



Technical Publications

**Direction DOC1744647
Revision Rev2**

MAC Link v1.0 DICOM CONFORMANCE STATEMENT

Copyright© 2015 by General Electric Co.

Do not duplicate



GE Healthcare

REVISION HISTORY

Revision	Date	Description
1	Aug.25, 2015	Creation of the document.
2	Oct.14, 2015	Fix header format display issue.

THIS PAGE LEFT INTENTIONALLY BLANK

CONFORMANCE STATEMENT OVERVIEW

The MAC Link system implements the necessary DICOM services to download work list from an information system, save acquired 12-lead ECG images to a network storage device or media. The system conforms to the DICOM standard to allow the sharing of medical information with other digital imaging systems.

Table 0.1 provides an overview of the network services supported by MAC Link v1.0.

Table 0.1 – NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
General ECG Waveform Storage	Yes	No
Workflow Management		
Modality Worklist Information Model – FIND SOP Class	Yes	No

Option*: This means that this service can be purchased separately

TABLE OF CONTENTS

1. INTRODUCTION	8
1.1 Overview	8
1.2 Overall DICOM Conformance Statement Document Structure	9
1.3 Intended Audience	10
1.4 Scope and Field of Application	10
1.5 Important Remarks	10
1.6 References.....	11
1.7 Definitions.....	11
1.8 Symbols and Abbreviations	13
2. NETWORK CONFORMANCE STATEMENT	16
2.1 Introduction.....	16
2.2 Implementation Model	16
2.3 AE Specifications	18
2.4 Communication Profiles.....	22
2.5 Extensions / Specializations/ Privatizations.....	23
2.6 Configuration.....	23
2.7 Support of Extended Character Sets	23
2.8 Codes and Controlled Terminology	24
2.9 Security Profiles	24
3. GENERAL ECG INFORMATION OBJECT IMPLEMENTATION.....	26
3.1 Introduction.....	26
3.2 MAC Link Mapping of DICOM Entities	26
3.3 IOD Module Table	26
3.4 Information Module Definitions.....	27

4. MODALITY WORKLIST QUERY IMPLEMENTATION37

4.1 Introduction..... 37

4.2 MAC Link Mapping of DICOM Entities 37

4.3 Worklist Query Module Table..... 37

4.4 Worklist Query Module Definitions..... 38

1. INTRODUCTION

1.1 OVERVIEW

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

Section 1 (Introduction), which describes the overall structure, intent, and references for this Conformance Statement

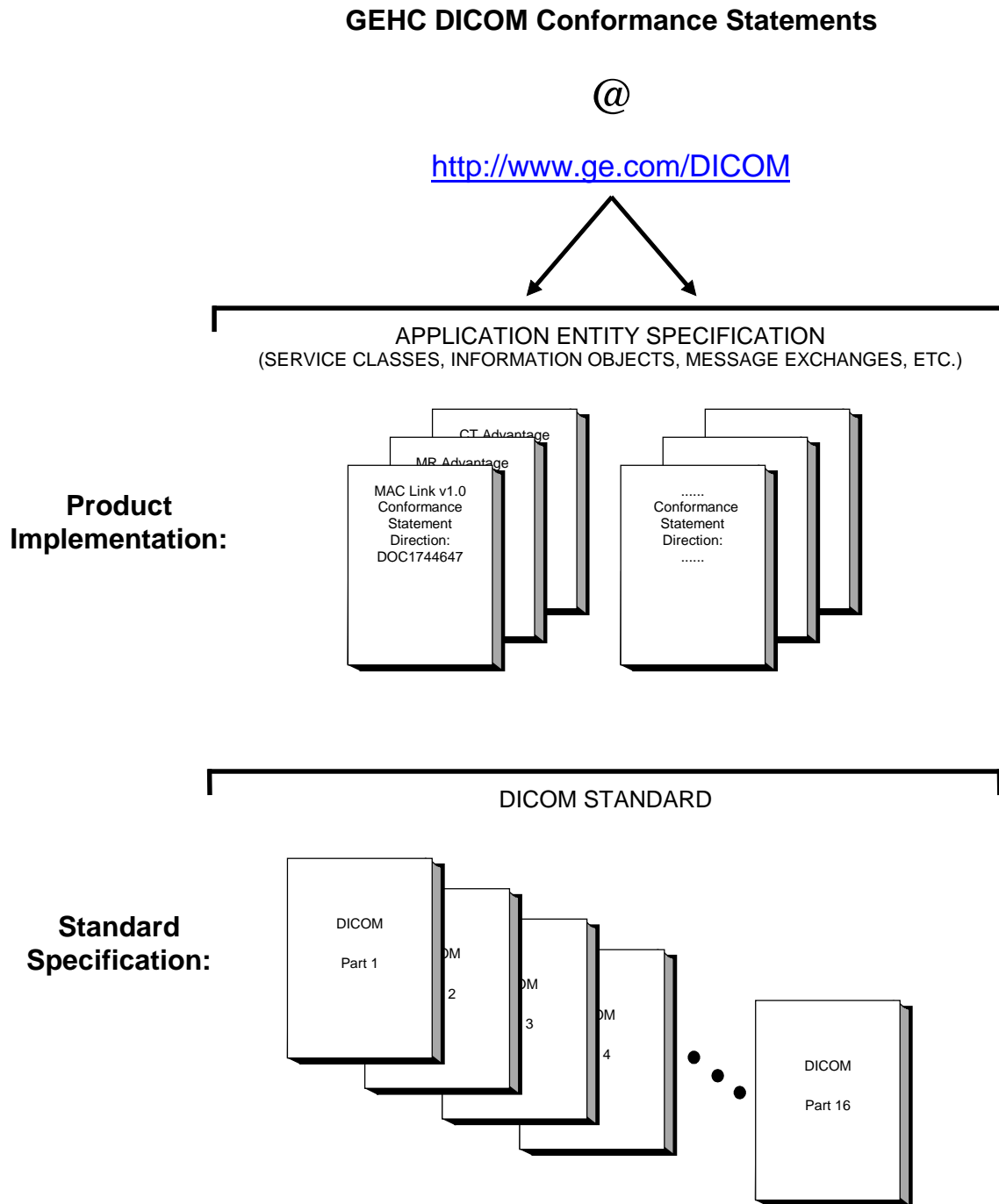
Section 2 (Network Conformance Statement), which specifies the GEHC equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (General ECG Information Object Implementation), which specifies the GEHC equipment compliance to DICOM requirements for the implementation of the general ECG information object.

