

DICOM Conformance Statement for bdDICOM

Company Name: Hitachi, Ltd.

Product Name: DXA Bone Densitometer: DCS series,
Ultrasound Bone Densitometry System: AOS series

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Revision History

Date	Revision	Revision Description
2002/10/14	1.00	Release first edition
2005/03/18	1.02	<ul style="list-style-type: none"> - MPPS support - Deleted "available for Secondary Capture Image IOD" from Requesting Physician (0032,1032) of Modality Worklist.
2006/01/20	1.03	Words unification (Specific Character Set to Extended Character Set)
2011/01/20	1.10	<ul style="list-style-type: none"> - Series Instance UID (0020,000E) was changed from "1.2.392.200039.301.v.u.12.x.y" to "1.2.392.200039.301.v.u.12.x.1y". - SOP Instance UID (0008,0018) was changed from "1.2.392.200039.301.v.u.10.x.y" to "1.2.392.200039.301.v.u.10.x.1y".
2011/04/15	1.10	Company name was changed
2013/10/24	1.11	Company name of the Manufacturer (0008,0070) tag was changed.
2014/10/08	2.00	<ul style="list-style-type: none"> - Implementation Version Name was changed from "bdDICOM20050318" to "ADLib 20070220". - A support object of the Abstract Syntax was changed only to little endian. - Modality was changed from common modality "OT" to each model's modality. - The VR of the Pixel Data (7FE0,0010) was used only "OW". - Patient Orientation (0020,0020) was changed from "Not Used" to "NULL". - Implementation Class UID was changed from common UID to each model's UID. - Usage of Clinical Trial Subject, Clinical Trial Study, Clinical Trial Series, Device, Specimen, and ICC Profile were added to Table 2.1.2.4.2-1 (Usage of Image IOD Module). - Handling of the Patient Comments (0010,4000) was changed. - Handling of the Study Description (0008,1030) was changed. - Handling of the Laterality (0020,0060) was changed. - About "Series Instance UID (0020,000E)" and "SOP Instance UID (0008,0018)", the following contents were changed. <ul style="list-style-type: none"> - "301" was changed to "obj". - Deleted "1" before the "y". - ISO_IR 100 was added to Supported Extended Character Set.
2016/04/01	2.00	Company name was changed

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0. Introduction

This document is a conformance statement that ensures the subprogram (bdDICOM) installed in the personal computer to control the bone densitometer conforms to DICOM, the international standard for the exchange of digital medical image data.

bdDICOM supports the following SOP classes as SCU (Service Class User) in a network environment.

- Verification (C-ECHO)
- Secondary Capture Image Storage (C-STORE)
- Modality Worklist Information Model – FIND (MWM)
- Modality Performed Procedure Step (MPPS)

1. Implementation Model

The bdDICOM AE stores the Secondary Capture Image Information Object to an external Storage Service Class Provider (SCP) over the Ethernet cable connected between them. Secondary Capture Image may be represented in RGB photometric interpretation.

When the bdDICOM AE acts as a Modality Worklist SCU, the peer server may be implemented as a stand-alone worklist server or as a storage-worklist composite server. Parts of patient and study information obtained from the Modality Worklist server is automatically integrated in the Image IODs.

1.1. Application Data Flow Diagram

The application data flow diagram of bdDICOM AE is shown in the Figure 1.1-1.

As described in the DICOM Conformance Statement part, the AEs are placed in boxes, the Real-world Activities performed by the user are circled to the left of the AEs. The Real-world Activities performed by the external devices are circled to the right. The vertical dashed line indicates the DICOM Standard Interface between the bdDICOM and the external devices.

When a user requests patient information of bdDICOM, the bdDICOM AE initiates an association with the Modality Worklist SCP (including Modality Performed Procedure Step SCP). When an association is established, bdDICOM AE issues a C-FIND request command to SCP to receive comparison results from SCP.

When the user requests storage to the storage server on the network, the bdDICOM AE initiates an association to the server. If the storage SCP supports the Secondary Capture Image IODs, the bdDICOM AE sends the instances of Secondary Capture Image IODs.

The association is successfully closed if the peer server responds, or is terminated if the communication fails.

