Technical Publications

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Revision 1

CardioSoft V6.7 for Windows 10
DICOM CONFORMANCE STATEMENT

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1. CONFORMANCE STATEMENT OVERVIEW

1.1 CONFORMANCE STATEMENT OVERVIEW

The system provides sophisticated image processing and storage functions. It will provide support for DICOM 3.0 to achieve interoperability across equipment produced by different vendors.

Table 1.1 provides an overview of the network services supported by the system.

Table 1.1

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes

2. INTRODUCTION

2.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 2 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

Section 3 (Network Conformance Statement), which specifies the GE Healthcare equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 4 (Modality Worklist Information Model), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of the Modality Worklist service.

Section 5 (Modality Performed Procedure Step SOP Class Definition), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of a Modality Performed Procedure Step Service.

Section 6 (Storage Commitment Push Model SOP Class Definition), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of a Storage Commitment Push Model Service.

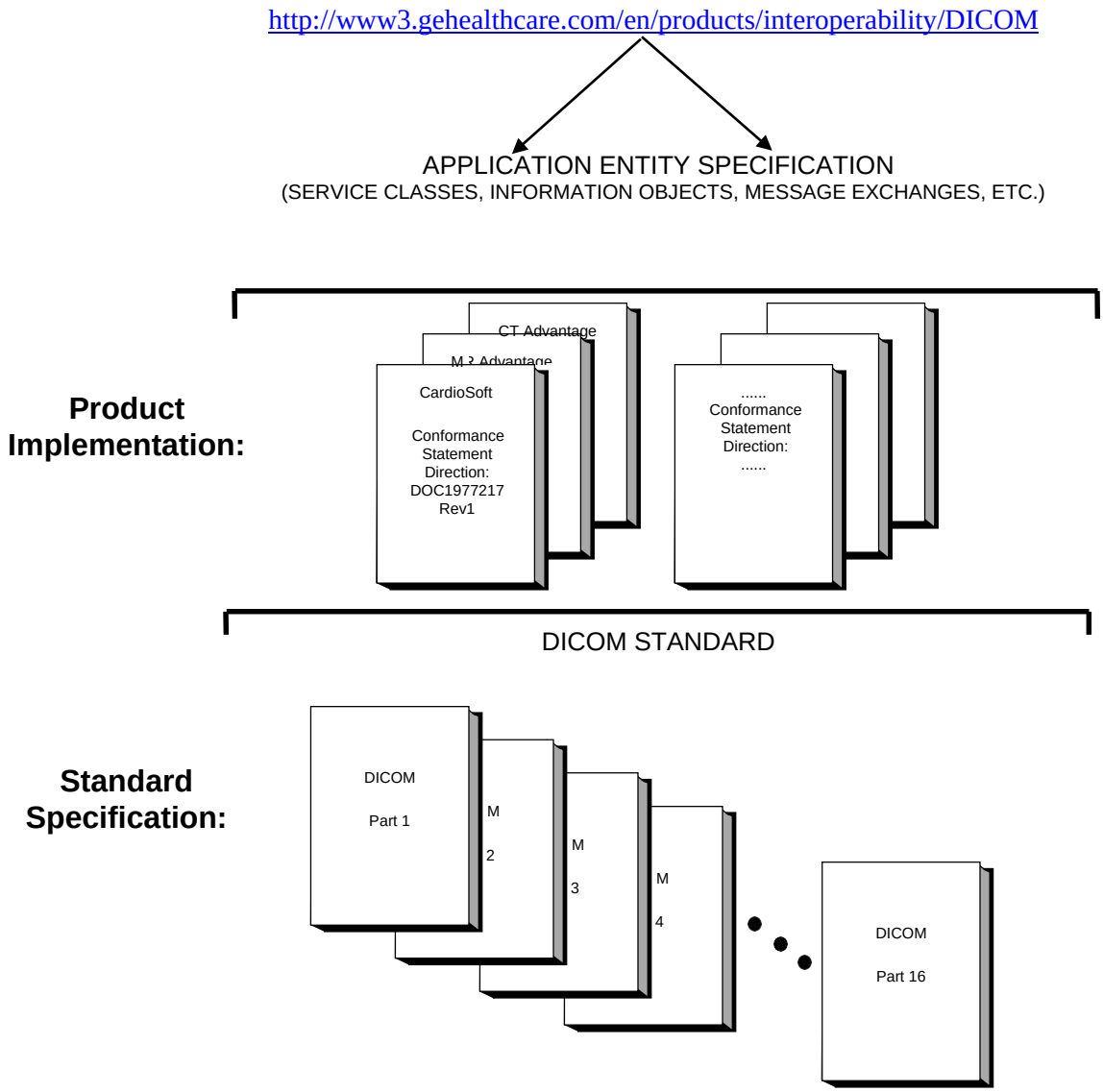
Section 7 (Encapsulated PDF Information Object Implementation), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of an Encapsulated PDF Object.

Section 8 (12-Lead ECG Waveform Information Object Implementation), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of a 12-Lead ECG Waveform Object.

Section 9 (General ECG Waveform Information Object Implementation), which specifies the GE Healthcare equipment compliance to DICOM requirements for the implementation of an General ECG Waveform Object.

2.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GE Healthcare Conformance Statements and their relationship with the DICOM v3.0 Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

CardioSoft V 6.7 for Windows 10
Conformance Statement for DICOM

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GE Healthcare network interface.

The GE Healthcare Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the Standard may be addressed to:

DICOM Secretariat
NEMA
1300 N. 17th Street, Suite 1752
Rosslyn, VA 22209
USA
Phone: +1.703.841.3200

2.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts which are used in that Standard.

2.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this documentto provide an unambiguous specification for GE Healthcare implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GE Healthcare medical data exchanged using DICOM v3.0. The GE Healthcare Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GE Healthcare devices are capable of using different Information Object Definitions. For example, a GE Healthcare CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GE Healthcare implementation. If the user encounters unspecified private data elements while parsing a GE Healthcare Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GE Healthcare devices.

2.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The user **(or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standard. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GE Healthcare protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) described by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

2.6 REFERENCES

NEMA PS3:

Digital Imaging and Communications in Medicine (DICOM) Standard, available free at http://medical.nema.org/.

2.7 DEFINITIONS

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

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

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

Application Entity Title – the externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between Application Entities. Example: DICOM network protocol.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

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

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

2.8 SYMBOLS AND ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
ISO	International Organization for Standards
JPEG	Joint Photographic Experts Group
LUT	Look-up Table
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
O	Optional (Key Attribute)
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
VR	Value Representation

3. NETWORK CONFORMANCE STATEMENT

3.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the CardioSoft compliance to DICOM requirements for **Networking** features.

Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

CardioSoft is a PC based diagnostic workstation for Exercise tests, Resting ECG, Ambulatory Blood Pressure (ABP), Spirometry and Ergospirometry tests.

All 3 products CardioSoft include the identical software application. It provides

the following DICOM functionality:

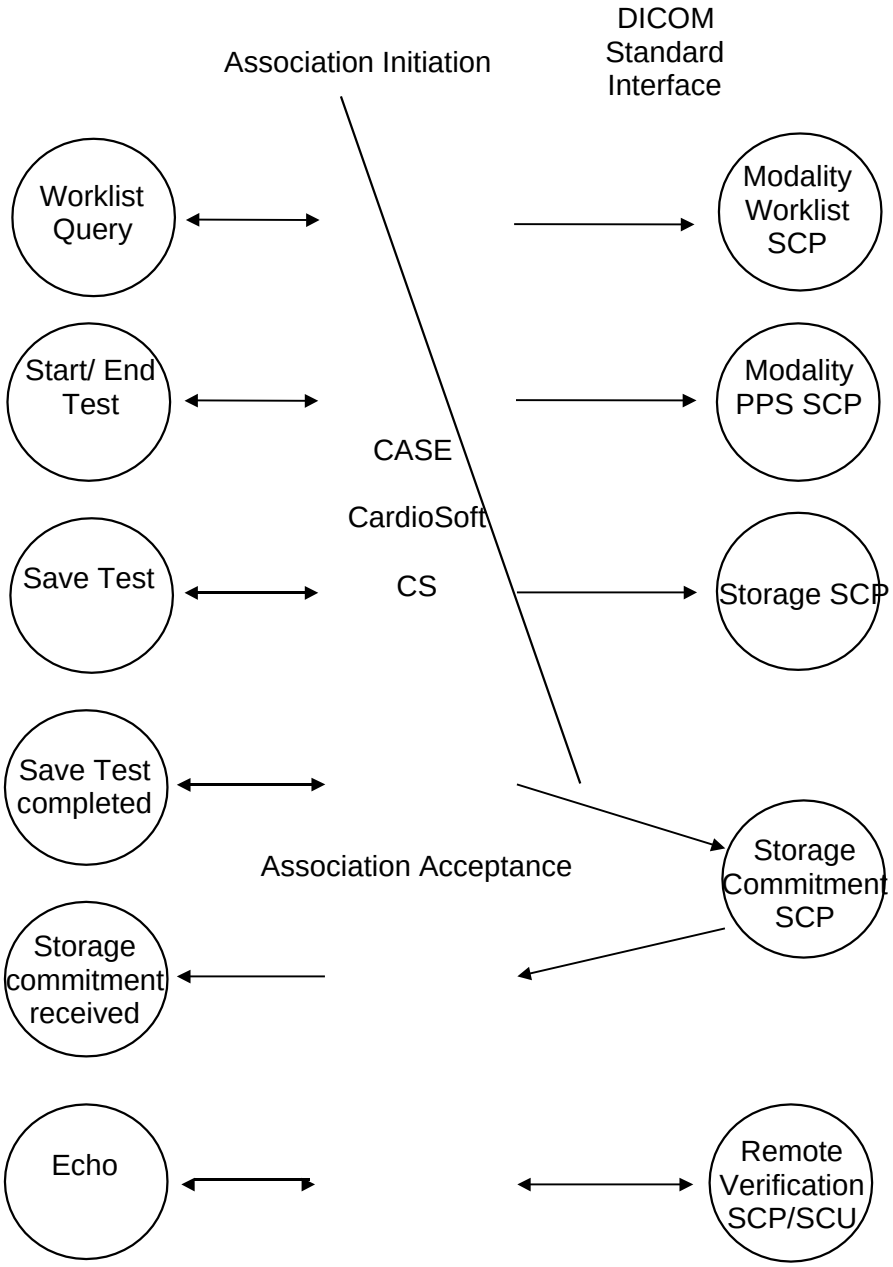
- Querying and retrieving a DICOM Modality Worklist from a Worklist SCP.
- Sending start and end of a test (MPPS in progress, MPPS completed/ discontinued) to a DICOM Modality Performed Procedure Step SCP.
- Sending storage commitment requests (and receiving replies) to a DICOM Storage Commitment SCP.
- Exporting DICOM Composite Instances (as Storage SCU)
    - ECG Waveforms for Exercise- or Ergospirometry tests
    - Final report as DICOM Encapsulated PDF for all types of tests
- DICOM Verification (as SCP and SCU)

3.2 IMPLEMENTATION MODEL

3.2.1 Application Data Flow Diagram

The network application model for the CardioSoft is shown in the following Illustration:

ILLUSTRATION 2–1
CARDIOSOFT NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM



There are 6 local real-world activities that occur in CardioSoft:

- **Worklist Query**
- **Start/End Test**
- **Save Test**
- **Save Test completed**
- **Test Status change**
- **Echo**

Worklist Query initiates a connection to the Modality Worklist SCP, performs a query and retrieves the matching entries to the product.

Start/ End Test initiates a connection to the Modality PPS SCP. N-CREATE/ N-SET messages are sent.

Save Test initiates a connection to the Storage SCP (Image Archive) and transmits configured Composite Instances to the Storage SCP (C-STORE). After successful transmission the transfer status of the test in the database is set to “Transferred (DCM)”.

Save Test completed initiates a commitment request (N-ACTION-RQ) message that is sent to the Storage Commitment SCP for the images of the test (if Storage Commitment is enabled (default) in the System Configuration).

Storage commitment received: Receiving the corresponding commitment responses (N-EVENT-REPORT) from the Storage Commitment SCP at any time the system runs, initiates the system to set the transfer status of the test in the database to “Committed (DCM)”.
If Storage Commitment is disabled, the transfer status is directly set to “Committed (DCM)”.
A committed test cannot be modified (default, see Service Manual).

Echo: Initiates a connection to the DICOM SCP, sends a verification request and closes the connection. It also responds to incoming Verification requests (for service use).

3.2.2 Functional Definition of AE's

Application Entity CardioSoft supports the following functions:

- Initiates a DICOM association to query a DICOM worklist
- Receives DICOM modality worklist information.
- Initiates a DICOM association to notify start of test.
- Initiates a DICOM association to notify end of test.
- Initiates a DICOM association to send Composite Instances.
- Transmits DICOM Composite Instances to the DICOM Storage SCP.
- Initiates a DICOM association to request storage commitment of Composite Instances.
- Responds to replies for storage commitment requests of Composite Instances.
- Initiates verification (as SCU) to assist in network diagnostics.
- Responds to verification requests (as SCP) from other devices.

3.2.3 Sequencing of Real-World Activities

In case of a scheduled test the following sequence takes place:

- Modality Worklist query
- Start test with Modality Performed Procedure Step “In Progress”
- End test with Modality Performed Procedure Step “Completed” or “Discontinued”.
- Save test with storage of Composite Instances
- Save test completed with Storage Commitment request (if enabled in system configuration)
- Test status change with reception of Storage Commitment replies

For an unscheduled test the sequence is identical except that the Modality Worklist query is not applicable.

