DICOM Conformance Statement

ECG PageWriter TC A.06.01

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PHILIPS

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1. DICOM Conformance Statement Overview

Philips PageWriter TC cardiographs are as easy to use as 1-2-3. The PageWriter TC implements the necessary DICOM services to: (1) search and retrieve worklists (lists of orders) from information systems, (2) save ECG waveform objects to network storage system. Below Table provides an overview of the network services supported by PageWriter TCs.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)	Display
Name	**UID**			
Other				
Transfer				
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No	N/A
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No	N/A
Workflow Management				
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No	N/A

PageWriter TCs do not support any DICOM media services.

2. Table of Contents

3. Introduction

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

3.1. Revision History

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

Table 2: Revision History

Document Version	Date of Issue	Status	Description
01	04-March-2014	Proposal	Initial version

3.2. Audience

This Conformance Statement is intended for:

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

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

3.3. Remarks

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

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

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

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

3.4. Definitions, Terms and Abbreviations

Table 3: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
AE	Application Entity
AP	Application Profile
DICOM	Digital Imaging and Communications in Medicine
GUI	Graphic User Interface
IOD	Information Object Definition
Modality	A device that communicates using the DICOM standard
MPPS	Modality Performed Procedure Step
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TC	PageWriter TC Cardiograph
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 20 (NEMA PS 3.1- PS 3.20),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America
Internet: http://medical.nema.org/
Note that at any point in time the official standard consists of the most recent yearly edition of the base standard (currently 2011) plus all the supplements and correction items that have been approved as Final Text.

4. Networking

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

4.1. Implementation model

The implementation model consists of three sections:

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

4.1.1. Application Data Flow

The operator of a PageWriter TC electrocardiograph initiates a Modality Worklist query when an up-to-date list is needed. This, in turn, causes a Modality Worklist query to the configured Modality Worklist SCP.
When one or more ECGs have been acquired, the operator of a PageWriter TC electrocardiograph initiates a single or batch ECG transmission. This, in turn, causes one or more 12-lead or General ECG Waveform objects to be stored into the configured Storage SCP.

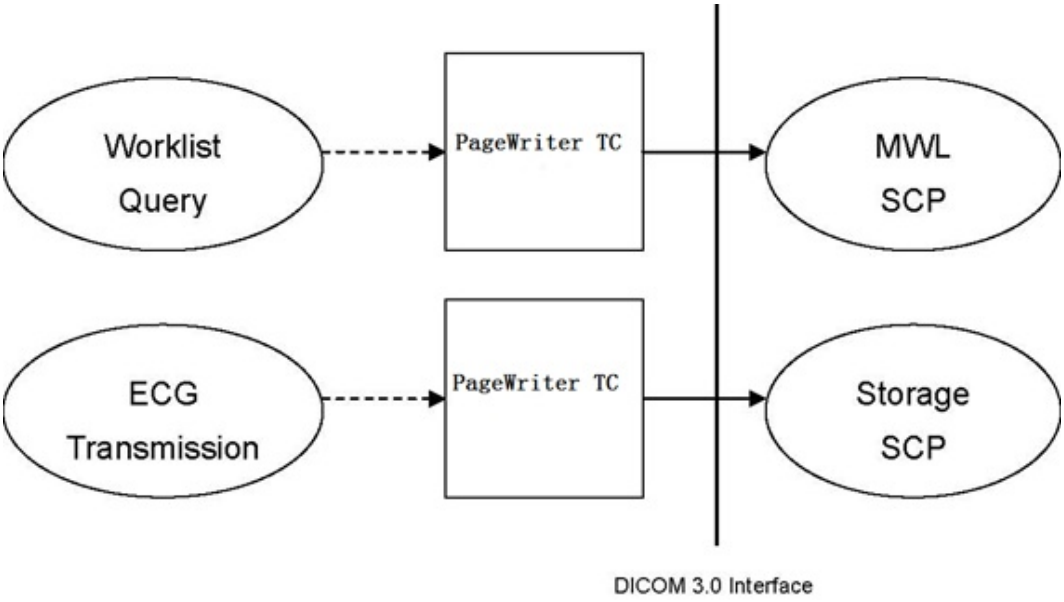

Figure 1: Application Data Flow Diagram

4.1.2. Functional Definition of AE's

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

4.1.2.1. Functional Definition of ECG Storage Application Entity

After acquiring one or more ECGs, the operator can initiate a single or batch transmission of ECGs. This causes the PageWriter TC cardiograph to store each ECG into the configured storage SCP. Each ECG is stored as a 12-lead or General ECG Waveform object.

4.1.2.2. Functional Definition of Worklist Application Entity

The operator of a PageWriter TC cardiograph can choose to retrieve an up-to-date worklist to the cardiograph.
The operator can either initiate this function on the Worklist GUI to retrieve the whole list, or specify query filters on the Find Patient GUI, and the Modality Worklist service provider is queried for the Modality Worklist. The returned list of work items is listed on the cardiograph.

