

Positron Emission Tomography System

SET-5001

SET-5002

DICOM MWM Conformance Statement

These specifications may be changed for improvement without notice.

Medical Systems Division
Shimadzu Corporation

Revision History

Date	Revision Code	Description
Dec. 2020	First version	Newly created

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0. Introduction

0.1 Overview

This document is a statement of conformance to DICOM standards for the Positron Emission Tomography (PET) system “SET-5001” and “SET-5002”. It specifically applies to the implementation of DICOM functionality in the positron emission tomography portion of the PET system.

This DICOM functionality is operated based on the DICOM Basic Worklist Service Class (MWM).

This document is intended for readers familiar with how the in-hospital network where DICOM is used is configured.

The content of this document conforms to the DICOM version 3.0 Part 2: Conformance.

0.2 Definitions

- Association is the first phase of communication between two DICOM application entities (AE). AEs use association to negotiate how data is encoded.
- DICOM message service elements (DIMSE) define the services and protocols used by AEs when exchanging messages.
- Information object definitions (IOD) are abstract data models for information about real-world activities.
- Service class providers (SCP) function as a server that executes operations to invoke notifications during association.
- Service class users (SCU) function as a client that executes operations to invoke notifications during association.
- A service-object pair (SOP) class is a group of DIMSEs defined as an IOD combination.

0.3 Acronyms, Abbreviations, and Symbols

- ACR: American College of Radiology
- ACSE: Association Control Service Element
- AE: Application Entity
- ANSI: American National Standards Institute
- AP: Application Profile
- API: Application Programming Interface
- ASCII: American Standard Code for Information Interchange
- CEN TC251: Comité Européen de Normalisation – Technical Committee 251 – Medical Informatics
- DICOM: Digital Imaging and Communications in Medicine
- DIMSE: DICOM Message Service Element
- DIMSE-C: DICOM Message Service Element-Composite
- DIMSE-N: DICOM Message Service Element-Normalized
- FSC: File-set Creator
- FSR: File-set Reader
- FSU: File-set Updater
- HISPP: Healthcare Informatics Standards Planning Panel
- HL7: Health Level 7
- IE: Information Entity
- IEEE: Institute of Electrical and Electronics Engineers
- IOD: Information Object Definition
- ISO: International Standards Organization
- ISP: International Standardized Profile
- JIRA: Japanese Industry Radiology Apparatus
- MSDS: Healthcare Messages Standard Developers Sub-Committee

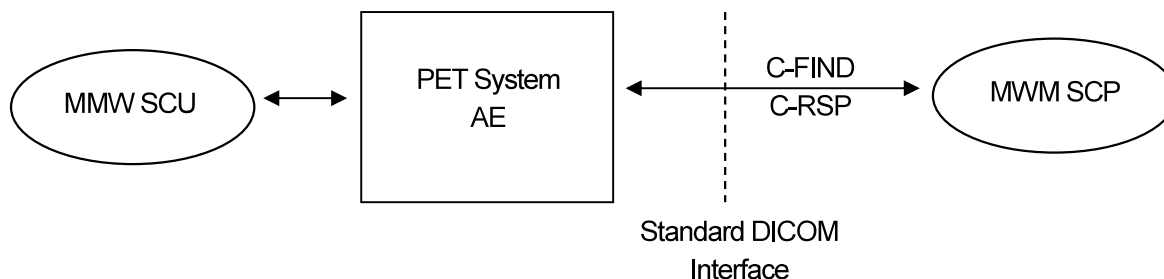
- NEMA: National Electrical Manufacturers Association
- OSI: Open Systems Interconnection
- PDU: Protocol Data Unit
- RWA: Real-World Activity
- SCP: Service Class Provider
- SCU: Service Class User
- SOP: Service-Object Pair
- TCP/IP: Transmission Control Protocol/Internet Protocol
- UID: Unique Identifier

0.4 References

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

1. Implementation Model

1.1 Flowchart of Application Data



1.2 Definition of AE Functions

The PET system AEs support the following DICOM functionality.

