

**Philips Medical Systems
DICOM Conformance Statement**

**EasyVision R4.1
DICOM Store, Query/Retrieve, Print, Media**

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1 Introduction

This section provides general information about the scope, intended audience and contents of this Conformance Statement and how to use it.

1.1 Scope and field of application

The scope of this DICOM Conformance Statement is to facilitate data exchange between equipment of Philips Medical Systems and with equipment of other vendors. This document specifies the compliance to the DICOM standard, formally called the NEMA PS 3.X-1996 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), Service Elements 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. The conformance to the DICOM standard is a key element of the Inturis Program (see [INTURIS]).

1.2 Intended audience

This Conformance Statement is intended for:

- (potential) clients,
- marketing staff interested in data exchange functionality,
- system integrators and Customer Support Engineers of medical equipment,
- software engineers 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 section 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2-1996.

Additionally, the sections following 7 (if present) specify the details of the applied IODs and Service Elements.

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 3.3-1996.

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

1.5 References

- [DICOM] The Digital Imaging and Communications in Medicine (DICOM) standard:
NEMA PS 3.X (X refers to the part 1 - 13)
National Electrical Manufacturers Association (NEMA) Publication Sales

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[INTURIS] Philips Inturis Program
Integrated Clinical Solutions
Philips Medical Systems Nederland B.V. (see address at page ii)

[EV REL BUL] EasyVision Release Bulletin, Document Number 4522 220 84541
Clinical Solutions Systems (CSS)
Philips Medical Systems Nederland B.V. (see address at page ii)

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 a networked 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 analyse 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).

2 Implementation model

The EasyVision Release 4.1 system (further mentioned EasyVision) of Philips Medical Systems is a comprehensive range of hardware and software modules that allow for tailored clinical solutions. The software applications are categorised in packages, for instance the Stack View package for CT/MR images. The hardware consists out of a range of different SUN stations allowing for flexibility in price-performance. The range is from simple user box workstation till complex client-server configurations.

EasyVision provides the following DICOM data exchange features:

- It receives images sent to it by local applications (e.g. workstations or imaging modalities) and stores them in a network database.
- It allows the operator to copy images from the database to remote databases and vice versa. For this purpose the operator is able to query remote databases.
- It allows a remote system to query the EasyVision database and to retrieve images from it.
- It allows the operator to print images stored in the database on a DICOM printer.
- It is able to read and write DICOM CD-R disks.

EasyVision allows the operator also to view, to analyse and process the images stored in the database. Some advanced analysis and processing applications are primarily designed for images generated by Philips equipment and that are sent to the EasyVision by means of a private protocol (like Gyrocom or PMSNet, the Philips Medical Systems proprietary communication protocol). Some of these advanced applications may not perform optimally when applied to images that are sent to EasyVision by means of DICOM because additional required data is lacking.

2.1 Application Data Flow Diagram

The EasyVision system behaves as a single Application Entity. Its related Implementation Model is shown in Figure 2-1 on page v.

The EasyVision operator can request to query on a selected remote system, request to copy images from EasyVision to a selected remote system and request to retrieve selected images from remote systems. This results in Associations initiated by EasyVision.

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

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

2.2 Functional definition of Application Entities

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

Query/Retrieve and Store service classes.

The EV-Print Application Entity acts as Service Class User (SCU) for the Print Service Class.