4.1.3. Sequencing of Real World Activities

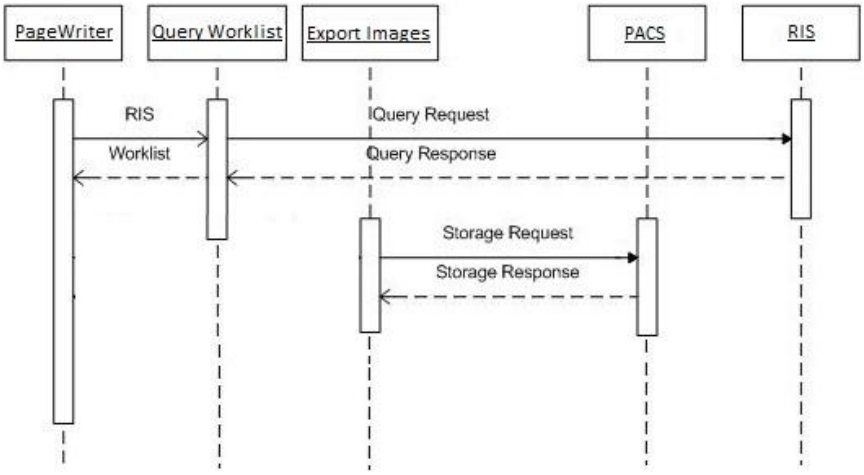

Figure 2: Sequence of Real World Activities

4.2. AE Specifications

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

4.2.1. ECG Storage Application Entity

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

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 4: SOP Classes for ECG Storage Application Entity

SOP Class Name	SOP Class UID	SCU	SCP
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No

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

4.2.1.2. Association Policies

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

4.2.1.2.1. General

The DICOM standard application context is specified below.

Table 5: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified here.

Table 6: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	1

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

Description	Value
Maximum number of simultaneous associations	0

4.2.1.2.3. Asynchronous Nature

The implementation supports negotiation of multiple outstanding transactions, along with the maximum number of outstanding transactions supported.

Table 8: Asynchronous nature as an Association Initiator for this AE

Description	Value
Maximum number of outstanding asynchronous transactions	0

4.2.1.2.4. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 9: DICOM Implementation Class and Version for ECG Storage Application Entity

Implementation Class UID	1.3.46.670589.49.2.1.2
Implementation Version Name	DECGDICOM_1_1_0

4.2.1.2.5. Communication Failure Handling

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

Table 10: Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the command is marked as failed. The reason is logged and reported to the user.
Failed to connect	Failed to connect message is displayed to the user

4.2.1.3. Association Initiation Policy

The behavior of this Application Entity is summarized in the next Table.

Table 11: Response Status Handler Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful storage of instances	
Refused	A700	Data set does not match SOP Class	“Remote transfer error” is displayed to the user
Error	C000	Cannot Understand	“Remote transfer error” is displayed to the user
Warning	B000	Coercion of data elements	“Remote transfer error” is displayed to the user

The Application Entity will respond to a received Association rejection as shown in the next table.

Table 12: Association Rejection response

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

Result	Source	Reason/Diagnosis	Behavior
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	
		2 - protocol-version-not-supported	
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	
		2 - local-limit-exceeded	

The behavior of the AE on receiving an Association abort is summarized in the next table.

Table 13: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

4.2.1.3.1. (Real-World) Activity – Image Export

4.2.1.3.1.1. Description and Sequencing of Activities

After generating an ECG, PageWriter TC will initiate transmission of the ECG. This causes the PageWriter TC to store the ECG into the configured Storage SCP. ECGs are stored using the 12-Lead ECG Waveform Object or as a General ECG Waveform Object depending on the configuration settings.

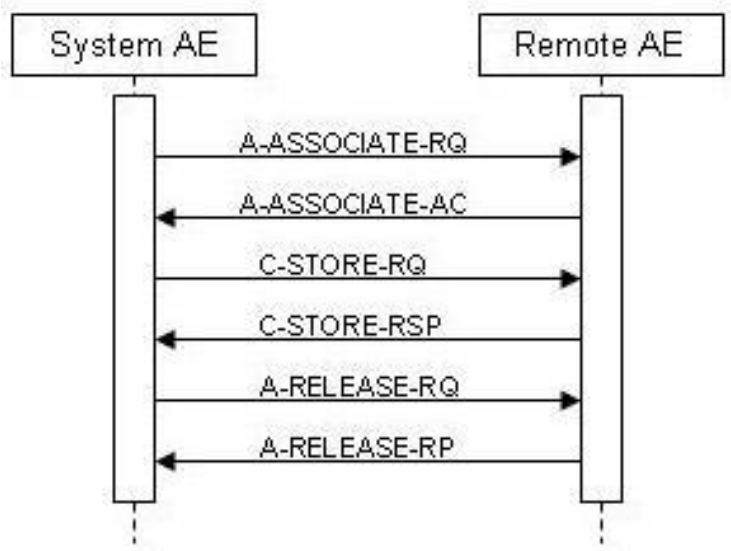

Figure 3: Image Export

4.2.1.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 14: Proposed Presentation Contexts for (Real-World) Activity – Image Export

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.1.3. SOP Specific Conformance for Storage SOP Classes

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

4.2.1.3.1.3.1. Dataset Specific Conformance for C-STORE-RQ

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

Table 15: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful stored	
Failure	A7xx	Refused: Out of Resources	“Remote transfer error” is displayed to the user
	A9xx	Error: Data Set does not match SOP Class	“Remote transfer error” is displayed to the user
	Cxxx	Error: cannot understand	“Remote transfer error” is displayed to the user
Warning	B000	Coercion of Data Elements	“Remote transfer error” is displayed to the user

4.2.1.4. Association Acceptance Policy

The Application Entity may reject Association attempts as shown in the table below.

Table 16: Association Reject Reasons

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

The behavior of the AE for sending an Association abort is summarized in next table.

Table 17: Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU parameter	
	5 - unexpected-PDU parameter	
	6 - invalid-PDU-parameter value	

4.2.2. Worklist Application Entity

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

4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 18: SOP Classes for Worklist Application Entity

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No

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

4.2.2.2. Association Policies

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

4.2.2.2.1. General

The DICOM standard application context is specified below.

