



CANON DICOM Communication Module

CXDI DMW_PS2

DICOM Conformance Statement

To Customers

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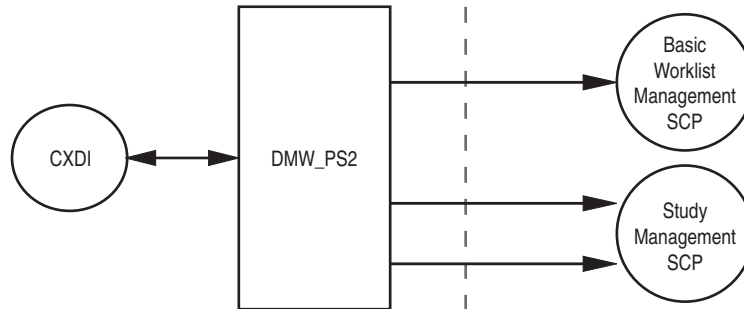
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0. Introduction

This Conformance Statement describes the compliance of the Canon DICOM Communication Module CXDI DMW_PS2 version 4.4 (hereinafter referred to as “DMW_PS2”) of the Canon Digital Radiography CXDI series (hereinafter referred to as “CXDI”) with DICOM V3.0.

1. Implementational Model

1.1 Application Data Flow Diagram



1.2 Functional Definition of AE's

DMW_PS2 operates as part of the CXDI.

DMW_PS2 captures the study data when worklists (study data) are to be captured by sending C-FIND to the Basic Worklist Management Service Class Provider (SCP) and receiving C-FIND from SCP, after which it displays the study data.

DMW_PS2 also sends N-CREATE when a study is being performed, and N-SET when the study has been completed or suspended to the Study Management SCP.

1.3 Sequencing of Real-World Activities

DMW_PS2 sends N-CREATE or N-SET to the Study Management SCP for studies acquired by C-FIND and new studies conducted by CXDI.

2. AE Specifications

2.1 AE Specifications

DMW_PS2 functions as an SCU in the following DICOM V3.0 SOP classes:

SOP Class Name	SOP Class UID	Role
Modality Worklist SOP Class	1.2.840.10008.5.1.4.31	SCU
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	SCU

2.1.1 Association Establishment Policies

2.1.1.1 General

DMW_PS2 generates association establishment requests in the following cases:

- It issues C-FIND when a worklist is obtained.
- It issues N-CREATE when a study is started.
- It issues N-SET when a study is over and the external transfer of the image files has been completed.

The maximum PDU size used depends on the system. The default size is 16K.

2.1.1.2 Number of Associations

DMW_PS2 generates a single association establishment request.

Depending on the progress made by the internal processing, these requests may overlap.

2.1.1.3 Asynchronous Nature

Asynchronous processing is not supported.

2.1.1.4 Implementation Identifying Information

The implementation Class UID and Implementation version name are as follows.

Implementation Class UID: 1.2.392.200046.100.7.2.xxxxx (version no.)

Implementation version name: DMW_PS2xxxxx (version no.)

2.1.2 Association Initiation by Real-World Activity

2.1.2.1 Real-World Activity – Modality Worklist

2.1.2.1.1 Associated Real-World Activity

DMW_PS2 generates an association establishment request in order to issue C-FIND when a study is started.

The study is started by pressing the [PATIENT] button on the CXDI.

2.1.2.1.2 Proposed Presentation Context

The following presentation context is proposed:

Presentation Context Table					
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.1.2.1.3 SOP Specific Conformance Statement for SOP Class

The C-FIND data tags supported by DMW_PS2 are listed below. You can select IHE Setting during installation. However, the tags used for IHE Setting and Default Setting are different.

The VR column shows the data type.

In the SC (Search Condition) column, “O” indicates a tag whose value can be set when DMW_PS2 is installed. “*” indicates a tag whose value can be entered when a search string is input to the CXDI.

In the CS (Change Settings) column, “O” indicates the tag that must be set when DMW_PS2 is installed if the tag is going to be used.