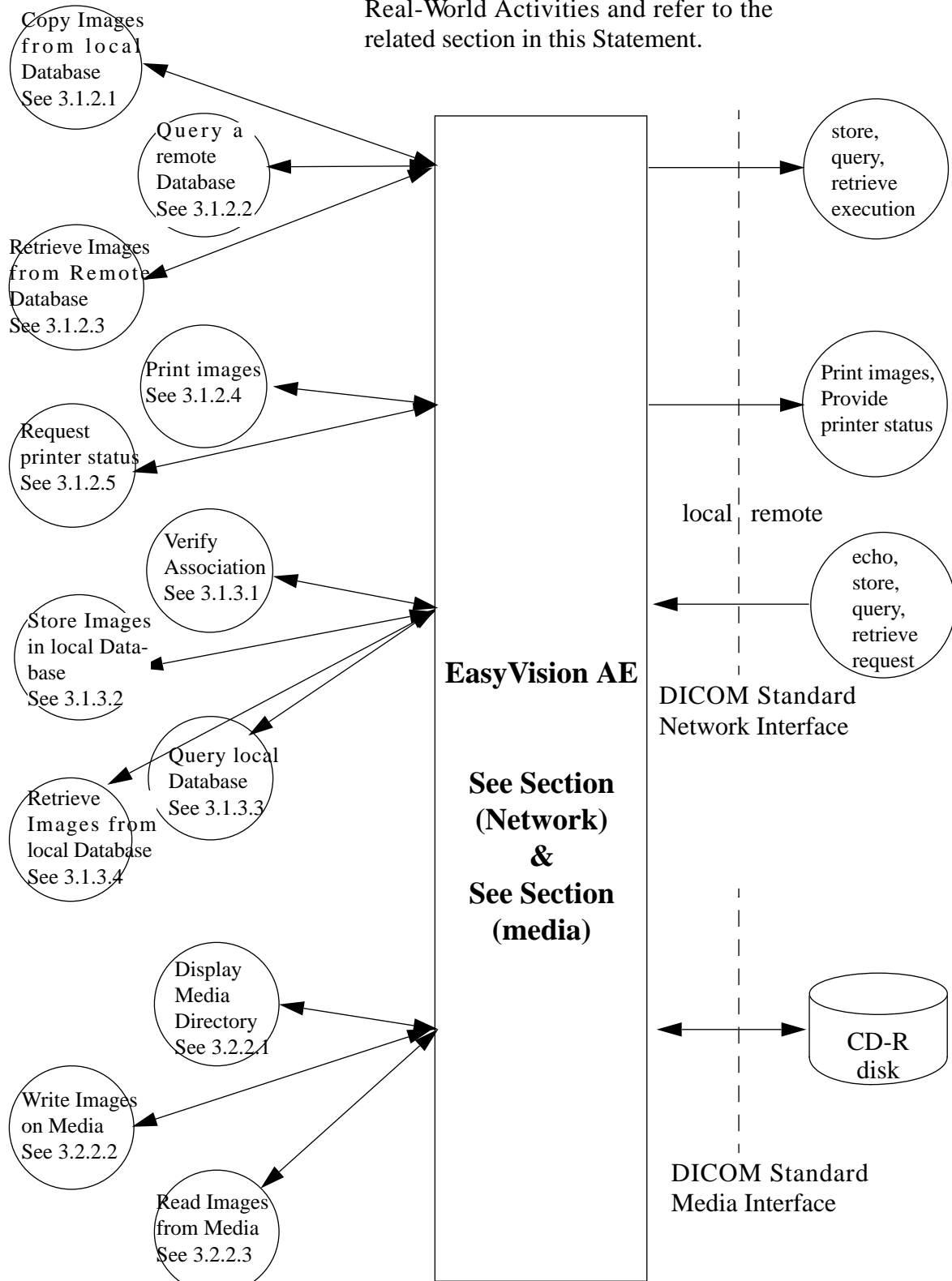
EasyVision acts also as a File Set Creator (FSC), File Set Reader (FSR) and File Set Updater (FSU) of the Media Service Class.

2.3 Sequencing of Real World Activities

All Real-World Activities as specified in Figure 2-1 may occur independently from each other, except that the two local Print Real-World Activities are mutual exclusive: A request for the printer status is not done when a request for image printing is busy, vice versa.

Figure 2-1: EasyVision Implementation Model

The circles to the left represent the Local Real-World Activities and refer to the related section in this Statement.



3 AE Specifications

The Network capabilities of the EasyVision DICOM Application Entity are specified in section and the Media capabilities are specified in section .

3.1 EasyVision AE Network Specification

The EasyVision Application Entity provides Standard Conformance to the DICOM V3.0 SOP classes as an SCU specified in Table 3. The following remarks are important:

- The list of available SOP Classes out of the full list in Table 3 can be configured per EasyVision system at installation time. The SOP Classes to be used as SCU can be configured per remote station. See also section on page xxx.
- In case the remote system does not support the import of a specific Image Storage SOP Class, EasyVision will convert (if configured to do so) these images and sends them via the SC Image SOP Class.
- Multi-frame Ultrasound images and Biplane XA images are not exported as such but as a sequence of separate images.
- The Private SOP Classes may be stored in image archives but are to be used in EasyVision systems only. See also section on page xxviii.

Table 3-1: Supported SOP classes by the EasyVision AE as SCU

SOP class Name	UID
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
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage (retired standard class)	1.2.840.10008.5.1.4.1.1.5
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Image Storage (retired standard class)	1.2.840.10008.5.1.4.1.1.6
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
XA Single-Plane 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
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

Table 3-1: Supported SOP classes by the EasyVision AE as SCU (Continued)

SOP class Name	UID
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
> ^a 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
3D Volume Storage (Private class)	1.3.46.670589.5.0.1
3D Object Storage (Private class)	1.3.46.670589.5.0.2
Surface Storage (Private class)	1.3.46.670589.5.0.3
Composite Object Storage (Private class)	1.3.46.670589.5.0.4
MR Cardio Profile Image Storage (Private class)	1.3.46.670589.5.0.7
MR Cardio Image Storage (Private class)	1.3.46.670589.5.0.8

a. The '>' sign indicates that the SOP Class is part of the above mentioned Meta SOP Class.

The EasyVision Application Entity provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCP specified in Table 3. The following remarks are important:

- The list of available SOP Classes out of the full list in Table 3 can be configured per EasyVision system at installation time. The SOP Classes to be used as SCP can be configured per remote station. See also section on page xxx.
- Multi-frame Ultrasound images and Biplane XA images can be imported but are stored as a sequence of separate images.
- The Private SOP Classes may be stored in image archives but are to be used in EasyVision systems only. See also section on page xxviii.