Table 19: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as a Initiator or Acceptor is specified here.

Table 20: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	1

Table 21: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous associations	0

4.2.2.2.3. Asynchronous Nature

The implementation supports negotiation of multiple outstanding transactions, along with the maximum number of outstanding transactions supported.

Table 22: Asynchronous nature as an Association Initiator for this AE

Description	Value
Maximum number of outstanding asynchronous transactions	0

4.2.2.2.4. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented here.

Table 23: DICOM Implementation Class and Version for Worklist Application Entity

Implementation Class UID	1.3.46.670589.49.2.1.2
Implementation Version Name	DECGDICOM_1_1_0

4.2.2.2.5. Communication Failure Handling

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

Table 24: Communication Failure Behavior

Exception	Behavior
Timeout	e.g The Association is aborted using A-ABORT and the command is marked as failed. The reason is logged and reported to the user.

4.2.2.3. Association Initiation Policy

The behavior of this Application Entity is summarized in the next Table.

Table 25: Response Status Handler Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successfully stored instances	
Refused	A900	Data set does not match SOP Class	“Remote transfer error” is displayed to the user
Error	C000	Cannot Understand	“Remote transfer error” is displayed to the user
Warning	B000	Coercion of data elements	“Remote transfer error” is displayed to the user

The Application Entity will respond to a received Association rejection as shown in the next table.

Table 26: Association Rejection response

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

The behavior of the AE on receiving an Association abort is summarized in the next table.

Table 27: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU-parameter	
	5 - unexpected-PDU-parameter	
	6 - invalid-PDU-parameter-value	

4.2.2.3.1. (Real-World) Activity – Modality worklist As SCU

4.2.2.3.1.1. Description and Sequencing of Activities

The operator of the PageWriter TC can choose to retrieve an up-to-date worklist. To initiate this function, the operator will run a query from the cardiograph, with or without optional search criteria. When the operator starts the query process, the PageWriter TC will query the DICOM Modality Worklist service provider for the Modality Worklist, using the search criteria if provided. The returned list of orders is returned to the cardiograph and displayed to the operator.
The operator of the PageWriter TC can select and perform one or more ECGs from the returned worklist and transmit it/them to the DICOM storage/management system as described in section Transmit ECG

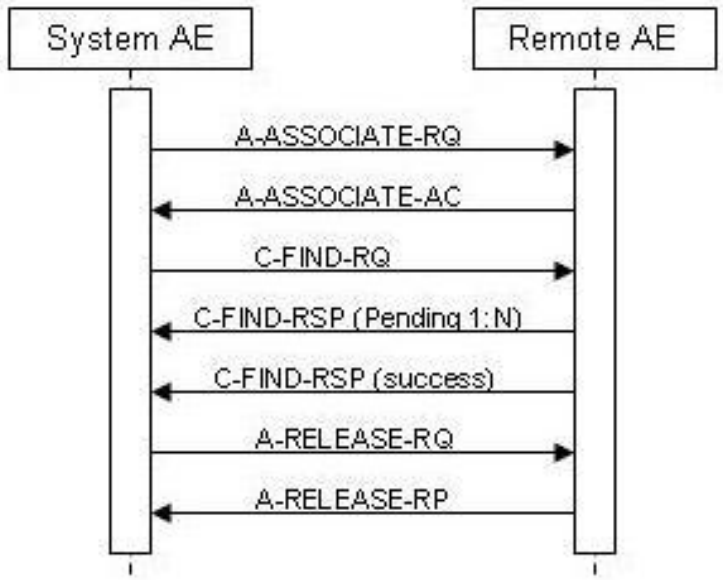

Figure 4: Modality Worklist as SCU

4.2.2.3.1.2. Proposed Presentation Contexts

The presentation contexts are defined in the next table.

Table 28: Proposed Presentation Contexts for (Real-World) Activity – Modality worklist As SCU

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

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

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

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

Detail regarding the Dataset Specific response behavior will be reported in this section.
The table below should be read as follows:

Attribute Name: Attributes supported to build a Modality Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching Keys for (automatic) Worklist Update.
R: Return Keys. An "X" will indicate that this attribute as matching key can be used.
Q: Interactive Query Key. An "X" will indicate that this attribute as matching key can be used.
D: Displayed Keys. An "X" indicates that this Worklist attribute is displayed o the user during a patient registration dialog.
IOD: An "X" indicates that this Worklist attribute is included into all object Instances created during performance of the related Procedure Step.
Type of matching: The following types of matching exists:
Single Value Matching
List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

Table 29: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Patient Relationship Module									
Referenced Patient Alias Sequence	0038,0004	SQ						List Of UID	Uniquely identifies any Patient SOP Instances that also describe this patient. These SOP Instances are aliases. Zero or more Items may be included in this Sequence
Referenced Study Sequence	0008,1110	SQ						List Of UID	Uniquely identifies the Study SOP Instances associated with the Patient SOP Instance. One or more Items may be included in this Sequence.
Referenced Visit Sequence	0008,1125	SQ						List Of UID	Uniquely identifies the Visit SOP Instances associated with this Patient SOP Instance. One or more Items may be included in this Sequence
Patient Identification Module									
Other Patient IDs	0010,1000	LO							Other identification numbers or codes used to identify the patient.
Patient ID	0010,0020	LO						Single Value	
Patient's Name	0010,0010	PN						Single Value,WildCard	
Patient Demographic Module									
Patient's Age	0010,1010	AS							Age of the Patient.
Patient's Birth Date	0010,0030	DA							Date of birth of the named patient
Patient's Birth Time	0010,0032	TM							Time of birth of the named patient
Patient's Sex	0010,0040	CS							Sex of the named patient. Enumerated Values: M = male F = female O = other
Patient's Size	0010,1020	DS							Patient's height or length in meters
Patient's Weight	0010,1030	DS							Weight of the patient in kilograms

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

Table 30: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	e.g The SCU has successfully returned all matching information

4.2.2.4. Association Acceptance Policy

The Application Entity may reject Association attempts as shown in the table below.