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

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEHC DICOM Conformance Statements is shown in the Illustration below.



This document specifies the DICOM implementation. It is entitled:

MAC Link v1.0
Conformance Statement for DICOM
Direction DOC1744647

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

The GEHC 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 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

1.3 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.

1.4 SCOPE AND FIELD OF APPLICATION

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

The reader of this DICOM Conformance Statement should be aware that different GEHC devices are capable of using different Information Object Definitions. For example, a GEHC 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 GEHC implementation. If the user encounters unspecified private data elements while parsing a GEHC 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 GEHC devices.

1.5 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 GEHC 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 for the future 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.

1.6 REFERENCES

NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://medical.nema.org/>

1.7 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 point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.8 SYMBOLS AND ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
DNS	Domain Name System
FSU	File-Set Updater
FSR	File-Set Reader
HIS	Hospital Information System
HL7	Health Level 7 Standard

IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
JPEG	Joint Photographic Experts Group
LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format
LUT	Look-up Table
MAR	Medication Administration Record
MPEG	Moving Picture Experts Group
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NTP	Network Time Protocol
O	Optional (Key Attribute)
OP	Ophthalmic Photography
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
RDN	Relative Distinguished Name (LDAP)
RF	Radiofluoroscopy
RIS	Radiology Information System
RT	Radiotherapy
SC	Secondary Capture

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
DHCP	Dynamic Host Configuration Protocol
U	Unique (Key Attribute)
UL	Upper Layer
VL	Visible Light
VR	Value Representation

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

This section of the DICOM Conformance Statement specifies the MAC Link 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.

MAC Link is a tablet based diagnostic ECG device for resting ECG tests.

It provides the following DICOM functionality:

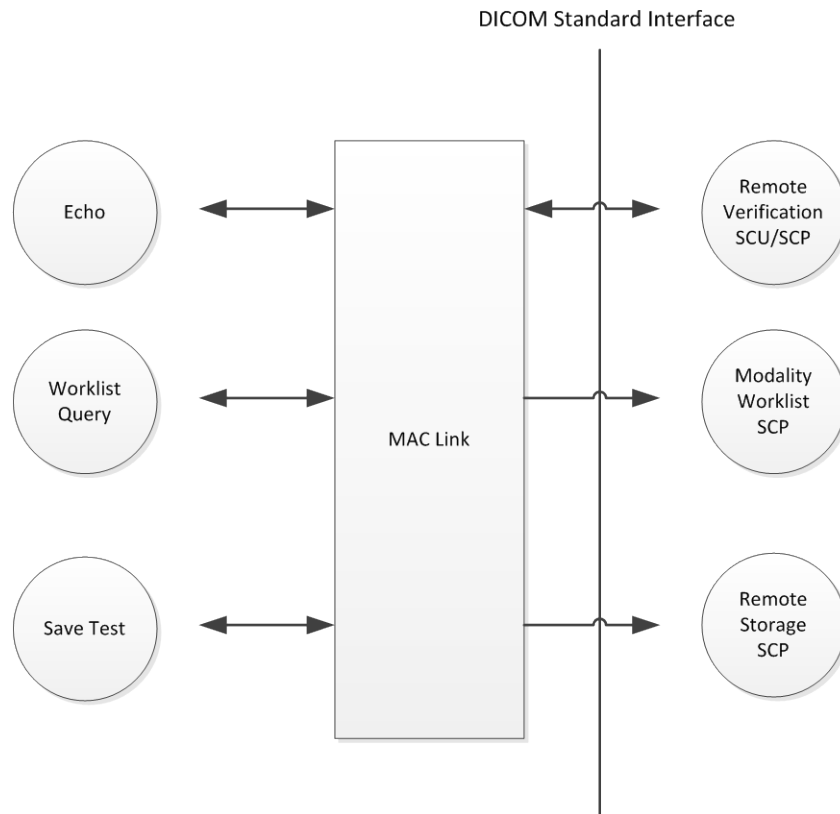
- Querying and retrieving a DICOM Modality Worklist from a Worklist SCP
- Exporting DICOM Composite Instances (as Storage SCU)
- DICOM Verification (as SCP and SCU)

2.2 IMPLEMENTATION MODEL

2.2.1 Application Data Flow Diagram

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

ILLUSTRATION 2-1
MAC LINK NETWORK APPLICATION MODEL AND DATA FLOW DIAGRAM



There are 3 local real-world activities that occur in MAC Link:

- Worklist Query
- Echo
- Save Test

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

Echo: Initiates a connection to the DICOM SCP, sends a verification request and closes the connection.

Save Test initiates a connection to the Storage SCP (Image Archive) and transmits configured Composite Instances to the Storage SCP (C-STORE).