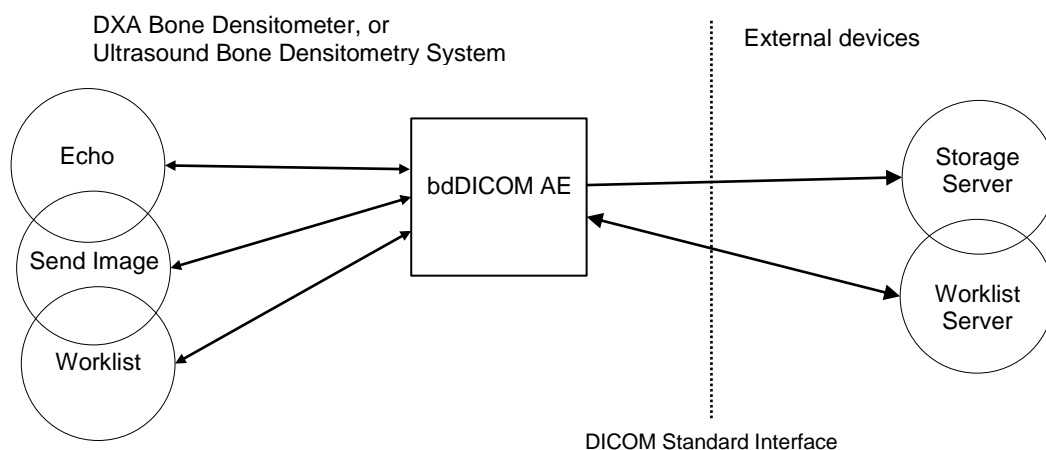


Figure 1.1-1. Data Flow Diagram

Functional Definition of bdDICOM AE's

bdDICOM AE : Performs the Secondary Capture Image Storage SOP Class, Modality Worklist SOP Class, Modality Performed Procedure Step SOP Class, and Verification SOP Class as an SCU.

2.AE Specifications

2.1. bdDICOM AE Specifications

The bdDICOM AE conforms to the Secondary Capture Image Storage SOP Class, the Modality Worklist SOP Class, Modality Performed Procedure Step SOP Class, and the Verification SOP Class listed below as an SCU.

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

2.1.1. Association establishment Policies

Modality Worklist: When a user accesses the information reception function of the bone densitometer (assessment), bdDICOM initiates an association with the preset Modality Worklist SCP. If SCP accepts the association, bdDICOM issues a C-FIND command with the matching key that is the Patient ID.

Secondary Capture Image Storage: When a user accesses the result transmission function of the bone densitometer (assessment), bdDICOM initiates an association with the preset Secondary Capture Image Storage SCP. If SCP accepts the association, bdDICOM transmits the Secondary Capture Image Information Object to SCP.

Modality Performed Procedure Step: When a user operates the bone densitometer (assessment), bdDICOM initiates an association with the preset Modality Performed Procedure Step SCP. If the SCP accepts the association, bdDICOM transmits the N-CREATE and N-SET commands to notify the start and end of the examination.

2.1.1.1.General

The maximum PDU size is 16,384 bytes. The bdDICOM AE does not have extended negotiation.

2.1.1.2. Number of Associations

The bdDICOM AE supports only one association at a time.

2.1.1.3. Asynchronous Nature

The bdDICOM AE does not support asynchronous communication.

2.1.1.4. Implementation Identifying Information, and File Meta Information

The following identification value is used as Implementation Class UID and File Meta-information:

- DCS-600EXV: 1.2.392.200039.302
- AOS-100SA : 1.2.392.200039.308
- DCS-900FX: 1.2.392.200039.309
- AOS-100E: 1.2.392.200039.310

The following Implementation Version Name is used as an initial value:

- ADLib 20070220

2.1.2. Client Activity – bdDICOM AE

2.1.2.1. Proposed Presentation Context

The bdDICOM AE presents the Presentation Context listed in Table 2.1.2.1-1. A Presentation Context consists of the SOP Class UIDs and sets of the Transfer Syntax UIDs.

Table 2.1.2.1-1. Presentation Context

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name List	Transfer Syntax UID List	Role	Extended Negotiation
Verification	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		
Secondary Capture image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
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		
Modality Performed Procedure Step	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		

2.1.2.2. Client Activity – Verification SOP

2.1.2.2.1. Specific DICOM Conformance Statement for Verification SOP Class

The bdDICOM AE conforms to the standard Verification SOP Class as an SCU.

2.1.2.3. Client Activity – Modality Worklist SOP

The Modality Worklist SOP is used to retrieve a list of patients and related study directions scheduled for the modality from the Information System (IS).