Table 31: Association Reject Reasons

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

The behavior of the AE for sending an Association abort is summarized in next table.

Table 32: Association Abort Policies

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	
	1 - unrecognized-PDU	
	2 - unexpected-PDU	
	4 - unrecognized-PDU parameter	
	5 - unexpected-PDU parameter	
	6 - invalid-PDU-parameter value	

4.3. Network Interfaces

4.3.1. Physical Network Interfaces

PageWriter TCs support a single network interface. The physical network interface depends on the host server on which the PageWriter TC is installed.

4.3.2. Additional Protocols

Not applicable

4.4. Configuration

Any implementation's DICOM conformance may be dependent upon configuration, which takes place at the time of installation. Issues concerning configuration are addressed in this section.

4.4.1. AE Title/Presentation Address Mapping

An important installation issue is the translation from AE title to presentation address. How this is to be performed is described here.

4.4.1.1. Local AE Titles

The AE Titles and TCP/IP Ports configured from the PageWriter TC Configuration GUI. All DICOM services use the same AE Title.

4.4.1.2. Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the PageWriter TC Configuration GUI.

4.4.2. Parameters

A number of parameters related to general operation can be configured using the PageWriter TC Configuration GUI. The table below only shows those configuration parameters relevant to DICOM communications, grouped according the specific PageWriter TC application. See the PageWriter TC Manual on the application for details on general configuration capabilities.

The PageWriter TC supports the following configuration parameters:

Table 33: PageWriter TC Parameters

Parameter Description	Configurable(Yes/No)	Default Value
SOP Class	Yes	“Based on Lead Count”, which means 12-Lead ECG Waveform for ECGs with only 12 leads, and General ECG Waveform for ECGs with more than 12 leads

Table 34: PageWriter TC Parameters (SCU Worklist Retrieval Settings-Remote System Information for C-FIND

Parameter Description	Configurable(Yes/No)	Default Value
AE Title	Yes	-
Host Address	Yes	-
Host Port	Yes	-

Table 35: PageWriter TC Parameters (SCU Record Storage Settings - Remote System Information for C-STORE)

Parameter Description	Configurable(Yes/No)	Default Value
AE Title	Yes	-
Host Address	Yes	-
Host Port	Yes	-
Character Set	Simplified Chinese: GB18030	The default value depends on the installed language.
	Traditional Chinese: ISO_IR 192	
	Russian: ISO_IR 144	
	Other languages: ISO-IR 100	

5. Media Interchange

5.1. Implementation model

Not applicable.

5.1.1. Application Data Flow Diagram

Not applicable.

5.1.2. Functional Definitions of AE's

Not applicable.

5.1.3. Sequencing of Real World Activities

Not applicable.

5.2. AE Specifications

Not applicable

5.3. Augmented and Private Application Profiles

Not applicable

5.4. Media Configuration

Not applicable.

6. Support of Character Sets

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

Table 36: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859
Cyrillic	ISO_IR 144	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 144	G1	Supplementary set of ISO 8859
Default repertoire	ISO_IR 6	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
Unicode in UTF-8	ISO_IR 192	-	-	-	-
GB18030	GB18030	-	-	-	-

7. Security

7.1. Security Profiles

Not applicable

7.1.1. Security use Profiles

Not applicable

7.1.2. Security Transport Connection Profiles

Not applicable

7.1.3. Digital Signature Profiles

Not applicable

7.1.4. Media Storage Security Profiles

Not applicable

7.1.5. Attribute Confidentiality Profiles

Not applicable

7.1.6. Network Address Management Profiles

Not applicable

7.1.7. Time Synchronization Profiles

Not applicable

7.1.8. Application Configuration Management Profiles

Not applicable

7.1.9. Audit Trail Profiles

Not applicable

7.2. Association Level Security

Not applicable

7.3. Application Level Security

Not applicable

8. Annexes of application "PageWriter TC"

8.1. IOD Contents

8.1.1. Created SOP Instance

This section specifies each IOD created by this application.

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

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

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

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

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

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

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

8.1.1.1. List of created SOP Classes

Table 37: List of created SOP Classes

SOP Class Name	SOP Class UID
12-Lead ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2

8.1.1.2. 12-Lead ECG Waveform Storage SOP Class

Table 38: IOD of Created 12-Lead ECG Waveform Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS

Equipment	General Equipment Module	ALWAYS
Waveform	Acquisition Context Module	ALWAYS
Waveform	Waveform Identification Module	ALWAYS
Waveform	Waveform Module	ALWAYS
Waveform	Waveform Annotation Module	CONDITIONAL
Waveform	SOP Common Module	ALWAYS