3.3 AE SPECIFICATIONS

3.3.1 CardioSoft AE Specification

The CardioSoft Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU**:

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3
Storage Commitment Push Model	1.2.840.10008.1.20.1
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Verification SOP Class	1.2.840.10008.1.1

The CardioSoft Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCP**:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

3.3.1.1 Association Establishment Policies

3.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	**1.2.840.10008.3.1.1.1**

The maximum length PDU receive size (not configurable) for the CardioSoft is:

Maximum Length PDU	**64234**

3.3.1.1.2 Number of Associations

The CardioSoft will initiate a maximum of 1 simultaneous associations to remote nodes.

The CardioSoft will support a maximum of 1 simultaneous associations initiated by remote nodes.

3.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

3.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

CardioSoft Implementation UID	**1.2.840.113619.6.442**

The Implementation Version Name for this DICOM Implementation is:

CardioSoft Implementation Version Name	**CSOFT_V11**

3.3.1.2 Association Initiation Policy

When the CardioSoft Application Entity initiates an Association for any Real- World Activity, it will propose the Presentation Context for only this Real-World Activity.

CardioSoft proposes a set of Transfer Syntaxes per Presentation Context and Abstract Syntax.

3.3.1.2.1 Real-World Activity A (Worklist Query)

3.3.1.2.1.1 Associated Real-World Activity

The user may initiate a DICOM Worklist Query when entering the “Order List” screen or when clicking the “Find” button in the “Order List” screen. The query sends a C-FIND-RQ to the Worklist SCP.

The association is closed upon the receipt of C-FIND-RSP confirmation.

3.3.1.2.1.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE CardioSoft for Activity A (Worklist Query)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.2.1.2.1 SOP Specific DICOM Conformance Statement for the Modality Worklist Information Model - FIND SOP Class

The CardioSoft includes matching keys in the Modality Worklist queries as described in Section **3**.

The Scheduled Procedure Steps and it’s corresponding response information are displayed in the DICOM Worklist, accessible through the Patient List (button “Order List”).

In System Configuration (DICOM tab) the displayable fields of the worklist can be configured. Further information see Service Manual.

A C-FIND CANCEL is not supported. However, the number of displayed worklist items is limited to 200. If more are available, the user is informed to modify the filter criteria for the query (see Operators Manual).

Following are the status codes that are more specifically processed when receiving messages from a **Modality Worklist** SCP equipment :

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700	Refused: Out of resources	Received items of the worklist are displayed and the user is informed, that there may be more items. The association is closed.
	A900	Error: Identifier does not match SOP Class	The user is informed in the status bar of the worklist screen that the worklist could not be received. The worklist is cleared. The error is logged. The association is closed.
	Cxxx	Error: Unable to process	The user is informed in the status bar of the worklist screen that the worklist could not be received. The worklist is cleared. The error is logged. The association is closed.
Cancel	FE00	Matching terminated due to cancel	The user is informed in the status bar of the worklist screen that the worklist could not be received. The worklist is cleared. The error is logged. The association is closed.
Success	0000	Matching is complete - No final identifier is supplied	The worklist is displayed. The association is closed.
Pending	FF00	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	Continue receiving keys.
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this	Continue receiving keys.

		Identifier	

3.3.1.2.2 Real-World Activity B (Start/ End Test)

3.3.1.2.2.1 Associated Real-World Activity

The Modality Performed Procedure Step "In Progress" (N-CREATE) is sent when the test is started:

- Exercise test: when entering the Pre-Test phase
- Resting ECG test: after the first 10 second ECG has been acquired
- Spirometry test: when initiating the first trial
- ABP test: when initiating the download from the BP Monitor
- Ergospirometry test: when entering the Pre-Test phase

The Modality Performed Procedure Step "Completed" or "Discontinued" (N-SET) is sent when the test is finished:

- Exercise test: Confirmation of the "Test end status" dialog (when stepping to the Post Test Review or Initial screen)
- Resting ECG test: Confirmation of the "Test end status" dialog (when stepping to the Post Test Review screen)
- Spirometry test: Confirmation of the "Test end status" dialog (when stepping to the Post Test Review screen)
- ABP: Confirmation of the "Test end status" dialog (after downloading data from the BP Monitor)
- Ergospirometry: Confirmation of the "Test end status" dialog (when stepping to the Post Test Review or Initial screen)

The "Test end status" dialog provides the following selections:

- "Test successfully finished": leads to MPPS Completed
- "Test cancelled/ unsuccessfully terminated": leads to MPPS Discontinued with one of the following selectable reasons:
  - Procedure was cancelled
  - Equipment failure
  - Incorrect procedure ordered
  - Patient allergic to media
  - Patient refused to continue
  - Patient did not arrive
  - Duplicate order
  - Equipment change
  - Unspecified reason
  - Incorrect worklist entry selected
  - Patient condition prevented continuing

The association is opened before the transaction and closed after the transaction.

3.3.1.2.2.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE CardioSoft for Activity B (Start/ End Test)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.2.2.2.1 SOP Specific DICOM Conformance Statement for Modality Performed Procedure Step SOP Class

The CardioSoft includes attributes in the Modality Performed Procedure Step N-CREATE as described in Section 4.2

If the response to an N-CREATE-RSP fails, the user is informed by an error message, that the connection to the PPS-Manager failed.

The AE includes attributes in the Modality Performed Procedure Step N-SET as described in Section 4.2

If the response to an N-SET-RSP fails, the user is informed by an error message, that the connection to the PPS-Manager failed.

3.3.1.2.3 Real-World Activity C (Save Test)

2.3.1.2.3.1 Associated Real-World Activity

The Image Stored (C-STORE) message is sent to the Storage SCP when the test is stored:

- Exercise test: When stepping to the Post Test Review or Initial screen.
- Resting ECG test: When stepping to the Post Test Review screen.
- Spirometry test: When stepping to the Post Test Review screen.
- ABP test: After downloading data from the BP Monitor.
- Ergospirometry: When stepping to the Post Test Review or Initial screen.

After successful transmission of all C-STORE messages per test the transfer status for this test is set to “Transferred (DCM)”, which is displayed in the overall test list of CardioSoft.

If the response to a C-STORE fails, the user is informed by an error message, that the connection to the Image Archive failed. In case of an error CardioSoft does not send further C-STORES for this corresponding test.

Encapsulated PDF:

The Encapsulated PDF is created as one final report, depending on the test specific configuration.

DICOM Encapsulated PDF is provided by the following test types:

- Exercise test
- Resting ECG
- Spirometry test
- ABP test
- Ergospirometry test

The association is opened before the transaction and closed after the transaction.

ECG Waveforms:

DICOM ECG Waveforms are only provided by the Exercise- and Ergospirometry test.

The following ECG Waveforms objects are sent per test:

- The first 12SL ECG strip in Pre-Test phase (as "Resting ECG"), if available.
- Last ECG strip in Pre-Test phase (as "Baseline ECG"), if available.
- Last ECG strip per stage in Exercise Phase (as "Exercise ECG"), if available.
- Last ECG strip in Recovery Phase (as "Post Exercise ECG"), if available.

Per ECG Waveform object one C-STORE message is sent.

The association is opened before the first ECG Waveform object is sent and closed after the last ECG Waveform object was sent.

Storage of ECG Waveforms either uses the General ECG Waveform SOP Class or the 12-Lead ECG Waveform SOP Class, which is the default value (Product Service Manual). The General ECG Waveform SOP Class also supports 15-Lead ECG acquisition.

Note:

Alternatively, CardioSoft provides DICOM Part 10 File Export (using all listed Storage SOP Classes) to a configurable folder. File name customization can be done in the Export-Configuration dialog of the System Configuration. This fits into the CardioSoft export concept.

CardioSoft does not use the DICOM File Services and therefore does not play the role of an FSC (DICOMDIR is not used).

3.3.1.2.3.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE CardioSoft for Activity C (Save Test)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.2.3.2.1 SOP Specific DICOM Conformance Statement for All Storage SOP Classes

The CardioSoft includes optional data elements in the SOP Instances as described in Sections 6.2 (Encapsulated PDF IOD), 7.2 (12-Lead ECG Waveform IOD) and 8.2 (General ECG Waveform IOD).

3.3.1.2.4 Real-World Activity D (Save Test completed)

3.3.1.2.4.1 Associated Real-World Activity

When the test is stored (Real-World Activity C “Save Test”), CardioSoft initiates an association and sends an N-ACTION-RQ to the SCP, if this is enabled in the System Configuration (which is the default value). N-EVENT-REPORT messages shall use a different association as the one used to transfer N-ACTION-RQ messages.

All status codes of the N-ACTION-RSP with status Failure or Warning are treated as failures and terminate the association and operation. The user is informed by an error message, that the connection to the Image Manager failed.

After reception of the N-ACTION-RSP the association is closed.

The number of SOP Instances per individual request depends on the duration of the test:

For Resting ECG, Spirometry and ABP only 1 SOP Instance is sent (final report sent as encapsulated PDF).

For the Exercise- and Ergospirometry test the number depends on how many 12SL-ECGs were executed and how many stages have passed. Typically, about 10 SOP Instances may be sent to the SCP. Maximum is 50.

3.3.1.2.4.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE CardioSoft for Activity D (Save Test completed)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.2.4.2.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class SCU

CardioSoft uses DICOM network storage services to transfer SOP Instances which are to be committed. It does not support the optional Storage Media File-Set ID and UID Attributes in the Storage Commitment N-ACTION for transfer of SOP Instances by media for Storage Commitment.

CardioSoft may request Storage Commitment for Instances of any of the SOP Classes it supports as an SCU (see Section 2.3.1.2.3.2)

The Storage Commitment Information Object is described in Section 5.

3.3.1.2.5 Real-World Activity F (Echo)

3.3.1.2.5.1 Associated Real-World Activity

The user may initiate a DICOM Verification Request in the System Configuration screen. Associations will be released upon the receipt of each C-ECHO confirmation.
In the event that the SCP does not respond, the operation will time out, close the association and inform the user.

3.3.1.2.5.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE CardioSoft for Activity F (Echo)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.3 Association Acceptance Policy

3.3.1.3.1 Real-World Activity E (Storage commitment received)

3.3.1.3.1.1 Associated Real-World Activity

CardioSoft waits for an SCP association request for the N-EVENT-REPORT messages on the configured port (see System Configuration).

When the requested association is accepted by CardioSoft, all messages are read, processed and the corresponding N-EVENT-RSP messages are sent.

The CardioSoft receives N-EVENT-REPORT messages at any time CardioSoft is running. N-EVENT-REPORT messages shall use a different association as the one used to transfer N-ACTION-RQ messages.

There is no time limit for the duration of applicability of the Transaction UID.

3.3.1.3.1.2 Accepted Presentation Context Table

Presentation Context Table - Accepted by AE CardioSoft for Activity E (Storage commitment received)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.3.1.3.1.2.1 SOP Specific DICOM Conformance Statement for the Storage Commitment Push Model SOP Class SCU

CardioSoft will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class.

Upon receiving a Storage Commitment N-EVENT-REPORT (Storage Commitment Result), CardioSoft will validate the Transaction UID against its list of outstanding Storage Commitment Request Transaction UIDs.

If it matches an outstanding Request and if all SOP Instances for this test indicate a success status, the AE will mark the test in it's test list with "Committed (DCM)". If at least one of them don't have success status, the test keeps its status "Transferred (DCM)".

The transfer status "Committed (DCM)" does not allow to modify this test anymore (default, can be changed in System Configuration).

If the Storage Commitment Result indicates any failure status, the error will be written to the error log.

Any retry of the Storage Commitment Request must be manually reinitiated by resending the test to the Image Archive (test list, button “Send to Image Archive”). In this case also the C-STORE is resent.

The AE always returns a Success Status 0000 to a Storage Commitment N-EVENT-REPORT.

3.3.1.3.1.3 Presentation Context Acceptance Criterion

CardioSoft evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

3.3.1.3.1.4 Transfer Syntax Selection Policies

Within each Presentation Context, CardioSoft will accept the first proposed transfer syntax that it also supports for that Abstract Syntax.

3.3.1.3.2 Real-World Activity F (Echo)

3.3.1.3.2.1 Associated Real-World Activity

An incoming Verification Request will cause the AE to accept the association and respond with a Verification Response.

3.3.1.3.2.2 Accepted Presentation Context Table

Presentation Context Table - Accepted by AE CardioSoft for Activity F (Echo)					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

3.3.1.3.2.2.1 SOP Specific DICOM Conformance Statement for Verification SOP Class

The AE provides standard conformance to the Verification SOP Class as an SCP. The default port number is 108.

3.3.1.3.2.3 Presentation Context Acceptance Criterion

No criterion

3.3.1.3.2.4 Transfer Syntax Selection Policies

The selected transfer syntax is based on the proposed transfer syntax list. The priority order is Explicit VR Little Endian, Explicit VR Big Endian and Implicit VR Little Endian.

3.4 COMMUNICATION PROFILES

3.4.1 Supported Communication Stacks

The DICOM Upper Layer Protocol is supported using TCP/IP, as specified in DICOM PS3.8.

The TCP/IP stack is inherited from the Windows Operating System.