2.1.2.3.1. Associated Real-World Activity

When the user presses the Receive information button in the examination information (Subject Info) entry screen of the bone densitometer (assessment), bdDICOM starts the examination. The range of the search is limited by the examination start date derived from the dates in the bone densitometer (assessment) and the Patient ID (ID No.) entered by the user.

bdDICOM acquires the search result from the patient list display. When the user selects an examination from the patient list display, bdDICOM reflects this information in the examination information (Subject Info).

Operation details depend on instrument type.

2.1.2.3.2. Specific DICOM Conformance Statement for Modality Worklist SOP Class

Table 2.1.2.3.2-1 lists the modules comprising the Modality Worklist IODs and their status in the implementation.

Table 2.1.2.3.2-1. Modality Worklist Information Object Model

Module Name	Matching Key Type	Returned Key Type	Usage
SOP Common	O	1C	Used
Scheduled Procedure Step	R	1	Used
Requested Procedure	O	1	Used
Imaging Service Request	O	2	Used
Patient Relationship	O	3	Not used
Patient Identification	R	1	Used
Patient Demographic	O	2	Used
Patient Medical	O	2	Not used
Visit Identification	O	2	Not used
Visit Status	O	2	Not used
Visit Relationship	O	2	Not used
Visit Admission	O	3	Not used

2.1.2.3.2.1.SOP Common Module

Table 2.1.2.3.2.1-1. SOP Common Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0008,0005)	Specific Character Set	CS	O	1C	Used
(0008,0012)	Instance Creation Date	DA	O	3	Not used
(0008,0013)	Instance Creation Time	TM	O	3	Not used
(0008,0014)	Instance Creator UID	UI	O	3	Not used
(0008,0016)	SOP Class UID	UI	O	3	Not used
(0008,0018)	SOP Instance UID	UI	O	3	Not used

2.1.2.3.2.2. Scheduled Procedure Step Module

Table 2.1.2.3.2.2-1. Scheduled Procedure Step Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0040,0100)	Scheduled Procedure Step Sequence	SQ	R	1	The sequence shall contain Only one Item.
(0008,0060)	> Modality	CS	R	1	DCS series: Requested with "BMD" or "OT". AOS series: Requested with "BDUS" or "OT".
(0032,1070)	> Requested Contrast Agent	LO	O	2C	Not used
(0040,0001)	> Scheduled Station AE Title	AE	R	1	Requested with STORE's AE Title of SCU.
(0040,0002)	> Scheduled Procedure Step Start Date	DA	R	1	Requested with the current Date.
(0040,0003)	> Scheduled Procedure Step Start Time	TM	R	1	Requested with NULL string.
(0040,0004)	> Scheduled Procedure Step End Date	DA	O	3	Not used
(0040,0005)	> Scheduled Procedure Step End Time	TM	O	3	Not used
(0040,0006)	> Scheduled Performing Physician's Name	PN	R	2	Requested with NULL string.
(0040,0007)	> Scheduled Procedure Step Description	LO	O	1C	Requested with NULL string.
(0040,0008)	> Scheduled Protocol Code Sequence	SQ	O	1C	NA
(0008,0100)	>> Code Value	SH	O	1C	NA
(0008,0102)	>> Coding Scheme Designator	SH	O	1C	NA
(0008,0103)	>> Coding Scheme Version	SH	O	3	NA
(0008,0104)	>> Code Meaning	LO	O	3	NA
(0040,0009)	> Scheduled Procedure Step ID	SH	O	1	Requested with NULL string.
(0040,0010)	> Scheduled Station Name	SH	O	2	Not used
(0040,0011)	> Scheduled Procedure Step Location	SH	O	2	Not used
(0040,0012)	> Pre-Medication	LO	O	2C	Not used
(0040,0020)	> Scheduled Procedure Step Status	CS	O	3	Not used
(0040,0400)	> Comments on the Scheduled Procedure Step	LT	O	3	Not used

2.1.2.3.2.3. Requested Procedure Module

A Modality Worklist SCP is expected to return the Study Instance UID which is common to the examinations performed by separate modalities.