Table 39: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER, MWL	Patient's full name. (Patient First Name/Last Name)
Patient ID	0010,0020	LO		VNAP	USER, MWL, AUTO	Primary hospital identification number or code for the patient. (Patient ID)
Patient's Birth Date	0010,0030	DA		VNAP	USER, MWL	Birth date of the patient. (DateOfBirth)
Patient's Sex	0010,0040	CS		VNAP	USER, MWL	Sex of the named patient. Enumerated Values: "M" = male
Ethnic Group	0010,2160	SH		ANAPCV		Ethnic group or race of the patient. (Race)

Table 40: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP	AUTO	Date the Study started (Acquisition Date – output only)
Study Time	0008,0030	TM		VNAP	AUTO	Time the Study started (Acquisition Time – output only)
Accession Number	0008,0050	SH		VNAP	AUTO, MWL	A number that identifies the order for the study (Order Number)
Referring Physician's Name	0008,0090	PN		VNAP	AUTO, MWL	Name of the patient's referring physician. (Referring Doctor Name)
Study Description	0008,1030	LO		ANAPCV	AUTO, MWL	Institution-generated description or classification of the Study (component) performed. (Test Reason)
Study Instance UID	0020,000D	UI		ALWAYS	AUTO	Unique identifier for the Study. For MWL, or generated by PageWriter TC using: DECG prefix: 1.3.46.670589.32 Time Clock Random Number
Study ID	0020,0010	SH		VNAP	AUTO	User or equipment generated Study identifier. For output this will be blank.

Table 41: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		VNAP	USER	Age of the Patient. (Age)
Patient's Size	0010,1020	DS		VNAP	USER	Length or size of the Patient, in meters. (Height)
Patient's Weight	0010,1030	DS		VNAP	USER	Weight of the Patient, in kilograms. (Weight)
Admission ID	0038,0010	LO		ANAPCV		Identification number of the visit as assigned by the healthcare provider.

Table 42: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS		Type of equipment that originally acquired the data used to create the images in this Series. For output this will always be “ECG”.
Operators' Name	0008,1070	PN		ANAPCV		Name(s) of the operator(s) supporting the Series. (Technician Name)
Series Instance UID	0020,000E	UI		ALWAYS		Unique identifier for the Series. PageWriter TC will generate this as: DECG prefix: 1.3.46.670589.32 Time Clock Random Number Suffix: 1
Series Number	0020,0011	IS		VNAP		A number that identifies this Series. For output this will be blank
Laterality	0020,0060	CS		ANAPEV		Laterality of (paired) body part examined. Required if the body part examined is a paired structure and Image Laterality (0020,0062) or Frame Laterality (0020,9072) are not sent. For output this will always be blank.
Performed Protocol Code Sequence	0040,0260	SQ		ALWAYS		Needed to distinguish resting ECGs from other ECG types. ONLY PRESENT FOR GENERAL ECG WAVEFORM SOP CLASS OUTPUT.
>Code Value	0008,0100	SH		ANAP		This will be “P2-3120A”.
>Coding Scheme Designator	0008,0102	SH		ANAP		This will be “SRT”.
>Code Meaning	0008,0104	LO		ANAP		This will be “12-lead ECG”.

Table 43: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		VNAP		Philips Medical Products
Institution Name	0008,0080	LO		ANAPCV		Institution where the equipment that produced the composite instances is located. (Institution Name)
Station Name	0008,1010	SH		ANAPCV		User defined name identifying the machine that produced the composite instances (Cart ID)
Institutional Department Name	0008,1040	LO		ANAPCV		Department in the institution where the equipment that produced the composite instances is located. (Department Name)
Manufacturer's Model Name	0008,1090	LO		ANAPCV		Manufacturer’s model name of the equipment that produced the composite instances (Cart Model)
Device Serial Number	0018,1000	LO		ANAPCV		Manufacturer’s serial number of the equipment that produced the composite instances. (Cart Serial Num)
Software Version(s)	0018,1020	LO		ANAPCV		Manufacturer’s designation of software version of the equipment that produced the composite instances. (Cart Version)

Table 44: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		VNAP		A sequence of items that describes the conditions present during the acquisition of the data of the SOP instance. Zero or more items may be included in this sequence.
>Value Type	0040,A040	CS		VNAP		The type of the value encoded in this item. This will be “CODE”.
>Concept Name Code Sequence	0040,A043	SQ		ALWAYS		A concept that constrains the meaning of (i.e. defines the role of) observation value.
>>Code Value	0008,0100	SH		ANAP		This will be "5.4.5-33-1-1" which means “Standard 12-lead positions: limb leads placed at extremities”
>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG"
>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3"
>>Code Meaning	0008,0104	LO		ANAP		This will be "Electrode Placement"
>Concept Code Sequence	0040,A168	SQ		ALWAYS		This is the Value component of a Name/Value pair when the Concept implied by Concept Name Code Sequence (0040,A043) is a Coded Value.
>>Code Value	0008,0100	SH		ANAP		This will be "5.4.5-33-1-1" which means “Standard 12-lead positions: limb leads placed at extremities”
>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG"
>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3"
>>Code Meaning	0008,0104	LO		ANAP		This will be "Standard 12-Lead Positions"

Table 45: Waveform Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS		The date the waveform data was created
Acquisition Datetime	0008,002A	DT		ALWAYS		The date and time that the acquisition of data that resulted in this waveform. (Acquisition Date/Time)
Content Time	0008,0033	TM		ALWAYS		The time the Waveform data was created
Instance Number	0020,0013	IS		ALWAYS		A number that identifies this waveform. For output this will always be “1”. "

Table 46: Waveform Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Waveform Sequence	5400,0100	SQ		ALWAYS		Sequence of one or more Items, each representing one waveform multiplex group
>Waveform Originality	003A,0004	CS		ALWAYS		This will be “ORIGINAL” for the rhythm data and “DERIVED” for median data.
>Number of Waveform Channels	003A,0005	US		ALWAYS		Number of channels for this multiplex group