3.4.2 Physical Media Support

The product is provided with a 10/100 Mb/s auto-sensing Ethernet interface. Additional or alternate network interfaces may be available.

Note: For more information about the Physical Media available on CardioSoft, please refer to the Product Data Sheet.

3.4.3 DHCP

DHCP can be used to obtain TCP/IP network configuration information. The network parameters obtainable via DHCP are shown in the Table below. The Default Value column of the table shows the default used if the DHCP server does not provide a value. Values for network parameters set in the Service/Installation tool take precedence over values obtained from the DHCP server. Support for DHCP is pre-configured on the system. If DHCP is not in use, TCP/IP network configuration information must be manually configured via the service interface.

3.4.4 IPv4 and IPv6 Support

This product supports only IPv4.

3.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

3.5.1 Standard Extended / Specialized / Private SOP Classes

3.5.1.1 Standard Extended SOP Classes

There are no Standard Extended SOP Class supported by this product.

3.5.1.2 Private SOP Class

There are no Private SOP Classes supported by the product.

3.5.2 Private Transfer Syntaxes

There are no private Transfer Syntaxes supported by the product.

3.6 CONFIGURATION

3.6.1 AE Title/Presentation Address Mapping

The Local AE title is configurable in the System Configuration, see below.

3.6.2 Configurable Parameters

The following fields are configurable for this AE (local):

- Local AE Title: through System Configuration, DICOM screen
- Local IP Address: through Operating System (static IP Address configuration)
- Local Listening Port Number (for Storage Commitment SCU): through System Configuration, DICOM screen
- Local IP Netmask: through Operating System (static IP Address configuration)

The following SCP DICOM AE's are configurable:

- SCP DSS/ Order Filler (DMWL Query)
- SCP PPS Manager (MPPS)
- SCP Image Archive/ Storage (Image Stored)
- SCP Image Manager (Storage Commitment)

The following fields are configurable for the listed SCP DICOM AE's (also used for Verification):

- SCP AE Title: through System Configuration, DICOM screen
- SCP IP Address: through System Configuration, DICOM screen
- SCP TCP/IP Port Number: through System Configuration, DICOM screen

The following field is configurable as Storage Commitment SCU (also used for Verification):

- SCU TCP/IP Port Number: through System Configuration, DICOM screen

DICOM Verification:

- Max retries, retry interval, timeout (see product Service Manual)

General:

- Timeout for reading messages, e.g. response messages (default value: 5 seconds)

Further information about the DICOM Configuration please see the Service Manual of the Product.

Note: All configurations must be performed by a GE Field Engineer.

3.7 SUPPORT OF EXTENDED CHARACTER SETS

CardioSoft will support the following single-byte extended character sets:

- ISO_IR 6 (ASCII): Default
- ISO_IR 100 (ISO 8859-1: Latin 1: Western Europe)
- ISO_IR 101 (ISO 8859-2: Latin 2: Central/Eastern Europe)
- ISO_IR 144 (ISO 8859-5: Cyrillic)
- ISO_IR 148 (ISO 8859-9: Latin 5: Turkish)

as extended character set.

As a Query SCU, the product will accept response items with any value of Specific Character Set (0008,0005). However, it will display in the user interface only characters specified as within ISO_IR 6 (ASCII) or the configured extended character set.

The product user interface will allow the user to enter characters that are within ASCII or the configured extended character set. If any such extended characters are included in SOP Instances or in query identifier matching fields, the product will appropriately specify the extended character set in Specific Character Set (0008,0005).

The product will accept, as a Modality Worklist SCU, Scheduled Procedure Step Identifiers with any value of Specific Character Set (0008,0005). Text attributes of the Scheduled Procedure Step Identifier, including Patient and Physician names, that include extended characters will be displayed as described above.

Please see the Service Manual for the extended character set configuration.

3.8 CODES AND CONTROLLED TERMINOLOGY

3.8.1 Fixed Coded Terminology

Not applicable.

3.8.2 Mapped Coded Terminology

Not applicable.

3.8.3 Configurable Coded Terminology

The product allows configuration of the following sets of coded terminology:

Context Group	Default Value Set	Use
Stress Protocol	CID 3261, CSO_STRESS, CSO_ESPIRO, CSO_ECG,	Value of Scheduled Protocol Code Sequence (0040,0008) from selected Modality Worklist Scheduled Procedure Step is matched to this group for selection of the test type (one of Exercise test, Resting ECG, Spirometry, ABP test,

	CSO_ABP, CSO_SPI	Ergospirometry test) and protocol type (e.g. BRUCE) Selected value from this group is used in the Performed Protocol Code Sequence (0040,0260)

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
CSO_STRESS	CSO_WHO	Exercise Test, WHO Ergometer Protocol
CSO_STRESS	CSO_WHO50	Exercise Test, WHO50 Ergometer Protocol
CSO_STRESS	CSO_WHO75	Exercise Test, WHO75 Ergometer Protocol
CSO_STRESS	CSO_HOLLMANN	Exercise Test, HOLLMANN Ergometer Protocol
CSO_STRESS	CSO_BAL	Exercise Test, BAL Ergometer Protocol
CSO_STRESS	CSO_STD.FRANCE	Exercise Test, STD.FRANCE Ergometer Protocol
CSO_STRESS	CSO_MODWHO	Exercise Test, MODWHO Ergometer Protocol
CSO_STRESS	CSO_CONCONI	Exercise Test, CONCONI Ergometer Protocol
CSO_STRESS	CSO_BRUCE	Exercise Test, BRUCE Treadmill Protocol
CSO_STRESS	CSO_MODBRUCE	Exercise Test, MODBRUCE Treadmill Protocol
CSO_STRESS	CSO_NAUGHTON	Exercise Test, NAUGHTON Treadmill Protocol
CSO_STRESS	CSO_ELLESTAD	Exercise Test, ELLESTAD Treadmill Protocol
CSO_STRESS	CSO_MODBALKE	Exercise Test, MODBALKE Treadmill Protocol
CSO_STRESS	CSO_USAFSAM	Exercise Test, USAFSAM Treadmill Protocol
CSO_STRESS	CSO_SLOWUSAFSAM	Exercise Test, SLOWUSAFSAM Treadmill Protocol
CSO_STRESS	CSO_CORNELL	Exercise Test, CORNELL Treadmill Protocol
CSO_STRESS	CSO_BALKE	Exercise Test, BALKE Treadmill Protocol
CSO_STRESS	CSO_MODBALKEWARE	Exercise Test, MODBALKEWARE Treadmill Protocol
CSO_STRESS	CSO_ADENOSINE	Exercise Test, ADENOSINE Pharma Protocol
CSO_STRESS	CSO_DOBUTAMINE	Exercise Test, DOBUTAMINE Pharma Protocol
CSO_STRESS	CSO_PERSANTINE	Exercise Test, PERSANTINE Pharma Protocol
CSO_STRESS	CSO_ERG_UNKNOWN	Exercise Test, Unknown Ergometer Protocol
CSO_STRESS	CSO_TRM_UNKNOWN	Exercise Test, Unknown Treadmill Protocol
CSO_ESPIRO	CSO_E_WHO	Ergospirometry, WHO Ergometer Protocol
CSO_ESPIRO	CSO_E_WHO50	Ergospirometry, WHO50 Ergometer Protocol
CSO_ESPIRO	CSO_E_WHO75	Ergospirometry, WHO75 Ergometer Protocol
CSO_ESPIRO	CSO_E_HOLLMANN	Ergospirometry, HOLLMANN Ergometer Protocol
CSO_ESPIRO	CSO_E_BAL	Ergospirometry, BAL Ergometer Protocol
CSO_ESPIRO	CSO_E_STD.FRANCE	Ergospirometry, STD.FRANCE Ergometer Protocol
CSO_ESPIRO	CSO_E_MODWHO	Ergospirometry, MODWHO Ergometer Protocol
CSO_ESPIRO	CSO_E_CONCONI	Ergospirometry, CONCONI Ergometer Protocol
CSO_ESPIRO	CSO_E_BRUCE	Ergospirometry, BRUCE Treadmill Protocol
CSO_ESPIRO	CSO_E_MODBRUCE	Ergospirometry, MODBRUCE Treadmill Protocol
CSO_ESPIRO	CSO_E_NAUGHTON	Ergospirometry, NAUGHTON Treadmill Protocol
CSO_ESPIRO	CSO_E_ELLESTAD	Ergospirometry, ELLESTAD Treadmill Protocol
CSO_ESPIRO	CSO_E_MODBALKE	Ergospirometry, MODBALKE Treadmill Protocol
CSO_ESPIRO	CSO_E_USAFSAM	Ergospirometry, USAFSAM Treadmill Protocol
CSO_ESPIRO	CSO_E_SLOWUSAFSAM	Ergospirometry, SLOWUSAFSAM Treadmill Protocol
CSO_ESPIRO	CSO_E_CORNELL	Ergospirometry, CORNELL Treadmill Protocol
CSO_ESPIRO	CSO_E_BALKE	Ergospirometry, BALKE Treadmill Protocol

CSO_ESPIRO	CSO_E_MODBALKEWARE	Ergospirometry, MODBALKEWARE Treadmill Protocol
CSO_ESPIRO	CSO_E_ADENOSINE	Ergospirometry, ADENOSINE Pharma Protocol
CSO_ESPIRO	CSO_E_DOBUTAMINE	Ergospirometry, DOBUTAMINE Pharma Protocol
CSO_ESPIRO	CSO_E_PERSANTINE	Ergospirometry, PERSANTINE Pharma Protocol
CSO_ESPIRO	CSO_ERG_UNKNOWN	Ergospirometry, Unknown Ergometer Protocol
CSO_ESPIRO	CSO_TRM_UNKNOWN	Ergospirometry, Unknown Treadmill Protocol
CSO_ECG	CSO_ECG	Resting ECG test (EKG), Protocol not applicable
CSO_ABP	CSO_ABP	Ambulatory Blood Pressure test, Protocol not applicable
CSO_SPI	CSO_SPI	Spirometry test, Protocol not applicable

Procedures for configuring these Context Groups are found in the product Service Manual.

3.9 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.

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

1. Firewall or router protections to ensure that only approved external hosts have network access to the product.
2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
3. Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN))

4. MODALITY WORKLIST QUERY IMPLEMENTATION

4.1 CARDIOSOFT MAPPING OF DICOM ENTITIES

The CardioSoft maps DICOM Information Entities to local Information Entities in the product's database and user interface.

TABLE 4.1-1
MAPPING OF DICOM ENTITIES TO CARDIOSOFT ENTITIES

DICOM	CardioSoft **Entity**
Scheduled Procedure Step	Test
Requested Procedure	Test
Imaging Service Request	Test
Visit	Not applicable
Patient	Patient

4.2 WORKLIST QUERY MODULE TABLE

See DICOM PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

TABLE 4.2-1
MODALITY WORKLIST INFORMATION MODEL MODULES

Entity Name	**Module Name**	**Reference**
Scheduled Procedure Step	SOP Common	4.3.1
	Scheduled Procedure Step	4.3.2
Requested Procedure	Requested Procedure	4.3.3
Imaging Service Request	Imaging Service Request	4.3.4
Visit	Visit Identification	4.3.5
	Visit Status	4.3.6
	Visit Relationship	4.3.7
	Visit Admission	4.3.8
Patient	Patient Relationship	4.3.9
	Patient Identification	4.3.10
	Patient Demographic	4.3.11
	Patient Medical	4.3.12

4.3 WORKLIST QUERY MODULE DEFINITIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) for a description of each of the query key attributes contained within the Modality Worklist Information Model.

"Not used" means that these elements are not requested.

4.3.1 SOP Common Module

TABLE 4.3-1
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Mapped into MPPS	Use
Specific Character Set	(0008,0005)	O	1C	No	**No**	See 3.7

4.3.1.1 SOP Common Module Attribute Descriptions

4.3.1.1.1 Specific Character Set

See section See 3.7.

4.3.2 Scheduled Procedure Step Module

TABLE 4.3-2
SCHEDULED PROCEDURE STEP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Mapped into MPPS	Use
Scheduled Procedure	(0040,0100)	R	1	No	No	
>Scheduled Station AE Title	(0040,0001)	R	1	No	No	Type of matching: Single value Matching value dynamically configurable in worklist. Returned value can be displayed in
>Scheduled Procedure Step Start Date	(0040,0002)	R	1	No	No	Type of matching: Single value, range Matching value dynamically configurable in the worklist. Returned value is displayed in worklist.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1	No	No	No matching. (always zero) Returned value is displayed in worklist.