Default Setting

Description/Module	Tag	VR	SC	CS	Remarks
SOP Common					
Specific Character Set	(0008,0005)	CS			
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)	SQ			
> Scheduled Station AE Title	(0040,0001)	AE	O		Single Value matching / Universal matching
> Scheduled Procedure Step Start Date	(0040,0002)	DA	O/*		Single Value matching / Range matching / Universal matching
> Scheduled Procedure Step Start Time	(0040,0003)	TM	O		Range matching / Universal matching
> Modality	(0008,0060)	CS	O		Single Value matching / Universal matching
> Scheduled Performing Physician’s Name	(0040,0006)	PN	O		Single Value matching / Wild card matching
> Scheduled Procedure Step Description	(0040,0007)	LO			
> Scheduled Station Name	(0040,0010)	SH	O		Single Value matching
> Scheduled Procedure Step Location	(0040,0011)	SH	O		Single Value matching
> Scheduled Action Item Code Sequence	(0040,0008)	SQ		O	Usable for receiving/giving body part information
>> Code Value	(0008,0100)	SH		O	
>> Coding Scheme Designer	(0008,0102)	SH		O	
>> Coding Scheme Version	(0008,0103)	SH		O	
>> Code Meaning	(0008,0104)	LO		O	

Description/Module	Tag	VR	SC	CS	Remarks
>> Pre-Medication	(0040,0012)	LO			
> Scheduled Procedure Step ID	(0040,0009)	SH			
> Requested Contrast Medium	(0032,1070)	LO			
Requested Procedure					
Requested Procedure ID	(0040,1001)	SH	*		Single Value matching / Universal matching / Wild Card matching
Requested Procedure Description	(0032,1060)	LO			
Requested Procedure Code Sequence	(0032,1064)	SQ		O	Cannot be used together with Scheduled Action Item Sequence.
> Code Value	(0008,0100)	SH		O	
> Code Scheme Designator	(0008,0102)	SH		O	
> Code Scheme Version	(0008,0103)	SH		O	
> Code Meaning	(0008,0104)	LO		O	
Study Instance UID	(0020,000D)	UI			Generated inside the modality if it is not notified
Reason for the Requested Procedure	(0040,1002)	LO			
Requested Study Sequence	(0008,1110)	SQ			
> Referenced SOP Class UID	(0008,1150)	UI			
> Referenced SOP Instance UID	(0008,1155)	UI			
Image Service Request					
Accession Number	(0008,0050)	SH	*		Single Value matching / Universal matching / Wild Card matching
Requesting Physician	(0032,1032)	PN			
Referring Physician's Name	(0008,0090)	PN			
Requesting Service	(0032,1033)	LO			
Visit Status					
Patient's Institution Residence	(0038,0400)	LO			
Patient Identification					
Patient's Name	(0010,0010)	PN	*		Single Value matching / Universal matching / Wild Card matching
Patient ID	(0010,0020)	LO	*		Single Value matching / Universal matching / Wild Card matching
Patient Demographic					
Patient's Birth Date	(0010,0030)	DA			
Patient's Sex	(0010,0040)	CS			
Patient's Age	(0010,1010)	AS			
Patient's Size	(0010,1020)	DS			
Patient's Weight	(0010,1030)	DS			
Patient Medical					
Pregnancy Status	(0010,21C0)	US			
Medical Alerts	(0010,2000)	LO			
Contrast Allergies	(0010,2110)	LO			
CANON UNIQUE					
Exposure Dose Sequence	(0040,030E)	SQ		O	
> KVp	(0018,0060)	DS		O	
> Exposure Time	(0018,1150)	IS		O	
> X-ray Tube Current in μ A	(0018,8151)	DS		O	