2.2.2 Functional Definition of AE's

Application Entity MAC Link supports the following functions:

- Initiates a DICOM association to query a DICOM worklist
- Receives DICOM modality worklist information
- Initiates a DICOM association to send Composite Instances

- Transmits DICOM Composite Instances to the DICOM Storage SCP
- Initiates verification (as SCU) to assist in network diagnostics

2.2.3 Sequencing of Real-World Activities

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

- Modality Worklist query
- Start test
- Save test completed with Storage Commitment request (if enabled in system configuration)

2.3 AE SPECIFICATIONS

2.3.1 MAC Link AE Specification

The MAC Link Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU** and/or as an **SCP**:

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	No
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
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

2.3.1.1 Association Establishment Policies

2.3.1.1.1 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 for the MAC Link is:

Maximum Length PDU	16384(Not Configurable)
---------------------------	--------------------------------

2.3.1.1.2 Number of Associations

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

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

2.3.1.1.3 Asynchronous Nature

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

2.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM Implementation is:

MAC Link Implementation UID	1.3.6.1.4.1.6018.2.11111
MAC Link Implementation Version Name	GE_MACPAD_100

2.3.1.2 Association Initiation Policy

When the MAC Link Application Entity initiates an Association for any Real-World Activity, it will propose the Presentation Contexts for all Real-World Activities; i.e., there is only a single, comprehensive Presentation Context Negotiation proposed for the AE.

The MAC Link proposes only a single Transfer Syntax in each Presentation Context; i.e., for each Abstract Syntax in the following Presentation Context Tables, the AE proposes one Presentation Context for each specified Transfer Syntax.

2.3.1.2.1 Real-World Activity A (Worklist Query)

2.3.1.2.1.1 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.

2.3.1.2.1.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE MAC Link 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	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

DIR DOC1744647 REV2

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

The MAC Link includes matching keys in the Modality Worklist queries as described in Section 4.

The Scheduled Procedure Steps and its corresponding response information are displayed in the DICOM Worklist, accessible through the Order Manager.

A C-FIND CANCEL is not supported.

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	Terminate the association and operation
	A900	Error: Identifier does not match SOP Class	Terminate the association and operation
	C000-CFFF	Error: Unable to process	Terminate the association and operation
	0122	SOP Class Not Supported	Terminate the association and operation
Cancel	FE00	Matching terminated due to cancel	Terminate the association and operation
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.	Receiving process of the matches continues.
	FF01	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	Receiving process of the matches continues.

2.3.1.2.2 Real-World Activity B (Save Test)

2.3.1.2.2.1 Associated Real-World Activity

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

2.3.1.2.2.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE MAC Link for Activity B (Save Test)					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

2.3.1.2.2.2.1 SOP Specific DICOM Conformance Statement for All Storage SOP Classes

The MAC Link includes optional data elements in the SOP Instances as described in Section 3.

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

Service Status	Status Code	Further Meaning	Application Behavior When Receiving Status Code
Failure	A700-A7FF	Refused: Out of resources	The association is closed.
	A900-A9FF	Error: Data Set does not match SOP Class	The error is logged. The association is closed.
	C000-CFFF	Error: Cannot Understand	The error is logged. The association is closed.
	0122	SOP Class Not Supported	The error is logged. The association is closed.
Warning	B000	Coercion of Data Elements	The test image is sent to the Storage SCP. The association is closed.
	B006	Elements Discarded	The test image is sent to the Storage SCP. The association is closed.
	B007	Data Set does not match SOP Class	The test image is sent to the Storage SCP. The association is closed.
Success	0000		The test image is sent to the Storage SCP. The association is closed.

DIR DOC1744647 REV2

2.3.1.2.3 Real-World Activity C (Echo)**2.3.1.2.3.1 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.

2.3.1.2.3.2 Proposed Presentation Context Table

Presentation Context Table – Proposed by AE MAC Link for Activity C (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	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

2.4 COMMUNICATION PROFILES**2.4.1 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 Linux Operating System.

2.4.2 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 MAC Link, please refer to the Product Data Sheet.

2.4.3 Additional Protocols

The product supports DHCP protocol.

2.4.4 IPv4 and IPv6 Support

The product supports IPv4 only. IPv6 is not supported.

2.5 EXTENSIONS / SPECIALIZATIONS/ PRIVATIZATIONS

2.5.1 Standard Extended / Specialized / Private SOP Classes

2.5.1.1 Standard Extended SOP Classes

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

2.5.1.2 Private SOP Class

There are no Private SOP Classes supported by the product.

2.5.2 Private Transfer Syntaxes

No Private Transfer Syntax is supported.

2.6 CONFIGURATION

2.6.1 AE Title/Presentation Address Mapping

2.6.2 Configurable Parameters

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

- Local AE Title
- Local IP Address
- Local IP Netmask

The following fields are configurable for every remote DICOM AE:

- Remote AE Title
- Remote IP Address
- Listening TCP/IP Port Number

2.7 SUPPORT OF EXTENDED CHARACTER SETS

The MAC Link is configurable with a single single-byte extended character set, either the default ISO_IR 100 (Latin alphabet Number 1 supplementary set), or the alternate ISO_IR 101 (Latin alphabet Number 2 supplementary set).

The product user interface will allow the user to enter characters from the console keyboard 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). It will map that Specific Character Set value without change into the images created pursuant to that Scheduled Procedure Step. Text attributes of the Scheduled Procedure Step Identifier, including Patient and Physician names, that include extended characters will be displayed as described above.

2.8 CODES AND CONTROLLED TERMINOLOGY

2.8.1 Fixed Coded Terminology

The product uses the fixed (non-configurable, non-extensible) coded terminology in Image SOP Instance and Modality Performed Procedure Step attributes, as described in Sections 3.

2.8.2 Mapped Coded Terminology

The product maps, without change, coded terminology values supplied in Modality Worklist Scheduled Procedure Steps into Image SOP Instance and Modality Performed Procedure Step attributes, as described in Sections 3.