Table 3-2: Supported SOP classes by the EasyVision 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

Table 3-2: Supported SOP classes by the EasyVision AE as SCP (Continued)

SOP class Name	UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multi Frame Image Storage (retired standard class)	1.2.840.10008.5.1.4.1.1.3
US Multi Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage (retired standard class)	1.2.840.10008.5.1.4.1.1.5
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Image Storage (retired standard class)	1.2.840.10008.5.1.4.1.1.6
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
XA Single-Plane 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
XA Bi-Plane Image Storage	1.2.840.10008.5.1.4.1.1.12.3
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
3D Object Storage (Private class)	1.3.46.670589.5.0.2
Surface Storage (Private class)	1.3.46.670589.5.0.3
Composite Object Storage (Private class)	1.3.46.670589.5.0.4
MR Cardio Profile Image Storage (Private class)	1.3.46.670589.5.0.7
MR Cardio Image Storage (Private class)	1.3.46.670589.5.0.8

3.1.1 Association Establishment Policies

3.1.1.1 General

EasyVision will offer unrestricted PDU size (indicated as PDU size 0) on Associations initiated by EasyVision itself. This is also configurable per remote station. EasyVision will accept any PDU size offered on Associations initiated by remote applications.

3.1.1.2 Number of Associations

The number of simultaneous Associations supported by EasyVision 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, EasyVision will initiate at most 2 simultaneous Associations. One Association is used to issue query requests. The other Association is used to issue store, retrieve and print requests.

EasyVision will further initiate an Association for each remote retrieve request executed by EasyVision as a MOVE Service Class Provider. These Associations are used to issue the store suboperations implied by the retrieve requests. The number of simultaneous store Associations for this retrieve purpose is in principle not limited.

EasyVision will further initiate an Association for each auto-forward request from some Philips equipment by means of private protocols (like Gyrocom and PMSnet, the Philips proprietary communication protocol). The number of simultaneous store Associations for this auto-forward purpose is in principle not limited.

3.1.1.3 Asynchronous Nature

EasyVision does not support asynchronous operations and will not perform asynchronous window negotiation.

3.1.1.4 Implementation Identifying Information

The Implementation Class UID is: 1.3.46.670589.5.2.10

The implementation version name is: EV41

3.1.2 Association Initiation Policy

EasyVision initiates Associations as a result of the following events:

- The EasyVision operator or a remote application copies selected images from the EasyVision database to another database (i.e. image export), see section 3.1.2.1 on page x;
- The EasyVision operator queries a remote database, see section 3.1.2.2 on page xiii;
- The EasyVision operator copies selected images from a remote database to another database, see section 3.1.2.3 on page xiv.
- The EasyVision operator requests to print selected images in the EasyVision database, see section 3.1.2.4 on page xvi.
- The EasyVision operator requests for the status of a selected printer, see section 3.1.2.5 on page xviii.

3.1.2.1 Copy Images from EasyVision (i.e. Image Export)

3.1.2.1.1 Associated Real-World Activity

The operator is able to copy all/selected images in a patient folder from the local EasyVision database to a another database (i.e. image export) by means of the copy tool in the EasyVision data handling facility. EasyVision initiates for each selected study 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 study have been transmitted. EasyVision handles operator copy requests one after another.

A DICOM copy action can also be initiated indirectly on some Philips equipment by means of private protocols (like Gyrocom and PMSnet, the Philips proprietary communication protocol). This is the auto-forward function. EasyVision is able to simultaneously handle these auto-forward requests.

A remote application copies images from the local EasyVision database to a another database by sending a C-MOVE request to EasyVision. EasyVision 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 images selected by the retrieve request identifier have been transmitted. EasyVision is able to simultaneously handle C-MOVE requests.

3.1.2.1.2 Proposed Presentation Contexts

EasyVision will propose the following presentation contexts:

Table 3-3: Proposed Presentation Contexts for Copy EasyVision to Other

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		

Table 3-3: Proposed Presentation Contexts for Copy EasyVision to Other (Continued)

See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note	See Note	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
See Note	See Note	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
See Note	See Note	JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCU	None
See Note	See Note	JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None

Note: Any of the Standard Image Storage and Private SOP classes listed in Table 3, “Supported SOP classes by the EasyVision AE as SCU,” on page vi.

3.1.2.1.3 C-STORE SCU Conformance

Options:

Extended negotiation is not supported.

Status display and error handling:

The store response status is displayed via the user interface of EasyVision.

EasyVision 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.

Generation of new images:

Some EasyVision applications are able to generate new derived images from a set of received (original) images. An example is a 3D reconstructed image from a CT or MR image set. The attributes in these generated images are not specified in this Conformance Statement but specified in detail in the EasyVision Release Bulletin [EV REL BUL] as they are private SOP Classes.