IHE Setting

Description/Module	Tag	VR	SC	CS	Remarks
SOP Common					
Specific Character Set	(0008,0005)	CS			
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)	SQ			
> Scheduled Station AE Title	(0040,0001)	AE	O		Single Value matching / Universal matching
> Scheduled Procedure Step Start Date	(0040,0002)	DA	O/*		Single Value matching / Range matching / Universal matching
> Scheduled Procedure Step Start Time	(0040,0003)	TM	O		Range matching / Universal matching
> Modality	(0008,0060)	CS	O		Single Value matching / Universal matching
> Scheduled Performing Physician's Name	(0040,0006)	PN	O		Single Value matching / Wild card matching
> Scheduled Procedure Step Description	(0040,0007)	LO			
> Scheduled Station Name	(0040,0010)	SH	O		Single Value matching
> Scheduled Procedure Step Location	(0040,0011)	SH	O		Single Value matching
> Scheduled Action Item Code Sequence	(0040,0008)	SQ		O	Usable for receiving/giving body part information
>> Code Value	(0008,0100)	SH		O	
>> Coding Scheme Designer	(0008,0102)	SH		O	
>> Coding Scheme Version	(0008,0103)	SH		O	
>> Code Meaning	(0008,0104)	LO		O	
>> Pre-Medication	(0040,0012)	LO			
> Scheduled Procedure Step ID	(0040,0009)	SH			
> Requested Contrast Medium	(0032,1070)	LO			
Requested Procedure					
Requested Procedure ID	(0040,1001)	SH	*		Single Value matching / Universal matching/Wild Card matching
Requested Procedure Description	(0032,1060)	LO			
Requested Procedure Code Sequence	(0032,1064)	SQ		O	Cannot be used together with Scheduled Action Item Sequence.
> Code Value	(0008,0100)	SH		O	
> Code Scheme Designator	(0008,0102)	SH		O	
> Code Scheme Version	(0008,0103)	SH		O	
> Code Meaning	(0008,0104)	LO		O	
Study Instance UID	(0020,000D)	UI			Generated inside the modality if it is not notified
Reason for the Requested Procedure	(0040,1002)	LO			
Requested Study Sequence	(0008,1110)	SQ			
> Referenced SOP Class UID	(0008,1150)	UI			
> Referenced SOP Instance UID	(0008,1155)	UI			
Image Service Request					
Accession Number	(0008,0050)	SH	*		Single Value matching / Universal matching / Wild Card matching
Requesting Physician	(0032,1032)	PN			
Referring Physician's Name	(0008,0090)	PN			
Requesting Service	(0032,1033)	LO			
Visit Status					
Patient's Institution Residence	(0038,0400)	LO			
Patient Identification					

Description/Module	Tag	VR	SC	CS	Remarks
Patient's Name	(0010,0010)	PN	*		Single Value matching / Universal matching / Wild Card matching
Patient ID	(0010,0020)	LO	*		Single Value matching / Universal matching / Wild Card matching
Patient Demographic					
Patient's Birth Date	(0010,0030)	DA			
Patient's Sex	(0010,0040)	CS			
Patient's Age	(0010,1010)	AS			
Patient's Size	(0010,1020)	DS			
Patient's Weight	(0010,1030)	DS			
Patient Medical					
Pregnancy Status	(0010,21C0)	US			
Medical Alerts	(0010,2000)	LO			
Contrast Allergies	(0010,2110)	LO			
CANON UNIQUE					
Exposure Dose Sequence	(0040,030E)	SQ		O	
> KVP	(0018,0060)	DS		O	
> Exposure Time	(0018,1150)	IS		O	
> X-ray Tube Current in μ A	(0018,8151)	DS		O	

2.1.2.2 Real-World Activity - Modality Performed Procedure Step

2.1.2.2.1 Associated Real-World Activity

DMW_PS2 generates an association establishment request in order to issue N-CREATE when the study to be performed has been selected.

It also generates an association establishment request in order to issue N-SET when the study is ended, or the external transfer of the image files has been completed.

The study is over by pressing the [END STUDY] button on the CXDI.

When the [END STUDY] button is pressed, the image processing and image transfer processing are commenced.

2.1.2.2.2 Proposed Presentation Context

The following presentation context is proposed:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.1.2.2.3 SOP Specific Conformance Statement for SOP Class

The N-CREATE data tags supported by DMW_PS2 are listed below. You can select IHE Setting during installation. However, the tags used for IHE Setting and Default Setting are different.

