 2. Application Data Flow**



---

As documented in the PS 3.4, the arrows in the diagram have the following meanings:

- An arrow pointing to the right indicates the local application entity initiates an association.
- An arrow pointing to the left indicates the local application entity accepts an association.

The Eleva EDI system can request a worklist from a remote system such as a RIS / HIS system. The Eleva EDI can issue the request information using the Modality Performed Procedure Step service to update the RIS.

The Eleva EDI system can request to query a selected remote system, request to copy images from Eleva EDI to a selected remote system, request storage commitment on exported images, request to retrieve selected images from remote systems and can request to print images. This results in Associations initiated by Eleva EDI.

Eleva EDI is able to reply on verification requests, to execute a requested query, to store received images into Eleva EDI and retrieve requested images from Eleva EDI. These requests from remote systems are done via Associations initiated by the remote systems.

Eleva EDI is also able to display the contents (i.e. directory listing) of DICOM CD-Recordable disks and to write, read and update images on/from a DICOM CD-Recordable disk.

## 2.2. Functional definition of Application Entities

The Eleva Examination Control Application Entity acts as a Service Class User (SCU) of Worklist and MPPS.

The Eleva ViewForum Application Entity acts as a Service Class User (SCU) of Query/Retrieve, Storage commitment and Store service classes. The application acts as a Service Class Provider (SCP) of Verification, Query/Retrieve and Store service classes.

The Eleva EDI Print functionality acts as Service Class User (SCU) for the Print Service Class.

Eleva EDI acts also as a File Set Creator (FSC), File Set Reader (FSR) and File Set Updater (FSU) of the Media Service Class.

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## 2.3. Sequencing of Real World Activities

Examinations, identified with a new UID, are created inside the EEC AE as result of worklist management or on manual scheduling by the clinical user. Once an examination (an equivalent to the DICOM Procedure Step) is created, the user can select it at the EEC for acquisition. The administration parameters will be sent from EEC to DI, where also a new Examination is created, having the same UID and parameters. Examination selection for acquisition is synchronized between EEC and DI. Once acquisition has started, the MPPS CREATED messages are sent from the EEC. Acquired images (DI) and related data (DI and EEC) are added to the examination selected for acquisition in DI and EEC. The composite images acquired are forwarded to the ViewForum AE, to be viewed, printed and exported from here. When the clinical user has explicitly indicated on the EEC that the examination is finished and /or can be deleted, this will be communicated to the DI, and the Examination instance is deleted here also, as soon as automatic export to the ViewForum has taken place. MPPS COMPLETED or DISCONTINUED message is sent from the EEC.

## 3. AE SPECIFICATIONS

The Network capabilities of the system consists of two DICOM Application Entities:

- Eleva Examination control AE
- Eleva ViewForum AE

The functions supported by these AE are specified in section 3.1 and 3.2.

The Media functionality is described in section 3.3

### 3.1. ELEVA EXAMINATION CONTROL AE

The ELEVA Examination Control Application Entity provides Standard Conformance to the following DICOM 3.0 SOP classes as an SCU specified in Table 1.

**Table 1. Supported SCU SOP Classes by the ELEVA Examination Control AE**

SOP Class Name	UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.2.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

The ELEVA Examination Control Application Entity does not support DICOM 3.0 SOP classes as a SCP.

#### 3.1.1. Association Establishment Policies

##### 3.1.1.1. General

The ELEVA Examination Control offers unrestricted max. PDU size on associations initiated by ELEVA Examination Control. The PDU size is also configurable per remote station.

##### 3.1.1.2. Number of Associations

The maximum number of simultaneous associations is by default unlimited, but the maximum can be limited via the configuration repository.

##### 3.1.1.3. Asynchronous Nature

The ELEVA Examination Control does not support asynchronous operations and will not perform asynchronous window negotiation.

##### 3.1.1.4. Implementation Identifying Information

THE IMPLEMENTATION CLASS UID:	1.3.46.670589.30.1.1
THE IMPLEMENTATION VERSION NAME:	PMS_PA_1.0

### 3.1.2. Association Acceptance Policy

The ELEVA Examination Control Application Entity does not handle incoming associations.

### 3.1.3. Association Initiation Policy

For each request an association to the peer entity is established.

#### 3.1.3.1. Real-World Activity – Management Worklist (MWL) - FIND

##### 3.1.3.1.1. Associated Real-World Activity

For each Broad or specific Worklist request, an association towards the Basic Worklist Management SCP is established and a C-FIND request is transmitted. The Broad query can be configured with a combination of the matching keys:

- Scheduled Station AE Title
- Scheduled Procedure Step Start Date
- Modality

Each of the matching keys is optional. The association will be closed on reception of the last C-FIND response. The Worklist Query result is displayed in the Patient List. The query is interruptible if it was triggered by the user.

##### 3.1.3.1.2. Presentation Context Table

ELEVA Examination Control Application Entity will propose the presentation contexts as given in the next table.

**Table 2. Prop. Pres. Contexts for DI ELEVA Examination Control MWL SCU**

Abstract Syntax	UID	Transfer Syntax	UID List	Role	Ext. Neg.
MWL-FIND	1.2.840.10008.5.1.4.31	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Note: ELE is preferred

##### 3.1.3.1.3. SOP Specific Conformance – MWL-FIND

By default, the patient/examination list update is performed by a “Broad” Query with pre-configured matching keys. This MWL query may be performed in the system background and may be disabled. The time interval between subsequent background queries is configurable.

The Broad Query may also be issued by the operator and will be performed from the Patient List User interface.

The table below gives an overview of the matching keys for a Broad Query.

**Table 3. Matching Keys for Broad Query**

Attribute Name	Tag	Note
----------------	-----	------



Attribute Name	Tag	Note
Scheduled Station AE Title	0040,0001	Configurable of "ALL" or comma separated list of Application Entity names
Scheduled Procedure Step Start Date	0040,0002	Configurable of: "ALL", "<Today", <Today + Tomorrow", "<Today + Yesterday"
Modality (type)	0008,0060	"CR", "OT", "XA", "RF", "DX", "US"

When date matching is configured, the date value is continuously generated from local system time, including a configurable nightshift tolerance in the morning hours taking the steps from "<yesterday". The modality type query may be used for environments that do not schedule per individual modality's AE Title, but for a modality pool.

The optional Patient Based Worklist Query is typically triggered by operator action when a patient arrives at the system for examination. ELEVA Examination Control expects the operator to enter the value(s) of the search key(s).

The table below gives an overview of the matching keys for a Patient Query

**Table 4. Matching Keys for Patient Query**

Attribute Name	Tag	Note
Patient's Name	0010,0010	Identified from admission form.
Patient ID	0010,0020	Identified from admission form.
Accession Number	0008,0040	Identified from admission form.
Requested Procedure ID	0040,1001	Identified from admission form.
Scheduled Station AE Title	0040,0001	
Scheduled Procedure Step Start Date	0040,0002	This key may be optionally (default: no) added by the system. Its value is (Configurable) one of: date of <today>, date of <today> and subsequent dates, date of prior to and incl. <today>

Wildcard search (using "\*" only) is supported for "Patient Name", "Patient ID", "Accession Number", "Requested Procedure ID", and "Scheduled Station AE Title".

The Patient Query will be cancelled by GFIND-CANCEL request after the user has pressed a "Cancel" Button on the User Interface. As the query is performed asynchronously, intermediate results are displayed in the meantime..

#### 3.1.3.1.3.1. Patient and Study Merge

The ELEVA EDI looks in its internal database for a Study with the same Study Instance UID (0020,000D) as given in the Scheduled Procedure Step.

If a Study Instance UID match was not found, it looks for a Patient with the same Patient ID (0010,0020) as given in the Scheduled Procedure Step. If no Patient match is found, a new Patient is created, using attributes from Scheduled Procedure Step. If Patient with a matching Patient ID was found, attributes are updated for the internal Patient, based on the attributes as given in the Scheduled Procedure Step.

A new Study with a Study Instance UID as given in the Scheduled Procedure Step is created.

If a Study Instance UID match was found, all Patient attributes as given in the Scheduled Procedure Step are updated in the internal database for the parent patient of this study. Study attributes are updated for the internal study based on the attributes as given in the Scheduled Procedure Step.

### 3.1.3.1.3.2. Scheduled Procedure Step (= Examination) Merge

If the Eleva EDI's internal database contains no SPS with Scheduled Procedure Step ID (0040,0009) identifying an incoming Scheduled Procedure Step, it creates a new one and creates an corresponding Examination referencing this Scheduled Procedure Step ID.

If the Eleva EDI's internal database contains already an SPS with the Scheduled Procedure Step ID (0040,0009) identifying an incoming Scheduled Procedure Step, the behaviour depends on the corresponding Examination state.

If the Examination is still "scheduled", the SPS attributes are compared to the attributes sent with the most recent WLM query. If at least one attribute differs, the scheduled Examination is deleted and re-scheduled. Manual changes the user might have performed on this Examination are lost.

If the Examination has already started, no changes are performed, and the potential changes of the incoming Scheduled Procedure Step are disregarded.

**Table 5. MWL Inform. Model - FIND SOP Class - C-FIND-RQ – Sop Common Module**

Attribute Name	Tag	Note
Specific Character Set	0008, 0005	Configurable: Not queried, or queried as "ISO-IR 100"

**Table 6. MWL Inform. Model - FIND SOP Class - C-FIND-RQ – Pat. Ident. Module**

Attribute Name	Tag	Note
PatientName	0010,0010	Displayed. Optional matching key in Patient Query
PatientID	0010,0020	Displayed. Optional matching key in Patient Query
PatientOtherIDs	0010,1000	Displayed.

**Table 7. MWL Inform. Model - FIND SOP Class - C-FIND-RQ – Pat. Demogr. Module**

Attribute Name	Tag	Note
Patient's Birth Date	0010,0030	Displayed. Used for calculation of Patient Type.
Patient's Sex	0010,0040	Displayed.
Patient Data Confidentiality Constraint Description	0040,3001	Stored, not displayed.
Ethnic group	(0010,2160)	Displayed.
Patient Comments	(0010,4000)	Displayed.