- Output requests to establish DICOM associations for MWM SCPs.
- Output MWM SCP search requests based on entered search parameters.
- Receive search results and send received information objects to the PET system patient information entry application.

1.3 Real-World Activity Sequence Control

The PET system AEs do not apply sequence control for real-world activities.

2. AE Specifications

2.1 Specifications

The PET system AEs supply the following DICOM version 3.0 SOP classes as SOP class SCUs.

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

2.1.1 Association Establishment Policy

The PET system AEs try to start an association whenever valid parameters are received.

2.1.1.1 Overview

2.1.1.2 Number of Associations

Only one association is attempted per time.

2.1.1.3 Asynchronous Characteristics

Asynchronous processes are not supported.

2.1.1.4 Implementation Identifying Information

The implementation class UID for the PET system AEs is 1.2.392.200036.9110.

2.1.2 Starting Associations Based on Real-World Activities

The PET system AEs try to start an association for the following activities.

- Patient information inquiries

2.1.2.1 Patient Information Inquiries

2.1.2.1.1 Related Real-World Activities

The PET system AEs send association requests to MWM SCPs and wait to receive acceptance before sending search parameters. Search parameters include patient name, patient ID, accession number, date, and modality.

2.1.2.1.2 Presentation Context

Only the following presentation context is proposed. This presentation context uses the SOP class UID specified in the file header as the proposed abstract syntax and the transfer syntax specified in the file header as the proposed transfer syntax (in this case "DICOM implicit VR").

Presentation Context					
Abstract Syntax		Transfer Syntax		Function	Extended Negotiation
Name	UID	Name List	UID		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit Little Endian	1.2.840.10008.5.1.2	SCU	None

2.1.2.1.3 SOP Class-Specific Conformance

The PET system AEs provides compliance with standards for the Modality Worklist Information Model - FIND function.

Scheduled Procedure Step Sequence

Tag	Attribute Name	VR	Check	Response	Description
(0040,0100)	Scheduled Procedure Step Sequence	SQ	R	1	Sequence is limited to one procedure.
>(0008,0060)	Modality	CS	R	1	
>(0032,1070)	Requested Contrast Agent	LO	O	2C	(Not applicable)
>(0040,0001)	Scheduled Station AE Title	AE	R	1	
>(0040,0002)	Scheduled Procedure Step Start Date	DA	R	1	Checked based on one value. Returned value is displayed on the screen.
>(0040,0003)	Scheduled Procedure Step Start Time	TM	R	1	Returned value is displayed on the screen.
>(0040,0004)	Scheduled Procedure Step End Date	DA	O	3	
>(0040,0005)	Scheduled Procedure Step End Time	TM	O	3	
>(0040,0006)	Scheduled Performing Physician's Name	PN	R	2	
>(0040,0007)	Scheduled Procedure Step Description	LO	O	1C	
>(0040,0008)	Scheduled Protocol Code Sequence	SQ	O	1C	(Not used)
>>(0008,0100)	Code Value		O	1C	(Not applicable)
>>(0008,0102)	Coding Scheme Designator		O	1C	(Not applicable)
>>(0008,0104)	Code Meaning		O	1C	(Not applicable)
>(0040,0009)	Scheduled Procedure Step ID	SH	O	1	
>(0040,0010)	Scheduled Station Name	SH	O	2	
>(0040,0011)	Scheduled Procedure Step Location	SH	O	2	
>(0040,0012)	Pre-Medication	LO	O	2C	
>(0040,0400)	Comments on the Scheduled Procedure Step	LT	O	3	