Table 2.1.2.3.2.3-1. Requested Procedure Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0008,1110)	Referenced Study Sequence	SQ	O	2	Not used
(0008,1150)	> Referenced SOP Class UID	UI	O	1C	NA
(0008,1155)	> Referenced SOP Instance UID	UI	O	1C	NA
(0020,000D)	Study Instance UID	UI	O	1	Requested with NULL string. Used in Secondary Capture Image IODs.
(0032,1060)	Requested Procedure Description	LO	O	1C	Not used
(0032,1064)	Requested Procedure Code Sequence	SQ	O	1C	Not used
(0008,0100)	> Code Value	SH	O	1C	NA
(0008,0102)	> Coding Scheme Designator	SH	O	1C	NA
(0008,0103)	> Coding Scheme Version	SH	O	3	NA
(0008,0104)	> Code Meaning	LO	O	3	NA
(0040,1001)	Requested Procedure ID	SH	O	1	Not used
(0040,1002)	Reason for the Requested Procedure	LO	O	3	Not used
(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
(0040,1008)	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

2.1.2.3.2.4. Imaging Service Request Module

A Modality Worklist SCP is expected to return the Accession Number which is common to the examinations performed by separate modalities. Uses values generated by Modality when the Modality Worklist SCP does not generate Accession Numbers or the Accession Number is a Null string.

Table 2.1.2.3.2.4-1. Imaging Service Request Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0008,0050)	Accession Number	SH	O	2	Requested with NULL string. Available to Secondary Capture Image IODs.
(0008,0090)	Referring Physician's Name	PN	O	2	Requested with NULL string. Available to Secondary Capture Image IODs.
(0032,1032)	Requesting Physician	PN	O	2	Requested with NULL string.
(0032,1033)	Requesting Service	LO	O	3	Not used
(0040,2001)	Reason for the Imaging Service Request	LO	O	3	Not used
(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
(0040,2008)	Order Entered By	PN	O	3	Not used
(0040,2009)	Order Enterers Location	SH	O	3	Not used
(0040,2010)	Order Callback Phone Number	SH	O	3	Not used
(0040,2016)	Placer Order Number/Imaging Service Request	LO	O	3	Not used
(0040,2017)	Filler Order Number/Imaging Service Request	LO	O	3	Not used
(0040,2400)	Imaging Service Request Comments	LT	O	3	Not used

2.1.2.3.2.5. Patient Identification Module

"Find" can be started in the Modality Worklist after entering the Patient ID in the NEW STUDY screen. Placing "*" after the Patient ID will result in a wild card search.

Table 2.1.2.3.2.5-1. Patient Identification Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0010,0010)	Patient's Name	PN	R	1	Requested with NULL string. The return value is used in Secondary Capture Image IODs.
(0010,0020)	Patient ID	LO	R	1	Requested with NULL, wildcard or single value matching. The return value is used in Secondary Capture Image IODs.
(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

2.1.2.3.2.6. Patient Demographic Module

Table 2.1.2.3.2.6-1. Patient Demographic Module Attribute

Tag	Attribute Name	VR	Matching Key Type	Returned Key Type	Description
(0010,0030)	Patient's Birth Date	DA	O	2	Requested with NULL string. Used in Secondary Capture Image IODs.
(0010,0032)	Patient's Birth Time	TM	O	3	Not used
(0010,0040)	Patient's Sex	CS	O	2	Requested with NULL string. Used in Secondary Capture Image IODs.
(0010,0050)	Patient's Insurance Plan Code Sequence	SQ	O	3	Not used
> Include "Code Sequence Macro"					NA
(0010,1010)	Patient's Age	AS	O	3	Requested with NULL string. Used in Secondary Capture Image IODs.
(0010,1020)	Patient's Size	DS	O	3	Requested with NULL string. Used in Secondary Capture Image IODs.
(0010,1030)	Patient's Weight	DS	O	2	Requested with NULL string. Used in Secondary Capture Image IODs.
(0010,1040)	Patient's Address	LO	O	3	Not used
(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

2.1.2.4. Client Activity – Secondary Capture image Storage SOP

2.1.2.4.1. Associated Real-World Activity

When the user presses the Send button in the Analysis Results screen of the bone densitometer (assessment), the bdDICOM sends the screen (window) to SCP as a Secondary Capture Image Information Object.

Operation details depend on instrument type.

2.1.2.4.2. Specific DICOM Conformance Statement for Secondary Capture image Storage SOP Class

Table 2.1.2.4.2-1 identifies the defined modules used in Secondary Capture Image IODs.