2.9 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))

3. GENERAL ECG INFORMATION OBJECT IMPLEMENTATION

3.1 INTRODUCTION

This section specifies the use of the DICOM General ECG IOD to represent the information included in General ECG produced by this implementation. Corresponding attributes are conveyed using the module construct.

3.2 MAC LINK MAPPING OF DICOM ENTITIES

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

TABLE 3-1
MAPPING OF DICOM ENTITIES TO MAC LINK ENTITIES

DICOM IE	MAC Link Entity
Patient	Patient
Study	Exam
Series	Series
Image	Image

3.3 IOD MODULE TABLE

The General ECG 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 **Error! Reference source not found.**

TABLE 3-2
GENERAL ECG IOD MODULES

Entity Name	Module Name	Usage	Reference
Patient	Patient	Used	3.4.1.1
	Clinical Trial Subject	Not Used	N/A
Study	General Study	Used	3.4.2.1
	Patient Study	Used	3.4.2.2
	Clinical Trial Study	Not Used	N/A
Series	General Series	Used	3.4.3.1
	Clinical Trial Series	Not Used	N/A
Frame of Reference	Synchronization	Not Used	N/A
Equipment	General Equipment	Used	3.4.4.1
Waveform	Waveform Identification	Used	3.4.5.1

	Waveform	Used	3.4.5.2
	Acquisition Context	Not Used	N/A
	Waveform Annotation	Used	3.4.5.3
	SOP Common	Used	3.4.5.4

3.4 INFORMATION MODULE DEFINITIONS

Please refer to DICOM Part 3 (Information Object Definitions) for a description of each of the entities, modules, and attributes contained within the 12-Lead ECG 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 when generating the instance. It should be noted that they are the same ones as defined in the DICOM Standard Part 3 (Information Object Definitions). Also note that Attributes not present in tables are not supported.

3.4.1 Patient Entity Modules

3.4.1.1 Patient Module

This section specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a diagnostic Study. This Module contains Attributes of the patient that are needed for diagnostic interpretation of the Image and are common for all studies performed on the patient.

**TABLE 3-3
PATIENT MODULE ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
Patient's Name	(0010,0010)	2	May be entered from User Interface. Taken from worklist if it is there.
Patient ID	(0010,0020)	2	May be entered from User Interface. Taken from worklist if it is there.
Issuer of Patient ID	(0010,0021)	3	Not Used
Patient's Birth Date	(0010,0030)	2	May be entered from User Interface. Taken from worklist if it is there.
Patient's Sex	(0010,0040)	2	May be entered from User Interface. Taken from worklist if it is there.
Referenced Patient Sequence	(0008,1120)	3	Not Used
<i>>Include 'SOP Instance Reference Macro'</i>			
Patient's Birth Time	(0010,0032)	3	Not Used
Other Patient IDs	(0010,1000)	3	May be entered from User Interface. Taken from worklist if it is there.
Other Patient IDs Sequence	(0010,1002)	3	Not Used

>Patient ID	(0010,0020)	1	Not Used
>Issuer of Patient ID	(0010,0021)	1	Not Used
>Type of Patient ID	(0010,0022)	1	Not Used
Other Patient Names	(0010,1001)	3	Not Used
Ethnic Group	(0010,2160)	3	May be entered from User Interface.
Patient Comments	(0010,4000)	3	Not Used
Patient Species Description	(0010,2201)	1C	Not Used
Patient Species Code Sequence	(0010,2202)	1C	Not Used
>Include 'Code Sequence Macro'			
Patient Breed Description	(0010,2292)	2C	Not Used
Patient Breed Code Sequence	(0010,2293)	2C	Not Used
>Include 'Code Sequence Macro'			
Breed Registration Sequence	(0010,2294)	2C	Not Used
>Breed Registration Number	(0010,2295)	1	Not Used
>Breed Registry Code Sequence	(0010,2296)	1	Not Used
>>Include 'Code Sequence Macro'			
Responsible Person	(0010,2297)	2C	Not Used
Responsible Person Role	(0010,2298)	1C	Not Used
Responsible Organization	(0010,2299)	2C	Not Used
Patient Identity Removed	(0012,0062)	3	Not Used
De-identification Method	(0012,0063)	1C	Not Used
De-identification Method Code Sequence	(0012,0064)	1C	Not Used
>Include 'Code Sequence Macro'			

3.4.2 Study Entity Modules

3.4.2.1 General Study Module

The following Study IE Modules are common to all Composite Image IODs, which reference the Study IE.

TABLE 3-4
GENERAL STUDY MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Study Instance UID	(0020,000D)	1	Uniquely generated by the equipment. Taken from worklist if it is there.
Study Date	(0008,0020)	2	Is set to examination date
Study Time	(0008,0030)	2	Is set to examination date
Referring Physician's Name	(0008,0090)	2	May be entered from User Interface.
Referring Physician Identification Sequence	(0008,0096)	3	Not Used
>Include 'Person Identification Macro'			

Study ID	(0020,0010)	2	Taken from worklist if it is there (from Requested Procedure Id)
Accession Number	(0008,0050)	2	May be entered from User Interface. Taken from worklist if it is there.
Study Description	(0008,1030)	3	Taken from worklist if it is there (from Requested Procedure Description).
Physician(s) of Record	(0008,1048)	3	Taken from worklist if it is there (from Requesting Physician)
Physician(s) of Record Identification Sequence	(0008,1049)	3	Not Used
>Include 'Person Identification Macro'			
Name of Physician(s) Reading Study	(0008,1060)	3	Not Used
Physician(s) Reading Study Identification Sequence	(0008,1062)	3	Not Used
>Include 'Person Identification Macro'			
Referenced Study Sequence	(0008,1110)	3	Not Used
>Include 'SOP Instance Reference Macro'			
Procedure Code Sequence	(0008,1032)	3	Not Used
>Include 'Code Sequence Macro'			

3.4.2.2 Patient Study Module

This section specifies the attributes that identify the patient study information.