Important remarks about the exported images:

- The images are exported in the status “as last seen”.
- EasyVision allows the operator to modify attributes of the stored images. EasyVision 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, EasyVision will convert (if configured to do so) the images and sends them via the SC Image SOP Class. These Secondary Capture images are 8 bits deep and additional information (like graphics, text and important attribute information) are burnt-in.
- In case of colour images, all colour coding schemes are sent out just like they are received. However, the image handling is based on RGB colour coding.
- EasyVision does not support standard DICOM overlays and curves, so will never be sent out. Overlay and curve data may be exported via private Philips attributes (if configured to do so).
- Philips modality images imported into EasyVision via a protocol other than DICOM and then exported via DICOM by EasyVision, will conform as much as possible to the DICOM Conformance Statement of the Philips modality.
- Attributes 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 coding of Image Number in CT images imported via a non-DICOM interface and exported via DICOM is as follows:
Modality Image Number 1 => DICOM Image Number 1000
Modality Image Number 1a => DICOM Image Number 1001
Modality Image Number 1b => DICOM Image Number 1002 etc.
Modality Image Number 2 => DICOM Image Number 2000 etc.
- The exported EasyVision images do not contain Image Number if the original images received from modalities (possibly via a non-DICOM interface) do not contain this attribute or provide information in other attributes to EasyVision to generate it.
- Exported CT/MR images relate Scannogram and related Slice images on the following way: Attribute 'Referenced Image Sequence' is present in the slice images and points to the related Scannogram image.
Note that Attribute 'Frame of Reference UID' in the Scannogram (Localiser image) and related image slices are not guaranteed to be equal; this depends on the source of the images.
- A number of attributes (e.g., Window Width and Window Center) can be formatted as floating point numbers.
- For SC images only one Window Width and Window Center value is exported.

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 EasyVision configuration (see section on page xxx).

Private elements are not described except for the following elements that facilitate the correct interpretation of the pixel data of images exported by EasyVision:

- *odd group number, 00YY Owner Data Elements (VR=LO, VM=1)*
The value of this text element are the Recognition Codes and it declares that all elements YYxx in the odd numbered group are Private Philips elements. The EasyVision Recognition

Codes are:

Group 9	'SPI-P Release 1'
Group 11	'SPI-P Release 1'
Group 21	'SPI-P-Private_CDS Release 1'
Group 29	'SPI-P-Private_ICS Release 1'
	'SPI-P-Private_ICS Release 1;1'
	'SPI-P-Private_ICS Release 1;5'

- *0009, YY04 Image Data Consistence (VR=LO, VM=1-n)*

This element indicates the consistency of the data elements because of incorporated processing, windowing or burnt-in graphics. A data element becomes inconsistent if its value incorporates a value (or reference to a value) which has been changed while the data element itself has not been changed or deleted. Updating or deleting such data elements cannot be done if the data element is a free formatted data element or other than a standard data element.

The generic format of the multiple values of this text element is: <free text> | '\$'<enumerated text>. The first value is a global indication of the consistency and the following enumerations are defined for it:

- '\$unknown': This is the default value.
- '\$normal': Normal consistency.
- '\$limited': Possibly limited consistency.

The other (second etc.) values of this element give detailed consistency information and are not specified in this Statement.

- *0019, YY25 Original Pixel Data Quality (VR=LO, VM=1-n)*

This element indicates that the quality of the original pixel data is limited because of one reason or another. The generic format and enumerated values are the same as for private element 0009, YY04 Image Data Consistence.

- *0029, YY25 Processed Pixel Data Quality (VR=LO, VM=1-n)*

This element indicates that the quality of the processed pixel data is limited because of incorporated processing, windowing or burnt in graphics. The first value summarizes the quality. Each subsequent value identifies one aspects which contributes to the quality , in order of occurrence. The generic format and enumerated values are the same as for private element 0009, YY04 Image Data Consistence.

- A private group with group number 7FE1 can be available to store non standard pixel data behind the 7FE0 group which contains the standard pixel data.

3.1.2.2 Query a Remote Database

3.1.2.2.1 Associated Real-World Activity

The operator queries a remote database by means of the query tool in the EasyVision data handling facility. EasyVision 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.

3.1.2.2.2 Proposed Presentation Contexts

EasyVision will propose the following presentation contexts:

Table 3-4: Proposed Presentation Contexts for Remote Database Query

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note	See Note	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
See Note	See Note	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
See Note	See Note	JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCU	None
See Note	See Note	JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None

Note: Any of the FIND SOP classes listed in Table 3, “Supported SOP classes by the EasyVision AE as SCU,” on page vi.

3.1.2.2.3 C-FIND SCU Conformance

EasyVision will not generate queries containing optional keys. EasyVision will not generate relational queries.

3.1.2.3 Retrieve Images from a Remote Database

3.1.2.3.1 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 EasyVision data handling facility. EasyVision initiates for each selected study an Association to the selected peer entity and uses it to send C-MOVE requests (and receive the associated move replies). The Association is released when all selected images in the selected study have been transmitted.

3.1.2.3.2 Proposed Presentation Contexts

EasyVision will propose the following presentation contexts:

Table 3-5: Proposed Presentation Contexts for Copy Remote to Other

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See Note	See Note	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
See Note	See Note	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
See Note	See Note	JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCU	None
See Note	See Note	JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None

Note: Any of the MOVE SOP classes listed in Table 3, "Supported SOP classes by the EasyVision AE as SCU," on page vi.