Table 2.1.2.4.2-1. Usage of Image IOD Module

IOD Modules	Secondary Capture Image IOD	Usage
Patient	Required	Used
Clinical Trial Subject	Option	Not used
General Study	Required	Used
Patient Study	Option	Used
Clinical Trial Study	Option	Not used
General Series	Required	Used
Clinical Trial Series	Option	Not used
General Equipment	Option	Used
Secondary Capture Equipment	Required	Used
General Image	Required	Used
Image Pixel	Required	Used
Device	Option	Not used
Specimen	Option	Not used
Secondary Capture Image	Required	Used
Overlay Plane	Option	Not used
Modality LUT	Option	Not used
VOI LUT	Option	Not used
ICC Profile	Option	Not used
SOP Common	Required	Used

2.1.2.4.2.1. Patient IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,1120)	Referenced Patient Sequence	SQ	3	Not used
(0010,0010)	Patient's Name	PN	2	Patient names and titles.
(0010,0020)	Patient ID	LO	2	Forced to use.
(0010,0030)	Patient's Birth Date	DA	2	Date of birth. *1)
(0010,0032)	Patient's Birth Time	TM	3	Not used
(0010,0040)	Patient's Sex	CS	2	"M" = Male, "F" = Female, "O" = Other
(0010,1000)	Other Patient IDs	LO	3	Not used
(0010,1001)	Other Patient Names	PN	3	Not used
(0010,2160)	Ethnic Group	SH	3	Not used
(0010,4000)	Patient Comments	LT	3	Comment

*1) Any data already acquired from the Modality Worklist SCP is used. Otherwise, data entered by the user or a Null string is used.

2.1.2.4.2.2. General Study IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0020)	Study Date	DA	2	Date of new study.
(0008,0030)	Study Time	TM	2	Time of new study.
(0008,0050)	Accession Number	SH	2	*1)
(0008,0090)	Referring Physician's Name	PN	2	*1)
(0008,1030)	Study Description	LO	3	Body part which was studied.
(0008,1060)	Name of Physician(s) Reading Study	PN	3	Not used
(0008,1110)	Referenced Study Sequence	SQ	3	Not used
(0020,000D)	Study Instance UID	UI	1	Given to the study. *1)
(0020,0010)	Study ID	SH	2	*1)
(0008,1032)	Procedure Code Sequence	SQ	3	Not used
(0008,1048)	Physician(s) of Record	PN	3	Not used

*1) Any data already acquired from the Modality Worklist SCP is used. Otherwise, data entered by the user or a Null string is used.

2.1.2.4.2.3. Patient Study IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,1080)	Admitting Diagnoses Description	LO	3	Not used
(0008,1084)	Admitting Diagnosis Code Sequence	SQ	3	Not used
(0010,1010)	Patient's Age	AS	3	Calculated if birth date given. *1)
(0010,1020)	Patient's Size	DS	3	Unit: m (meter) *1)
(0010,1030)	Patient's Weight	DS	3	Unit: Kg (kilogram) *1)
(0010,2180)	Occupation	SH	3	Not used
(0010,21B0)	Additional Patient's History	LT	3	Not used

*1) Any data already acquired from the Modality Worklist SCP is used. Otherwise, data entered by the user or a Null string is used.

2.1.2.4.2.4. General Series IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0021)	Series Date	DA	3	Not used
(0008,0031)	Series Time	TM	3	Not used
(0008,0060)	Modality	CS	1	DCS series: Requested with "BMD" or "OT". AOS series: Requested with "BDUS" or "OT".
(0008,103E)	Series Description	LO	3	Not used
(0008,1050)	Performing Physician's Name	PN	3	Not used
(0008,1070)	Operators' Name	PN	3	Not used
(0008,1111)	Referenced Performed Procedure Step Sequence	SQ	3	Not used
(0018,0015)	Body Part Examined	CS	3	NA
(0018,1030)	Protocol Name	LO	3	NA
(0018,5100)	Patient Position	CS	2C	NA
(0020,000E)	Series Instance UID	UI	1	Unique to series. 1.2.392.200039.obj.v.u.12.x.y
(0020,0011)	Series Number	IS	2	"1"
(0020,0060)	Laterality	CS	2C	"L" = Left, "R" = Right
(0028,0108)	Smallest Pixel Value in Series	US	3	Not used
(0028,0109)	Largest Pixel Value in Series	US	3	Not used
(0040,0244)	Performed Procedure Step Start Date	DA	3	Examination date.
(0040,0245)	Performed Procedure Step Start Time	TM	3	Examination time.
(0040,0253)	Performed Procedure Step ID	SH	3	"yyyymmddHHMMSS"
(0040,0254)	Performed Procedure Step Description	LO	3	Not used
(0040,0260)	Performed Protocol Code Sequence	SQ	3	NA
(0040,0275)	Request Attributes Sequence	SQ	3	Not used
(0040,0280)	Comments on the Performed Procedure	ST	3	Not used