**TABLE 3-6
PATIENT STUDY MODULE ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
Admitting Diagnoses Description	(0008,1080)	3	Not Used
Admitting Diagnoses Code Sequence	(0008,1084)	3	Not Used
>Include 'Code Sequence Macro'			
Patient's Age	(0010,1010)	3	Not Used
Patient's Size	(0010,1020)	3	Not Used
Patient's Weight	(0010,1030)	3	May be entered from User Interface. Taken from worklist if it is there.
Occupation	(0010,2180)	3	Not Used
Additional Patient's History	(0010,21B0)	3	Not Used
Admission ID	(0038,0010)	3	Not Used
Issuer of Admission ID	(0038,0011)	3	Not Used
Service Episode ID	(0038,0060)	3	Not Used
Issuer of Service Episode ID	(0038,0061)	3	Not Used
Service Episode Description	(0038,0062)	3	Not Used
Patient's Sex Neutered	(0010,2203)	2C	Not Used

3.4.3 Series Entity Modules

3.4.3.1 General Series Module

This section specifies the attributes that identify and describe general information about the Series within a Study.

TABLE 3-5
GENERAL SERIES MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Modality	(0008,0060)	1	Set value to "ECG"
Series Instance UID	(0020,000E)	1	Uniquely generated by the equipment
Series Number	(0020,0011)	2	Internal number which is incremented for each new series within a study.
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
Performing Physician Identification Sequence	(0008,1052)	3	Not Used
<i>>Include 'Person Identification Macro'</i>			
Protocol Name	(0018,1030)	3	Not Used
Series Description	(0008,103E)	3	Not Used
Operators' Name	(0008,1070)	3	May be entered from User Interface.
Operator Identification Sequence	(0008,1072)	3	Not Used
<i>>Include 'Person Identification Macro'</i>			
Referenced Performed Procedure Step Sequence	(0008,1111)	3	Not Used
<i>>Include 'SOP Instance Reference Macro'</i>			
Related Series Sequence	(0008,1250)	3	Not Used
<i>>Study Instance UID</i>	(0020,000D)	1	Not Used
<i>>Series Instance UID</i>	(0020,000E)	1	Not Used
<i>>Purpose of Reference Code Sequence</i>	(0040,A170)	2	Not Used
<i>>>Include 'Code Sequence Macro'</i>			
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	Not Used
<i>>Requested Procedure ID</i>	(0040,1001)	1C	Not Used
<i>>Accession Number</i>	(0008,0050)	3	Not Used
<i>>Study Instance UID</i>	(0020,000D)	3	Not Used
<i>>Referenced Study Sequence</i>	(0008,1110)	3	Not Used

>> Include 'SOP Instance Reference Macro'			
>Requested Procedure Description	(0032,1060)	3	Not Used
>Requested Procedure Code Sequence	(0032,1064)	3	Not Used
>>Include 'Code Sequence Macro'			
Reason for the Requested Procedure	(0040,1002)	3	Not Used
Reason for Requested Procedure Code Sequence	(0040,100A)	3	Not Used
>>Include 'Code Sequence Macro'			
>Scheduled Procedure Step ID	(0040,0009)	1C	Not Used
>Scheduled Procedure Step Description	(0040,0007)	3	Not Used
>Scheduled Protocol Code Sequence	(0040,0008)	3	Not Used
>>Include 'Code Sequence Macro'			
>>Protocol Context Sequence	(0040,0440)	3	Not Used
>>>Include 'Content Item Macro'			
>>>Content Item Modifier Sequence	(0040,0441)	3	Not Used
>>>>Include 'Content Item Macro'			
Performed Procedure Step ID	(0040,0253)	3	Not Used
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	Not Used
Performed Protocol Code Sequence	(0040,0260)	3	Not Used
>Include 'Code Sequence Macro'			
>>Protocol Context Sequence	(0040,0440)	3	Not Used
>>>Include 'Content Item Macro'			
>>>Content Item Modifier Sequence	(0040,0441)	3	Not Used
>>>>Include 'Content Item Macro'			
Comments on the Performed Procedure Step	(0040,0280)	3	Not Used

3.4.4 Equipment Entity Modules

3.4.4.1 General Equipment Module

This section specifies the attributes that identify and describe the piece of equipment, which produced a Series of Images.

TABLE 3-6
GENERAL EQUIPMENT MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Is 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	Is set to "MAC Link"
Device Serial Number	(0018,1000)	3	Not Used
Software Versions	(0018,1020)	3	Not Used
Gantry ID	(0018,1008)	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

3.4.5 Waveform Entity Modules

3.4.5.1 Waveform Identification Module

This section specifies the attributes that identify and describe a waveform within a particular series.

TABLE 3-7
WAVEFORM IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Instance Number	(0020,0013)	1	Internal value which is incremented for each captured image within a series. (within a study)
Content Date	(0008,0023)	1	Set from Image date
Content Time	(0008,0033)	1	Set from Image time
Acquisition DateTime	(0008,002A)	1	Set from the acquisition date time
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
>>Include 'Code Sequence Macro'			Not Used

3.4.5.2 Waveform Module

This section specifies the attributes of a waveform within a particular serie.