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Attribute Name	Tag	Note
Patient Size	0010,1020	Stored. Used for calculation of Patient Type.
Patient Weight	0010,1030	Stored. Used for calculation of Patient Type.

**Table 8. MWL Inform. Model - FIND SOP Class - C-FIND-RQ - Patient Medical Module**

Attribute Name	Tag	Note
Medical Alerts	0010,2000	Displayed.
Contrast Allergies	0010,2110	Displayed.
Additional Patient History	0010,21B0	Displayed.
Pregnancy Status	0010,21C0	Displayed.
Special Needs	0038,0050	Stored.
Patient State	0038,0500	Stored.

**Table 9. MWL Inform. Model - FIND SOP Class - C-FIND-RQ - Visit Status Module**

Attribute Name	Tag	Note
Current Patient Location	0038,0300	Stored.

**Table 10. MWL Info. Model - FIND SOP Class-C-FIND-RQ-Sched. Proced. Step Mod.**

Attribute Name	Tag	Note
Scheduled Procedure Step Sequence	0040,0100	
>Modality	0008,0060	Stored. Optional matching key for Broad and Patient Query
>Scheduled Procedure Step Start Date	0040,0002	Stored. Displayed until Examination becomes in progress. Optional matching key for Broad and Patient Query
>Scheduled Procedure Step Start Time	0040,0003	Stored. Displayed until Examination becomes in progress.
>Scheduled Performing Physician's Name	0040,0006	Stored.
>Scheduled Procedure Step Description	0040,0007	Stored. Displayed if configured as source item for code mapping.
>Scheduled Action Item Code Sequence	0040,0008	Stored. Displayed if configured as source item for code mapping.
>>Code Value	0008,0100	Displayed.
>>Coding Scheme Designator	0008,0102	Stored.
>>Coding Scheme Version	0008,0103	Stored.
>>Code Meaning	0008,0104	Stored.
>Scheduled Procedure Step ID	0040,0009	Stored.
>Requested Contrast Agent	0032,1070	Stored.
>Scheduled AE Title	0040,0001	Stored. Optional matching key for Broad and Patient Query
>Scheduled Procedure Step End Date	0040,0004	Stored.
>Scheduled Procedure Step End Time	0040,0005	Stored.

Attribute Name	Tag	Note
>Scheduled Station Name	0040,0010	Stored.
>Scheduled Procedure Step Location	0040,0011	Stored.
>Pre-Medication	0040,0012	Stored.
>Scheduled Procedure Step Status	0040,0020	Stored.
>Comments on the Scheduled Procedure Step	0040,0400	Stored.

**Table 11. MWL Inform. Model - FIND SOP Class-C-FIND-RQ – Req. Procedure Module**

Attribute Name	Tag	Note
Referenced Study Sequence	0008,1110	Stored.
>Referenced SOP Class UID	0008,1150	Stored.
>Referenced SOP Instance UID	0008,1155	Stored.
Study Instance UID	0020,000D	Stored.
Requested Procedure Description	0032,1060	Stored.
Requested Procedure Code Sequence	0032,1064	Stored.
>Code Value	0008,0100	Stored. Displayed if configured as source item for code mapping.
>Coding Scheme Designator	0008,0102	Stored.
>Coding Scheme Version	0008,0103	Stored.
>Code Meaning	0008,0104	Stored.
Requested Procedure ID	0040,1001	Stored. Displayed if configured as source item for code mapping. Optional matching key for Patient Query
Names of Intended Recipients of Results	0040,1010	Displayed.
Requested Procedure Comments	0040,1400	Stored.

**Table 12. MWL Inform. Model - FIND SOP Class-C-FIND-RQ – Imag. Serv. Req. Mod.**

Attribute Name	Tag	Note
Accession Number	0008,0050	Displayed. Optional matching key for Patient Query
Referring Physician's Name	0008,0090	Displayed.
Requesting Physician	0032,1032	Displayed.
Requesting Service	0032,1033	Displayed.
Imaging Service Request Comments	0040,2400	Stored.

### 3.1.3.2. Real-World Activity – Modality Performed Procedure Step

#### 3.1.3.2.1. Associated Real-World Activity

An Eleva EDI “Examination” is regarded equivalent to a DICOM Procedure Step. It is scheduled or manually entered before an acquisition is taken, and performed by taking acquisitions. If scheduled by the RIS, one Examination is the result of one Scheduled Procedure Step. Since an examination may not be re-opened after having been closed, and each examination workflow context is enclosed in one MPPS, one

examination may result in 0:1 MPPS instances. However, image archiving after the examination's closure leads to 1:n MPPS instances per examination (append case).

An initial MPPS IN PROGRESS message with N-CREATE is sent once the first X-ray radiation has been released. The system does not generate intermediate MPPS IN PROGRESS messages for subsequent acquisitions of this Scheduled Procedure Step / Examination instance.

After the Examination has been closed by the user, the system will change the MPPS status of the related examination to "COMPLETED" and generate a MPPS COMPLETED message by N-SET. The examination cannot be reopened. Eleva EDI also generates MPPS messages for unscheduled examinations.

The MPPS COMPLETED message will list the UID's of all related DICOM exported images and format of (optionally) generated direct prints.

The user might cancel an unclosed examination at any time. Depending on state of examination and MPPS related system configuration, an MPPS IN PROGRESS message might be already sent (discontinued case) or not (abandoned case). If not, (abandoned case) the system generates an MPPS IN PROGRESS message. In both cases it sends then a MPPS DICONTINUED message. The reason for abandoning or discontinuing a procedure step is unspecified.

#### 3.1.3.2.1.1. Sequencing of Performed Procedure Steps

The performed sequence order of scheduled procedure steps may be interchanged by the user.

#### 3.1.3.2.1.2. Interleave of Performed Procedure Steps

MPPS messages may interleave. Depending on the application workflow optimization by the user, an MPPS sequence like this may come up:

```
MPPS / Inst UID 1: N_CREATE / IN PROGRESS
MPPS / Inst UID 2: N_CREATE / IN PROGRESS
MPPS / Inst UID 3: N_CREATE / IN PROGRESS
...
MPPS / Inst UID 2: N_SET / COMPLETED
MPPS / Inst UID 1: N_SET / COMPLETED
MPPS / Inst UID 3: N_SET / COMPLETED
```

(i.e.: running multiple procedure steps 'in parallel').

#### 3.1.3.2.2. Presentation Context Table

ELEVA Examination Control will propose the presentation contexts as given in the next table.

**Table 13. Proposed Presentation Context for the Verification by the RIS AE**

Abstract Syntax	UID	Transfer Syntax	UID List	Role	Ext. Neg.
MPPS	1.2.840.10008.3.1.2.3.3	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Note: For Modality Performed Procedure Step, ELE is preferred.

### 3.1.3.2.3. SOP Specific Conformance

ELEVA Examination Control by default derives the specific acquisition protocol from the Scheduled Protocol Code Sequence Items. If this Sequence contains more than one Protocol Code, these codes will be displayed as separate examinations on the UI, but will be handled by one common MPPS instance.

ELEVA Examination Control supports 3 more (configurable) mapping relations, as shown below:

- Examination is selected from Scheduled Protocol Code Items->Code Value 0040,0008 (default)
- Examination is selected from Scheduled Procedure Step Description 0040,0007
- Examination is selected from Requested Procedure Code Items->Code Value 0032,1064
- Examination is selected from Requested Procedure Description 0032,1060

ELEVA Examination Control does not evaluate the attributes Coding Scheme Version 008,0103, Coding Scheme Designator 0008,0102, Code Meaning 0008,0104, but only the Code Value 0008,0100, for mapping the examination settings. That is, ELEVA Examination Control expects, that any used Code Value is unique (unambiguous) within a given RIS domain. The number of items in the Scheduled Protocol Code Sequence accepted by the ELEVA Examination Control is not limited.

**Table 14. MPPS SOP Class - N-CREATE-RQ - Sop Common Module**

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied Value(s): ISO_IR 100
SOP Class UID	0008,0016	Applied Value(s): 1.2.840.10008.3.1.2.3.3
SOP Instance UID	0008,0018	

**Table 15. MPPS SOP Class - N-CREATE-RQ - Image Acquisition Results Module**

Attribute Name	Tag	Note
Modality	0008,0060	Applied Value: RF
Study ID	0020,0010	If scheduled: Req. Procedure ID, else: equipment generated Study identifier
Performed Action Item Code Sequence	0040,0260	0 length
>Code Value	0008,0100	
>Coding Scheme Designator	0008,0102	
>Coding Scheme Version	0008,0103	
>Code Meaning	0008,0104	
Performed Series Sequence	0040,0340	0 length
>ReferencedImageSequence	0008,1140	
>>ReferenceSOPClassUID	0008,1150	
>>ReferencedSOPInstanceUID	0008,1155	
>ReferencedStandAloneSOPInst.Seq	0040,0220	
>>ReferenceSOPClassUID	0008,1150	
>>ReferencedSOPInstanceUID	0008,1155	
>RetrieveAETitle	0008,0054	
>SeriesPerformingPhysiciansName	0008,1050	



Attribute Name	Tag	Note
>SeriesOperatorsName	0008,1070	
>SeriesProtocolName	0018,1030	
>SeriesDescription	0008,103E	
>SeriesInstanceUID	0020,000E	

**Table 16. MPPS SOP Class - N-CREATE-RQ – Perform. Proced. Step Inform. Module**

Attribute Name	Tag	Note
Procedure Code Sequence	0008,1032	
>Code Value	0008,0100	
>Coding Scheme Designator	0008,0102	
>Coding Scheme Version	0008,0103	
>Code Meaning	0008,0104	
Performed Station AE Title	0040,0241	
Performed Station Name	0040,0242	0 length
Performed Location	0040,0243	0 length
Performed Procedure Step Start Date	0040,0244	
Performed Procedure Step Start Time	0040,0245	
Performed Procedure Step End Date	0040,0250	0 length
Performed Procedure Step End Time	0040,0251	0 length
Performed Procedure Step Status	0040,0252	Applied Value IN PROGRESS
Performed Procedure Step ID	0040,0253	
Performed Procedure Step Description	0040,0254	0 length
Performed Procedure Type Description	0040,0255	0 length