Requested Procedure Module

Tag	Attribute Name	VR	Check	Response	Description
(0008,1110)	Referenced Study Sequence	SQ	O	2	(Not used)
>(0008,1150)	Referenced SOP Class UID	UI	O	1C	(Not applicable)
>(0008,1155)	Referenced SOP Instance UID	UI	O	1C	(Not applicable)
(0020,000D)	Study Instance UID	UI	O	1	
(0032,1060)	Requested Procedure Description	LO	O	1C	
(0032,1064)	Requested Procedure Code Sequence	SQ	O	1C	(Not used)
>(0008,0100)	Code Value		O	1C	(Not applicable)
>(0008,0102)	Coding Scheme Designator		O	1C	(Not applicable)
>(0008,0104)	Code Meaning		O	1C	(Not applicable)
(0040,1001)	Requested Procedure ID	SH	O	1	
(0040,1002)	Reason for the Requested Procedure	LO	O	3	
(0040,1003)	Requested Procedure Priority	SH	O	2	(Not used)
(0040,1004)	Patient Transport Arrangements	LO	O	2	(Not used)
(0040,1005)	Requested Procedure Location	LO	O	3	(Not used)
(0040,1006)	Placer Order Number/Procedure		O	3	(Not used)
(0040,1007)	Filler Order Number/Procedure		O	3	(Not used)
(0040,1008)	Confidentiality Code	LO	O	3	(Not used)
(0040,1009)	Reporting Priority	SH	O	3	(Not used)
(0040,1010)	Names of Intended Recipients of Results	PN	O	3	(Not used)
(0040,1400)	Requested Procedure Comments	LT	O	3	(Not used)

Imaging Service Request Module

Tag	Attribute Name	VR	Check	Response	Description
(0008,0050)	Accession Number	SH	O	2	Returned value is displayed on the screen.
(0008,0090)	Referring Physician's Name	PN	O	2	
(0032,1032)	Requesting Physician	PN	O	2	
(0032,1033)	Requesting Service	LO	O	3	
(0040,2001)	Reason for the Imaging Service Request	LO	O	3	
(0040,2004)	Issue Date of Imaging Service Request	DA	O	3	(Not used)
(0040,2005)	Issue Time of Imaging Service Request	TM	O	3	(Not used)
(0040,2006)	Placer Order Number/Imaging Service Request	SH	O	3	(Not used)
(0040,2007)	Filler Order Number/Imaging Service Request	SH	O	3	(Not used)
(0040,2008)	Order entered by	PN	O	3	(Not used)
(0040,2009)	Order Enterer's Location	SH	O	3	(Not used)
(0040,2010)	Order Callback Phone Number	SH	O	3	(Not used)
(0040,2400)	Imaging Service Request Comments	LT	O	3	(Not used)

Patient Identification Module

Tag	Attribute Name	VR	Check	Response	Description
(0010,0010)	Patient's Name	PN	R	1	Returned value is displayed on the screen.
(0010,0020)	Patient ID	LO	R	1	Returned value is displayed on the screen.
(0010,0021)	Issuer of Patient ID	LO	O	3	(Not used)
(0010,1000)	Other Patient IDs	LO	O	3	(Not used)
(0010,1001)	Other Patient Names	PN	O	3	(Not used)
(0010,1005)	Patient's Birth Name	PN	O	3	(Not used)
(0010,1060)	Patient's Mother's Birth Name	PN	O	3	(Not used)
(0010,1090)	Medical Record Locator	LO	O	3	(Not used)

Patient Description Module

Tag	Attribute Name	VR	Check	Response	Description
(0010,0030)	Patient's Birth Date	DA	O	2	
(0010,0032)	Patient's Birth Time	TM	O	3	(Not used)
(0010,0040)	Patient's Sex	CS	O	2	
(0010,0050)	Patient's Insurance Plan Code Sequence	SQ	O	3	(Not used)
>(0008,0100)	Code Value		O	1C	(Not applicable)
>(0008,0102)	Coding Scheme Designator		O	1C	(Not applicable)
>(0008,0104)	Code Meaning		O	1C	(Not applicable)
(0010,1010)	Patient's Age	AS	O	3	
(0010,1020)	Patient's Size	DS	O	3	
(0010,1030)	Patient's Weight	DS	O	2	
(0010,1040)	Patient's Address	LO	O	3	
(0010,1080)	Military Rank	LO	O	3	(Not used)
(0010,1081)	Branch of Service	LO	O	3	(Not used)
(0010,2150)	Country of Residence	LO	O	3	(Not used)
(0010,2152)	Region of Residence	LO	O	3	(Not used)
(0010,2154)	Patient's Telephone Numbers	SH	O	3	(Not used)
(0010,2160)	Ethnic Group	SH	O	3	(Not used)
(0010,2180)	Occupation	SH	O	3	(Not used)
(0010,21F0)	Patient's Religious Preference	LO	O	3	(Not used)
(0010,4000)	Patient Comments	LT	O	3	(Not used)
(0040,3001)	Confidentiality Constraint on Patient Data Description	LO	O	2	(Not used)