TABLE 3-8
WAVEFORM MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Waveform Sequence	(5400,0100)	1	
> Multiplex Group Time Offset	(0018,1068)	1C	Not Used
> Trigger Time Offset	(0018,1069)	1C	Not Used
> Trigger Sample Position	(0018,106E)	3	Not Used

> Waveform Originality	(003A,0004)	1	Is set to "ORIGINAL"
> Number of Waveform Channels	(003A,0005)	1	12 channels
> Number of Waveform Samples	(003A,0010)	1	Can be 5000(500Hz * 10s) or 10000 (1000Hz * 10s)
> Sampling Frequency	(003A,001A)	1	Can be 500Hz or 1000Hz
> Multiplex Group Label	(003A,0020)	3	Not Used
> Channel Definition Sequence	(003A,0200)	1	Number of Channel Definition Sequences
>> 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
>>> Include 'Code Sequence Macro'			
>> Channel Source Modifiers Sequence	(003A,0209)	1C	Not Used
>>> Include 'Code Sequence Macro'			Not Used
>> Source Waveform Sequence	(003A,020A)	3	Not Used
>>>Referenced SOP Class UID	(0008,1150)	1	Not Used
>>>Referenced SOP Instance UID	(0008,1155)	1	Not Used
>>> Referenced Waveform Channels	(0040,A0B0)	1	Not Used
>> Channel Derivation Description	(003A,020C)	3	Not Used
>> Channel Sensitivity	(003A,0210)	1C	Set to "0.00488"
>> Channel Sensitivity Units Sequence	(003A,0211)	1C	Set to "mV"
>>> Include 'Code Sequence Macro'			
>> Channel Sensitivity Correction Factor	(003A,0212)	1C	Set to "1"
>> Channel Baseline	(003A,0213)	1C	Set to "0"
>> Channel Time Skew	(003A,0214)	1C	Set to "0"
>> Channel Sample Skew	(003A,0215)	1C	Not Used
>> Channel Offset	(003A,0218)	3	Not Used
>> Waveform Bits Stored	(003A,021A)	1	Set to "16"
>> Filter Low Frequency	(003A,0220)	3	Set to "0.56"
>> Filter High Frequency	(003A,0221)	3	Set to "150"
>> 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	Set to "0"
> Waveform Data	(5400,1010)	1	Binary waveform data
Waveform Data Display Scale	(003A,0230)	3	Not Used
Waveform Display Background CIELab Value	(003A,0231)	3	Not Used

Waveform Presentation Group Sequence	(003A,0240)	3	Not Used
>Presentation Group Number	(003A,0241)	1	Not Used
>Channel Display Sequence	(003A,0242)	1	Not Used
>>Referenced Waveform Channels	(0040,A0B0)	1	Not Used
>>Channel Offset	(003A,0218)	3	Not Used
>>Channel Recommended Display CIELab Value	(003A,0244)	1	Not Used
>>Channel Position	(003A,0245)	1	Not Used
>>Display Shading Flag	(003A,0246)	3	Not Used
>>Fractional Channel Display Scale	(003A,0247)	1C	Not Used
>>Absolute Channel Display Scale	(003A,0248)	1C	Not Used

3.4.5.3 Waveform Annotation Module

TABLE 3-9
WAVEFORM ANNOTATION MODULE ATTRIBUTES

Attribute Name	Tag	Type	Attribute Description
Waveform Annotation Sequence	(0040,B020)	1	Waveform annotation sequence
> Unformatted Text Value	(0070,0006)	1C	Not used
> Concept Name Code Sequence	(0040,A043)	1C	See CID 3335
>>Include 'Code Sequence Macro'			
>> Modifier Code Sequence	(0040,A195)	1C	Not Used
>>>Include 'Code Sequence Macro'			Not Used
> Concept Code Sequence	(0040,A168)	3	Not Used
>>Include 'Code Sequence Macro'			Not Used
>> Modifier Code Sequence	(0040,A195)	1C	Not Used
>>>Include 'Code Sequence Macro'			Not Used
> Numeric Value	(0040,A30A)	3	Set the value of measurement
> Measurement Units Code Sequence	(0040,08EA)	3	Set the measurement unit
>> Include 'Code Sequence Macro'			
> Referenced Waveform Channels	(0040,A0B0)	1	Set to "0", all channels
> Temporal Range Type	(0040,A130)	1C	Not Used
> Referenced Sample Positions	(0040,A132)	1C	Not Used
> Referenced Time Offsets	(0040,A138)	1C	Not Used
> Referenced DateTime	(0040,A13A)	1C	Not Used
> Annotation Group Number	(0040,A180)	3	Group "0" for interpretation, Group "2" for measurements

TABLE 3-10
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	Generate the unique SOP Instance UIDs with device id, time in millis.
Specific Character Set	(0008,0005)	1C	See 2.7
Instance Creation Date	(0008,0012)	3	Not Used
Instance Creation Time	(0008,0013)	3	Not Used
Instance Creator UID	(0008,0014)	3	Not Used
Related General SOP Class UID	(0008,001A)	3	Not Used
Original Specialized SOP Class UID	(0008,001B)	3	Not Used
Coding Scheme Identification Sequence	(0008,0110)	3	Not Used
>Coding Scheme Designator	(0008,0102)	1	Not Used
>Coding Scheme Registry	(0008,0112)	1C	Not Used
>Coding Scheme UID	(0008,010C)	1C	Not Used
>Coding Scheme External ID	(0008,0114)	2C	Not Used
>Coding Scheme Name	(0008,0115)	3	Not Used
>Coding Scheme Version	(0008,0103)	3	Not Used
>Coding Scheme Responsible Organization	(0008,0116)	3	Not Used
Timezone Offset From UTC	(0008,0201)	3	Not Used
Contributing Equipment Sequence	(0018,A001)	3	Not Used
>Purpose of Reference Code Sequence	(0040,A170)	1	Not Used
>>Include 'Code Sequence Macro'			
>Manufacturer	(0008,0070)	1	Not Used
>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
>Contribution DateTime	(0018,A002)	3	Not Used
>Contribution Description	(0018,A003)	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
>Digital Signature Purpose Code Sequence	(0400,0401)	3	Not Used
Encrypted Attributes Sequence	(0400,0500)	1C	Not Used
>Encrypted Content Transfer Syntax UID	(0400,0510)	1	Not Used
>Encrypted Content	(0400,0520)	1	Not Used
Original Attributes Sequence	(0400,0561)	3	Not Used
>Source of Previous Values	(0400,0564)	2	Not Used
>Attribute Modification DateTime	(0400,0562)	1	Not Used
>Modifying System	(0400,0563)	1	Not Used
>Reason for the Attribute Modification	(0400,0565)	1	Not Used
>Modified Attributes Sequence	(0400,0550)	1	Not Used
>>Any Attribute from the main data set that was modified or removed; may include Sequence Attributes and their Items.			
HL7 Structured Document Reference Sequence	(0040,A390)	1C	Not Used
>Referenced SOP Class UID	(0008,1150)	1	Not Used
>Referenced SOP Instance UID	(0008,1155)	1	Not Used
>HL7 Instance Identifier	(0040,E001)	1	Not Used
>Retrieve URI	(0040,E010)	3	Not Used