**Table 17. MPPS SOP Class - N-CREATE-RQ – Perform. Proced. Step Relat. Module**

Attribute Name	Tag	Note
Patient's Name	0010,0010	
Patient ID	0010,0020	
Patient's Birth Date	0010,0030	
Patient's Sex	0010,0040	
Referenced Patient Sequence	0008,1120	0 length
>ReferencedSOPClassUID	0008,1150	
>ReferencedSOPInstance UID	0008,1155	
Scheduled Step Attribute Sequence	0040,0270	
>Accession Number	0008,0050	
>Referenced Study Sequence	0008,1110	0 length if unscheduled
>>Referenced SOP Class UID	0008,1150	
>>Referenced SOP Instance UID	0008,1155	
>Study Instance UID	0020,000D	
>Requested Procedure ID	0040,1001	0 length if unscheduled
>Requested Procedure Description	0032,1060	0 length if unscheduled
>Scheduled Procedure Step ID	0040,0009	0 length if unscheduled
>Scheduled Procedure Step Description	0040,0007	0 length if unscheduled

Attribute Name	Tag	Note
>Scheduled Protocol Code Sequence	0040,0008	0 length
>>Code Value	0008,0100	
>>Code Scheme Designator	0008,0102	
>> Coding Scheme Version	0008,0103	
>>Code Meaning	0008,0104	

**Table 18. MPPS SOP Class - N-CREATE-RQ - Radiation Dose Module**

Attribute Name	Tag	Note
Anatomical Structure, Space or Region Sequence	0008,2229	0 length
>Code Value	0008,0100	
>Code Scheme Designator	0008,0102	
> Coding Scheme Version	0008,0103	
>Code Meaning	0008,0104	
Image Area Dose Product	0018,115E	0 length
Total Number of Exposures	0040,0301	0 length
Exposure Dose Sequence	0040,030E	0 length
ImageDistanceSourceToDetector	0018,1110	
RadiatDoseTotalTimeOfFluoroscopy	0040,0300	
RadiationDoseEntranceDose	0040,0302	
RadiationDoseExposedDose	0040,0303	
RadiatDoseDistSourceToDetector	0040,0306	
RadiationDoseComments	0040,0310	

**Table 19. MPPS SOP Class - N-CREATE-RQ - Billing & Material Mgmt. Code Module**

Attribute Name	Tag	Note
Film Consumption Sequence	0040,0321	0 length

**Table 20. MPPS SOP Class - N-SET-RQ - Sop Common Module**

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied Value(s): ISO_IR 100
SOP Class UID	0008,0016	
SOP Instance UID	0008,0018	

**Table 21. MPPS SOP Class - N-SET-RQ - Image Acquisition Results Module**

Attribute Name	Tag	Note
Performed Action Item Code Sequence	0040,0260	1 item only
>Code Value	0008,0100	
>Coding Scheme Designator	0008,0102	
>Coding Scheme Version	0008,0103	

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Attribute Name	Tag	Note
>Code Meaning	0008,0104	
Performed Series Sequence	0040,0340	N items
>Retrieve AE Title	0008,0054	0 length
>Series Description	0008,103E	0 length
>Performing Physician's Name	0008,1050	0 length
>Operator's Name	0008,1070	N values
>Referenced Image Sequence	0008,1140	In Non-Tomo Examinations 1 item only. In Tomo-Examinations N items. Missing after conventional acquisition.
>>Referenced SOP Class UID	0008,1150	Presently only RF class
>>Referenced SOP Instance UID	0008,1155	
>Protocol Name	0018,1030	Copy of Perf. Act. Item -> Code Value
>Series Instance UID	0020,000E	
>Referenced Standalone SOP Instance Sequence	0040,0220	0 length

**Table 22. MPPS SOP Class - N-SET-RQ - Performed Procedure Step Inform. Module**

Attribute Name	Tag	Note
Procedure Code Sequence	0008,1032	
>Code Value	0008,0100	
>Coding Scheme Designator	0008,0102	
>Coding Scheme Version	0008,0103	
>Code Meaning	0008,0104	
Performed Procedure Step End Date	0040,0250	
Performed Procedure Step End Time	0040,0251	
Performed Procedure Step Status	0040,0252	Applied Value(s): COMPLETED, DISCONTINUED
Performed Procedure Step Description	0040,0254	Zero length
Performed Procedure Type Description	0040,0255	Zero length
Performed Procedure Comment	0040,0280	

**Table 23. MPPS SOP Class - N-SET-RQ - Radiation Dose Module**

Attribute Name	Tag	Note
Image Area Dose Product	0018,115E	Not accumulating: re-processed images, non-digital images.
Total Number of Exposures	0040,0301	Not counting: re-processed images
Exposure Dose Sequence	0040,030E	0 length for non-digital images
>KVP	0018,0060	
>Exposure Time	0018,1150	

**Table 24. MPPS SOP Class - N-SET-RQ - Billing & Material Management Code Module**

Attribute Name	Tag	Note
Film Consumption Sequence	0040,0321	If local print option configured; else zero length

Attribute Name	Tag	Note
>Medium Type	2000,0030	Applied Value: CLEAR FILM
>Film Size ID	2010,0050	Applied Value 14INX17IN
BillingProcedureStepSequence	0040,0320	
>Code Value	0008,0100	
>Coding Scheme Designator	0008,0102	
>Coding Scheme Version	0008,0103	
>Code Meaning	0008,0104	
FilmConsumptionSequence	0040,0321	
FilmConsumptionMediumType	2000,0030	
FilmConsumptionSizeID	2010,0050	
FilmConsumptionNumberOfFilms	2100,0170	
BillingSuppliesAndDevicesSequence	0040,0324	
>BillingItemSequence	0040,0296	
>>Code Value	0008,0100	
>>Coding Scheme Designator	0008,0102	
>>Coding Scheme Version	0008,0103	
>>Code Meaning	0008,0104	
>QuantitySequence	0040,0293	
>>QuantityValue	0040,0294	
>>MeasuringUnitsSequence	0040,0295	
>>>Code Value	0008,0100	
>>> Code Scheme Designator	0008,0102	
>>> Code Scheme Version	0008,0103	
>>> Code Meaning	0008,0104	





### 3.2. Eleva EDI viewForum AE

The Eleva EDI ViewForum Application Entity provides Standard Extended Conformance to the DICOM V3.0 SOP classes as an SCU specified in Table 24. The following remarks are important:

- In case the remote system does not support the import of a specific Image Storage SOP Class, Eleva EDI ViewForum AE will convert (if configured to do so) these images and sends them via the SC Image SOP Class.
- The Imported Images should only be used for viewing purposes.
- The Eleva EDI ViewForum AE requests for a Storage Commitment.

**Table 25. Supported SOP classes by the Eleva EDI ViewForum AE as SCU**

SOP class Name	UID
Storage Commitment Push Model	1.2.840.10008.1.20.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient/Study Only Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
> Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
> Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
> Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
> Printer SOP Class	1.2.840.10008.5.1.1.16

The Eleva EDI Application Entity provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCP specified in Table 25.

**Table 26. Supported SOP classes by the Eleva EDI ViewForum AE as SCP**

SOP class Name	UID
Verification	1.2.840.10008.1.1
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
DX Image Storage for presentation	1.2.840.10008.5.1.4.1.1.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Presentation State Storage	1.2.840.10008.5.1.4.1.1.11
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2

SOP class Name	UID
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient/Study Only Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
3D Volume Storage (Private class)	1.3.46.670589.5.0.1.1
3D Volume Object Storage (Private class)	1.3.46.670589.5.0.2.1
Surface Storage (Private class)	1.3.46.670589.5.0.3.1
CT Synthetic Image (Private class)	1.3.46.670589.5.0.9
MR Synthetic Image (Private class)	1.3.46.670589.5.0.10
MR Cardio Storage (Private class)	1.3.46.670589.5.0.8.1
MR Cardio Analysis Storage (Private class)	1.3.46.670589.5.0.11.1
Specialized X-ray (Private class)	1.3.46.670589.2.3.1.1
CX Image (Private class)	1.3.46.670589.2.4.1.1
CX Synthetic Image (Private class)	1.3.46.670589.5.0.12
Perfusion (Private class)	1.3.46.670589.5.0.13
Perfusion Analysis (Private class)	1.3.46.670589.5.0.14



### 3.2.1. Association Establishment Policies

#### 3.2.1.1. General

Eleva EDI as SCU will offer unrestricted maximum PDU size on Associations initiated by Eleva EDI itself. This is also configurable per remote station.

When Eleva EDI acts as SCP the maximum number of simultaneous associations is by default unlimited, but the maximum can be limited via the configuration.

#### 3.2.1.2. Number of Associations

The number of simultaneous Associations supported by Eleva EDI as a Service Class Provider is in principle not limited. The practical maximum number of supported Associations is determined by the amount of resources (CPU, memory, hard disk size).

As a result of local activities, Eleva EDI will initiate at most 3 simultaneous Associations. One Association is used to issue query requests. The other Association is used to issue store or retrieve and one for print requests. Eleva EDI will further initiate an Association for each remote retrieve request executed by Eleva EDI as a MOVE Service Class Provider. These Associations are used to issue the store sub-operations implied by the retrieve requests. The number of simultaneous store Associations for this retrieve purpose is in principle not limited.

Storage Commitment can keep open a configurable number of associations.

#### 3.2.1.3. Asynchronous Nature

Eleva EDI does not support asynchronous operations and will not perform asynchronous window negotiation.