>Number of Waveform Samples	003A,0010	UL		ALWAYS		Number of samples per channel in this multiplex group. (Lead Sample Count / Median Sample Count)
>Sampling Frequency	003A,001A	DS		ALWAYS		Frequency in Hz
>Multiplex Group Label	003A,0020	SH		ANAPCV		This is “RHYTHM” for the first group and “MEDIAN BEAT” for the second group.
>Channel Definition Sequence	003A,0200	SQ		ALWAYS		Sequence of one or more Items, with one Item per channel.
>>Channel Source Sequence	003A,0208	SQ		ALWAYS		Sequence of one or more Items which further qualify the Waveform Source.
>>>Code Value	0008,0100	SH		ANAP		This is the code for the lead
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG"
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3"
>>>Code Meaning	0008,0104	LO		ANAP		This is the lead name.
>>Channel Sensitivity	003A,0210	DS		ANAP		Nominal numeric value of unit quantity of sample
>>Channel Sensitivity Units Sequence	003A,0211	SQ		ANAP		A coded descriptor of the Units of measure for the Channel Sensitivity
>>>Code Value	0008,0100	SH		ANAP		This will be “uV”
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be “UCUM”
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be “1.4”
>>>Code Meaning	0008,0104	LO		ANAP		This will be “microvolt”
>>Channel Sensitivity Correction Factor	003A,0212	DS		ANAP		Multiplier to be applied to encoded sample values to match units specified in Channel Sensitivity (003A,0210).
>>Channel Baseline	003A,0213	DS		ANAP		Offset of encoded sample value 0 from actual 0 using the units defined in the Channel Sensitivity Units Sequence (003A,0211). This will be “0”.
>>Channel Sample Skew	003A,0215	DS		ANAP		Offset of first sample of channel from waveform multiplex group start time, in samples. This will be “0”.
>>Waveform Bits Stored	003A,021A	US		ALWAYS		Number of significant bits within the waveform samples. This will be “16”.
>>Filter Low Frequency	003A,0220	DS		ANAPCV		Nominal 3dB point of lower frequency of pass band
>>Filter High Frequency	003A,0221	DS		ANAPCV		Nominal 3dB point of higher frequency of pass band
>>Notch Filter Frequency	003A,0222	DS		ANAPCV		Center frequency of notch filter(s)
>Waveform Bits Allocated	5400,1004	US		ALWAYS		Size of each waveform data sample within the waveform data. This will be “16”.
>Waveform Sample Interpretation	5400,1006	CS		ALWAYS		Data representation of the waveform data points. This will be “SS”. ”
>Waveform Data	5400,1010	O W/ OB		ALWAYS		Encoded data samples - channel multiplexed

Table 47: Waveform Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Annotation Sequence	0040,B020	SQ		ALWAYS		Sequence of Annotation Items
>Measurement Units Code Sequence	0040,08EA	SQ		ANAP		Units of measurement. Coded entry sequence with one item only.

>>Code Value	0008,0100	SH		ANAP		This is the measurement unit designator. These are the possible values:
>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "UCUM".
>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.4".
>>Code Meaning	0008,0104	LO		ANAP		This is the text name of the measurement unit. These are the possible values:
>Concept Name Code Sequence	0040,A043	SQ		ANAP		Code representing the fully specified name of the NUMERIC measurement or CODED concept. This sequence shall contain exactly one item.
>>Modifier Code Sequence	0040,A195	SQ		ANAP		
>>>Code Value	0008,0100	SH		ANAP		This is the code for the marker. These are the possible values:
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG".
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3".
>>>Code Meaning	0008,0104	LO		ANAP		This is the text name of the marker. These are the possible values:
>Referenced Waveform Channels	0040,A0B0	US		ANAP		List of channels in waveform to which annotation applies. This will be “0001 0000” (1,0).
>Referenced Sample Positions	0040,A132	UL		ANAP	AUTO	List of samples within a multiplex group specifying temporal points for annotation. Position of first sample is 1. There will be only one sample position.
>Annotation Group Number	0040,A180	US		ANAP		Number identifying associated annotations. This will be “3”.
>Numeric Value	0040,A30A	DS		ANAP		Numeric measurement value or values.
>Unformatted Text Value	0070,0006	ST		ANAP		Text Observation Value (annotation). (Statements)

Table 48: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
SOP Class UID	0008,0016	UI		ALWAYS	CONFIG	Uniquely identifies the SOP Class. This will be the 12- Lead ECG SOP Class “1.2.840.10008.5.1.4.1.1.9.1.1” or it will be the General ECG SOP Class “1.2.840.10008.5.1.4.1.1.9.1.2” depending on the configuration settings.
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	Uniquely identifies the SOP Instance. PageWriter TC will generate this as: DECG prefix: 1.3.46.670589.32 Time Clock Random Number Suffix: 1

Table 49: Additional Attributes Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Institution Residence	0038,0400	LO		ANAP		
Value Type	0040,A040	CS		ANAP		
Numeric Value	0040,A30A	DS		ANAP		

8.1.1.3. General ECG Waveform Storage SOP Class

Table 50: IOD of Created General ECG Waveform Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	ALWAYS
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Waveform	Acquisition Context Module	ALWAYS
Waveform	Waveform Identification Module	ALWAYS
Waveform	Waveform Module	ALWAYS
Waveform	Waveform Annotation Module	CONDITIONAL
Waveform	SOP Common Module	ALWAYS

Table 51: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		VNAP	USER, MWL	Patient's full name. (Patient First Name/Last Name)
Patient ID	0010,0020	LO		VNAP	USER, MWL, AUTO	Primary hospital identification number or code for the patient.
Patient's Birth Date	0010,0030	DA		VNAP	USER, MWL	Birth date of the patient
Patient's Sex	0010,0040	CS		VNAP	USER, MWL	"M" = male
Ethnic Group	0010,2160	SH		ANAPCV		Ethnic group or race of the patient.