4. MODALITY WORKLIST QUERY IMPLEMENTATION

4.1 INTRODUCTION

This section specifies the use of the DICOM Modality Worklist Information Model used to organize data and against which a Modality Worklist Query will be performed.

4.2 MAC LINK MAPPING OF DICOM ENTITIES

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

TABLE 4-1
MAPPING OF DICOM ENTITIES TO MAC LINK ENTITIES

DICOM	MAC Link Entity
Scheduled Procedure Step	Exam
Requested Procedure	Exam
Imaging Service Request	Exam
Visit	Exam
Patient	Patient

4.3 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
MODALITY WORKLIST INFORMATION MODEL MODULES

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	4.4.1.1
	Scheduled Procedure Step	4.4.1.2
Requested Procedure	Requested Procedure	4.4.2.1
Imaging Service Request	Imaging Service Request	4.4.3.1
Visit	Visit Identification	4.4.4.1
	Visit Status	4.4.4.2
	Visit Relationship	4.4.4.3
	Visit Admission	4.4.4.4
Patient	Patient Relationship	4.4.5.1
	Patient Identification	4.4.5.2
	Patient Demographic	4.4.5.3
	Patient Medical	4.4.5.4

4.4 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.

4.4.1 Common Scheduled Procedure Step Entity Modules

4.4.1.1 SOP Common Module

TABLE 4-3
□SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Specific Character Set	(0008,0005)	O	1C	No	See 2.7

4.4.1.2 Scheduled Procedure Step Module

TABLE 4-4
SCHEDULED PROCEDURE STEP MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Scheduled Procedure Step Sequence	(0040,0100)	R	1	No	Matching is supported.
>Scheduled Station AE Title	(0040,0001)	R	1	No	Matching is supported.

>Scheduled Procedure Step Start Date	(0040,0002)	R	1	No	Matching is supported. Filtering is supported.
>Scheduled Procedure Step Start Time	(0040,0003)	R	1	No	Matching is supported.
>Scheduled Procedure Step End Date	(0040,0004)	O	3	No	Not used
>Scheduled Procedure Step End Time	(0040,0005)	O	3	No	Not used
>Modality	(0008,0060)	R	1	No	Matching is supported, but always set to "ECG"
>Scheduled Performing Physician's Name	(0040,0006)	R	2	No	Matching is supported.
>Scheduled Procedure Step Description	(0040,0005)	O	1C	No	Matching is supported.
>Scheduled Station Name	(0040,0010)	O	2	No	Matching is supported.
>Scheduled Procedure Step Location	(0040,0011)	O	2	No	Matching is supported.
>Scheduled Protocol Code Sequence	(0040,0008)	O	1C	No	Not used
>>Code Value	(0008,0100)	O	1	No	Not used
>>Coding Scheme Designator	(0008,0102)	O	1	No	Not used
>>Coding Scheme Version	(0008,0103)	O	3	No	Not used
>>Code Meaning	(0008,0104)	O	3	No	Not used
>Pre-Medication	(0040,0012)	O	2C	No	Matching is supported.
>Scheduled Procedure Step ID	(0040,0009)	O	1	No	Matching is supported.
>Requested Contrast Agent	(0032,1070)	O	2C	No	Not used
>Scheduled Procedure Step Status	(0040,0020)	O	3	No	Not used
>Comments on the Scheduled Procedure Step	(0040,0400)	O	3	No	Not used

4.4.2 Common Requested Procedure Entity Modules

4.4.2.1 Requested Procedure Module

TABLE 4-5
REQUESTED PROCEDURE MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Requested Procedure ID	(0040,1001)	O	1	Yes	Matching is supported.
Requested Procedure Description	(0032,1060)	O	1C	Yes	Matching is supported.
Requested Procedure Code Sequence	(0032,1064)	O	1C	No	Not used
>Code Value	(0008,0100)	O	1	No	Not used
>Coding Scheme Designator	(0008,0102)	O	1	No	Not used
>Coding Scheme Version	(0008,0103)	O	3	No	Not used
>Code Meaning	(0008,0104)	O	3	No	Not used
Study Instance UID	(0020,000D)	O	1	Yes	Matching is supported.
Study Date	(0008,0020)	O	3	No	Not used
Study Time	(0008,0030)	O	3	No	Not used
Referenced Study Sequence	(0008,1110)	O	2	No	Not used
>Referenced SOP Class UID	(0008,1150)	O	1C	No	Not used
>Referenced SOP Instance UID	(0008,1155)	O	1C	No	Not used
Requested Procedure Priority	(0040,1003)	O	2	No	Matching is supported.
Patient Transport Arrangements	(0040,1004)	O	2	No	Not used
Requested Procedure Location	(0040,1005)	O	3	No	Not used
Confidentiality Code	(0040,1008)	O	3	No	Not used
Reporting Priority	(0040,1009)	O	3	No	Not used
Names of Intended Recipients of Results	(0040,1010)	O	3	No	Not used
Reason for the Requested Procedure	(0040,1002)	O	3	No	Not used
Requested Procedure Comments	(0040,1400)	O	3	No	Not used