#### 3.2.1.4. Implementation Identifying Information

THE IMPLEMENTATION CLASS UID:	1.3.46.670589.5.2.20
THE IMPLEMENTATION VERSION NAME:	"ViewForum R3.1"

---

## 3.2.2. Association Initiation Policy

Eleva EDI initiates Associations as a result of the following events:

- The Eleva EDI operator or a remote application copies selected images from the Eleva EDI database to another database (i.e. image export), see section 3.1.2.1;
- The Eleva EDI operator queries a remote database, see section 3.1.2.2;
- The Eleva EDI operator copies selected images from a remote database to another database, see section 3.1.2.3.
- The Eleva EDI operator requests to print selected images in the Eleva EDI database, see section 3.1.2.4.
- The Eleva EDI operator requests for the status of a selected printer, see section 3.1.2.5.

### 3.2.2.1. Copy Images from Eleva EDI (i.e. Image Export)

#### 3.2.2.1.1. *Associated Real-World Activity*

The operator is able to copy all/selected images in a patient folder from the local Eleva EDI database to another database (i.e. image export) by means of the copy tool in the Eleva EDI data-handling tool. Eleva EDI initiates for each selected patient an Association to the selected peer entity and uses it to send C-STORE requests (and receive the associated store replies). The Association is released when all selected images in the selected folder have been transmitted. Eleva EDI handles operator copy requests one after another.

A remote application copies images from the local Eleva EDI database to another database by sending a GMOVE request to Eleva EDI. Eleva EDI initiates for each received retrieve request an Association to the requested move destination and uses it to send C-STORE requests (and receive the associated store replies). The Association is released when all instances (images and presentation states) selected by the retrieve request identifier have been transmitted. Eleva EDI is able to simultaneously handle C-MOVE requests.

The Eleva EDI DICOM query as SCU for all possible levels all the required and the unique keys. No optional keys are queried.

### 3.2.2.1.2. Proposed Presentation Contexts

Eleva EDI will propose the following presentation contexts:

**Table 27. Proposed Presentation Contexts for Eleva EDI to Other**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
See Note	See Note	ELE	1.2.840.10008.1.2.1	SCU	None
See Note	See Note	EBE	1.2.840.10008.1.2.2	SCU	None

*Note: Any of the Standard Image Storage and Private storage SOP classes listed in Table 24, "Supported SOP classes by the Eleva EDI AE as SCU,". For performance reasons the ELE is preferred.*

Extended negotiation is not supported.

### 3.2.2.1.3. C-STORE SCU Conformance

The store response status is saved in the log file, a user error will be displayed in the GUI.

Eleva EDI will stop the transfer of the images and release the Association as soon as it receives an unsuccessful or warning store response status. In case a remote application requested the transfer (by means of a C-MOVE request), a move response with status unsuccessful is sent to the retrieve requester.

The Eleva EDI system can create instances for the following SOP Classes:

**Table 28. Created objects by the Eleva EDI**

SOP class Name	UID
Storage Commitment Push Model	1.2.840.10008.1.20.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2

For the definition of these objects see the attached annexes.

Important remarks about the exported images:

- Eleva EDI allows the operator to modify attributes of the stored images. Eleva EDI does not modify the pixel values of the stored images. Modified images retain their original Study, Series and Image UID.
- In case the remote system does not support a modality specific Image Storage SOP Class, Eleva EDI will convert (if configured to do so) the images and sends them via the SC Image SOP Class. These Secondary Capture images and additional information (like graphics, text and important attribute information) are burnt-in (if configured). The original bit depth of the Secondary Capture image is kept. Note: only standard DICOM images can be converted, private SOP classes can't be converted.
- In case of color images, all color-coding schemes are sent out just like they are received.

- Attributes e.g. Study Date and Study Time will be added to images to be exported (if not yet present). This is done because there are imaging systems relying on the existence of these attributes.
- The exported Eleva EDI images do not contain Instance Number if the original images received from modalities do not contain this attribute or provide information in other attributes to Eleva EDI to generate it.
- Exported CT/MR images relate Scanogram and Slice images in the following way: Attribute 'Referenced Image Sequence' is present in the slice images and points to the related Scanogram image.  
Note that Attribute 'Frame of Reference UID' in the Scanogram (Localiser image) and related image slices are not guaranteed to be equal; this depends on the source of the images.
- For SC images only one Window Width and Window Centre value is exported.
- When the location of a graphic or text annotation is specified relatively with regards to the displayed area. (i.e. DICOM attribute: Bounding Box Annotation Units, Ancjor Point Annotation Units or Graphic Annotation Units equals "DISPLAY"), the annotation is not displayed.
- Areas occluded by shutter are always black in Eleva EDI , whereas it is possible to want it to be white in DICOM.
- On the export of such an image the Eleva EDI system first sets up an association to determine if the SCP supports the Grayscale softcopy presentation state SOP Class. If the SCP doesn't supports the Grayscale softcopy presentation state service the Graphical information is added to the image object additional a new instance UID is generated for this image.
- All kind of Images sending out from the are included with Performed Procedure Step Tags like: (Start Date, Start Time, ID ).

Use of optional, private and retired attributes:

The transmitted Storage SOP instances may include all optional elements specified in the DICOM standard, depending on the source of the images.

The transmitted Storage SOP instances may contain Retired and Private data elements, depending on the source of the images and of the Eleva EDI configuration.

The Eleva EDI can convert the transfer syntax when exporting images.

The Eleva EDI can perform a transfer syntax conversion according to the following table:

**Table 29. Transfer Syntax Conversion**

Destination Syntax / Source Syntax	ILE	ELE	EBE
ILE	+	+	+
ELE	+	+	+
EBE	+	+	+

### 3.2.2.2. Query a Remote Database

#### 3.2.2.2.1. Associated Real-World Activity

The operator queries a remote database by means of the query tool in the Eleva EDI data handling facility. Eleva EDI initiates an Association to the selected peer entity and uses it to send C-FIND requests (and receive the associated find replies). The Association is released when the find execution completes (the Q/R dialog on the User Interface is closed).

#### 3.2.2.2.2. Proposed Presentation Contexts

Eleva EDI will propose the presentation contexts as given in the next table.

**Table 30. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

*Note: Any of the Standard Query Retrieve SOP classes listed in Table 24, "Supported SOP classes by the Eleva EDI AE as SCU,".*

*For performance reasons the ELE is preferred.*

#### 3.2.2.2.3. C-FIND SCU Conformance

Eleva EDI will not generate queries containing optional keys. Eleva EDI will not generate relational queries.

In the following tables the supported query's attributes for each SOP class are described.

**Table 31. Supported query attributes**

	Attributes	Tag	Query Key	Matching key
PatientLevel	Patient's Name	0010,0010	X	X
	Patient ID	0010,0020	X	X
	Patient's Birth Date	0010,0030	X	
	Patient's Sex	0010,0040	X	
StudyLevel	Study Date	0008,0020	X	X
	Study Time	0008,0030	X	
	Accession Number	0008,0050	X	X
	Referring Physician's Name	0008,0090	X	
	Study Description	0008,1030	X	
	Study ID	0020,0010	X	X
Series	Requesting Physician	0032,1032	X	
	Station Name	0008,1010	X	
	Scheduled Procedure Step Start Date	0040,0002	X	
	Performed Station Name	0040,0242	X	

	Attributes	Tag	Query Key	Matching key
	Performed Procedure Step ID	0040,0253	X	
	Performed Procedure Type Description	0040,0255	X	
	Modality	0008,0060	X	
	Performing Physician's Name	0008,1050	X	
	Protocol Name	0018,1030	X	
	Body Part Examined	0018,0015	X	
ImageLevel	SOP Instance UID	0008,0018	X	
	SOP Class UID	0008,0016	X	
	Content Date	0008,0023	X	
	Content Time	0008,0033	X	
	Instance Number	0020,0013	X	

**3.2.2.3. Retrieve Images from a Remote Database**

**3.2.2.3.1. Associated Real-World Activity**

The operator is able to copy all/selected images in a patient folder from a remote database to another, local or remote, database by means of the copy tool in the Eleva EDI data handling facility. Eleva EDI initiates for each selected study an Association to the selected peer entity and uses it to send GMOVE requests (and receive the associated move replies). A study may contain both images and presentation states. When Eleva EDI receives the presentation state objects of such a study before its images, it may remove attributes on patient and study level that are present in the images but not in the presentation states. The Association is released when all selected images have been transmitted.

**3.2.2.3.2. Proposed Presentation Contexts**

Eleva EDI will propose the presentation contexts as given in the next table.

**Table 32. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

*Note: Any of the Standard Query Retrieve SOP classes listed in Table 24, "Supported SOP classes by the Eleva EDI AE as SCU,". For performance reasons the ELE is preferred.*

**3.2.2.3.3. C-MOVE SCU Conformance**

The AE provides standard conformance.





### 3.2.2.4. Print images

#### 3.2.2.4.1. *Associated Real-World Activity*

The operator will select the print destination (out of choice list of configured printers) and some print parameters (depending on the configuration and the selected printer), these values can also be configured.

As a result, Eleva EDI will initiate an association to the selected printer and uses it to send the Print Service Elements of the Print SOP Classes.

Eleva EDI allows having a print preview first.

#### 3.2.2.4.2. *Proposed Presentation Contexts*

Eleva EDI will propose the presentation contexts as given in the next table.

**Table 33. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

*Note: Any of the Print SOP classes listed in Table 24, "Supported SOP classes by the Eleva EDI AE as SCU,".*

*For performance reasons the ELE is preferred.*

#### 3.2.2.4.3. *Conformance to the Print SOP Classes*

Eleva EDI provides standard conformance to the Basic Grayscale Print Management Meta SOP Class.

The applied order of Print Service Elements (DIMSE) is specified in Table 7. A description and the applied optional (i.e. non-mandatory attributes as Print SCU) attributes in these Service Elements are specified too. Note that the Service Elements order is not specified by the DICOM standard.

An explicit NDELETE Request on the created instances is not done by Eleva EDI ; these are deleted implicitly when releasing the association.