Table 52: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		VNAP		Date the Study started
Study Time	0008,0030	TM		VNAP		Time the Study started
Accession Number	0008,0050	SH		VNAP		A number that identifies the order for the study
Referring Physician's Name	0008,0090	PN		VNAP		Name of the patient’s referring physician
Study Description	0008,1030	LO		ANAPCV		Institution-generated description or classification of the Study (component) performed.
Study Instance UID	0020,000D	UI		ALWAYS		Unique identifier for the Study
Study ID	0020,0010	SH		VNAP		User or equipment generated Study identifier

Table 53: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Age	0010,1010	AS		VNAP		Age of the Patient
Patient's Size	0010,1020	DS		VNAP		Length or size of the Patient, in meters
Patient's Weight	0010,1030	DS		VNAP		Weight of the Patient, in kilograms. (Weight)
Admission ID	0038,0010	LO		ANAPCV		Identification number of the visit as assigned by the healthcare provider.

Table 54: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS		Type of equipment that originally acquired the data used to create the images in this Series. For output this will always be “ECG”.
Operators' Name	0008,1070	PN		ANAPCV		Name(s) of the operator(s) supporting the Series. (Technician Name)
Series Instance UID	0020,000E	UI		ALWAYS		Unique identifier for the Series
Series Number	0020,0011	IS		VNAP		A number that identifies this Series
Laterality	0020,0060	CS		ANAPEV		Laterality of (paired) body part examined.
Performed Protocol Code Sequence	0040,0260	SQ		ANAPCV		Needed to distinguish resting ECGs from other ECG types
>Code Value	0008,0100	SH		ANAP		This will be “P2-3120A”
>Coding Scheme Designator	0008,0102	SH		ANAP		This will be “SRT”
>Code Meaning	0008,0104	LO		ANAP		This will be “12-lead ECG”

Table 55: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		VNAP		“Philips Medical Products”
Institution Name	0008,0080	LO		ANAPCV		Institution where the equipment that produced the composite instances is located.
Station Name	0008,1010	SH		ANAPCV		User defined name identifying the machine that produced the composite instances
Institutional Department Name	0008,1040	LO		ANAPCV		Department in the institution where the equipment that produced the composite instances is located
Manufacturer's Model Name	0008,1090	LO		ANAPCV		Manufacturer’s model name of the equipment that produced the composite instances (Cart Model)
Device Serial Number	0018,1000	LO		ANAPCV		Manufacturer’s serial number of the equipment that produced the composite instances.
Software Version(s)	0018,1020	LO		ANAPCV		Manufacturer’s designation of software version of the equipment that produced the composite instances.

Table 56: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		VNAP		A sequence of items that describes the conditions present during the acquisition of the data of the SOP instance. Zero or more items may be included in this sequence.
>Value Type	0040,A040	CS		VNAP		The type of the value encoded in this item. This will be “CODE”.
>Concept Name Code Sequence	0040,A043	SQ		ALWAYS		The “Name” component of the Name/Value pair. This sequence shall contain exactly one item.
>>Code Value	0008,0100	SH		ANAP		This will be "5.4.5-33-1"

>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG"
>>Coding Scheme Version	0008,0103	SH		ANAP		is will be "1.3"
>>Code Meaning	0008,0104	LO		ANAP		This will be "Electrode Placement"
>Concept Code Sequence	0040,A168	SQ		ANAP		This is the Value component of a Name/Value pair when the Concept implied by Concept Name Code Sequence (0040,A043) is a Coded Value.
>>Code Value	0008,0100	SH		ANAP		This will be "5.4.5-33-1-1" which means “Standard 12-lead positions: limb leads placed at extremities”
>>Coding Scheme Designator	0008,0102	SH		ANAP		"SCPECG"
>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3"
>>Code Meaning	0008,0104	LO		ANAP		This will be "Standard 12-Lead Positions"

Table 57: Waveform Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS		The date the waveform data was created.
Acquisition Datetime	0008,002A	DT		ALWAYS		The date and time that the acquisition of data that resulted in this waveform.
Content Time	0008,0033	TM		ALWAYS		The time the Waveform data was created.
Instance Number	0020,0013	IS		ALWAYS		A number that identifies this waveform. For output this will always be “1”. "

Table 58: Waveform Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Waveform Sequence	5400,0100	SQ		ALWAYS		Sequence of one or more Items, each representing one waveform multiplex group. Ordering of Items in this Sequence is significant for external reference to specific multiplex groups. This will have 1 or 2 multiplex groups, one for rhythm data and one for median data
>Waveform Originality	003A,0004	CS		ALWAYS		This will be “ORIGINAL” for the rhythm data and “DERIVED” for median data.
>Number of Waveform Channels	003A,0005	US		ALWAYS		Number of channels for this multiplex group
>Number of Waveform Samples	003A,0010	UL		ALWAYS		Number of samples per channel in this multiplex group
>Sampling Frequency	003A,001A	DS		ALWAYS		Frequency in Hz.
>Multiplex Group Label	003A,0020	SH		ANAPCV		Label for multiplex group. This is “RHYTHM” for the first group and “MEDIAN BEAT” for the second group.
>Channel Definition Sequence	003A,0200	SQ		ALWAYS		Sequence of one or more Items, with one Item per channel. Ordering of Items in this Sequence is significant for reference to specific channels. There will be one item for each lead.
>>Channel Source Sequence	003A,0208	SQ		ALWAYS		Sequence of one or more Items which further qualify the Waveform Source. This will have one item for each lead.