3.1.2.3.3 C-MOVE SCU Conformance

The AE provides standard conformance.

3.1.2.4 Print images

3.1.2.4.1 Associated Real-World Activity

There are two ways to request for image printing:

- **Print Compose**
The operator is able to select one or more images from the internal database (via the Data Handling facility) and perform the Print operation on them.
- **Print Protocol**
The operator is also able to print images via the various clinical applications of EasyVision.

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

EasyVision allows to have a print preview first.

3.1.2.4.2 Proposed Presentation Contexts

EasyVision will propose the following presentation contexts:

Table 3-6: Proposed Presentation Contexts for the Print Request Activity

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.1.2.4.3 Conformance to the Print SOP Classes

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

The applied order of Print Service Elements (DIMSE's) is specified in Table 3. A description and the applied optional (i.e. non-mandatory attributes as Print SCU) attributes in these Serv-

ice Elements are specified too. Note that the Service Elements order is not specified by the DICOM standard.

An explicit N-DELETE Request on the created instances is not done by EasyVision; 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 the image).

The **full list of (Mandatory and Optional) attributes** applied in these Service Elements are given in section on page xxxii.

Table 3-7: 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.
N-CREATE of the Basic Film Session SOP Class	EasyVision 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	EasyVision 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 Gray-scale Image Box SOP Class	EasyVision will send the images to be printed. Applied optional attributes are: Polarity
N-ACTION of the Basic Film Box SOP Class	EasyVision triggers the DICOM Printer to print. So 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 3-8: The applied sequence of Print Service Elements and its optional attributes

Service Element of SOP Class	Note
N-EVENTREPORT of the Printer SOP Class	May be sent at any moment by the Printer SCP (i.e. the DICOM Printer). EasyVision 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 following implementation remarks are important to achieve successful printing:

- The number of Film Boxes per Film Session is **one**.
This means that multiple Film Sessions per Associations may be possible if many images are to be printed.
- The number of images per Film Box is **one!**
The images to be printed on one film are rendered by EasyVision into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image), use of color or not. A rough indication is 20 MByte. This should take that into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).
- EasyVision 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.

3.1.2.5 Request for the printer status

3.1.2.5.1 Associated Real-World Activity

EasyVision will periodically (every 10 seconds) 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.

3.1.2.5.2 Proposed Presentation Contexts

EasyVision will propose the following presentation contexts:

Table 3-9: Proposed Presentation Contexts for the Printer Status Request

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.1.2.5.3 Conformance to the Printer SOP Class

EasyVision provides standard conformance to this SOP Class.

The applied optional attributes in the N-GET Service Element are specified in Table 3. The **detailed list of (Mandatory and Optional) attributes** applied in this Service Element is given in section on page xxxii.

Table 3-10: 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.

3.1.3 Association Acceptance Policy

EasyVision accepts Associations for the following purposes:

- To allow remote applications to verify application level communication with EasyVision, see section 3.1.3.1 on page xxi;
- To allow remote applications to store images in the EasyVision database (i.e. image import), see section 3.1.3.2 on page xxi;
- To allow remote applications to query the EasyVision database, see section 3.1.3.3 on page xxiii;
- To allow remote applications to retrieve images from the EasyVision database, see section 3.1.3.4 on page xxiv.

The EasyVision 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 EasyVision system.

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

Any of the presentation contexts shown in the table below are acceptable:

Table 3-11: Acceptable Presentation Contexts

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See Note	See Note	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See Note	See Note	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
See Note	See Note	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
See Note	See Note	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
See Note	See Note	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
See Note	See Note	JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCU	None
See Note	See Note	JPEG Lossless, Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None

Note: Any of the SOP classes listed in Table 3, “Supported SOP classes by the EasyVision AE as SCP,” on page vii.

3.1.3.1 Verify Application Level Communication

3.1.3.1.1 Associated Real-World Activity

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

3.1.3.1.2 Presentation Context Table

Any of the presentation contexts shown in Table 3, “Acceptable Presentation Contexts,” on page xx are acceptable.

3.1.3.1.3 C-ECHO SCP Conformance

EasyVision provides standard conformance.

3.1.3.1.4 Presentation Context Acceptance Criterion

EasyVision 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 EasyVision.

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

3.1.3.1.5 Transfer Syntax Selection Policies

If a proposed Presentation Context contains multiple proposed Transfer Syntaxes, EasyVision selects one Transfer Syntax according to the following order (first one is most preferred one):

1. Explicit VR Big Endian (1.2.840.10008.1.2.2)
2. Explicit VR Little Endian (1.2.840.10008.1.2.1)
3. JPEG Lossless default (1.2.840.10008.1.2.4.70)
4. JPEG Lossless (1.2.840.10008.1.2.4.57)
5. Implicit VR Little Endian (1.2.840.10008.1.2)
6. JPEG Lossy Baseline default (1.2.840.10008.1.2.4.50)
7. JPEG Lossy Extended (1.2.840.10008.1.2.4.51)

3.1.3.2 Store Images in the EasyVision Database (i.e. Image Import)

3.1.3.2.1 Associated Real-World Activity

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

3.1.3.2.2 Presentation Context Table

Any of the presentation contexts shown in Table 3, “Acceptable Presentation Contexts,” on page xx are acceptable.