Tag	Attribute Name	VR	Type	Description
(0040,0007)	> Scheduled Procedure Step Description	LO	3	Not used
(0040,0008)	> Scheduled Protocol Code Sequence	SQ	3	NA
(0040,0009)	> Scheduled Procedure Step ID	SH	3	Not used
(0040,1001)	> Requested Procedure ID	SH	3	Not used

2.1.2.4.2.5. General Equipment IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0070)	Manufacturer	LO	2	"Hitachi Aloka Medical, Ltd."
(0008,0080)	Institution Name	LO	3	Available in full mode
(0008,0081)	Institution Address	ST	3	Available in full mode
(0008,1010)	Station Name	SH	3	Available in full mode
(0008,1040)	Institutional Department Name	LO	3	Available in full mode
(0008,1090)	Manufacturer's Model Name	LO	3	Preset at Manufacturer's Model
(0018,1000)	Device Serial Number	LO	3	Preset at Device Serial Number
(0018,1020)	Software Version(s)	LO	3	Version of Analysis software
(0018,1050)	Spatial Resolution	DS	3	Not used
(0018,1200)	Date of Last Calibration	DA	3	Not used
(0018,1201)	Time of Last Calibration	TM	3	Not used
(0028,0120)	Pixel Padding Value	US	3	Not used

2.1.2.4.2.6. Secondary Capture Equipment IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0064)	Conversion Type	CS	1	"WSD"
(0008,0060)	Modality	CS	3	Not used
(0018,1010)	Secondary Capture Device ID	LO	3	Not used
(0018,1016)	Secondary Capture Device Manufacturer	LO	3	Not used
(0018,1018)	Secondary Capture Device Manufacturer's Model Name	LO	3	Not used
(0018,1019)	Secondary Capture Device Software Versions	LO	3	Not used
(0018,1022)	Video Image Format Acquired	SH	3	Not used
(0018,1023)	Digital Image Format Acquired	LO	3	Not used

2.1.2.4.2.7. General Image IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0008)	Image Type	CS	3	"ORIGINAL\PRIMARY"
(0008,0022)	Acquisition Date	DA	3	Not used
(0008,0023)	Content Date	DA	2C	Date when image was transmitted.
(0008,0032)	Acquisition Time	TM	3	Not used
(0008,0033)	Content Time	TM	2C	Time when image was transmitted.
(0008,1140)	Referenced Image Sequence	SQ	3	Not used
(0008,2110)	Lossy Image Compression (Retired)	CS	3	Not used
(0008,2111)	Derivation Description	ST	3	Not used
(0008,2112)	Source Image Sequence	SQ	3	Not used
(0020,0012)	Acquisition Number	IS	3	Not used
(0020,0013)	Instance Number	IS	2	Null string
(0020,0020)	Patient Orientation	CS	2C	Null string
(0020,1002)	Images in Acquisition	IS	3	Not used
(0020,4000)	Image Comments	LT	3	Not used

2.1.2.4.2.8. Image Pixel IOD Module

Tag	Attribute Name	VR	Type	Description
(0028,0002)	Samples per Pixel	US	1 3	
(0028,0004)	Photometric Interpretation	CS	1	"RGB"
(0028,0006)	Planar Configuration	US	1C	0 or 1 in RGB image
(0028,0010)	Rows	US	1	Number of pixels in vertical direction of image data
(0028,0011)	Columns	US	1	Number of pixels in horizontal direction of image data
(0028,0034)	Pixel Aspect Ratio	IS	1C	1:1
(0028,0100)	Bits Allocated	US	1	8
(0028,0101)	Bits Stored	US	1	8
(0028,0102)	High Bit	US	1	7
(0028,0103)	Pixel Representation	US	1	Always 0
(0028,0106)	Smallest Image Pixel Value	US	3	Not used
(0028,0107)	Largest Image Pixel Value	US	3	Not used
(7FE0,0010)	Pixel Data	OW,OB	1	Always "OW"

2.1.2.4.2.9. SOP Common IOD Module

Tag	Attribute Name	VR	Type	Description
(0008,0005)	Specific Character Set	CS	1C	Used
(0008,0012)	Instance Creation Date	DA	3	Not used
(0008,0013)	Instance Creation Time	TM	3	Not used
(0008,0014)	Instance Creator UID	UI	3	Not used
(0008,0016)	SOP Class UID	UI	1	1.2.840.10008.5.1.4.1.1.7
(0008,0018)	SOP Instance UID	UI	1	1.2.392.200039.obj.v.u.10.x.y

2.1.2.5. Client Activity – Modality Performed Procedure Step SOP

The Modality Performed Procedure Step SOP has a function for notifying IS (Information System) of information for a patient whose examination has been completed.