The VR column shows the data type.

In the N-SET column, “O” indicates a tag that sets the value when N-SET is issued.

In the CS (Change Settings) column, “O” indicates the tag that must be set when DMW_PS2 is installed if the tag is going to be used by N-SET.

Default Setting

Description/Module	Tag	VR	N-SET	CS	Remarks
SOP Common					
Specific Character Set	(0008,0005)	CS			
Performed Procedure Step Relationship					
Scheduled Step Attribute Sequence	(0040,0270)	SQ	O	O	
> Study Instance UID	(0020,000D)	UI	O	O	Same values as those in the study obtained
> Referenced Study Sequence	(0008,1110)	SQ			
>> Referenced SOP Class UID	(0008,1150)	UI			
>> Referenced SOP Instance UID	(0008,1155)	UI			
> Accession Number	(0008,0050)	SH			Same values as those in the study obtained
> Requested Procedure ID	(0040,1001)	SH			
> Requested Procedure Description	(0032,1060)	LO			
> Scheduled Procedure Step ID	(0040,0009)	SH			
> Scheduled Procedure Step Description	(0040,0007)	LO			
> Scheduled Action Item Code Sequence	(0040,0008)	SQ			
>> Code Value	(0008,0100)	SH			
>> Coding Scheme Designator	(0008,0102)	SH			
>> Code Scheme Version	(0008,0103)	SH			
>> Code Meaning	(0008,0104)	LO			

Description/Module	Tag	VR	N-SET	CS	Remarks
Patient's Name	(0010,0010)	PN			Same values as those in the study obtained
Patient ID	(0010,0020)	LO			
Patient's Birth Date	(0010,0030)	DA			
Patient's Sex	(0010,0040)	CS			
Referenced Patient Sequence	(0008,1120)	SQ			
Performed Procedure Step Information					
Performed Procedure Step ID	(0040,0253)	CS			
Performed Station AE Title	(0040,0241)	AE			Default is "CANON_CCR"
Performed Station Name	(0040,0242)	SH			
Performed Location	(0040,0243)	SH			
Performed Procedure Step Start Date	(0040,0244)	DA			
Performed Procedure Step Start Time	(0040,0245)	TM			
Performed Procedure Step Status	(0040,0252)	CS	O		
Performed Procedure Step Description	(0040,0254)	LO	O		
Performed Procedure Type Description	(0040,0255)	LO	O		
Procedure Code Sequence	(0008,1032)	SQ			
Performed Procedure Step End Date	(0040,0250)	DA	O		
Performed Procedure Step End Time	(0040,0251)	TM	O		
Image Acquisition Results					
Modality	(0008,0060)	CS			Default is "CR"
Study ID	(0020,0010)	SH			
Performed Action Item Sequence	(0040,0260)	SQ	O		
> Code Value	(0008,0100)	SH	O		
> Coding Scheme Designer	(0008,0102)	SH	O		
> Code Scheme Version	(0008,0103)	SH	O		
> Code Meaning	(0008,0104)	LO	O		
Performed Series Sequence	(0040,0340)	SQ	O		
> Performing Physician's Name	(0008,1050)	PN	O		
> Protocol Name	(0018,1030)	LO	O		
> Operator's Name	(0008,1070)	PN	O		
> Series Instance UID	(0020,000E)	UI	O		
> Series Description	(0008,103E)	LO	O		
> Retrieve AE Title	(0008,0054)	AE	O		
> Reference Image Sequence	(0008,1140)	SQ	O		
>> Reference SOP Class UID	(0008,1150)	UI	O		
>> Reference SOP Instance UID	(0008,1155)	UI	O		
> Referenced Standalone SOP Instance Sequence	(0040,0220)	SQ	O		
Billing and Material Management Code					
Film Consumption Sequence	(0040,0321)	SQ	O		Number of films is set for each size of film
> Number of Films	(2100,0170)	IS	O		When not printing, tag is not output.
> Film Size ID	(2010,0050)	CS	O		
Radiation Dose					
Total Number of Exposures	(0040,0301)	US	O	O	Optional
Exposure Dose Sequence	(0040,030E)	SQ	O	O	
> KVp	(0018,0060)	DS	O	O	
> Exposure Time	(0018,1150)	IS	O	O	
> X-ray Tube Current	(0018,1151)	IS	O	O	Either one can be set Default is (0018,8151).
> X-ray Tube Current in μ A	(0018,8151)	DS	O	O	
> Radiation Mode	(0018,115A)	CS	O	O	
> Filter Type	(0018,1160)	SH	O	O	
> Filter Material	(0018,7050)	LT	O	O	
Entrance Dose	(0040,0302)	US	O		
Image Area Dose Product	(0018,115E)	DS	O		