Overlay, Annotation (showing the values of some major identifying attributes) and Shutter information is processed in the images sent to the printer (i.e. burnt-in in the image).

**Table 34. The applied order of Print Service Elements and its optional attributes**

Service Element of SOP Class	Description and applied optional attributes
N-GET of the Printer SOP Class	Purpose is to retrieve printer information.

Service Element of SOP Class	Description and applied optional attributes
N-CREATE of the Basic Film Session SOP Class	Eleva EDI specifies the DICOM Printer about some general presentation parameters, applicable for all films in the Film Session. Applied optional attributes are: Number of Copies, Print Priority, Medium Type, Film Destination
N-CREATE of the Basic Film Box SOP Class	Eleva EDI specifies the DICOM Printer about some general presentation parameters, applicable for all images in the Film Box. Applied optional attributes are: Film Orientation, Film Size ID, Magnification Type, Max. Density, Configuration Information, Trim.
N-SET of the Basic Grayscale Image Box SOP Class	Eleva EDI will send the images to be printed. Applied optional attributes are: Polarity
N-ACTION of the Basic Film Box SOP Class	Eleva EDI triggers the DICOM Printer to print, this actual print action is done at film box level. No (optional) attributes are present.

The table below specifies the supported Service Elements which may be generated by the Printer at any time during the association.

**Table 35. The applied sequence of Print Service Elements and its optional attributes**

Service Element of SOP Class	Note
N-EVENT-REPORT of the Printer SOP Class	May be sent at any moment by the Printer SCP (i.e. the DICOM Printer). Eleva EDI will ignore the contents of these events. However, the printer status is polled via a separate association, see section See 3.1.2.5.

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

- “Job Completed” and has the meaning that the print job is accepted by the printer; the actual printing will be done afterwards.
- “General Print Error” indicating that a failure occurred during the DICOM Print. Also, most warning cases (like default printer values applied on optional print attributes) are interpreted as a print error because this will mostly result in a different print quality or print layout than expected.
- The only warning code on which the Print Job is continued is 0x0107 (Attribute list error) in the N-GET-RSP.

The following implementation remarks are important to achieve successful printing:

- The number of Film Boxes per Film Session is **one**.
- The number of images per Film Box is **one**.  
The images to be printed on one film are rendered by Eleva EDI into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image). A rough indication is 20 MByte. One should

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take this into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).

- Eleva EDI will release the association when the print command is given (i.e. the N-ACTION Request); the association is not kept open for receiving N-EVENT-REPORTs of the Printer SOP Class.
- On status-errors/warnings in a DIMSE response, the data transfer will be stopped and film will not be printed.
- The only warning code on which the Print Job is continued is 0x0107 (Attribute list error) in the N-GET-RSP.

This section gives an overview of the applied attributes in the applied Service Elements of the supported SOP Classes.

The list of possible attribute values is given. The situation that an attribute is present conditionally. The standard DICOM Conditions and Defined Terms and Enumerated Values are applicable



### 3.2.2.5. Request for the Printer Status

#### 3.2.2.5.1. *Associated Real-World Activity*

Eleva EDI will periodically request for the printer status. This is only done when no association is set-up for a print job. In case of a print job association the printer status is requested in that association.

The received printer status is displayed in the Printer Status Tool.

#### 3.2.2.5.2. *Proposed Presentation Contexts*

Eleva EDI will propose the presentation contexts as given in the next table.

**Table 36. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Printer SOP Class	1.2.840.10008.5.1.1.16	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

For performance reasons the ELE is preferred.

#### 3.2.2.5.3. *Conformance to the Printer SOP Class*

Eleva EDI provides standard conformance to this SOP Class.

The applied optional attributes in the N-GET Service Element are specified in Table 24.

**Table 37. The applied optional attributes in the N-GET Service Element**

Service Element of SOP Class	Note
N-GET of the Printer SOP Class	Purpose is to retrieve printer information. Applied optional attributes are: Printer Status, Printer Status Info, Printer Name, Manufacturer, Manufacturer Model Name

The Status Codes of Printer N-GET Responses (Success, Warning, Failure) as returned by the printer will also be logged (for service purposes) and are not indicated towards the operator.

This section gives an overview of the applied attributes in the applied Service Elements of the supported SOP Classes.

The Eleva EDI does not send an attribute list to the printer, therefore the only attributes that are needed to be supported by the printer, are the mandatory attributes listed in Table 3-18, "Printer SOP Class - N-GET,"

### 3.2.2.6. Storage Commitment

#### 3.2.2.6.1. *Associated Real-World Activity*

After every C-STORE a new association concerning Storage Commitment will be started. This association will be open till the remote archive sends a commit response or when the configured maximum time is passed. When this maximum configured period is passed it is the responsibility of the archive to setup a connection with Eleva EDI and send the commit response.

#### 3.2.2.6.2. *Presentation Context Table*

Eleva EDI will propose the presentation contexts as given in the next table.

**Table 38. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Storage Commitment Push Model	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

For performance reasons the ELE is preferred.

#### 3.2.2.6.3. *Storage Commitment Push Conformance*

The Eleva EDI provides standard conformance. The storage commitment service is only configurable for one remote node.

### 3.2.3. Association Acceptance Policy

Eleva EDI accepts Associations for the following purposes:

- To allow remote applications to verify application level communication with Eleva EDI , see section 3.1.3.1;
- To allow remote applications to store images in the Eleva EDI database (i.e. image import), see section 3.1.3.2;
- To allow remote applications to query the Eleva EDI database, see section 3.1.3.3;
- To allow remote applications to retrieve images from the Eleva EDI database, see section 3.1.3.2.

The Eleva EDI Application Entity rejects Association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application is known if and only if it is defined during configuration of the Eleva EDI system.

The Eleva EDI Application Entity rejects Association requests from applications that do not address the Eleva EDI AE, i.e. that offer a wrong “called AE title”. The Eleva EDI AE title is defined during configuration of the Eleva EDI system.

#### 3.2.3.1. Verify Application Level Communication

##### 3.2.3.1.1. Associated Real-World Activity

Eleva EDI accepts Associations from systems that wish to verify application level communication using the C-ECHO command.

##### 3.2.3.1.2. Presentation Context Table

Eleva EDI will accept the presentation contexts as given in the next table.

**Table 39. Accepted Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Verification	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

For performance reasons the ELE is preferred.

##### 3.2.3.1.3. C-ECHO SCP Conformance

Eleva EDI provides standard conformance.

##### 3.2.3.1.4. Presentation Context Acceptance Criterion

Eleva EDI accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that Eleva EDI accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes. There is no check for duplicate contexts, which are therefore accepted.

##### 3.2.3.1.5. Transfer Syntax Selection Policies

Any of the presentation context show in Table 13, are acceptable.

### 3.2.3.2. Store Images in the Eleva EDI Database (i.e. Image Import)

#### 3.2.3.2.1. Associated Real-World Activity

Eleva EDI accepts Associations from systems that wish to store images in the Eleva EDI database using the C-STORE command.

#### 3.2.3.2.2. Presentation Context Table

Eleva EDI will propose the following presentation contexts:

**Table 40. Proposed Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
See Note	See Note	ELE	1.2.840.10008.1.2.1	SCP	None
See Note	See Note	EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Image Storage and Private SOP classes listed in Table 25, “Supported SOP classes by the Eleva EDI AE as SCP,”.

For performance reasons the ELE is preferred.

#### 3.2.3.2.3. C-STORE SCP Conformance

Eleva EDI provides conformance for the Storage Service Class. In the event of a successful C-STORE operation, the image has been stored in the Eleva EDI database.

The C-STORE is unsuccessful if Eleva EDI returns one of the following status codes:

**Table 41. Exception handling by the Eleva EDI**

Error Type	STATUS Response	Error	Action
Refused	A700	Indicates the database is full. Recovery from this condition is left to the Service Class User.	Notification sent, logging and connection abort
	A900	Indicates that the SOP class of the image does not match the abstract syntax negotiated for the presentation context	Notification sent, logging and connection abort
Failure	C000	Indicates that the image cannot be parsed.	Notification sent, logging and connection abort
Success	0000		

When the Eleva EDI imports images and during the association negotiation the Presentation State SOP class is not negotiated the Eleva EDI system creates a Presentation State Instance at the import of an Image.

The following table gives an overview of the Image formats that can be viewed (other formats can only be stored):

**Table 42. Photometric Interpretation Supported**

Photometric Interpretation	Storing	Viewing
<b>MONOCHROME1</b>	<b>Yes</b>	<b>Yes</b>
MONOCHROME2	Yes	Yes
RGB	Yes	Yes, Instances are not sorted
YBR_FULL	Yes	No
YBR_FULL_422	Yes	No
YBR_PARTIAL_422	Yes	No
PALETTE COLOR	Yes	No
Others	Yes	No

If Eleva EDI receives improper DICOM, Eleva EDI tries as much as possible (if configured so), to make them proper DICOM. However, Eleva EDI also tries to remain as transparent on images as possible. So, on export the images must be changed only as far as really necessary. Therefore, it is not guaranteed that all DICOM violations of incoming images are repaired (e.g. attributes as one with enumerated values, are not changed). So, improper DICOM input to the Eleva EDI can result in improper DICOM output (no Checks are available for incorrect UIDs, Date-Time formats etc.).