Patient Medical Module

Tag	Attribute Name	VR	Check	Response	Description
(0010,2000)	Medical Alerts	LO	O	2	
(0010,2110)	Allergies	LO	O	2	(Not applicable)
(0010,21A0)	Smoking Status	CS	O	3	(Not used)
(0010,21B0)	Additional Patient History	LT	O	3	
(0010,21C0)	Pregnancy Status	US	O	2	
(0010,21D0)	Last Menstrual Date	DA	O	3	(Not used)
(0038,0050)	Special Needs	LO	O	2	
(0038,0500)	Patient Status	LO	O	2	

Visit Identification Module

Tag	Attribute Name	VR	Check	Response	Description
(0008,0080)	Institution Name	LO	O	3	
(0008,0081)	Institution Address	ST	O	3	
(0008,0082)	Institution Code Sequence	SQ	O	3	(Not used)
>(0008,0100)	Code Value		O	1C	(Not applicable)
>(0008,0102)	Coding Scheme Designator		O	1C	(Not applicable)
>(0008,0104)	Code Meaning		O	1C	(Not applicable)
(0038,0010)	Admission ID	LO	O	2	
(0038,0011)	Issuer of Admission ID	LO	O	3	

Visit Status Module

Tag	Attribute Name	VR	Check	Response	Description
(0038,0008)	Visit Status ID	CS	O	3	
(0038,0300)	Current Patient Location	LO	O	2	
(0038,0400)	Patient's Institution Residence	LO	O	3	
(0038,4000)	Visit Comments	LT	O	3	

Visit Admission Module

Tag	Attribute Name	VR	Check	Response	Description
(0008,0090)	Referring Physician's Name	PN	O	3	(Not used)
(0008,0092)	Referring Physician's Address	ST	O	3	(Not used)
(0008,0094)	Referring Physician's Telephone Numbers	SH	O	3	(Not used)
(0008,1080)	Admitting Diagnoses Description	LO	O	3	(Not used)
(0008,1084)	Admitting Diagnoses Code Sequence	SQ	O	3	(Not used)
(0038,0016)	Route of Admissions	LO	O	3	(Not used)
(0038,0020)	Admitting Date	DA	O	3	(Not used)
(0038,0021)	Admitting Time	TM	O	3	(Not used)

3. Communication Profiles

3.1 Supported Communication Stacks (Parts 8 and 9)

The system supports DICOM version 3.0 TCP/IP network communications defined in Part 8 of DICOM standards.

3.2 OSI Stacks

Not supported.

3.3 TCP/IP Stacks

Retains TCP/IP stacks from Windows operating system.

3.3.1 API

Not applied.

3.3.2 Physical Media Support

This is independent of physical media supported by TCP/IP. Maintains support of physical media from the Windows operating system where TCP/IP runs.

3.4 Stacks Between Two Points

Not supported.

4. Extension, Specialization, and Personalization

Not applied.

5. Contents

The PET system AEs obtain setting information from a setting file.

5.1 AE Title and Presentation Address Support

Local AEs

- Has the following standard value
Local AE title: SMZ_PT00

Remote AEs

- AE title, port number, and host name can be specified.

5.2 Settable Parameters

Settings can be specified (or changed) for the following parameters.

- Local AE title
- Local IP address
- Local IP netmask

6. Supported Character Set Extensions

No character set extensions are supported.