IHE Setting

Description/Module	Tag	VR	N-SET	CS	Remarks
SOP Common					
Specific Character Set	(0008,0005)	CS			
Performed Procedure Step Relationship					
Scheduled Step Attribute Sequence	(0040,0270)	SQ	O	O	Same values as those in the study obtained
> Study Instance UID	(0020,000D)	UI	O	O	
> Referenced Study Sequence	(0008,1110)	SQ			
> Accession Number	(0008,0050)	SH			
> Requested Procedure ID	(0040,1001)	SH			
> Requested Procedure Description	(0032,1060)	LO			
> Scheduled Procedure Step ID	(0040,0009)	SH			
> Scheduled Procedure Step Description	(0040,0007)	LO			
> Scheduled Action Item Code Sequence	(0040,0008)	SQ			
>> Code Value	(0008,0100)	SH			
>> Coding Scheme Designer	(0008,0102)	SH			
>> Coding Scheme Version	(0008,0103)	SH			
>> Code Meaning	(0008,0104)	LO			
Patient's Name	(0010,0010)	PN			
Patient ID	(0010,0020)	LO			
Patient's Birth Date	(0010,0030)	DA			
Patient's Sex	(0010,0040)	CS			
Referenced Patient Sequence	(0008,1120)	SQ			
Performed Procedure Step Information					
Performed Procedure Step ID	(0040,0253)	CS			
Performed Station AE Title	(0040,0241)	AE			Default is "CANON_CCR"
Performed Station Name	(0040,0242)	SH			
Performed Location	(0040,0243)	SH			
Performed Procedure Step Start Date	(0040,0244)	DA			
Performed Procedure Step Start Time	(0040,0245)	TM			
Performed Procedure Step Status	(0040,0252)	CS	O		
Performed Procedure Step Description	(0040,0254)	LO	O		
Performed Procedure Type Description	(0040,0255)	LO	O		
Procedure Code Sequence	(0008,1032)	SQ	O		
> Code Value	(0008,0100)	SH	O		
> Coding Scheme Designer	(0008,0102)	SH	O		
> Coding Scheme Version	(0008,0103)	SH	O		
> Code Meaning	(0008,0104)	LO	O		
Performed Procedure Step End Date	(0040,0250)	DA	O		
Performed Procedure Step End Time	(0040,0251)	TM	O		
Image Acquisition Results					
Modality	(0008,0060)	CS			Default is "CR"
Study ID	(0020,0010)	SH			
Performed Action Item Sequence	(0040,0260)	SQ	O		
> Code Value	(0008,0100)	SH	O		
> Coding Scheme Designer	(0008,0102)	SH	O		
> Coding Scheme Version	(0008,0103)	SH	O		
> Code Meaning	(0008,0104)	LO	O		
Performed Series Sequence	(0040,0340)	SQ	O		
> Performing Physician's Name	(0008,1050)	PN	O		
> Protocol Name	(0018,1030)	LO	O		
> Operator's Name	(0008,1070)	PN	O		
> Series Instance UID	(0020,000E)	UI	O		
> Series Description	(0008,103E)	LO	O		
> Retrieve AE Title	(0008,0054)	AE	O		