3.1.3.2.3 C-STORE SCP Conformance

Options:

EasyVision provides level 2 (Full) conformance for the Storage Service Class. In the event of a successful C-STORE operation, the image has been stored in the EasyVision database. The duration of the storage of the image is determined by the operator of the EasyVision system.

If easy vision receives im-proper DICOM at reception time EV tries as much as possible (if configured so), to make them proper DICOM. However, EasyVision 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, not guaranteed all DICOM violations of imcoming images are repaired (e.g. attributes as one with enumerated values, are not changed). So, improper DICOM input to the EasyVision can result in improper DICOM output.

Important implementation remarks and restrictions:

- EasyVision stores XA Bi-Plane as two Single Plane images.
- EasyVision stores multi-frame images as a series of single frame images.
- EasyVision assumes that High Bit (0x0028, 0x0102) = Bits Stored (0x0028, 0x0101) - 1. If this is not the case in received images, the images are not accepted or the EasyVision applications cannot process/view them.
- EasyVision accepts all colour coding schemes in colour image (however the image handling is based on RGB).
- EasyVision does not yet support Value Representation 'UN' (meaning 'Unknown VR' which is recently standardised). EasyVision does not accept images containing attributes with Value Representation '??'. This VR may be used by some imaging systems to indicate 'Unknown VR' of an attribute (although not standardised in DICOM). Acceptance of such images can be achieved via disabling Explicit Big/Little Endian transfer syntaxes at configuration.
- Acquisition number can be changed on import with a value related to the image number.

Support for additional Standard, Private and Retired attributes:

EasyVision 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 EasyVision was C-STORE SCP) using one of the explicit value representations or
- The image was encoded (when EasyVision 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 EasyVision is C-STORE SCU).

Error handling:

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

- A700 - Indicates the database is full. Recovery from this condition is left to the Service Class User.
- A900 - Indicates that the SOP class of the image does not match the abstract syntax negotiated for the presentation context.
- C000 - Indicates that the image cannot be parsed.

Processing of imported images and interoperability:

- EasyVision allows the operator to modify attributes of the stored images. EasyVision 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 EasyVision applications can be process the received images. This depends on the presence and consistency of a set of attributes in these images. The conditions for running the EasyVision applications are specified in detail in the EasyVision Release Bulletin [EV REL BUL].
- EasyVision does not support DICOM (Stand-alone and embedded in images) overlay and curves.

3.1.3.2.4 Presentation Context Acceptance Criterion

See section 3.1.3.1.4 on page xxi.

3.1.3.2.5 Transfer Syntax Selection Policies

See section 3.1.3.1.5 on page xxi.

3.1.3.3 Query the EasyVision Database

3.1.3.3.1 Associated Real-World Activity

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

3.1.3.3.2 Presentation Context Table

Any of the presentation contexts shown in Table 3, “Acceptable Presentation Contexts,” on page xx are acceptable.

3.1.3.3.3 C-FIND SCP Conformance

EasyVision provides standard conformance. Optional keys are not supported. Relational queries are not supported. EasyVision simultaneously handles simultaneous C-FIND requests.

The EasyVision 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.

3.1.3.3.4 Presentation Context Acceptance Criterion

See section 3.1.3.1.4 on page xxi.

3.1.3.3.5 Transfer Syntax Selection Policies

See section 3.1.3.1.5 on page xxi.

3.1.3.4 Retrieve Images from the EasyVision Database

3.1.3.4.1 Associated Real-World Activity

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

3.1.3.4.2 Presentation Context Table

Any of the presentation contexts shown in Table 3, “Acceptable Presentation Contexts,” on page xx are acceptable.

3.1.3.4.3 C-MOVE SCP Conformance

EasyVision supports all the Storage SOP classes listed in Table 3, “Supported SOP classes by the EasyVision AE as SCU,” on page vi.

3.1.3.4.4 Presentation Context Acceptance Criterion

See section 3.1.3.1.4 on page xxi.

3.1.3.4.5 Transfer Syntax Selection Policies

See section 3.1.3.1.5 on page xxi.

3.2 EasyVision AE Media Specification

The EasyVision AE provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10) and the Media Storage Application Profiles (PS 3.1.1) as far as the reading of uncompressed images on CD-Recordable medium is concerned.

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

Additionally, the reading of CD-Medical Basic Cardiac disks is supported, the writing of this type of disks is not supported.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in Table 3.

Table 3-12: Application Profile, Activities and Roles of the DICOM Media part of EasyVision

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

The same SOP Classes are supported as mentioned in Table 3 on page vi (for Write) and Table 3 on page vii (for Read) via this Application Profile.

3.2.1 File Meta Information

The (Source) Application Entity Title is specified in section 3.1.1.4 on page ix.

The Implementation Class UID and the Implementation Version Name in the File Meta Header is specified in section 3.1.1.4 on page ix.