4.4.3 Common Imaging Service Request Entity Modules

4.4.3.1 Imaging Service Request Module

TABLE 4-6
IMAGING SERVICE REQUEST MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Accession Number	(0008,0050)	O	2	Yes	Matching is supported. Filtering is supported. Only Single Value is supported
Requesting Physician	(0032,1032)	O	2	Yes	Matching is supported
Referring Physician's Name	(0008,0090)	O	2	No	Not used
Requesting Service	(0032,1033)	O	3	No	Not used
Reason for the Imaging Service Request	(0040,2001)	O	3	No	Not used
Imaging Service Request Comments	(0040,2400)	O	3	No	Not used
Issue Date of Imaging Service Request	(0040,2004)	O	3	No	Not used
Issue Time of Imaging Service Request	(0040,2005)	O	3	No	Not used
Placer Order Number / Imaging Service Request	(0040,2016)	O	3	No	Not used
Filler Order Number / Imaging Service Request	(0040,2017)	O	3	No	Not used
Order entered by ...	(0040,2008)	O	3	No	Not used
Order Enterer's Location	(0040,2009)	O	3	No	Not used
Order Callback Phone Number	(0040,2010)	O	3	No	Not used

4.4.4 Common visit Entity Modules

4.4.4.1 Visit Identification

TABLE 4-7
VISIT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Admission ID	(0038,0010)	O	2	No	Not used
Institution Name	(0008.0080)	O	3	No	Not used

Institution Address	(0008,0081)	O	3	No	Not used
Institution Code Sequence	(0008,0082)	O	3	No	Not used
> 'Code Sequence Macro'					
Issuer of Admission ID	(0038,0011)	O	3	No	Not used

4.4.4.2 Visit Status

TABLE 4-8
VISIT STATUS MODULE ATTRIBUTES

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

4.4.4.3 Visit Relationship

TABLE 4-9
VISIT RELATIONSHIP MODULE ATTRIBUTES

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

4.4.4.4 Visit Admission

TABLE 4-10
VISIT ADMISSION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Referring Physician's Address	(0008,0092)	O	3	No	Not used
Referring Physician's Phone Numbers	(0008,0094)	O	3	No	Not used
Admitting Diagnoses Description	(0008,1080)	O	3	No	Not used

Admitting Diagnoses Code Sequence	(0008,1084)	O	3	No	Not used
> 'Code Sequence Macro'					
Route of Admissions	(0038,0016)	O	3	No	Not used
Admitting Date	(0038,0020)	O	3	No	Not used
Admitting Time	(0038,0021)	O	3	No	Not used

4.4.5 Common Patient Entity Modules

4.4.5.1 Patient Relationship

TABLE 4-11
PATIENT RELATIONSHIP MODULE ATTRIBUTES

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

4.4.5.2 Patient Identification

TABLE 4-12
PATIENT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Patient's Name	(0010,0010)	R	1	Yes	Matching is supported.
Patient ID	(0010,0020)	R	1	Yes	Matching is supported.
Issuer of Patient ID	(0010,0021)	O	3	No	Not used
Other Patient IDs	(0010,1000)	O	3	Yes	Matching is supported.
Other Patient Names	(0010,1001)	O	3	No	Not used
Patient's Birth Name	(0010,1005)	O	3	No	Not used
Patient's Mother's Birth Name	(0010,1060)	O	3	No	Not used
Medical Record Locator	(0010,1090)	O	3	No	Not used

TABLE 4-13
PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Mapped into Instance	Note
Patients Birth Date	(0010,0030)	O	2	Yes	Matching is supported.
Patient's Sex	(0010,0040)	O	2	Yes	Matching is supported.
Patient's Weight	(0010,1030)	O	2	Yes	Matching is supported.
Confidentiality constraint on patient data	(0040,3001)	O	2	No	Not used
Patient's Size	(0010,1020)	O	3	No	Not used
Patient's Address	(0010,1040)	O	3	No	Not used
Patient's Telephone Numbers	(0010,2154)	O	3	No	Not used
Patient's Age	(0010,1010)	O	3	No	Not used
Occupation	(0010,2180)	O	3	No	Not used
Patient's Birth Time	(0010,0032)	O	3	No	Not used
Patient's Insurance Plan Code Sequence	(0010,0050)	O	3	No	Not used
> 'Code Sequence Macro'					
Patient's Primary Language Code Sequence	(0010,0101)	O	3	No	Not used
> 'Code Sequence Macro'					
> Patient's Primary Language Code Modifier Sequence	(0010,0102)	O	3	No	Not used
>> 'Code Sequence Macro'					
Military Rank	(0010,1080)	O	3	No	Not used
Branch of Service	(0010,1081)	O	3	No	Not used
Country of Residence	(0010,2150)	O	3	No	Not used
Region of Residence	(0010,2152)	O	3	No	Not used
Patient's Telephone Numbers	(0010,2154)	O	3	No	Not used
Ethnic Group	(0010,2160)	O	3	No	Not used
Patient's Religious Preference	(0010,21F0)	O	3	No	Not used
Patient Comments	(0010,4000)	O	3	No	Not used

TABLE 4-14
PATIENT MEDICAL MODULE ATTRIBUTES

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