Description/Module	Tag	VR	N-SET	CS	Remarks
> Reference Image Sequence	(0008,1140)	SQ	O		
>> Reference SOP Class UID	(0008,1150)	UI	O		
>> Reference SOP Instance UID	(0008,1155)	UI	O		
> Referenced Standalone SOP Instance Sequence	(0040,0220)	SQ	O		
Billing and Material Management Code					
Film Consumption Sequence	(0040,0321)	SQ	O		Number of films is set for each size of film
> Number of Films	(2100,0170)	IS	O		When not printing, tag is not output.
> Film Size ID	(2010,0050)	CS	O		
Radiation Dose					
Total Number of Exposures	(0040,0301)	US	O	O	Optional
Exposure Dose Sequence	(0040,030E)	SQ	O	O	
> KVP	(0018,0060)	DS	O	O	
> Exposure Time	(0018,1150)	IS	O	O	
> X-ray Tube Current	(0018,1151)	IS	O	O	Either one can be set Default is (0018,8151).
> X-ray Tube Current in μ A	(0018,8151)	DS	O	O	
> Radiation Mode	(0018,115A)	CS	O	O	
> Filter Type	(0018,1160)	SH	O	O	
> Filter Material	(0018,7050)	LT	O	O	
Entrance Dose	(0040,0302)	US	O		
Image Area Dose Product	(0018,115E)	DS	O		

2.1.3 Association Acceptance Policy

DMW_PS2 operates only as an SCU and does not accept associations.

3. Communication Profiles

3.1 Supported Communication Stack

DMW_PS2 supports DICOM V3.0 TCP/IP network communication.

3.2 TCP/IP Stack

DMW_PS2 inherits the TCP/IP stack.

3.3 Physical Media Support

It depends on the environment in which DMW_PS2 is installed.

3.4 The Basic TLS Secure Transport Profile

To use DICOM secure communication, the Application Entities support the Basic TLS Secure Transport Profile. IP ports on which the profiles use TLS connections are configurable by the CXDI application user.

Supported TLS Feature	Minimum Mechanism
Entity Authentication	RSA based certificates
Exchange of Master Secrets	RSA
Data Integrity	SHA
Privacy	Triple DES EDE, CBC, AES-128

Three cipher suite options are offered during TLS negotiation by the CXDI application that comply with this profile:

TLS_RSA_WITH_AES_128_CBC_SHA

TLS_RSA_WITH_3DES_EDE_CBC_SHA

TLS_RSA_WITH_NULL_SHA

When an integrity check fails, the connection is dropped and an A-P-ABORT indication to the DICOM upper layer is issued. The provider reason on the DICOM is 0 (NO_REASON), see syslog file.

3.4.1 Key Management

Keys and Certificates are provided by the person who manages the network infrastructure or service persons, and are available in file. Their format is based on X.509 DER (Distinguished Encoding Rule). And, private keys may be stored in encrypted with pass-phrase.

The validation process attempts to check a certification chain up to the self-signed root certificate authority (CA) certificate in srv-certs folder in the CXDI application-working folder.

4. Extension / Specialization / Privatization

The Exposure Dose Sequence can be set in C-Find.

5. Configuration

DMW_PS2 is set by the “CHMWM.INI” setting file.

The AE title / host name / port number of the SCPs (Basic Worklist Management SCP and Study Management SCP) can be set separately.

Sending to Study Management SCP can be disabled.

6. Support of Extended Character Sets

DMW_PS2 supports the following extended character set.

Character Set Description	Defined Term
Default repertoire	(None)
	ISO 2002 IR 6
Japanese	ISO_IR 13
	ISO 2022 IR 13
	ISO 2022 IR 87
Latin alphabet No.1	ISO_IR 100
Latin alphabet No.2	ISO_IR 101
Latin alphabet No.3	ISO_IR 109
Latin alphabet No.4	ISO_IR 110
Greek	ISO_IR 126
Arabic	ISO_IR 127
Hebrew	ISO_IR 138
Cyrillic	ISO_IR 144
Latin alphabet No.5	ISO_IR 148
GB18030	GB18030

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