2.1.2.5.1. Associated Real-World Activity

bdDICOM sends examination status to SCP as specified by the bone densitometer (assessment).

Operation details depend on instrument type.

2.1.2.5.2. Specific DICOM Conformance Statement for Modality Performed Procedure Step SOP Class

Table 2.1.2.5.2-1 lists the modules comprising the Modality Performed Procedure Step IODs and their status in the implementation.

Table 2.1.2.5.2-1. Modality Performed Procedure Step Information Object Model

Module Name	Usage
SOP Common	Used
Performed Procedure Step Relationship	Used
Performed Procedure Step Information	Used
Image Acquisition Results	Used
Radiation Dose	Not used
Billing and Material Management Codes	Not used

2.1.2.5.2.1. SOP Common Module

Table 2.1.2.5.2.1-1. SOP Common Module Attribute

Tag	Attribute Name	VR	Type	Description
(0008,0005)	Specific Character Set	CS	1C	Used
(0008,0012)	Instance Creation Date	DA	3	Not used
(0008,0013)	Instance Creation Time	TM	3	Not used
(0008,0014)	Instance Creator UID	UI	3	Not used
(0008,0016)	SOP Class UID	UI	3	Not used
(0008,0018)	SOP Instance UID	UI	3	Not used

2.1.2.5.2.2. Performed Procedure Step Relationship Module

Table 2.1.2.5.2.2-1. Performed Procedure Step Relationship Module Attribute

Tag	Attribute Name	VR	Type	Description
(0010,0010)	Patient's Name	PN	2	Used in N-CREATE.
(0010,0020)	Patient ID	LO	2	Used in N-CREATE.
(0010,0030)	Patient's Birth Date	DA	2	Used in N-CREATE.
(0010,0040)	Patient's Sex	CS	2	Used in N-CREATE.
(0008,1120)	Referenced Patient Sequence	SQ	2	Used Empty sequence in N-CREATE.
(0008,1150)	> Referenced SOP Class UID	UI	1C	Not used
(0008,1155)	> Referenced SOP Instance UID	UI	1C	Not used
(0040,0270)	Scheduled Step Attributes Sequence	SQ	1	Used in N-CREATE.
(0020,000D)	> Study Instance UID	UI	1	Used in N-CREATE. ^{*1)}
(0008,1110)	> Referenced Study Sequence	SQ	2	Used Empty sequence in N-CREATE.
(0008,1150)	>> Referenced SOP Class UID	UI	1C	Not used
(0008,1155)	>> Referenced SOP Instance UID	UI	1C	Not used
(0008,0050)	> Accession Number	SH	2	Used in N-CREATE. ^{*1)}

(0040,2016)	> Placer Order Number / Imaging Service Request	LO	3	Not used
(0040,2017)	> Filler Order Number / Imaging Service Request	LO	3	Not used
(0040,1001)	> Requested Procedure ID	SH	2	Used NULL string in N-CREATE.
(0032,1060)	> Requested Procedure Description	LO	2	Used NULL string in N-CREATE.
(0040,0009)	> Scheduled Procedure Step ID	SH	2	Used NULL string in N-CREATE.
(0040,0007)	> Scheduled Procedure Step Description	LO	2	Used NULL string in N-CREATE.
(0040,0008)	> Scheduled Protocol Code Sequence	SQ	2	Used Empty sequence in N-CREATE.
(0008,0100)	>> Code Value	SH	1C	NA
(0008,0102)	>> Coding Scheme Designator	SH	1C	NA
(0008,0103)	>> Coding Scheme Version	SH	3	NA
(0008,0104)	>> Code Meaning	LO	3	NA

*1) Any data already acquired from the Modality Worklist SCP is used. Otherwise, data entered by the user or a Null string is used.