Important implementation remarks and restrictions:

- Eleva EDI allows the operator to modify attributes of the stored images. Eleva EDI does not modify the pixel values of the stored images. Modified images retain their original Study, Series and Image UID.
- The DICOM standard does not guarantee that the advanced Eleva EDI applications can process the received images. This depends on the presence and consistency of a set of attributes in these images. The conditions for running the Eleva EDI applications are specified in separate Eleva EDI application Conformance Statements.
- On the export of imported images the Eleva EDI adds private attributes to the image.
- Eleva EDI does NOT support IVUS (Intravascular Ultrasound) Ultrasound images.
- If during the image transfer the Presentation States instances are transferred before the images the Eleva EDI changes the content of the Images:  
Following attributes present in the original images and are removed by Eleva EDI  
:  
  - (0008,1120) Referenced Patient Seq.
  - (0008,1032) Proc. Code Seq.
  - (0040,0260) Performed Action Item Code Seq.
  - (0040,0275) Requested Attributes Seq.
  - (0040,0280) Comments on the Performed Proc. Steps.
 Following attributes with a value in the original images, are set to a zero length value in the exported images:
  - (0010,0032) Patient Birth Date
  - (0010,1000) Other Patient ID's
  - (0010,1001) Other Patient Names
  - (0010,2160) Ethnic Group

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- 
- (0010,4000) Patient Comments
  - (0010,1010) Patient's Age
  - (0010,1020) Patient's Size
  - (0010,1030) Patient's Weight
  - (0010,2180) Occupation
  - (0010,21B0) Additional Patient's History

Support for additional Standard, Private and Retired attributes:

Eleva EDI stores all additional Standard, Private and Retired attributes in received images. Retrieval of these attributes is only possible (by means of a C-MOVE request) if the following conditions are satisfied:

- The image was encoded (when Eleva EDI was C-STORE SCP) using one of the explicit value representations or
- The image was encoded (when Eleva EDI was C-STORE SCP) using implicit value representation and the move destination (i.e. a C-STORE Service Class Provider) has accepted implicit value representation as the only transfer syntax applicable to the storage SOP class of the image (when Eleva EDI is C-STORE SCU).



**3.2.3.2.4. Presentation Context Acceptance Criterion**

Eleva EDI accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes are accepted by Eleva EDI .

- There is no check for duplicate contexts which are therefore accepted.



**3.2.3.3. Query the Eleva EDI Database**

**3.2.3.3.1. Associated Real-World Activity**

Eleva EDI accepts Associations from systems that wish to query the Eleva EDI database using the C-FIND command.

**3.2.3.3.2. Presentation Context Table**

Eleva EDI will accept the presentation contexts as given in the next table.

**Table 43. Accepted Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 25, “Supported SOP classes by the Eleva EDI AE as SCP,”.

For performance reasons the ELE is preferred.

**3.2.3.3.3. C-FIND SCP Conformance**

Eleva EDI simultaneously handles simultaneous C-FIND requests.

The Eleva EDI database distinguishes two patients with the same Patient ID but different Patient Name or Patient Birth Date. Because the DICOM Query model has Patient ID as Unique Key at patient level, two patients with the same Patient ID cannot be distinguished via the DICOM Standard Query SOP Class.

NOTE: In case a query is performed with the “Patient- Study Only” SOP class on “Patient” Level the Eleva EDI always send back the “Patient’s Name” (0010,0010) attribute (also when it’s not queried for).

The C-FIND-RQ with query-model ‘Study Root Model’ and query-level ‘STUDY’ responds with a GFIND-RSP status xC000 ‘Unable to Process’ in stead of proper ‘Success’ query-responses.

**Table 44. Supported query attributes**

	Attributes	Tag	Supported Matching Keys
PatientLevel	Patient’s Name	0010,0010	X
	Patient ID	0010,0020	X
StudyLevel	Study Date	0008,0020	X
	Study Time	0008,0030	X
	Accession Number	0008,0050	X
	Study Instance UID	0020,000D	X
	Study ID	0020,0010	X
Series	Modality	0008,0060	X
	Series Instance UID	0020.000E	X
	Series Number	0020,0011	X
ImageLevel	SOP Instance UID	0008,0018	X



	Attributes	Tag	Supported Matching Keys
	Instance Number	0020,0013	X

**Table 45. Handling of status codes for the Eleva EDI**

Error Type	Status Code	Action
Refused	0xCxxx	Notification sent, logging and connection abort
	0xB000	Notification sent, logging and connection abort
Error	0xAxxx	Notification sent, logging and connection abort Abort association and logging Notification sent, logging and connection abort Logging and connection abort
Failure	0xh100	Logging
Success	0x000	

#### **3.2.3.3.4. Presentation Context Acceptance Criterion**

Eleva EDI accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that Eleva EDI accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes. There is no check for duplicate contexts and are therefore accepted.

### 3.2.3.4. Retrieve Images from the Eleva EDI Database

#### 3.2.3.4.1. *Associated Real-World Activity*

Eleva EDI accepts Associations from systems that wish to retrieve images from the Eleva EDI database using the C-MOVE command.

#### 3.2.3.4.2. *Presentation Context Table*

Eleva EDI will accept the presentation contexts as given in the next table.

**Table 46. Accepted Presentation Contexts**

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 25, “Supported SOP classes by the Eleva EDI AE as SCP,”.

For performance reasons the ELE is preferred.

#### 3.2.3.4.3. *C-MOVE SCP Conformance*

Eleva EDI supports all Query Retrieve SOP classes listed in Table 3. A G-STORE connection is built after the C-MOVE request, for C-STORE conformance see section 3.1.2.1 and Table 24.

Eleva EDI does not send Intermediate C-MOVE response with status pending.

#### 3.2.3.4.4. *Presentation Context Acceptance Criterion*

Eleva EDI accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that Eleva EDI accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes.

There is no check for duplicate contexts and are therefore accepted.

### 3.3. Eleva EDI AE Media Specification

The Eleva EDI AE provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10 [DICOM]) and the Media Storage Application Profiles (PS 3.11 [DICOM]) STD-GEN-CD for reading and writing.

Eleva EDI supports multi-patient and multi-session (both for reading and writing) CD-R disks.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in Table 45.

**Table 47. Application Profile, Activities and Roles of the DICOM Media part of Eleva EDI**

Application Profile	Identifier	Real World Activity	Role	SC Option
General Purpose CD-R Image Interchange Profile	STD-GEN-CD	Display Directory of CD-R disk	FSR	Interchange
		Write image(s) on CD-R disk	FSC/FSU	Interchange
		Read image(s) from CD-R disk	FSR	Interchange

Only adding on instances is supported for the FSU, deleting is not supported.

#### 3.3.1. File Meta Information

The (Source) Application Entity Title is specified in section 6.1.1.

The Implementation Class UID and the Implementation Version Name in the File Meta Header is specified in section 3.2.

#### 3.3.2. Media related Real-World Activities

##### 3.3.2.1. RWA Display Directory

The Eleva EDI AE will act as a FSR when reading the directory of the medium. This will result in an overview of the patients, studies, series and images on the Eleva EDI screen.

##### 3.3.2.1.1. Application Profile(s) for this RWA

See Table 45.

##### 3.3.2.1.2. Required and optionally DICOMDIR Keys

The Mandatory DICOMDIR Keys are required for the correct display of Directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series, Image.

Possibly present optional DICOMDIR Keys are not displayed.

##### 3.3.2.2. RWA Write images on CD-R disk

The Eleva EDI AE will act as a FSC/FSU when writing all/selected images in a patient folder onto the CD-R medium.

##### 3.3.2.2.1. Application Profile(s) for this RWA

See Table 45.

**3.3.2.2. Support for Attributes in the images**

The same remarks as in section 3.1.2.1 about the existence of Optional, Retired and Private Attributes are applicable.

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

Implementation remarks and restriction:

- When writing the DICOMDIR records the keys values are generated when no value of the corresponding attribute is supplied:
  - - PATIENT\_ID
  - - STUDY\_ID
  - - STUDY\_INSTANCE\_UID
  - - SERIES\_NUMBER
  - - SERIES\_INSTANCE\_UID
  - - IMAGE\_NUMBER
  - - SOP\_INSTANCE\_UID
- The mechanism of generating a value for PATIENT\_ID creates each time a new value based on PATIENT\_NAME for each new study written to the CD-R, even if this study belongs to a patient recorded earlier.
- The default value for the Pixel Intensity Relationship (0028,1040) is set to DISP.

**3.3.2.3. RWA Read images from CD-R disk**

The Eleva EDI AE will act as a FSR when reading all/selected images from the CD-R medium.

**3.3.2.3.1. Application Profile(s) for this RWA**

See Table 45.

**3.3.2.3.2. Support for Attributes in the images**

The Mandatory Attributes of the DICOM images are required for the correct storage of the images in the Eleva EDI internal image database. Optionally Attributes and Retired/Private Attributes are stored too if present; this is equivalent with the Level 2 (Full) conformance for the Storage Service Class in the Network support, see section 3.1.3.2.

The same remarks as in section 3.1.3.2.3 about the storage of images and about requirements to process read images via the dedicated Eleva EDI application functions, are applicable.

**3.3.3. Augmented Application Profile**

Instances of the Private SOP Classes (see Table 24) may be written on the CD-R disk.

**Patient Directory Record Augmentation**

Pat Birth Date	0010,0030
Patient's Sex	0010,0040

**Study Directory Record Augmentation**

Ref.Phys. Name	0008,0090
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**Image Directory Record Augmentation**

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Image Type	0008,0008
SOP Class UID	0008,0016
SOP Inst. UID	0008,0018
Content Date	0008,0023
Content Time	0008,0033
Rows	0028,0010
Columns	0028,0011

**Series Directory Record Augmentation**

Perf.Phys. Name	0008,1050
Body Part Exam.	0018,0015
Protocol Name	0018,1030
PPS Start Time	0040,0245
PPS ID	0040,0253
PPS Description	0040,0254

**Presentation State Directory Record Augmentation**

SOP Class UID	0008,0016
SOP Inst. UID	0008,0018





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## 4. COMMUNICATION PROFILES

### 4.1. Supported Communication Stacks

The Eleva EDI application provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

### 4.2. TCP/IP Stack

Eleva EDI inherits its TCP/IP stack from the SUN Solaris system upon which it executes.

#### 4.2.1. Physical Media Support

- Ethernet ISO.8802-3. Standard AUI, optional twisted pair 10/100-BaseT.

## 5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

The Standard DICOM SOP Classes may be Extended with additional attributes:

- Standard attributes of other SOP Classes; the presence of these attributes in exported images can be configured, see section 6.2
- Retired (from ACR NEMA 1.0 or 2.0) attributes; the presence of these attributes in exported images can be configured, see section 6.2
- Private attributes; the presence of these attributes in exported images can be configured, see section 6.2.