>Scheduled Procedure Step	(0040,0004)	O	3	No	No	Not used
>Scheduled Procedure Step	(0040,0005)	O	3	No	No	Not used
>Modality	(0008,0060)	R	1	No	Yes	Type of matching: Single value Matching value dynamically configurable in System Configuration, DICOM tab (item "Modality for worklist query"; default value "ECG").
>Scheduled Performing Physician's Name	(0040,0006)	R	2	Yes	No	Type of matching: Universal Returned value can be displayed in the worklist. Returned value mapped to the "Attending Physician" field in the test information and truncated to 30 characters. As the "Attending Physician" field is part of the products final reports, it is visible in the
>Scheduled Procedure Step Description	(0040,0007)	O	1C	Yes	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value mapped to the "Test type" field in the test information (for Exercise and Ergospirometry tests only) and truncated to 50 characters. It is also mapped in Performed Procedure Step Description (0040,0254)
>Scheduled Station Name	(0040,0010)	O	2	No	No	Type of matching: Universal Returned value can be displayed in the
>Scheduled Procedure Step Location	(0040,0011)	O	2	No	No	Type of matching: Universal Returned value can be displayed in the
>Scheduled Protocol Code Sequence	(0040,0008)	O	1C	No	Yes	Type of matching: Universal Returned value can be displayed in the worklist. See Configurable Context Groups (Stress
>> *'Code Sequence*						

>Scheduled Procedure Step ID	(0040,0009)	O	1	Yes (Cond)	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value can be mapped to the "Order number" field in the test information (if configured in System Configuration, item "Source for Order number) and truncated to 60 characters. As the "order number" field is part of the products final report, it is visible in the Encapsulated Document (PDF) itself. Attribute is copied to (0040,0009) in Modality Performed Procedure Step (N-CREATE-RQ), Encapsulated PDF Instances, 12-Lead ECG Waveform Instances and General ECG Waveform
>Pre-Medication	(0040,0012)	O	2C	No	No	Not used
>Scheduled Procedure Step	(0040,0020)	O	1	No	No	Not used
>Comments on the Scheduled	(0040,0400)	O	3	No	No	Not used
>Requested Contrast Agent	(0032,1070)	O	2C	No	No	Not used

4.3.2.1 Scheduled Procedure Step Module Attribute Descriptions

4.3.2.1.1 Scheduled Station AE Title

The MWL could also be queried for procedure steps of other acquisition workstations. The AE title source for image storage is always that of the querying station.

4.3.3 Requested Procedure Module

TABLE 4.3-3
REQUESTED PROCEDURE MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into the Image	Mapped into MPPS	Use

Requested Procedure ID	(0040,1001)	O	1	Yes (Cond)	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value can be mapped to the "Order number" field in the test information (if configured in System Configuration, item "Source for Order number) and truncated to 60 characters. As the "order number" field is part of the products final report, it is visible in the Encapsulated Document (PDF) itself. Attribute is copied to (0040,1001) in Modality Performed Procedure Step (N-CREATE-RQ), Encapsulated PDF Instances, 12-Lead ECG Waveform Instances and General ECG Waveform Instances. Attribute is mapped to Study ID (0020,0010) in Modality Performed Procedure Step (N- CREATE-RQ),
Requested Procedure Description	(0032,1060)	O	1C	Yes	Yes	Type of matching: Universal Returned value can be displayed in the worklist.
Requested Procedure Code Sequence	(0032,1064)	O	1C	No	No	Type of matching: Universal Returned value (Requested Procedure Code Meaning) can be
> 'Code Sequence						
Study Instance UID	(0020,000D)	O	1	Yes	Yes	Type of matching: Universal Returned value used for Encapsulated PDF and ECG Waveform C-Store.
Referenced Study Sequence	(0008,1110)	O	2	Yes	Yes	Type of matching: Universal Returned value used for Encapsulated PDF and ECG Waveform C-Store
>Referenced SOP Class UID	(0008,1150)	O	1C	Yes	Yes	Type of matching: Universal Returned value used for Encapsulated PDF and ECG Waveform C-Store
>Referenced SOP Instance UID	(0008,1155)	O	1C	Yes	Yes	Type of matching: Universal Returned value used for Encapsulated PDF and ECG Waveform C-Store

Requested Procedure	(0040,1003)	O	2	No	No	Not used
Patient Transport	(0040,1004)	O	2	No	No	Not used
Requested Procedure	(0040,1005)	O	3	No	No	Not used
Confidentiality	(0040,1008)	O	3	No	No	Not used
Reporting	(0040,1009)	O	3	No	No	Not used
Names of Intended Recipients of Results	(0040,1010)	O	3	No	No	Not used

Reason for the Requested	(0040,1002)	O	3	No	No	Not used
Requested Procedure	(0040,1400)	O	3	No	No	Not used

4.3.3.1 Requested Procedure Module Attribute Descriptions

4.3.3.1.1 Study Instance UID

The returned MWL Study Instance UID is used in the N-CREATE-RQ message of the MPPS.

The returned MWL Study Instance UID is used in each individual C-STORE message (Per created image “Encapsulated PDF” as well as “ECG Waveform”) of the related procedure.

For an unscheduled workflow the Study Instance UID is created by the SCU.

4.3.4 Imaging Service Request Module

TABLE 4.3-4
IMAGING SERVICE REQUEST MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Use
Accession Number	(0008,0050)	O	2	Yes	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value can be mapped to the “Order number” field in the test information (if configured in System Configuration, item “Source for Order number) and truncated to 60 characters. As the “order number” field is part of the products final report, it is visible in the Encapsulated Document (PDF) itself. Attribute is copied to (0008,0050) in Modality Performed Procedure Step (N-CREATE-RQ), Encapsulated PDF Instances, 12-Lead ECG Waveform Instances and General ECG Waveform Instances.
Requesting Physician	(0032,1032)	O	2	Yes	No	Type of matching: Universal Returned value can be displayed in the worklist. Returned value mapped to the “Ordering Physician” field in the test information and truncated to 30 characters. As the “Ordering Physician” field is part of the products final report, it is visible in the Encapsulated Document (PDF) itself.

Referring Physician's	(0008,0090)	O	2	No	No	Not used
Requesting	(0032,1033)	O	3	No	No	Not used
Reason for the Imaging Service	(0040,2001)	O	3	No	No	Not used
Imaging Service	(0040,2400)	O	3	No	No	Not used
Issue Date of Imaging	(0040,2004)	O	3	No	No	Not used
Issue Time of Imaging Service	(0040,2005)	O	3	No	No	Not used
Placer Order Number / Imaging	(0040,2016)	O	3	No	No	Not used
Filler Order Number / Imaging	(0040,2017)	O	3	No	No	Not used
Order entered	(0040,2008)	O	3	No	No	Not used
Order Enterer	(0040,2009)	O	3	No	No	Not used
Order Callba	(0040,2010)	O	3	No	No	Not used

4.3.5 Visit Identification

TABLE 4.3-5
VISIT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Admission	(0038,0010)	O	2	No	No	Not used
Institution	(0008.0080)	O	3	No	No	Not used
Institution	(0008,0081)	O	3	No	No	Not used
Institution Code	(0008,0082)	O	3	No	No	Not used
> 'Code Sequence						
Issuer of Admission	(0038,0011)	O	3	No	No	Not used

4.3.6 Visit Status

TABLE 4.3-6
VISIT STATUS MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Current Patient	(0038,0300)	O	2	No	No	Not used
Visit Status ID	(0038,0008)	O	3	No	No	Not used
Patient's Institution Residence	(0038,0400)	O	3	No	No	Not used
Visit Comments	(0038,4000)	O	3	No	No	Not used

4.3.7 Visit Relationship

TABLE 4.3-7
VISIT RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Referenced Patient	(0008,1120)	O	2	No	No	Not used
>Referenced SOP Class	(0008,1150)	O	1C	No	No	Not used
>Referenced SOP	(0008,1155)	O	1C	No	No	Not used

4.3.8 Visit Admission

TABLE 4.3-8
VISIT ADMISSION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Referring Physician's Address	(0008,0092)	O	3	No	No	Not used

Referring Physician's Phone	(0008,0094)	O	3	No	No	Not used
Admitting	(0008,1080)	O	3	No	No	Not used
Admitting Diagnoses Code	(0008,1084)	O	3	No	No	Not used
> *'Code Sequence*						
Route of Admissions	(0038,0016)	O	3	No	No	Not used
Admitting	(0038,0020)	O	3	No	No	Not used
Admitting	(0038,0021)	O	3	No	No	Not used

4.3.9 Patient Relationship

TABLE 4.3-9
PATIENT RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Referenced Visit	(0008,1125)	O	3	No	No	Not used
>Referenced SOP	(0008,1150)	O	3	No	No	Not used
>Referenced SOP Instance	(0008,1155)	O	3	No	No	Not used
Referenced Patient Alias	(0038,0004)	O	3	No	No	Not used
>Referenced SOP	(0008,1150)	O	3	No	No	Not used
>Referenced SOP Instance	(0008,1155)	O	3	No	No	Not used

4.3.10 Patient Identification

TABLE 4.3-10
PATIENT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Patient's Name	(0010,0010)	R	1	Yes	Yes	Type of matching: Wild Card matching. Last Name can be entered for query. Returned value can be displayed in the worklist.
Patient ID	(0010,0020)	R	1	Yes	Yes	Type of matching: Single value. Patient ID can be entered for query. Returned value can be displayed in the worklist.
Issuer of Patient ID	(0010,0021)	O	3	No	No	Not used.
Other Patient	(0010,1000)	O	3	No	No	Not used.
Other Patient	(0010,1001)	O	3	No	No	Not used.
Patient's Birth Name	(0010,1005)	O	3	No	No	Not used.
Patient's Mother's Birth	(0010,1060)	O	3	No	No	Not used.
Medical Record	(0010,1090)	O	3	No	No	Not used.

4.3.11 Patient Demographic

TABLE 4.3-11
PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the MPPS	Note
Patients Birth Date	(0010,0030)	O	2	Yes	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value is mapped to the “Date of Birth” field in the

Patient's Sex	(0010,0040)	O	2	Yes	Yes	Type of matching: Universal Returned value can be displayed in the worklist. Returned value is mapped to the “Gender” field in the local
Patient's Weight	(0010,1030)	O	2	Yes	No	Type of matching: Universal Returned value can be displayed in the worklist. Returned value is mapped to the “Weight” field in the local
Confidentiality constraint on	(0040,3001)	O	2	No	No	Not used
Patient’s Size	(0010,1020)	O	3	Yes	No	Type of matching: Universal Returned value can be displayed in the worklist. Returned value is mapped to the “Height” field in the local
Patient’s	(0010,1040)	O	3	No	No	Not used
Patient’s	(0010,2154)	O	3	No	No	Not used
Patient's Age	(0010,1010)	O	3	No	No	Not used
Occupation	(0010,2180)	O	3	No	No	Not used
Patient’s Birth Time	(0010,0032)	O	3	No	No	Not used
Patient's Insurance Plan Code	(0010,0050)	O	3	No	No	Not used
> ‘Code Sequence						
Patient’s Primary Language	(0010,0101)	O	3	No	No	Not used
> ‘Code Sequence						
> Patient’s Primary Language	(0010,0102)	O	3	No	No	Not used
>> ‘Code Sequence						

Military Rank	(0010,1080)	O	3	No	No	Not used
Branch of	(0010,1081)	O	3	No	No	Not used
Country of Residence	(0010,2150)	O	3	No	No	Not used
Region of Residence	(0010,2152)	O	3	No	No	Not used
Patient's	(0010,2154)	O	3	No	No	Not used
Ethnic Group	(0010,2160)	O	3	No	No	
Patient's Religious	(0010,21F0)	O	3	No	No	Not used
Patient	(0010,4000)	O	3	No	No	Not used

4.3.12 Patient Medical

TABLE 4.3-12
PATIENT MEDICAL MODULE ATTRIBUTES

Attribute	Tag	Expected Matching Key Type	Expected Returned Key	Mapped into the Image	Mapped into the Image	Note
Patient	(0038,0500)	O	2	No	No	Not used
Pregnancy	(0010,21C0)	O	2	No	No	Not used
Medical	(0010,2000)	O	2	No	No	Not used
Contrast	(0010,2110)	O	2	No	No	Not used
Special	(0038,0050)	O	2	No	No	Not used
Smoking Status	(0010,21A0)	O	3	No	No	Not used
Additional Patient	(0010,21B0)	O	3	No	No	Not used
Last Menstrual	(0010,21D0)	O	3	No	No	Not used

5. MODALITY PERFORMED PROCEDURE STEP IMPLEMENTATION

5.1 MODALITY PERFORMED PROCEDURE STEP MODULE TABLE

See DICOM PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

TABLE 5.1-1
MODALITY PERFORMED PROCEDURE STEP MODULES

Module Name	Reference
SOP Common	5.2.1
Performed Procedure Step Relationship	5.2.2
Performed Procedure Step Information	5.2.3
Image Acquisition Results	5.2.4
Radiation Dose	5.2.5
Billing and Material Management Codes	5.2.6

5.2 MODALITY PERFORMED PROCEDURE STEP MODULE DEFINITIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) for a description of each of the attributes contained within the Modality Performed Procedure Step Information Object Definition.