2.1.2.5.2.3. Performed Procedure Step Information Module

Table 2.1.2.5.2.3-1. Performed Procedure Step Information Module Attribute

Tag	Attribute Name	VR	Type	Description
(0040,0241)	Performed Station AE Title	AE	1	Used in N-CREATE.
(0040,0242)	Performed Station Name	SH	2	Used NULL string in N-CREATE.
(0040,0243)	Performed Location	SH	2	Used NULL string in N-CREATE.
(0040,0244)	Performed Procedure Step Start Date	DA	1	Used in N-CREATE.
(0040,0245)	Performed Procedure Step Start Time	TM	1	Used in N-CREATE.
(0040,0253)	Performed Procedure Step ID	CS	1	Used in N-CREATE.
(0040,0250)	Performed Procedure Step End Date	DA	2	Used NULL string in N-CREATE. Used date of transmission in N-SET.
(0040,0251)	Performed Procedure Step End Time	TM	2	Used NULL string in N-CREATE. Used time of transmission in N-SET.
(0040,0252)	Performed Procedure Step Status	CS	1	Used "IN PROGRESS" in N-CREATE. Used "DISCONTINUED" or "COMPLETED" in N-SET.
(0040,0254)	Performed Procedure Step Description	DA	2	Used NULL string in N-CREATE.
(0040,0280)	Comments on the Performed Procedure Step	ST	2	Used NULL string in N-CREATE.
(0040,0255)	Performed Procedure Type Description	LO	2	Used NULL string in N-CREATE.
(0008,1032)	Procedure Code Sequence	SQ	2	Used Empty sequence in N-CREATE.
(0008,0100)	> Code Value	SH	1C	NA
(0008,0102)	> Coding Scheme Designator	SH	1C	NA
(0008,0103)	> Coding Scheme Version	SH	3	NA
(0008,0104)	> Code Meaning	LO	3	NA

2.1.2.5.2.4. Image Acquisition Results Module

Table 2.1.2.5.2.4-1. Image Acquisition Results Module Attribute

Tag	Attribute Name	VR	Type	Description
(0008,0060)	Modality	CS	1	Used in N-CREATE. - DCS series: Requested with "BMD" or "OT". - AOS series: Requested with "BDUS" or "OT".
(0020,0010)	Study ID	SH	2	Used NULL string in N-CREATE.
(0040,0260)	Performed Protocol Code Sequence	SQ	2	Used Empty sequence in N-CREATE.
(0008,0100)	> Code Value	SH	1C	NA
(0008,0102)	> Coding Scheme Designator	SH	1C	NA
(0008,0103)	> Coding Scheme Version	SH	3	NA
(0008,0104)	> Code Meaning	LO	3	NA
(0040,0340)	Performed Series Sequence	SQ	2	Not used
(0008,1050)	> Performing Physician's Name	PN	2C	Not used
(0008,1070)	> Operators' Name	PN	2C	Not used
(0018,1030)	> Protocol Name	LO	1C	Not used
(0020,000E)	> Series Instance UID	UI	1C	Not used
(0008,103E)	> Series Description	LO	2C	Not used
(0008,0054)	> Retrieve AE Title	AE	2C	Not used
(0008,1140)	> Referenced Image Sequence	SQ	2C	Not used
(0008,1150)	>> Referenced SOP Class UID	UI	1C	Not used
(0008,1155)	>> Referenced SOP Instance UID	UI	1C	Not used
(0040,0220)	> Referenced Non-Image Composite SOP Instance Sequence	SQ	2C	Not used
(0008,1150)	>> Referenced SOP Class UID	UI	1C	Not used
(0008,1155)	>> Referenced SOP Instance UID	UI	1C	Not used

3. Communication Profiles

3.1. Supported Communications Stacks

3.1.1. TCP/IP Stack

3.1.1.1. Application Programming Interface (API)

The bdDICOM uses TCP/IP protocol.

3.1.1.2. Physical Media Support

The bdDICOM is connected to DIX-Ethernet using a 100Base-TX, or 10Base-T (UTP) cable.

4. Definition of Standard Extended / Specialized / Private SOP

4.1. Standard Extended / Specialized / Private SOP

None supported.

4.2. Private Transfer Syntaxes

None supported.

5. Configuration

The user can set up a configuration by changing the configuration file using tools. Restart processing program of the bone densitometer (assessment) to allow the changes to take effect.

5.1.AE Title/Presentation Address Mapping

Use tools to change the configuration file to establish a relationship between the AE title and the presentation address. Restart the processing program of the bone densitometer (assessment) to allow the changes to take effect.

6. Supported Extended Character Set

The bdDICOM support following Extended Character Sets.

- ISO_IR 100
- ISO_IR 13
- ISO 2022 IR 13
- ISO 2022 IR 87