3.2.2 Media related Real-World Activities

3.2.2.1 RWA Display Directory

The EasyVision 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 EasyVision screen.

Implementation restriction:

- EasyVision is not guaranteed able to display the directory listing of CD-ROM disks on which the data is pressed by the disk producer (like is the case with software CD's).

3.2.2.1.1 Application Profile(s) for this RWA

See Table 3.

3.2.2.1.2 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 displayed too.

3.2.2.2 RWA Write images on CD-R disk

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

Note that the images are written in Explicit VR Little Endian (so are uncompressed) as specified in the STD-GEN-CD Application Profile.

Update of CD-R is not always guaranteed.

3.2.2.2.1 Application Profile(s) for this RWA

See Table 3.

3.2.2.2.2 Support for Attributes in the images

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

The DICOMDIR file will be extended when new images are written. In case the some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, the string "Dummy Id" 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 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.
- A number of attributes (e.g., Window Width and Window Center) can be formatted as floating point numbers.

3.2.2.3 RWA Read images from CD-R disk

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

Implementation remarks and restriction:

- EasyVision is also able to read images coded in one of the four JPEG codes as specified in Table 3 on page xx.
- For the CD-Medical medium only the standard XA STILL file are being read, the non standard XA MOVIE files are not accessible.

3.2.2.3.1 Application Profile(s) for this RWA

See Table 3.

3.2.2.3.2 Support for Attributes in the images

The Mandatory Attributes of the DICOM images are required for the correct storage of the images in the EasyVision 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 on page xxi.

The same remarks as in section 3.1.3.2.3 on page xxi about the storage of read multi-frame/Bi-plane images and about requirements to process read images via the dedicated EasyVision application functions, are applicable.

3.2.3 Augmented Application Profile

Besides the Explicit Little Endian coding as specified by the Generic Purpose Application Profile, the JPEG transfer syntaxes as mentioned in Table 3 on page xiv are supported for media too.

Instances of the Private SOP Classes (see Table 3 on page vi) may be written on the CD-R disk. This will also result in PRIVATE Directory Records in the DICOMDIR file.

4 Communication Profiles

4.1 Supported Communication Stacks

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

4.2 TCP/IP Stack

EasyVision 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-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 on page xxx
- Retired (from ACR NEMA 1.0 or 2.0) attributes; the presence of these attributes in exported images can be configured, see section on page xxx
- Private attributes; the presence of these attributes in exported images can be configured, see section on page xxx.

There are no Specialised SOP Classes.

The Table 3 on page vi and Table 3 on page vii list the supported Private SOP Classes. The usage of these SOP Classes are in the EasyV ision domain only. However instances of these Private SOP Classes may be exported towards a P ACS environment and stored in a (central) DICOM archive and should be configured in order to make this possible. This is why the EasyVision Private SOP Classes UIDs are mentioned in this Conformance Statements. The table below gives a short description of the Private SOP Classes.

Table 5-1: Short description of the Private SOP classes of EasyVision

SOP Class	Description
3D Volume Storage	to be defined
3D Object Storage	
Surface Storage	
Composite Object Storage	
Merge Image Storage	This type of image is generated by previous EasyVision releases but not by EasyV ision R4.1. However the 4.1 Release still supports the import and export of these images.
Merge Surface Image Storage	This type of image is generated by previous EasyVision releases but not by EasyV ision R4.1. However the 4.1 Release still supports the import and export of these images.
MR Cardio Profile	
MR Cardio	

6 Configuration

The EasyVision system is configured by means of a configuration program. This program is accessible at start-up of the EasyVision 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 EasyVision application.

6.1 AE Title/Presentation Address mapping

6.1.1 Local AE Title and Presentation Address

The EasyVision AE title is equal to the IP host name. This host name is to be entered by the Customer Support Engineer at EasyVision configuration time.

EasyVision listens on port **3010**. This port number is **not** configurable.

6.1.2 Remote AE Titles and Presentation Addresses

All relevant remote applications able to setup a DICOM Association towards EasyVision must be configured at EasyVision 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 EasyVision accepts Associations.

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

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

6.2 Configurable parameters

6.2.1 Configuration per EasyVision system

The following items are configurable **per EasyVision installation**:

- The SOP classes (out of the full list of SOP Classes in Table 3 on page vi and Table 3 on page vii) 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 EasyVision (default is 0 meaning unlimited PDU size)

6.2.2 Configuration per remote system

The following items are configurable **per remote system**:

- The SOP classes and Transfer Syntaxes for which EasyVision sets-up and accepts Associations.
- 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 EasyVision,
- Export of 'pure' DICOM images (i.e. only the standard DICOM attributes defined in the related IOD) or 'rich' DICOM images (with additional Standard DICOM, Private and Retired Attributes)

6.2.3 Print Configuration

Configurable per EasyVision installation:

- The DICOM printers to be selected by the operator.