The Table 45 list the supported Private SOP Classes. The usage of these SOP Classes are in the Eleva EDI domain only. However instances of these Private SOP Classes may be exported towards a PACS environment and stored in a (central) DICOM archive and should be configured in order to make this possible.

**Table 48. Private SOP classes of Eleva EDI**

SOP Class	Description
3D Volume Storage (Private class)	1.3.46.670589.5.0.1.1
3D Volume Object Storage (Private class)	1.3.46.670589.5.0.2.1
Surface Storage (Private class)	1.3.46.670589.5.0.3.1
CT Synthetic Image (Private class)	1.3.46.670589.5.0.9
MR Synthetic Image (Private class)	1.3.46.670589.5.0.10
MR Cardio Storage (Private class)	1.3.46.670589.5.0.8.1
MR Cardio Analysis Storage (Private class)	1.3.46.670589.5.0.11.1
Specialized X-ray (Private class)	1.3.46.670589.2.3.1.1
CX Image (Private class)	1.3.46.670589.2.4.1.1
CX Synthetic Image (Private class)	1.3.46.670589.5.0.12
Perfusion (Private class)	1.3.46.670589.5.0.13
Perfusion Analysis (Private class)	1.3.46.670589.5.0.14

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## 6. CONFIGURATION

The Eleva EDI system is configured by means of a configuration program. This program is accessible at start-up of the Eleva EDI system. It is password protected and intended to be used by Philips Customer Support Engineers only. The program prompts the Customer Support Engineer to enter configuration information needed by the Eleva EDI application.

### 6.1. Configuration Items ELEVA Examination Control

#### 6.1.1. AE Title/Presentation Address mapping

##### 6.1.1.1. Local AE Titles and Presentation Addresses

The local Application Entity Title, local System Name and local (System) IP Address are selected by the service configuration program.

##### 6.1.1.2. Remote AE Titles and Presentation Addresses

All remote applications to be selected as image export destination or as Worklist supplier are configurable for the following items:

- The Application Entity Title of the remote application.
- The IP Address and Port Number at which the remote application should accept Association requests.
- The Remote Host Name (i.e. System name) of the system on which the remote application resides.

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## 6.2. Configuration Items ELEVA EDI ViewForum AE

### 6.2.1. AE Title/Presentation Address mapping

#### 6.2.1.1. Local AE Title and Presentation Address

The Eleva EDI AE title is default equal to the IP host name. The Customer Support Engineer at installation can change this host name. The Eleva EDI AE can be changed independently.

Eleva EDI listens on port 3010. This port number is not configurable.

#### 6.2.1.2. Remote AE Titles and Presentation Addresses

All relevant remote applications able to setup a DICOM Association towards Eleva EDI must be configured at Eleva EDI configuration time. The Customer Support Engineer must provide the following information for each remote application:

- The Application Entity title.
- The SOP classes and Transfer Syntaxes for which Eleva EDI accepts Associations.

All relevant remote applications able to accept DICOM Associations from Eleva EDI, the following information must be provided:

- The Application Entity title.
- The host name/IP address on which the remote application resides.
- The port number at which the remote application accepts Association requests.

### 6.2.2. Configurable parameters

#### 6.2.2.1. Configuration per Eleva EDI system

The following items are configurable per Eleva EDI installation:

- The SOP classes (out of the full list of SOP Classes in Table 24 and Table 25) and Transfer Syntaxes (out of the full list in Presentation Context tables in this Statement) to be used.
- The maximum PDU size for associations initiated by Eleva EDI (default is 0 meaning unlimited PDU size)

#### 6.2.2.2. Configuration per remote system

The following items are configurable per remote system:

- The SOP classes and Transfer Syntaxes for which Eleva EDI sets-up and accepts Associations.
- Storage Commitment request must be sent after Storage request. The Storage Commitment service can be configured for one node only. This node is configured as archive.
- Automatic conversion of images of SOP classes not supported by remote systems into SC Image Storage SOP instances,
- The maximum PDU size for Associations initiated by Eleva EDI,



- 
- Export of 'pure' DICOM images (i.e. only the standard DICOM attributes defined in the related IOD) or extended DICOM images (with additional Standard DICOM, Private and Retired Attributes)
  - Support of Overlays for DICOM 99 and for CD.

### 6.2.2.3. Print Configuration

Configurable per Eleva EDI installation:

- The DICOM printers to be selected by the operator.

The following print parameters are configurable per DICOM printer type:

- The Medium Type
- Film Size ID (i.e. Media Size)
- Resolution (300,600 dpi)
- Color model (8,16 bits), color

These print parameters can be selected from choice lists. These choice lists are defined via so-called prototypes for each type of printer and print medium. These prototypes are also configurable.

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## 7. SUPPORT OF EXTENDED CHARACTER SETS

The ISO\_IR 100 Specific character set is supported.



## ANNEX 1. Created SC Objects by the ELEVA DI DICOM AE

The following tables give a detailed overview of all supported attributes of the SC Storage SOP Class. The list of possible values are given (if applicable). The situation that an attribute is present conditionally/optionally or that an attribute may contain a zero length value, is indicated too. Conditions and Defined/Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.

Note: The shaded attributes are received from the RIS with the Worklist Management Query.

**Table 49. Secondary Capture Image Storage SOP Class -Patient Module**

Attribute Name	Tag	Note
Patient's Name	0010,0010	Received From RIS or Entered by Operator.
Patient ID	0010,0020	Received From RIS or Entered by Operator.
Patient's Birth Date	0010,0030	Received From RIS or Entered by Operator.
Patient's Sex	0010,0040	Received From RIS or Entered by Operator.

**Table 50. SC Image Storage SOP Class -General Study Module**

Attribute Name	Tag	Note
Study Date	0008,0020	
Study Time	0008,0030	
Accession Number	0008,0050	Zero length if not received from RIS.
Referring Physician's Name	0008,0090	Zero length if not received from RIS.
Study Instance UID	0020,000D	Generated at the creation of the study or received from RIS.
Study ID	0020,0010	undefined.

**Table 51. SC Image Storage SOP Class -General Series Module**

Attribute Name	Tag	Note
Series Date	0008,0021	
Series Time	0008,0031	
Modality	0008,0060	Applied Value(s): OT
Performing Physician's Name	0008,1050	Received from RIS, entered by user or is empty is not known.
Series Instance UID	0020,000E	Generated at creation of the series.
Series Number	0020,0011	
Laterality	0020,0060	Always zero length value
Performed Procedure Step Start Date	0040,0244	
Performed Procedure Step Start Time	0040,0245	
Performed Procedure Step Description	0040,0254	

**Table 52. SC Image Storage SOP Class -SC Image Equipment Module**

Attribute Name	Tag	Note
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Attribute Name	Tag	Note
Conversion Type	0008,0064	Applied Value(s): WSD
Manufacturer	0008,0070	Applied Value(s): Philips Medical Systems

**Table 53. SC Image Storage SOP Class -General Image Module**

Attribute Name	Tag	Note
Acquisition Date	0008,0022	
Content Date	0008,0023	
Acquisition Time	0008,0032	
Content Time	0008,0033	
Acquisition Number	0020,0012	
Instance Number	0020,0013	Applied Value(s): 1-n
Patient Orientation	0020,0020	Always zero length value
Image Comments	0020,4000	Contains also the ELEVA EDI image annotations on normal (i.e. non zoomed) images in the format --(x,y) text --. This attribute is not present if not entered by user and if no annotations are present.

**Table 54. Secondary Capture Image Storage SOP Class -Image Pixel Module**

Attribute Name	Tag	Note
Samples per Pixel	0028,0002	Applied Value(s): 1
Photometric Interpretation	0028,0004	Applied Value(s): MONOCHROME2
Rows	0028,0010	Applied Value(s): 1024, 512
Columns	0028,0011	Applied Value(s): 1024, 512
Bits Allocated	0028,0100	Applied Value(s): 8
Bits Stored	0028,0101	Applied Value(s): 8
High Bit	0028,0102	Applied Value(s): 7
Pixel Representation	0028,0103	Applied Value(s): 0000
Pixel Data	7FE0,0010	

**Table 55. Secondary Capture Image Storage SOP Class -Sc Image Module**

Attribute Name	Tag	Note
Date of Secondary Capture	0018,1012	
Time of Secondary Capture	0018,1014	





**Table 56. SC Image Storage SOP Class -Sop Common Module**

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied Value(s): ISO_IR 100
SOP Class UID	0008,0016	Applied Value(s): 1.2.840.10008.5.1.4.1.1.7
SOP Instance UID	0008,0018	Generated at creation of the image.



## ANNEX 2. Created XRF Objects by the ELEVA DI DICOM AE

The following tables give a detailed overview of all supported attributes of the XA Storage SOP Class. The list of possible values are given. The situation that an attribute is present conditionally/optionally or that an attribute may contain a zero length value, is indicated too. Conditions and Defined/Enumerated Values of DICOM 3.0 are applicable but are not shown in the tables.

*Note: The shaded attributes are received from the RIS with the Worklist Management Query.*

**Table 57. X-Ray Radiofluoroscopic Image Storage SOP Class -Patient Module**

Attribute Name	Tag	Note
Patient's Name	0010,0010	Received From RIS or Entered by Operator.
Patient ID	0010,0020	Received From RIS or Entered by Operator.
Patient's Birth Date	0010,0030	Received From RIS or Entered by Operator.
Patient's Sex	0010,0040	Received From RIS or Entered by Operator.

**Table 58. X-Ray Radiofluor. Image Storage SOP Class -General Study Module**

Attribute Name	Tag	Note
Study Date	0008,0020	
Study Time	0008,0030	
Accession Number	0008,0050	Zero length if not received from RIS.
Referring Physician's Name	0008,0090	Zero length if not received from RIS.
Study Instance UID	0020,000D	Generated at the creation of the study or received from RIS.
Study ID	0020,0010	Undefined.