5.2.1 SOP Common Module

TABLE 5.2-1
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Specific Character Set	(0008,0005)	1C	1C	See 3.7

5.2.2 Performed Procedure Step Relationship Module

TABLE 5.2-2
PERFORMED PROCEDURE STEP RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Patient's Name	(0010,0010)	2	-	Supported (comes from the MWL or entered in the Patient List dialog).
Patient ID	(0010,0020)	2	-	Supported (comes from the MWL or entered in the Patient List dialog).
Patient's Birth Date	(0010,0030)	2	-	Supported (comes from the MWL or entered in the Patient List dialog).
Patient's Sex	(0010,0040)	2	-	Supported (comes from the MWL or entered in the Patient List dialog).
Referenced Patient Sequence	(0008,1120)	2	-	Supported, always empty
>Referenced SOP Class UID	(0008,1150)	1	-	Not used
>Referenced SOP Instance UID	(0008,1155)	1	-	Not used
Scheduled Step Attributes Sequence	(0040,0270)	1	-	Supported (1 item can be sent)
>Study Instance UID	(0020,000D)	1	-	Supported (comes from the MWL or created on it's own in case of an unscheduled test.)
>Referenced Study Sequence	(0008,1110)	2	-	Supported
>>Referenced SOP Class UID	(0008,1150)	1	-	Set to "1.2.840.10008.3.1.2.3.1"
>>Referenced SOP Instance UID	(0008,1155)	1	-	Study Instance UID from the MWL if available, otherwise uniquely generated by the equipment.
>Accession Number	(0008,0050)	2	-	Supported (comes from the MWL if available, otherwise empty)
>Placer Order Number/Imaging Service Request	(0040,2016)	3	-	Not used
>Filler Order Number/Imaging Service Request	(0040,2017)	3	-	Not used
>Requested Procedure ID	(0040,1001)	2	-	Supported (comes from the MWL if available, otherwise empty)
>Requested Procedure Description	(0032,1060)	2	-	Supported (comes from the MWL if available, otherwise empty)
>Scheduled Procedure Step ID	(0040,0009)	2	-	Supported (comes from the MWL if available, otherwise empty)
>Scheduled Procedure Step Description	(0040,0007)	2	-	Supported (comes from the MWL if available, otherwise empty)

>Scheduled Protocol Code Sequence	(0040,0008)	2	-	Supported (comes from the MWL if available, otherwise empty), see Configurable Context Groups chapter 4.4.3
>> *'Code Sequence Macro'*				

5.2.3 Performed Procedure Step Information Module

TABLE 5.2-3
PERFORMED PROCEDURE STEP INFORMATION MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Performed Station AE Title	(0040,0241)	1	-	Supported
Performed Station Name	(0040,0242)	2	-	Supported, always empty
Performed Location	(0040,0243)	2	-	Supported, always empty
Performed Procedure Step Start Date	(0040,0244)	1	-	Supported, current date
Performed Procedure Step Start Time	(0040,0245)	1,	-	Supported, current time
Performed Procedure Step ID	(0040,0253)	1	-	Supported
Performed Procedure Step End Date	(0040,0250)	2 Always empty	3 Current date	Supported
Performed Procedure Step End Time	(0040,0251)	2 Always empty	3 Current time	Supported
Performed Procedure Step Status	(0040,0252)	1	3	Supported
Performed Procedure Step Description	(0040,0254)	2	3	Supported
Comments on the Performed Procedure Step	(0040,0280)	3	3	Not used
Performed Procedure Type Description	(0040,0255)	2 Always empty	3 Not used	
Procedure Code Sequence	(0008,1032)	2 Supported	3 Not used	
> *'Code Sequence Macro'*				
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	3 Always empty	3 Supported	CID 9300 is used.
> *'Code Sequence Macro'*				

5.2.4 Image Acquisition Results Module

TABLE 5.2-4
IMAGE ACQUISITION RESULTS MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Modality	(0008,0060)	1	-	Supported (comes from the MWL if available or taken from the application configuration data).
Study ID	(0020,0010)	2	-	Filled with Requested Procedure ID from the worklist if available, otherwise empty.
Performed Protocol Code Sequence	(0040,0260)	2	3	Supported, see Configurable Context Groups chapter 4.4.3
> *'Code Sequence Macro'*				
Performed Series Sequence	(0040,0340)	2 Always empty	3 Supported	
>Performing Physician's Name	(0008,1050)	2 Not used	2 Always empty	
>Operator's Name	(0008,1070)	2 Not used	2 Always empty	
>Protocol Name	(0018,1030)	1 Not used	1 Supported	
>Series Instance UID	(0020,000E)	1 Not used	1 Supported	
>Series Description	(0008,103E)	2 Not used	2 Always empty	
>Retrieve AE Title	(0008,0054)	2 Not used	2 Always empty	
>Referenced Image Sequence	(0008,1140)	2 Not used	2 Always empty	
>>Referenced SOP Class UID	(0008,1150)	1	1	Not used
>>Referenced SOP Instance UID	(0008,1155)	1	1	Not used
>Referenced Non-Image Composite SOP Instance Sequence (==Referenced Standalone SOP Instance Sequence)	(0040,0220)	2 Not used	2 Supported	Sequence includes all SOP Instances created during MPPS. Max. number is 50.
>>Referenced SOP Class UID	(0008,1150)	1	1	Supported

>>Referenced SOP Instance UID	(0008,1155)	1	1	Supported

5.2.5 Radiation Dose Module

TABLE 5.2-5
RADIATION DOSE MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	3	Not used
> *'Code Sequence Macro'*		3	3	Not used
Total Time of Fluoroscopy	(0040,0300)	3	3	Not used
Total Number of Exposures	(0040,0301)	3	3	Not used
Distance Source to Detector (SID)	(0018,1110)	3	3	Not used
Distance Source to Entrance	(0040,0306)	3	3	Not used
Entrance Dose	(0040,0302)	3	3	Not used
Entrance Dose in mGy	(0040,8302)	3	3	Not used
Exposed Area	(0040,0303)	3	3	Not used
Image Area Dose Product	(0018,115E)	3	3	Not used
Comments on Radiation Dose	(0040,0310)	3	3	Not used
Exposure Dose Sequence	(0040,030E)	3	3	Not used
>Radiation Mode	(0018,115A)	3	3	Not used
>KVp	(0018,0060)	3	3	Not used
>X-ray Tube Current in µ A	(0018,8151)	3	3	Not used
>Exposure Time	(0018,1150)	3	3	Not used
>Filter Type	(0018,1160)	3	3	Not used
>Filter Material	(0018,7050)	3	3	Not used

5.2.6 Billing and Material Management Codes Module

TABLE 5.2-6
BILLING AND MATERIAL MANAGEMENT CODES MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Billing Procedure Step Sequence	(0040,0320)	3	3	Not used

> 'Code Sequence Macro'		3	3	Not used
Film Consumption Sequence	(0040,0321)	3	3	Not used
>Number of Films	(2100,0170)	3	3	Not used
>Medium Type	(2000,0030)	3	3	Not used
>Film Size ID	(2010,0050)	3	3	Not used
Billing Supplies and Devices Sequence	(0040,0324)	3	3	Not used
>Billing Item Sequence	(0040,0296)	3	3	Not used
>> 'Code Sequence Macro'		3	3	Not used
>Quantity Sequence	(0040,0293)	3	3	Not used
>>Quantity	(0040,0294)	3	3	Not used
>>Measuring Units Sequence	(0040,0295)	3	3	Not used
>>> 'Code Sequence Macro'		3	3	Not used

5.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

The Product supports the Standard Extended and Private Data Attributes defined in the following sections in MPPS SOP Instances as Type 3 data elements.

5.3.1 Standard Extended Attributes

There are no Standard Extended Attributes supported in MPPS SOP Instances.

5.3.2 Private Data Attributes

There are no Private Data Attributes supported in MPPS SOP Instances.

5.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

The Product supports coded terminology using Standard Extended, Private, and Configurable Context Groups defined in the following sections.

5.4.1 Standard Extended Context Groups

There are no extensions to standard Context Groups for MPPS SOP Instances.

5.4.2 Private Context Groups

There are no Private Context Groups supported for MPPS SOP Instances.

5.4.3 Configurable Context Groups

The Product supports the following Configurable Context Groups for MPPS SOP Instances created by this product:

TABLE 5.4-1
CONFIGURABLE CONTEXT GROUPS

Context Group	Default Value Set	Use
Protocol Codes	See 2.8.3	Selected value from this group is used in the Scheduled Protocol Code Sequence (0040,0008) and the Performed Protocol Code Sequence (0040,0260).

6. STORAGE COMMITMENT PUSH MODEL IMPLEMENTATION

6.1 STORAGE COMMITMENT PUSH MODEL INFORMATION OBJECT DEFINITION

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the attributes contained within the Storage Commitment Information Object.

The Storage Commitment Information Object is used both for N-ACTION Storage Commitment Requests by the SCU and N-EVENT-REPORT Storage Commitment Notifications by the SCP.

6.1.1 STORAGE COMMITMENT MODULE FOR N-ACTION

TABLE 6.1-1
STORAGE COMMITMENT MODULE FOR N-ACTION

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Uniquely generated by the equipment and cached
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	Supported
>Referenced SOP Class UID	(0008,1150)	Supported
>Referenced SOP Instance UID	(0008,1155)	Supported, cached
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used

6.1.2 STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

TABLE 6.1-1
STORAGE COMMITMENT MODULE FOR N-EVENT-REPORT

Attribute Name	Tag	SCU Use
Transaction UID	(0008,1195)	Returned value is compared with cached Transaction-UID.
Retrieve AE Title	(0008,0054)	Not used
Storage Media File-Set ID	(0088,0130)	Not used
Storage Media File-Set UID	(0088,0140)	Not used
Referenced SOP Sequence	(0008,1199)	All SOP Instances of the corresponding Transaction-UID are compared with cached values and if found Transfer status is set to “Committed”.
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Supported
>Retrieve AE Title	(0008,0054)	Not used
>Storage Media File-Set ID	(0088,0130)	Not used
>Storage Media File-Set UID	(0088,0140)	Not used
Failed SOP Sequence	(0008,1198)	If at least one SOP Instance of the Transaction-UID failed, the transfer status remains as “Transferred” and does not switch to “Committed”.
>Referenced SOP Class UID	(0008,1150)	Not used
>Referenced SOP Instance UID	(0008,1155)	Not used
>Failure Reason	(0008,1197)	Not used

7. ENCAPSULATED PDF INFORMATION OBJECT IMPLEMENTATION

7.1 IOD MODULE TABLE

The Encapsulated PDF Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes. Standard Extended and Private attributes are described in Section 6.3.

TABLE 7.1-1
ENCAPSULATED PDF IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	7.2.1
	Specimen Identification	Not used	
	Clinical Trial Subject	Not used	
Study	General Study	Used	7.2.2
	Patient Study	Not used	
	Clinical Trial Study	Not used	
Series	Encapsulated Document Series	Used	7.2.3
	Clinical Trial Series	Not used	
Equipment	General Equipment	Used	7.2.4
	SC Equipment	Used	7.2.5
Encapsulated Document	Encapsulated Document	Used	7.2.6
	SOP Common	Used	7.2.7

7.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the Encapsulated PDF Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

Elements not listed in tables shall be considered as "Not used".

7.2.1 Patient Module

TABLE 7.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	May be entered (User Interface) or taken from worklist if it is there ("Last name" and "First Name" fields are both truncated to 30 characters)
Patient ID	(0010,0020)	2	May be entered (User Interface) or taken from worklist if it is there (max. 30 characters).
Patient's Birth Date	(0010,0030)	2	May be entered (User Interface) or taken from worklist if it is there.
Patient's Sex	(0010,0040)	2	May be entered (User Interface) or taken from worklist if it is there.
Referenced Patient Sequence	(0008,1120)	3	Not used
> *'Referenced SOP Class / Instance UIDs'*			
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient IDs	(0010,1000)	3	Not used
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Not used
Patient Comments	(0010,4000)	3	Not used

7.2.2 General Study Module

TABLE 7.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Taken from worklist if it is there. If not, uniquely generated by the equipment.
Study Date	(0008,0020)	2	Set to test date
Study Time	(0008,0030)	2	Set to test time
Referring Physician's Name	(0008,0090)	2	Empty
Study ID	(0020,0010)	2	Filled with Requested Procedure ID from the worklist if available, otherwise empty.
Accession Number	(0008,0050)	2	Taken from worklist if it is there, otherwise empty.
Study Description	(0008,1030)	3	Not used
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Used SOP Class 1.2.840.10008.3.1.2.3.1 Used SOP Instance: Study Instance UID from worklist if available, otherwise uniquely generated by the equipment.
> Include 'SOP Instance Reference Macro'			
Procedure Code Sequence	(0008,1032)	3	Not used
> 'Code Sequence Macro'			

7.2.3 Encapsulated Document Series Module

TABLE 7.2-3
ENCAPSULATED DOCUMENT SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Defined term “ECG” used.
Series Instance UID	(0020,000E)	1	Uniquely generated by the equipment.
Series Number	(0020,0011)	1	Fix: set to 1
Referenced Performed Procedure Step Sequence	(0008,1111)	3	Used
> Referenced SOP Class UID	(0008,1150)	1	Set to “1.2.840.10008.3.1.2.3.3”
> Referenced SOP Instance UID	(0008,1155)	1	Uniquely created PPS SOP Instance UID
Series Description	(0008,103E)	3	Not used
Request Attributes Sequence	(0040,0275)	3	Used if Requested Procedure ID, Scheduled Procedure Step ID and Scheduled Protocol Code are available from the worklist.
>Requested Procedure ID	(0040,1001)	1C	Taken from worklist if available.
>Accession Number	(0008,0050)	3	Not used
>Study Instance UID	(0020,000D)	3	Not used
>Referenced Study Sequence	(0008,1110)	3	Not used
>>‘SOP Instance Reference Macro'			
>Requested Procedure Description	(0032,1060)	3	Taken from the worklist if available
>Requested Procedure Code Sequence	(0032,1064)	3	Not used
>>‘Code Sequence Macro’			
>Reason for the Requested Procedure	(0040,1002)	3	Not used
> Reason for Requested Procedure Code Sequence	(0040,100A)	3	Not used