The following print parameters are configurable per DICOM printer type (see also the Print Management overview of the supported attributes in section on page xxxii):

- The Medium Type
- Film Size ID (i.e. Media Size)
- Film Orientation
- Image Display Format
- Film Size in X and Y direction (this influences the Rows and Columns in the Image Box instances)
- Configuration Information (configurable per print destination)
This is a character string containing implementation specific print parameters.
- Magnification Type.
- Trim.
- Film Destination.
- Max. Density.

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 prototype are also configurable.

7 Support of Extended Character Sets

EasyVision supports Extended Character Set “ISO_IR 100” which is the Latin alphabet No 1, supplementary set.

8 Overview of the applied Print Management Service Elements

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

Note that not all Service Elements of the SOP Classes are applied, see also section 3.1.2.4.3 on page xvi. For the order of sending these Service Elements, see that same section.

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

8.1 Basic Film Session SOP Class

Table 8-1: Basic Film Session SOP Class - N-CREATE

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Number of Copies	2000,0010	VR = IS (Integer String; max 12), VM = 1 Between 1 and 99.
Print Priority	2000,0020	VR = CS (Code String; max 16), VM = 1 Applied value(s): High
Medium Type	2000,0030	VR = CS (Code String; max 16), VM = 1 Applied value(s): BLUE FILM, CLEAR FILM, PAPER
Film Destination	2000,0040	Applied Values(s): PROCESSOR, MAGAZINE

8.2 Basic Film Box SOP Class

Table 8-2: Basic Film Box SOP Class - N-CREATE

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Image Display Format	2010,0010	VR = ST (Short Text; max 1024), VM = 1 The applied value below is an EasyVision specific value indicating that one (large) image is contained in a Film Box. Applied value(s): STANDARD\1,1 CUSTOM\I (I is a vendor specific index, i.e.an integer) is applied if the Standard Image Display Format does not result in acceptable films. Purpose of this value is to use the film surface as much as possible for image printing (and avoid large margins). This should be agreed per printer vendor.
Film Orientation	2010,0040	VR = CS (Code String; max 16), VM = 1 Applied value(s): LANDSCAPE, PORTRAIT
Film Size ID	2010,0050	VR = CS (Code String; max 16), VM = 1 DICOM specifies a number of Defined Terms; more values are possible and is print configuration dependent.
Magnification Type	2010,0060	VR = CS (Code String; max 16), VM = 1 Normally sent out, however so DICOM printers are not able to handle (value NONE for) this attribute. Applied value(s): NONE
Trim	2010,0140	VR = CS (Code String; max 16), VM = 1 Applied value(s): NO
Configuration Information	2010,0150	VR = ST (Short Text; max 1024), VM = 1 Contains a vendor specific Lookup-table (LUT); should be applied by the DICOM printer if LUT data is present.
Referenced Film Session Sequence	2010,0500	VR = SQ (Sequence of Items; -), VM = 1 Parent Film Session.
> Referenced SOP Class UID	0008,1150	VR = UI (Unique Identifier; max 64), VM = 1
> Referenced SOP Instance UID	0008,1155	VR = UI (Unique Identifier; max 64), VM = 1

Table 8-3: Basic Film Box SOP Class - N-ACTION

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
No attributes present		

8.3 Basic Grayscale Image Box SOP Class

Table 8-4: Basic Grayscale Image Box SOP Class - N-SET

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Image Position	2020,0010	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 1
Polarity	2020,0020	VR = CS (Code String; max 16), VM = 1 Applied value(s): NORMAL
Preformatted Grayscale Image Sequence	2020,0110	VR = SQ (Sequence of Items; -), VM = 1
> Samples per Pixel	0028,0002	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 1
> Photometric Interpretation	0028,0004	VR = CS (Code String; max 16), VM = 1 Applied value(s): MONOCHROME2
> Rows	0028,0010	VR = US (Unsigned Short; 2), VM = 1 Depending on the selected printer type and film size
> Columns	0028,0011	VR = US (Unsigned Short; 2), VM = 1 Depending on the selected printer type and film size
> Bits Allocated	0028,0100	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 16, 8
> Bits Stored	0028,0101	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 12, 8
> High Bit	0028,0102	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 11, 7
> Pixel Representation	0028,0103	VR = US (Unsigned Short; 2), VM = 1 Applied value(s): 0x0000 (i.e. unsigned integer)
> Pixel Data	7FE0,0010	VR = OW (Other Word String; -) or OB (Other Byte String; -), VM = 1

8.4 Printer SOP Class

Table 8-5: Printer SOP Class - N-GET

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Printer Status	2110,0010	VR = CS (Code String; max 16), VM = 1
Printer Status Info	2110,0020	VR = CS (Code String; max 16), VM = 1

Table 8-6: Printer SOP Class - N-EVENT-REPORT^a

<i>Attribute Name</i>	<i>Tag</i>	<i>Note</i>
Printer Status Info	2110,0020	VR = CS (Code String; max 16), VM = 1 Conditionally sent by the Printer. EasyVision will ignore this status information. However, polling this status via the N-GET Service Element is done.

- a. This Service Element is sent by the printer and interpreted by EasyVision.

The EasyVision does not send an attribute list to the printer, therefore the only attributes which are send back by the printer are listed in Table 8-6.