>>>Code Value	0008,0100	SH		ANAP		This is the code for the lead
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG"
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3"
>>>Code Meaning	0008,0104	LO		ANAP		This is the lead name.
>>Channel Sensitivity	003A,0210	DS		ANAP		Nominal numeric value of unit quantity of sample. This is the LSB in microvolts and will always be 5.00.
>>Channel Sensitivity Units Sequence	003A,0211	SQ		ANAP		A coded descriptor of the Units of measure for the Channel Sensitivity. Only a single Item shall be permitted in this sequence.
>>>Code Value	0008,0100	SH		ANAP		This will be “uV”
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be “UCUM”
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be “1.4”
>>>Code Meaning	0008,0104	LO		ANAP		This will be “microvolt”
>>Channel Sensitivity Correction Factor	003A,0212	DS		ANAP		Multiplier to be applied to encoded sample values to match units specified in Channel Sensitivity (003A,0210).
>>Channel Baseline	003A,0213	DS		ANAP		Offset of encoded sample value 0 from actual 0 using the units defined in the Channel Sensitivity Units Sequence (003A,0211). This will be “0”.
>>Channel Sample Skew	003A,0215	DS		ANAP		Offset of first sample of channel from waveform multiplex group start time, in samples. This will be “0”.
>>Waveform Bits Stored	003A,021A	US		ALWAYS		Number of significant bits within the waveform samples. This will be “16”.
>>Filter Low Frequency	003A,0220	DS		ANAPCV		Nominal 3dB point of lower frequency of pass band
>>Filter High Frequency	003A,0221	DS		ANAPCV		Nominal 3dB point of higher frequency of pass band
>>Notch Filter Frequency	003A,0222	DS		ANAPCV		Center frequency of notch filter(s)
>Waveform Bits Allocated	5400,1004	US		ALWAYS		Size of each waveform data sample within the waveform data. This will be “16”.
>Waveform Sample Interpretation	5400,1006	CS		ALWAYS		Data representation of the waveform data points. This will be “SS”. ”
>Waveform Data	5400,1010	O W/ OB		ALWAYS		Encoded data samples - channel multiplexed.

Table 59: Waveform Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Annotation Sequence	0040,B020	SQ		ALWAYS		Sequence of Annotation Items
>Measurement Units Code Sequence	0040,08EA	SQ		ANAP		Units of measurement. Coded entry sequence with one item only.
>>Code Value	0008,0100	SH		ANAP		This is the measurement unit designator
>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "UCUM"
>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.4"
>>Code Meaning	0008,0104	LO		ALWAYS		This is the text name of the measurement unit. These are the possible values:

>Concept Name Code Sequence	0040,A043	SQ		ANAP		Code representing the fully specified name of the NUMERIC measurement or CODED concept. This sequence shall contain exactly one item.
>>Modifier Code Sequence	0040,A195	SQ		ANAP		
>>>Code Value	0008,0100	SH		ANAP		This is the code for the measurement.
>>>Coding Scheme Designator	0008,0102	SH		ANAP		This will be "SCPECG".
>>>Coding Scheme Version	0008,0103	SH		ANAP		This will be "1.3".
>>>Code Meaning	0008,0104	LO		ALWAYS		This is the text name of the measurement
>Referenced Waveform Channels	0040,A0B0	US		ANAP		List of channels in waveform to which annotation applies. This will be “0001 0000” (1,0).
>Referenced Sample Positions	0040,A132	UL		ANAP		List of samples within a multiplex group specifying temporal points for annotation. Position of first sample is 1. There will be only one sample position.
>Annotation Group Number	0040,A180	US		ANAP		Number identifying associated annotations. This will be “3”.
>Numeric Value	0040,A30A	DS		ANAP		Numeric measurement value or values.
>Unformatted Text Value	0070,0006	ST		ANAP		Text Observation Value

Table 60: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS		ANAP	CONFIG	
Instance Creation Date	0008,0012	DA		ANAPCV	AUTO	
Instance Creation Time	0008,0013	TM		ANAPCV	AUTO	
SOP Class UID	0008,0016	UI		ALWAYS	CONFIG	This will be the 12- Lead ECG SOP Class “1.2.840.10008.5.1.4.1.1.9.1.1” or it will be the General ECG SOP Class “1.2.840.10008.5.1.4.1.1.9.1.2” depending on the configuration settings.
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	Uniquely identifies the SOP Instance.

8.1.2. Usage of Attributes from Received IOD

Not applicable.

8.1.3. Attribute Mapping

Not applicable

8.1.4. Coerced/Modified fields

Not applicable

8.2. Data Dictionary of Private Attributes

Not applicable

8.3. Coded Terminology and Templates

Not applicable.

8.3.1. Context Groups

Not applicable

8.3.2. Template Specifications

Not applicable

8.3.3. Private code definitions

Not applicable

8.4. Grayscale Image consistency

Not applicable

8.5. Standard Extended/Specialized/Private SOPs

Not applicable

8.6. Private Transfer Syntaxes

Not applicable