>> 'Code Sequence Macro'			
>Scheduled Procedure Step ID	(0040,0009)	1C	Taken from worklist if available.
>Scheduled Procedure Step Description	(0040,0007)	3	Used
>Scheduled Protocol Code Sequence	(0040,0008)	3	Used, see Configurable Context Group chapter 6.4.3
>> 'Code Sequence Macro'			
>>Protocol Context Sequence	(0040,0440)	3	Not used
>>> 'Content Item Macro'			
>>> Content Item Modifier Sequence	(0040,0441)	3	Not used
>>>> 'Content Item Macro'			
Performed Procedure Step ID	(0040,0253)	3	Equipment generated ID (date/time of this procedure step, format: MMDDYYYYHHMMSS)
Performed Procedure Step Start Date	(0040,0244)	3	Not used
Performed Procedure Step Start Time	(0040,0245)	3	Not used
Performed Procedure Step Description	(0040,0254)	3	Taken from the worklist (Scheduled Step Description) if available. For Exercise- and Ergospirometry test this field is mapped to the test type field in the Test Information dialog.
Performed Protocol Code Sequence	(0040,0260)	3	Used if Performed Protocol Code and Performed Protocol Code Scheme are available. See Configurable Context Groups chapter 6.4.3
>'Code Sequence Macro'			
>Protocol Context Sequence	(0040,0440)	3	Not used
>>'Content Item Macro'			
>>Content Item Modifier Sequence	(0040,0441)	3	Not used
>>>'Content Item Macro'			
Comments on the Performed Procedure Step	(0040,0280)	3	Not used

7.2.4 General Equipment Module

TABLE 7.2-4
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Set to “GE Healthcare”.
Institution Name	(0008,0080)	3	Not used
Institution Address	(0008,0081)	3	Not used
Station Name	(0008,1010)	3	Not used
Institutional Department Name	(0008,1040)	3	Not used
Manufacturer's Model Name	(0008,1090)	3	Not used
Device Serial Number	(0018,1000)	3	Not used
Software Versions	(0018,1020)	3	Not used
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	3	Not used

7.2.5 SC Equipment Module

TABLE 7.2-5
SC EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Conversion Type	(0008,0064)	1	WSD (= Workstation)
Modality	(0008,0060)	3	Used in Encapsulated Document Series Module with defined term “ECG”.
Secondary Capture Device ID	(0018,1010)	3	Not used
Secondary Capture Device Manufacturer	(0018,1016)	3	Not used
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	Not used
Secondary Capture Device Software Version	(0018,1019)	3	Not used
Video Image Format Acquired	(0018,1022)	3	Not used
Digital Image Format Acquired	(0018,1023)	3	Not used

7.2.6 Encapsulated Document Module

TABLE 7.2-6
ENCAPSULATED DOCUMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Instance Number	(0020,0013)	1	Continuous number within a series starting with zero.

Content Date	(0008,0023)	2	Date of PDF creation
Content Time	(0008,0033)	2	Time of PDF creation
Acquisition Datetime	(0008,002A)	2	Date and time of the test
Burned In Annotation	(0028,0301)	1	Set to “YES”
Source Instance Sequence	(0042,0013)	1C	Not used (not derived from a DICOM Instance)
>Referenced SOP Class UID	(0008,1150)	1	Not used
> Referenced SOP Instance UID	(0008,1155)	1	Not used
Document Title	(0042,0010)	2	Title structure: Patient Last Name, First Name [Patient ID] – Test Type (Continuous number) [Test Date, Test Time]
Concept Name Code Sequence	(0040,A043)	2	Empty
>Include ‘Code Sequence Macro’			
Verification Flag	(0040,A493)	3	Set to to “UNVERIFIED” if the test is not yet confirmed. Set to “VERIFIED” if the test is already confirmed (User Interface).
MIME Type of Encapsulated Document	(0042,0012)	1	Set to “application/pdf”
Encapsulated Document	(0042,0011)	1	Binary data of PDF

Note: One could distinguish four stages in the creation of the Encapsulated Document Object, identified by the following Attributes:

1. Measurement and/or data collection, identified by Acquisition Datetime (0008,002A) in the Encapsulated Document Module.

2. Creation of the original documentation of the data collection, identified by Content Date (0008,0023) and Content Time (0008,0033).

3. Rendering of the original documentation into the format that will be encapsulated, e.g. a PDF document. The rendering time is not captured by any DICOM Attribute, but may be encoded in the rendering.

4. Encapsulation of the rendering into a DICOM Object, identified by Instance Creation Date (0008,0012) and Instance Creation Time (0008,0013) in the SOP Common Module.

7.2.7 SOP Common Module

TABLE 7.2-7
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Set to "1.2.840.10008.5.1.4.1.1.104.1"
SOP Instance UID	(0008,0018)	1	Uniquely generated by the equipment (Implementation UID is used as base ID)
Specific Character Set	(0008,0005)	1C	See 3.7
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used
Timezone Offset From UTC	(0008,0201)	3	Not used
Instance Number	(0020,0013)	3	Not used
SOP Instance Status	(0100,0410)	3	Not used
SOP Authorization Date and Time	(0100,0420)	3	Not used
SOP Authorization Comment	(0100,0424)	3	Not used
Authorization Equipment Certification Number	(0100,0426)	3	Not used
MAC Parameters Sequence	(4FFE,0001)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>MAC Calculation Transfer Syntax UID	(0400,0010)	1	Not used
>MAC Algorithm	(0400,0015)	1	Not used
>Data Elements Signed	(0400,0020)	1	Not used
Digital Signatures Sequence	(FFFA,FFFA)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>Digital Signature UID	(0400,0100)	1	Not used
>Digital Signature DateTime	(0400,0105)	1	Not used
>Certificate Type	(0400,0110)	1	Not used
>Certificate of Signer	(0400,0115)	1	Not used
>Signature	(0400,0120)	1	Not used
>Certified Timestamp Type	(0400,0305)	1C	Not used
>Certified Timestamp	(0400,0310)	3	Not used

7.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

The Product supports the Standard Extended and Private Data Attributes defined in the following sections in Encapsulated PDF SOP Instances as Type 3 data elements.

7.3.1 Standard Extended Attributes

There are no Standard Extended Attributes supported in Encapsulated PDF SOP Instances.

7.3.2 Private Data Attributes

There are no Private Data Attributes supported in Encapsulated PDF SOP Instances.

7.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

The Product supports coded terminology using Standard Extended, Private and Configurable Context Groups defined in the following sections.

7.4.1 Standard Extended Context Groups

There are no Standard Extended Context Groups supported in Encapsulated SOP Instances.

7.4.2 Private Context Groups

There are no Private Context Groups supported in Encapsulated SOP Instances.

7.4.3 Configurable Context Groups

The Product supports the following Configurable Context Groups for Encapsulated PDF SOP Instances created by this product:

TABLE 7.4-1
CONFIGURABLE CONTEXT GROUPS

Context Group	Default Value Set	Use
Protocol Codes	See 3.8.3	Selected value from this group is used in the Scheduled Protocol Code Sequence (0040,0008) and the Performed Protocol Code Sequence (0040,0260).

8. 12-LEAD ECG WAVEFORM INFORMATION OBJECT IMPLEMENTATION

8.1 IOD MODULE TABLE

The 12-Lead ECG Waveform Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes. Standard Extended and Private attributes are described in Section 7.3.

TABLE 8.1-1
12-LEAD ECG WAVEFORM IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	8.2.1
	Clinical Trial Subject	Not used	
Study	General Study	Used	8.2.2
	Patient Study	Not used	
	Clinical Trial Study	Not used	
Series	General Series	Used	8.2.3
	Clinical Trial Series	Not used	
Frame of Reference	Synchronization	Not used	
Equipment	General Equipment	Used	8.2.4
Waveform	Waveform Identification	Used	8.2.5
	Waveform	Used	8.2.6
	Acquisition Context	Used	8.2.7
	Waveform Annotation	Not used	
	SOP Common	Used	8.2.8

8.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the Encapsulated PDF Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

Elements not listed in tables shall be considered as "Not used".

8.2.1 Patient Module

TABLE 8.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	May be entered (User Interface) or taken from worklist if it is there ("Last name" and "First Name" fields are both truncated to 30 characters).
Patient ID	(0010,0020)	2	May be entered (User Interface) or taken from worklist if it is there (max. 30 characters).
Patient's Birth Date	(0010,0030)	2	May be entered (User Interface) or taken from worklist if it is there.
Patient's Sex	(0010,0040)	2	May be entered (User Interface) or taken from worklist if it is there.
Referenced Patient Sequence	(0008,1120)	3	Not used
> *'Referenced SOP Class / Instance UIDs'*			
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient IDs	(0010,1000)	3	Not used
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Not used
Patient Comments	(0010,4000)	3	Not used

8.2.2 General Study Module

TABLE 8.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Taken from worklist if it is there. If not, uniquely generated by the equipment.
Study Date	(0008,0020)	2	Set to test date
Study Time	(0008,0030)	2	Set to test time
Referring Physician's Name	(0008,0090)	2	Empty
Study ID	(0020,0010)	2	Filled with Requested Procedure ID from the worklist if available, otherwise empty.
Accession Number	(0008,0050)	2	Taken from worklist if it is there, otherwise empty.
Study Description	(0008,1030)	3	Not used
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Used SOP Class 1.2.840.10008.3.1.2.3.1 Used SOP Instance: Study Instance UID from worklist if available, otherwise uniquely generated by the equipment.
> Include 'SOP Instance Reference Macro'			
Procedure Code Sequence	(0008,1032)	3	Not used
> 'Code Sequence Macro'			

8.2.3 General Series Module

TABLE 8.2-3
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Defined term “ECG” used.
Series Instance UID	(0020,000E)	1	Uniquely generated by the equipment.
Series Number	(0020,0011)	2	Fix: set to 1
Laterality	(0020,0060)	2C	Not used
Series Date	(0008,0021)	3	Not used
Series Time	(0008,0031)	3	Not used
Performing Physicians’ Name	(0008,1050)	3	Not used
Protocol Name	(0018,1030)	3	Filled with Exercise- or Ergospirometry test protocol name.
Series Description	(0008,103E)	3	Not used
Operators' Name	(0008,1070)	3	Not used
Referenced Performed Procedure Step Sequence	(0008,1111)	3	SOP Class UID: 1.2.840.10008.3.1.2.3.3 SOP Instance IOD: Uniquely created PPS SOP Instance UID
> Include ‘SOP Instance Reference Macro’			
Body Part Examined	(0018,0015)	3	Not used
Patient Position	(0018,5100)	2C	Not used
Smallest Pixel Value in Series	(0028,0108)	3	Not used
Largest Pixel Value in Series	(0028,0109)	3	Not used
Request Attributes Sequence	(0040,0275)	3	Used if Requested Procedure ID, Scheduled Procedure Step ID and Scheduled Protocol Code are available from the worklist.
>Requested Procedure ID	(0040,1001)	1C	Taken from worklist if available.
>Accession Number	(0008,0050)	3	Not used
>Study Instance UID	(0020,000D)	3	Not used
>Referenced Study Sequence	(0008,1110)	3	Not used
>>‘SOP Instance Reference Macro'			
>Requested Procedure Description	(0032,1060)	3	Taken from the worklist if available
>Requested Procedure Code Sequence	(0032,1064)	3	Not used
>>‘Code Sequence Macro’			
>Reason for the Requested Procedure	(0040,1002)	3	Not used
> Reason for Requested Procedure Code Sequence	(0040,100A)	3	Not used

>> 'Code Sequence Macro'			
>Scheduled Procedure Step ID	(0040,0009)	1C	Taken from worklist if available.
>Scheduled Procedure Step Description	(0040,0007)	3	Used
>Scheduled Protocol Code Sequence	(0040,0008)	3	Used, see Configurable Context Groups chapter 7.4.3
>> 'Code Sequence Macro'			
Performed Procedure Step ID	(0040,0253)	3	Equipment generated ID (date/time of this procedure step, format: MMDDYYYYHHMMSS)
Performed Procedure Step Start Date	(0040,0244)	3	Not used
Performed Procedure Step Start Time	(0040,0245)	3	Not used
Performed Procedure Step Description	(0040,0254)	3	Taken from the worklist (Scheduled Step Description) if available. For Exercise- or Ergospirometry test this field is mapped to the test type field in the Test Information dialog.
Performed Protocol Code Sequence	(0040,0260)	3	Used if Performed Protocol Code and Performed Protocol Code Scheme are available. See Configurable Context Groups chapter 7.4.3
> 'Code Sequence Macro'			
Comments on the Performed Procedure Step	(0040,0280)	3	Not used

8.2.4 General Equipment Module

TABLE 8.2-4
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Set to "GE Healthcare".
Institution Name	(0008,0080)	3	Not used
Institution Address	(0008,0081)	3	Not used
Station Name	(0008,1010)	3	Not used
Institutional Department Name	(0008,1040)	3	Not used
Manufacturer's Model Name	(0008,1090)	3	Not used
Device Serial Number	(0018,1000)	3	Not used
Software Versions	(0018,1020)	3	Not used
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	1C	Not used

8.2.5 Waveform Identification Module

TABLE 8.2-5
WAVEFORM IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Instance Number	(0020,0013)	1	Continuous number within a series starting with zero.
Content Date	(0008,0023)	1	Date of the test that includes this waveform.
Content Time	(0008,0033)	1	Time of the test that includes this waveform.
Acquisition Datetime	(0008,002A)	1	Date and time of the acquisition of this waveform.
Referenced Instance Sequence	(0008,114A)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1	Not used
>Referenced SOP Instance UID	(0008,1155)	1	Not used
>Purpose of Reference Code Sequence	(0040,A170)	3	Not used
>>'Code Sequence Macro'			Not used