**Table 59. X-Ray Radiofluor. Image Storage SOP Class -General Series Module**

Attribute Name	Tag	Note
Series Date	0008,0021	
Series Time	0008,0031	
Modality	0008,0060	Applied Value(s): RF
Performing Physician's Name	0008,1050	Received from RIS, entered by user or is empty if not known.
Series Instance UID	0020,000E	
Series Number	0020,0011	
Laterality	0020,0060	Always zero length value.
Performed Procedure Step Start Date	0040,0244	
Performed Procedure Step Start Time	0040,0245	
Performed Procedure Step Description	0040,0254	

**Table 60. X-Ray Radiof. Image Storage SOP Class-General Equipment Module**

Attribute Name	Tag	Note
Manufacturer	0008,0070	Applied Value(s): Philips Medical Systems
Software Version(s)	0018,1020	Applied Value(s): R1.1 LUTPROM 02-09-04 R6.1.1

**Table 61. X-Ray Radiofluor. Image Storage SOP Class -General Image Module**

Attribute Name	Tag	Note
Acquisition Date	0008,0022	
Content Date	0008,0023	
Acquisition Time	0008,0032	
Content Time	0008,0033	
Acquisition Number	0020,0012	
Instance Number	0020,0013	
Patient Orientation	0020,0020	Always zero length value.
Image Comments	0020,4000	Contains also the ELEVA EDI image annotations on normal (i.e. non zoomed) images in the format --(x,y) text --. This attribute is not present if not entered by user and if no annotations are present.

**Table 62. X-Ray Radiofluor. Image Storage SOP Class -Image Pixel Module**

Attribute Name	Tag	Note
Samples per Pixel	0028,0002	Applied Value(s): 1
Photometric Interpretation	0028,0004	Applied Value(s): MONOCHROME2
Rows	0028,0010	Applied Value(s): 1024, 512
Columns	0028,0011	Applied Value(s): 1024, 512
Bits Allocated	0028,0100	Applied Value(s): 8
Bits Stored	0028,0101	Applied Value(s): 8
High Bit	0028,0102	Applied Value(s): 7
Pixel Representation	0028,0103	Applied Value(s): 0000
Pixel Data	7FE0,0010	



**Table 63. X-Ray Radiofl. Image Storage SOP Class -Display Shutter Module**

Attribute Name	Tag	Note
Shutter Shape	0018,1600	Applied Value(s): CIRCULARRECTANGULAR
Shutter Left Vertical Edge	0018,1602	
Shutter Right Vertical Edge	0018,1604	
Shutter Upper Horizontal Edge	0018,1606	
Shutter Lower Horizontal Edge	0018,1608	
Center of Circular Shutter	0018,1610	
Radius of Circular Shutter	0018,1612	

**Table 64. X-Ray Radiofluor. Image Storage SOP Class -X-ray Image Module**

Attribute Name	Tag	Note
Image Type	0008,0008	Applied Value(s): ORIGINAL, PRIMARY, SINGLE PLANE
Samples per Pixel	0028,0002	
Photometric Interpretation	0028,0004	
Bits Allocated	0028,0100	
Bits Stored	0028,0101	
High Bit	0028,0102	
Pixel Representation	0028,0103	
Pixel Intensity Relationship	0028,1040	Applied Value(s): DISP

**Table 65. X-Ray Radiofl. Image Storage SOP Class -X-ray Acquisition Module**

Attribute Name	Tag	Note
KVP	0018,0060	Always zero length value.
Exposure	0018,1152	Always zero length value.
Radiation Setting	0018,1155	Applied Value(s): GR, SC

**Table 66. X-Ray Radiofluoroscopic Image Storage SOP Class -Voi Lut Module**

Attribute Name	Tag	Note
Window Center	0028,1050	This attribute is related to the ELEVA DI Contrast / Brightness.
Window Width	0028,1051	This Attribute is related to the ELEVA DI Contrast / Brightness.

**Table 67. X-Ray Radiofluor. Image Storage SOP Class -Sop Common Module**

Attribute Name	Tag	Note
Specific Character Set	0008,0005	Applied Value(s): ISO_IR 100
SOP Class UID	0008,0016	Applied Value(s): 1.2.840.10008.5.1.4.1.1.12.2
SOP Instance UID	0008,0018	



## ANNEX 3. Created Present. State Object by the ELEVA DI DICOM AE

**Table 68. Softcopy PS Storage SOP Class - C-STORE-RQ - Patient Module**

Attribute Name	Tag	Note
Patient's Name	0010,0010	Patient's full name.
Patient ID	0010,0020	Primary hospital identification number or code for the patient.
Patient's Birth Date	0010,0030	Birth data of the patient.
Patient's Sex	0010,0040	Sex of the named patient. Applied Value(s): F, M, O

**Table 69. Softcopy PS Storage SOP Class - C-STORE-RQ - Gen. Study Module**

Attribute Name	Tag	Note
Study Date	0008,0020	Date the study started.
Study Time	0008,0030	Time the study started.
Accession Number	0008,0050	A RIS generated number which identifies the order of the study.
Referring Physician's Name	0008,0090	Patient's referring physician.
Study Instance UID	0020,000D	Unique identifier for the Study.
Study ID	0020,0010	User or equipment generated Study identifier.

**Table 70. Softcopy PS Storage SOP Class - C-STORE-RQ -Gen. Series Module**

Attribute Name	Tag	Note
Series Date	0008,0021	Date the Series started.
Series Time	0008,0031	Time the Series started.
Performing Physician's Name	0008,1050	Name of the Physicians administering the Series.
Series Instance UID	0020,000E	Unique identifier of the Series.
Series Number	0020,0011	A number that identifies the Series.
Laterality	0020,0060	Laterality of (paired) body part examined. Required if the body part examined is a paired structure. Applied Value(s): L, R
Performed Procedure Step Start Date	0040,0244	
Performed Procedure Step Start Time	0040,0245	
Performed Procedure Step Description	0040,0254	

**Table 71. Softcopy PS Storage SOP Class-C-STORE-RQ-Gen. Equipm. Module**

Attribute Name	Tag	Note
Manufacturer	0008,0070	Manufacturer of the equipment that produced the digital images.
Software Version(s)	0018,1020	Manufacturers designation of software version of the equipment that produced the digital images.

**Table 72. Softcopy PS Storage SOP Class-C-STORE-RQ-Sop Common Mod.**



Attribute Name	Tag	Note
Specific Character Set	0008,0005	
SOP Class UID	0008,0016	
SOP Instance UID	0008,0018	

**Table 73. Softcopy PS Stor. SOP Class-C-STORE-RQ-Softcopy VOI LUT Mod.**

Attribute Name	Tag	Note
Softcopy VOI LUT Sequence	0028,3110	
>Window Center	0028,1050	
>Window Width	0028,1051	

**Table 74. Softcopy PS Stor. SOP Class-C-STORE-RQ-Softcopy Pres. Lut Mod.**

Attribute Name	Tag	Note
Presentation LUT Shape	2050,0020	

**Table 75. Softcopy PS Storage SOP Class-C-STORE-RQ-Disp. Area Module**

Attribute Name	Tag	Note
Displayed Area Selection Sequence	0070,005A	
>Displayed Area Top Left Hand Corner	0070,0052	
>Displayed Area Bottom Right Hand Corner	0070,0053	
>Presentation Size Mode	0070,0100	Applied Value(s): MAGNIFY, SCALE TO FIT, TRUE SIZE
>Presentation Pixel Aspect Ratio	0070,0102	

**Table 76. Softcopy PS Storage SOP Class-C-STORE-RQ-Pres. State Module**

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

**Table 77. Softcopy PS Storage SOP Class-C-STORE-RQ - Pres. Series Module**

Attribute Name	Tag	Note
Modality	0008,0060	Applied Value(s): PR

**Table 78. Softcopy PS Storage SOP Class-C-STORE-RQ-Graphic Layer Mod.**

Attribute Name	Tag	Note
Graphic Layer Sequence	0070,0060	
>Graphic Layer	0070,0002	
>Graphic Layer Order	0070,0062	

**Table 79. Softcopy PS Storage SOP Class-C-STORE-RQ-Graphic Annot. Mod.**

Attribute Name	Tag	Note
Graphic Annotation Sequence	0070,0001	
>Graphic Layer	0070,0002	
>Text Object Sequence	0070,0008	
>>Bounding Box Annotation Units	0070,0003	
>>Anchor Point Annotation Units	0070,0004	Applied Value(s): DISPLAY, PIXEL
>>Unformatted Text Value	0070,0006	
>>Bounding Box TLHC	0070,0010	
>>Bounding Box BRHC	0070,0011	
>>Bounding Box Text Horizontal Justification	0070,0012	Applied Value(s): CENTER, LEFT, RIGHT
>>Anchor Point	0070,0014	
>>Anchor Point Visibility	0070,0015	Applied Value(s): N, Y
>>Private Creator Group 2001	2001,0010	Applied Value(s): Philips Imaging DD001
>>Measurement Text Units	2001,105D	
>>Measurement Text Type	2001,105E	
>Graphic Object Sequence	0070,0009	
>>Graphic Annotation Units	0070,0005	
>>Graphic Dimensions	0070,0020	
>>Number of Graphics Points	0070,0021	
>>Graphic Data	0070,0022	
>>Graphic Type	0070,0023	Applied Value(s): CIRCLE, ELLIPSE, INTERPOLATED, POINT, POLYLINE
>>Graphic Filled	0070,0024	Applied Value(s): N, Y
>>Private Creator Group 2001	2001,0010	Applied Value(s): Philips Imaging DD001
>>Graphic Line Style	2001,1046	
>>Poly Line Interpolation Method	2001,104B	
>>Poly Line Begin Point Style	2001,104C	
>>Poly Line End Point Style	2001,104D	
>Private Creator Group	2001,0010	Applied Value(s): Philips Imaging DD001



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Attribute Name	Tag	Note
2001		
>MR Series NR of Chemical Shifts	2001,105A	