8.2.6 Waveform Module

TABLE 8.2-6
WAVEFORM MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Waveform Sequence	(5400,0100)	1	The default value is to use 1 sequence with max. 3, 6 or 12 Leads (depending on the number of monitored leads, see Exercise test configuration) including a 10 second ECG stripe. Especially in case of a 12-lead ECG the number of waveform items may vary up to 5, depending on the used 12-Lead/ 12SL Report Format (see Exercise test configuration). However, this must be explicitly enabled (see Product Service Manual).
> Multiplex Group Time Offset	(0018,1068)	1C	Not used (Acquisition Time Synchronized also not used)
> Trigger Time Offset	(0018,1069)	1C	Not used (waveform acquisition is not synchronized to a trigger)
> Trigger Sample Position	(0018,106E)	3	Not used
> Waveform Originality	(003A,0004)	1	Set to “ORIGINAL”

> Number of Waveform Channels	(003A,0005)	1	The number of waveforms channels per group: • 1 channel (e.g. as 1 rhythm channel in a 4 groups x 2.5 seconds plus 1 group x 10 seconds format) • 3 channels (e.g. 3 monitored leads in 1 group or 12 monitored leads in 4 groups x 2.5 seconds) • 6 channels (e.g. 6 monitored leads in 1 group or 12 monitored leads in 2 groups x 5 seconds) • 12 channels (e.g. 12 monitored leads in 1 group x 10 seconds)
> Number of Waveform Samples	(003A,0010)	1	Can be 1250 (2.5 seconds), 2500 (5 seconds) or 5000 (10 seconds) with a sampling rate of 500Hz.
> Sampling Frequency	(003A,001A)	1	500
> Multiplex Group Label	(003A,0020)	3	Not used
> Channel Definition Sequence	(003A,0200)	1	Number of Channel Definition Sequences: see Number of Waveform Channels
>> Waveform Channel Number	(003A,0202)	3	Not used
>> Channel Label	(003A,0203)	3	Not used
>> Channel Status	(003A,0205)	3	Not used
>> Channel Source Sequence	(003A,0208)	1	Context ID CID 3001 is used
>>> Code Value		1C	SCPECG lead labels as defined (e.g. "5.6.3-9-1" for Lead I)
>>> Coding Scheme		1C	Set to “SCPECG”
>>> Coding Meaning		1C	Set to “Lead <specified lead label>”
>>> Coding Version		1C	Not used (Code value is unambiguous)
>> Channel Source Modifiers Sequence	(003A,0209)	1C	Not used
>>> 'Code Sequence Macro’			Not used
>> Source Waveform Sequence	(003A,020A)	3	Not used
>>>Referenced SOP Class UID	(0008,1150)	1C	Not used
>>>Referenced SOP Instance UID	(0008,1155)	1C	Not used
>>> Referenced Waveform Channels	(0040,A0B0)	1C	Not used
>> Channel Derivation Description	(003A,020C)	3	Not used
>> Channel Sensitivity	(003A,0210)	1C	Set to “5.0” (microvolt)
>> Channel Sensitivity Units Sequence	(003A,0211)	1C	Context ID 3082 is used
>>> Code Value		1C	Set to "uV"
>>> Coding Scheme		1C	Set to “UCUM”
>>> Coding Meaning		1C	Set to “microvolt”
>>> Coding Version		1C	Set to “1.4”
>> Channel Sensitivity Correction Factor	(003A,0212)	1C	Set to “1”
>> Channel Baseline	(003A,0213)	1C	Set to “0”

>> Channel Time Skew	(003A,0214)	1C	Not used (Channel Sample Skew is used instead)
>> Channel Sample Skew	(003A,0215)	1C	Used (Offset of first sample of channel from waveform multiplex group start time, in samples)
>> Channel Offset	(003A,0218)	3	Not used
>> Waveform Bits Stored	(003A,021A)	1	Set to “16”
>> Filter Low Frequency	(003A,0220)	3	Set to “0.01” or “0.05” Hz, depending on the filter settings of this waveform.
>> Filter High Frequency	(003A,0221)	3	Set to “20”, “40”, “100” or “150” Hz depending on the filter settings of this waveform.
>> Notch Filter Frequency	(003A,0222)	3	Not used
>> Notch Filter Bandwidth	(003A,0223)	3	Not used
>> Channel Minimum Value	(5400,0110)	3	Not used
>> Channel Maximum Value	(5400,0112)	3	Not used
> Waveform Bits Allocated	(5400,1004)	1	Set to “16”
> Waveform Sample Interpretation	(5400,1006)	1	Set to “SS”
> Waveform Padding Value	(5400,100A)	1C	Not used, acquisition equipment does not insert padding
> Waveform Data	(5400,1010)	1	Binary waveform data

8.2.7 Acquisition Context Module

TABLE 8.2-7
ACQUISITION CONTEXT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Acquisition Context Sequence	(0040,0555)	2	Two items are present in this sequence. Template TID 3401 is used
First sequence item			
>Value Type	(0040,A040)	3	Set to “CODE”
>Concept Name Code Sequence	(0040,A043)	1	Sequence set to 109054,DCM,”Patient State”
>> ‘Code Sequence Macro			
>Referenced Frame Numbers	(0040,A136)	1C	Not used
>Numeric Value	(0040,A30A)	1C	Not used
>Measurement Units Code Sequence	(0040,08EA)	1C	Not used
>> ‘Code Sequence Macro’			
>Date	(0040,A121)	1C	Not used
>Time	(0040,A122)	1C	Not used
>Person Name	(0040,A123)	1C	Not used
>Text Value	(0040,A160)	1C	Not used

>Concept Code Sequence	(0040,A168)	1C	See CID 3262
>> 'Code Sequence Macro'			
Second sequence item			
>Value Type	(0040,A040)	3	Set to "NUMERIC"
>Concept Name Code Sequence	(0040,A043)	1	Sequence set to 109055,DCM,"Protocol Stage"
>> 'Code Sequence Macro			
>Referenced Frame Numbers	(0040,A136)	1C	Not used
>Numeric Value	(0040,A30A)	1C	Stage number of Exercise- or Ergospirometry test
>Measurement Units Code Sequence	(0040,08EA)	1C	Sequence set to {stage}, UCUM, "stage"
>> 'Code Sequence Macro'			
>Date	(0040,A121)	1C	Not used
>Time	(0040,A122)	1C	Not used
>Person Name	(0040,A123)	1C	Not used
>Text Value	(0040,A160)	1C	Not used
>Concept Code Sequence	(0040,A168)	1C	Not used
>> 'Code Sequence Macro'			
Acquisition Context Description	(0040,0556)	3	Not used

8.2.8 SOP Common Module

TABLE 8.2-8
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Set to "1.2.840.10008.5.1.4.1.1.9.1.1"
SOP Instance UID	(0008,0018)	1	Uniquely generated by the equipment (Implementation UID is used as base ID)
Specific Character Set	(0008,0005)	1C	See 3.7
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used

Timezone Offset From UTC	(0008,0201)	3	Not used
Instance Number	(0020,0013)	3	Not used
SOP Instance Status	(0100,0410)	3	Not used
SOP Authorization Date and Time	(0100,0420)	3	Not used
SOP Authorization Comment	(0100,0424)	3	Not used
Authorization Equipment Certification Number	(0100,0426)	3	Not used
MAC Parameters Sequence	(4FFE,0001)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>MAC Calculation Transfer Syntax UID	(0400,0010)	1	Not used
>MAC Algorithm	(0400,0015)	1	Not used
>Data Elements Signed	(0400,0020)	1	Not used
Digital Signatures Sequence	(FFFA,FFFA)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>Digital Signature UID	(0400,0100)	1	Not used
>Digital Signature DateTime	(0400,0105)	1	Not used
>Certificate Type	(0400,0110)	1	Not used
>Certificate of Signer	(0400,0115)	1	Not used
>Signature	(0400,0120)	1	Not used
>Certified Timestamp Type	(0400,0305)	1C	Not used
>Certified Timestamp	(0400,0310)	3	Not used

8.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

The Product supports the Standard Extended and Private Data Attributes defined in the following sections in 12-Lead ECG Waveform SOP Instances as Type 3 data elements.

8.3.1 Standard Extended Attributes

There are no Standard Extended Attributes supported in 12-Lead ECG Waveform IOD.

8.3.2 Private Data Attributes

There are no Private Data Attributes supported in 12-Lead ECG Waveform SOP Instances.

8.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

The Product supports coded terminology using Standard Extended, Private and Configurable Context Groups defined in the following sections.

8.4.1 Standard Extended Context Groups

There are no Standard Extended Context Groups supported in 12-Lead ECG Waveform SOP Instances.

8.4.2 Private Context Groups

There are no Private Context Groups supported in 12-Lead ECG Waveform SOP Instances.

8.4.3 Configurable Context Groups

The Product supports the following Configurable Context Groups for 12-Lead ECG Waveform SOP Instances created by this product.

TABLE 8.4-1
CONFIGURABLE CONTEXT GROUPS

Context Group	Default Value Set	Use
Protocol Codes	See 3.8.3	Selected value from this group is used in the Scheduled Protocol Code Sequence (0040,0008) and the Performed Protocol Code Sequence (0040,0260).

9. GENERAL ECG WAVEFORM INFORMATION OBJECT IMPLEMENTATION

9.1 IOD MODULE TABLE

The General ECG Waveform Information Object Definition comprises the modules of the following table, plus Standard Extended and Private attributes. Standard Extended and Private attributes are described in Section 8.3.

TABLE 9.1-1
GENERAL ECG WAVEFORM IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	9.2.1
	Clinical Trial Subject	Not used	
Study	General Study	Used	9.2.2
	Patient Study	Not used	
	Clinical Trial Study	Not used	
Series	General Series	Used	9.2.3
	Clinical Trial Series	Not used	
Frame of Reference	Synchronization	Not used	
Equipment	General Equipment	Used	9.2.4
Waveform	Waveform Identification	Used	9.2.5
	Waveform	Used	9.2.6
	Acquisition Context	Used	9.2.7
	Waveform Annotation	Not used	
	SOP Common	Used	9.2.8

9.2 INFORMATION MODULE DEFINITIONS

Please refer to DICOM v3.0 Standard Part 3 (Information Object Definitions) for a description of each of the entities and modules contained within the General ECG Waveform Information Object.

The following modules are included to convey Enumerated Values, Defined Terms, and Optional Attributes supported. Type 1 & Type 2 Attributes are also included for completeness and to define what values they may take and where these values are obtained from. It should be noted that they are the same ones as defined in the DICOM v3.0 Standard Part 3 (Information Object Definitions).

Elements not listed in tables shall be considered as "Not used".

9.2.1 Patient Module

TABLE 9.2-1
PATIENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	May be entered (User Interface) or taken from worklist if it is there ("Last name" and "First Name" fields are both truncated to 30 characters).
Patient ID	(0010,0020)	2	May be entered (User Interface) or taken from worklist if it is there (max. 30 characters).
Patient's Birth Date	(0010,0030)	2	May be entered (User Interface) or taken from worklist if it is there.
Patient's Sex	(0010,0040)	2	May be entered (User Interface) or taken from worklist if it is there.
Referenced Patient Sequence	(0008,1120)	3	Not used
> *'Referenced SOP Class / Instance UIDs'*			
Patient's Birth Time	(0010,0032)	3	Not used
Other Patient IDs	(0010,1000)	3	Not used
Other Patient Names	(0010,1001)	3	Not used
Ethnic Group	(0010,2160)	3	Not used
Patient Comments	(0010,4000)	3	Not used

9.2.2 General Study Module

TABLE 9.2-2
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Taken from worklist if it is there. If not, uniquely generated by the equipment.
Study Date	(0008,0020)	2	Set to test date
Study Time	(0008,0030)	2	Set to test time
Referring Physician's Name	(0008,0090)	2	Empty
Study ID	(0020,0010)	2	Filled with Requested Procedure ID from the worklist if available, otherwise empty.
Accession Number	(0008,0050)	2	Taken from worklist if it is there, otherwise empty.
Study Description	(0008,1030)	3	Not used
Physician(s) of Record	(0008,1048)	3	Not used
Name of Physician(s) Reading Study	(0008,1060)	3	Not used
Referenced Study Sequence	(0008,1110)	3	Used SOP Class 1.2.840.10008.3.1.2.3.1 Used SOP Instance: Study Instance UID from worklist if available, otherwise uniquely generated by the equipment.
> Include 'SOP Instance Reference Macro'			
Procedure Code Sequence	(0008,1032)	3	Not used
> 'Code Sequence Macro'			

9.2.3 General Series Module

TABLE 9.2-3
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Defined term “ECG” used.
Series Instance UID	(0020,000E)	1	Uniquely generated by the equipment.
Series Number	(0020,0011)	2	Fix: set to 1
Laterality	(0020,0060)	2C	Not used
Series Date	(0008,0021)	3	Not used
Series Time	(0008,0031)	3	Not used
Performing Physicians’ Name	(0008,1050)	3	Not used
Protocol Name	(0018,1030)	3	Filled with Exercise- or Ergospirometry test protocol name.
Series Description	(0008,103E)	3	Not used
Operators' Name	(0008,1070)	3	Not used
Referenced Performed Procedure Step Sequence	(0008,1111)	3	SOP Class UID: 1.2.840.10008.3.1.2.3.3 SOP Instance: Uniquely created PPS SOP Instance UID
> Include ‘SOP Instance Reference Macro’			
Body Part Examined	(0018,0015)	3	Not used
Patient Position	(0018,5100)	2C	Not used
Smallest Pixel Value in Series	(0028,0108)	3	Not used
Largest Pixel Value in Series	(0028,0109)	3	Not used
Request Attributes Sequence	(0040,0275)	3	Used if Requested Procedure ID, Scheduled Procedure Step ID and Scheduled Protocol Code are available from the worklist.
>Requested Procedure ID	(0040,1001)	1C	Taken from worklist if available.
>Accession Number	(0008,0050)	3	Not used
>Study Instance UID	(0020,000D)	3	Not used
>Referenced Study Sequence	(0008,1110)	3	Not used
>>‘SOP Instance Reference Macro'			
>Requested Procedure Description	(0032,1060)	3	Taken from the worklist if available
>Requested Procedure Code Sequence	(0032,1064)	3	Not used
>>‘Code Sequence Macro’			
>Reason for the Requested Procedure	(0040,1002)	3	Not used
> Reason for Requested Procedure Code Sequence	(0040,100A)	3	Not used

>> 'Code Sequence Macro'			
>Scheduled Procedure Step ID	(0040,0009)	1C	Taken from worklist if available.
>Scheduled Procedure Step Description	(0040,0007)	3	Used
>Scheduled Protocol Code Sequence	(0040,0008)	3	Used, see Configurable Context Groups chapter 8.4.3
>> 'Code Sequence Macro'			
Performed Procedure Step ID	(0040,0253)	3	Equipment generated ID (date/time of this procedure step, format: MMDDYYYYHHMMSS)
Performed Procedure Step Start Date	(0040,0244)	3	Not used
Performed Procedure Step Start Time	(0040,0245)	3	Not used
Performed Procedure Step Description	(0040,0254)	3	Taken from the worklist (Scheduled Step Description) if available. For Exercise- or Ergospirometry test this field is mapped to the test type field in the Test Information dialog.
Performed Protocol Code Sequence	(0040,0260)	3	Used if Performed Protocol Code and Performed Protocol Code Scheme are available. See Configurable Context Groups chapter 8.4.3
> 'Code Sequence Macro'			
Comments on the Performed Procedure Step	(0040,0280)	3	Not used

9.2.4 General Equipment Module

TABLE 9.2-4
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Set to "GE Healthcare".
Institution Name	(0008,0080)	3	Not used
Institution Address	(0008,0081)	3	Not used
Station Name	(0008,1010)	3	Not used
Institutional Department Name	(0008,1040)	3	Not used
Manufacturer's Model Name	(0008,1090)	3	Not used
Device Serial Number	(0018,1000)	3	Not used
Software Versions	(0018,1020)	3	Not used
Spatial Resolution	(0018,1050)	3	Not used
Date of Last Calibration	(0018,1200)	3	Not used
Time of Last Calibration	(0018,1201)	3	Not used
Pixel Padding Value	(0028,0120)	1C	Not used

9.2.5 Waveform Identification Module

TABLE 9.2-5
WAVEFORM IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Instance Number	(0020,0013)	1	Continuous number within a series starting with zero.
Content Date	(0008,0023)	1	Date of the test that includes this waveform.
Content Time	(0008,0033)	1	Time of the test that includes this waveform.
Acquisition Datetime	(0008,002A)	1	Date and time of the acquisition of this waveform.
Referenced Instance Sequence	(0008,114A)	3	Not used
>Referenced SOP Class UID	(0008,1150)	1	Not used
>Referenced SOP Instance UID	(0008,1155)	1	Not used
>Purpose of Reference Code Sequence	(0040,A170)	3	Not used
>>'Code Sequence Macro'			Not used

9.2.6 Waveform Module

TABLE 9.2-6
WAVEFORM MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Waveform Sequence	(5400,0100)	1	The default value is to use 1 sequence with max. 3, 6, 12, or 15 Leads (depending on the number of monitored leads, see Exercise test configuration) including a 10 second ECG stripe. Especially in case of a 12-lead ECG the number of waveform items may vary up to 4, depending on the used 12-Lead/ 12SL Report Format (see Exercise test configuration). However, this must be explicitly enabled (see Product Service Manual).
> Multiplex Group Time Offset	(0018,1068)	1C	Not used (Acquisition Time Synchronized also not used)
> Trigger Time Offset	(0018,1069)	1C	Not used (waveform acquisition is not synchronized to a trigger)
> Trigger Sample Position	(0018,106E)	3	Not used
> Waveform Originality	(003A,0004)	1	Set to “ORIGINAL”

> Number of Waveform Channels	(003A,0005)	1	The number of waveforms channels per group: • 3 channels (e.g. 3 monitored leads in 1 group or 12 monitored leads in 4 groups x 2.5 seconds) • 6 channels (e.g. 6 monitored leads in 1 group or 12 monitored leads in 2 groups x 5 seconds) • 12 channels (e.g. 12 monitored leads in 1 group x 10 seconds) • 15 channels (e.g. 15 monitored leads in 1 group x 10 seconds)
> Number of Waveform Samples	(003A,0010)	1	Can be 1250 (2.5 seconds), 2500 (5 seconds) or 5000 (10 seconds) with a sampling rate of 500Hz.
> Sampling Frequency	(003A,001A)	1	500
> Multiplex Group Label	(003A,0020)	3	Not used
> Channel Definition Sequence	(003A,0200)	1	Number of Channel Definition Sequences: see Number of Waveform Channels
>> Waveform Channel Number	(003A,0202)	3	Not used
>> Channel Label	(003A,0203)	3	Not used
>> Channel Status	(003A,0205)	3	Not used
>> Channel Source Sequence	(003A,0208)	1	Context ID CID 3001 is used
>>> Code Value		1C	SCPECG lead labels as defined (e.g. "5.6.3-9-1" for Lead I)
>>> Coding Scheme		1C	Set to “SCPECG”
>>> Coding Meaning		1C	Set to “Lead <specified lead label>”
>>> Coding Version		1C	Not used (Code value is unambiguous)
>> Channel Source Modifiers Sequence	(003A,0209)	1C	Not used
>>> 'Code Sequence Macro’			Not used
>> Source Waveform Sequence	(003A,020A)	3	Not used
>>>Referenced SOP Class UID	(0008,1150)	1C	Not used
>>>Referenced SOP Instance UID	(0008,1155)	1C	Not used
>>> Referenced Waveform Channels	(0040,A0B0)	1C	Not used
>> Channel Derivation Description	(003A,020C)	3	Not used
>> Channel Sensitivity	(003A,0210)	1C	Set to “5.0” (microvolt)
>> Channel Sensitivity Units Sequence	(003A,0211)	1C	Context ID 3082 is used
>>> Code Value		1C	Set to "uV"
>>> Coding Scheme		1C	Set to “UCUM”
>>> Coding Meaning		1C	Set to “microvolt”
>>> Coding Version		1C	Set to “1.4”
>> Channel Sensitivity Correction Factor	(003A,0212)	1C	Set to “1”
>> Channel Baseline	(003A,0213)	1C	Set to “0”

>> Channel Time Skew	(003A,0214)	1C	Not used (Channel Sample Skew is used instead)
>> Channel Sample Skew	(003A,0215)	1C	Used (Offset of first sample of channel from waveform multiplex group start time, in samples)
>> Channel Offset	(003A,0218)	3	Not used
>> Waveform Bits Stored	(003A,021A)	1	Set to “16”
>> Filter Low Frequency	(003A,0220)	3	Set to “0.01” or “0.05” Hz, depending on the filter settings of this waveform.
>> Filter High Frequency	(003A,0221)	3	Set to “20”, “40”, “100” or “150” Hz depending on the filter settings of this waveform.
>> Notch Filter Frequency	(003A,0222)	3	Not used
>> Notch Filter Bandwidth	(003A,0223)	3	Not used
>> Channel Minimum Value	(5400,0110)	3	Not used
>> Channel Maximum Value	(5400,0112)	3	Not used
> Waveform Bits Allocated	(5400,1004)	1	Set to “16”
> Waveform Sample Interpretation	(5400,1006)	1	Set to “SS”
> Waveform Padding Value	(5400,100A)	1C	Not used, acquisition equipment does not insert padding
> Waveform Data	(5400,1010)	1	Binary waveform data

9.2.7 Acquisition Context Module

TABLE 9.2-7
ACQUISITION CONTEXT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Use
Acquisition Context Sequence	(0040,0555)	2	Two items are present in this sequence. Template TID 3401 is used.
First sequence item			
>Value Type	(0040,A040)	3	Set to “CODE”
>Concept Name Code Sequence	(0040,A043)	1	Sequence set to 109054,DCM,”Patient State”
>> ‘Code Sequence Macro			
>Referenced Frame Numbers	(0040,A136)	1C	Not used
>Numeric Value	(0040,A30A)	1C	Not used
>Measurement Units Code Sequence	(0040,08EA)	1C	Not used
>> ‘Code Sequence Macro’			
>Date	(0040,A121)	1C	Not used
>Time	(0040,A122)	1C	Not used
>Person Name	(0040,A123)	1C	Not used
>Text Value	(0040,A160)	1C	Not used

>Concept Code Sequence	(0040,A168)	1C	See CID 3262
>> 'Code Sequence Macro'			
Second sequence item			
>Value Type	(0040,A040)	3	Set to "NUMERIC"
>Concept Name Code Sequence	(0040,A043)	1	Sequence set to 109055,DCM,"Protocol Stage"
>> 'Code Sequence Macro			
>Referenced Frame Numbers	(0040,A136)	1C	Not used
>Numeric Value	(0040,A30A)	1C	Stage number of Exercise- or Ergospirometry test
>Measurement Units Code Sequence	(0040,08EA)	1C	Sequence set to {stage}, UCUM, "stage"
>> 'Code Sequence Macro'			
>Date	(0040,A121)	1C	Not used
>Time	(0040,A122)	1C	Not used
>Person Name	(0040,A123)	1C	Not used
>Text Value	(0040,A160)	1C	Not used
>Concept Code Sequence	(0040,A168)	1C	Not used
>> 'Code Sequence Macro'			
Acquisition Context Description	(0040,0556)	3	Not used

9.2.8 SOP Common Module

TABLE 9.2-8
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
SOP Class UID	(0008,0016)	1	Set to "1.2.840.10008.5.1.4.1.1.9.1.2"
SOP Instance UID	(0008,0018)	1	Uniquely generated by the equipment (Implementation UID is used as base ID)
Specific Character Set	(0008,0005)	1C	See 3.7
Instance Creation Date	(0008,0012)	3	Not used
Instance Creation Time	(0008,0013)	3	Not used
Instance Creator UID	(0008,0014)	3	Not used

Timezone Offset From UTC	(0008,0201)	3	Not used
Instance Number	(0020,0013)	3	Not used
SOP Instance Status	(0100,0410)	3	Not used
SOP Authorization Date and Time	(0100,0420)	3	Not used
SOP Authorization Comment	(0100,0424)	3	Not used
Authorization Equipment Certification Number	(0100,0426)	3	Not used
MAC Parameters Sequence	(4FFE,0001)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>MAC Calculation Transfer Syntax UID	(0400,0010)	1	Not used
>MAC Algorithm	(0400,0015)	1	Not used
>Data Elements Signed	(0400,0020)	1	Not used
Digital Signatures Sequence	(FFFA,FFFA)	3	Not used
>MAC ID Number	(0400,0005)	1	Not used
>Digital Signature UID	(0400,0100)	1	Not used
>Digital Signature DateTime	(0400,0105)	1	Not used
>Certificate Type	(0400,0110)	1	Not used
>Certificate of Signer	(0400,0115)	1	Not used
>Signature	(0400,0120)	1	Not used
>Certified Timestamp Type	(0400,0305)	1C	Not used
>Certified Timestamp	(0400,0310)	3	Not used

9.3 STANDARD EXTENDED AND PRIVATE DATA ATTRIBUTES

The Product supports the Standard Extended and Private Data Attributes defined in the following sections in General ECG Waveform SOP Instances as Type 3 data elements.

9.3.1 Standard Extended Attributes

There are no Standard Extended Attributes supported in General ECG Waveform IOD.

9.3.2 Private Data Attributes

There are no Private Data Attributes supported in General ECG Waveform SOP Instances.

9.4 STANDARD EXTENDED AND PRIVATE CONTEXT GROUPS

The Product supports coded terminology using Standard Extended, Private and Configurable Context Groups defined in the following sections.

9.4.1 Standard Extended Context Groups

There are no Standard Extended Context Groups supported in General ECG Waveform SOP Instances.

9.4.2 Private Context Groups

There are no Private Context Groups supported in General ECG Waveform SOP Instances.

9.4.3 Configurable Context Groups

The Product supports the following Configurable Context Groups for General ECG Waveform SOP Instances created by this product:

TABLE 9.4-1
CONFIGURABLE CONTEXT GROUPS

Context Group	Default Value Set	Use
Protocol Codes	See 3.8.3	Selected value from this group is used in the Scheduled Protocol Code Sequence (0040,0008) and the Performed Protocol Code Sequence (0040,0260).