



KONICA MINOLTA

**NEOVISTA**  
**I-PACS CX**

医用画像管理システム  
**NEOVISTA**  
**I-PACS CX**

Version 1.00

**DICOM3.0**  
**Conformance**  
**Statement**  
**ECG DICOM Gateway**

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## *Revision History*

<b>Date</b>	<b>Version</b>	<b>Change</b>
2016-07-05	V1.00	First edition
2017-04-21	V1.00	For V1.00 R03/R05 release. Changed the design of cover page.

## **NOTE**

If you cannot find the answer to your questions in any of the documentation, contact I-PACS CX Technical Support. Please include any relevant logs, usage descriptions, or other data that may be helpful in diagnosing the problem in your submission.

Parts not mentioned in the I-PACS CX ECG DICOM Gateway DICOM CS are not supported.

## **1 Introduction**

This conformance statement (CS) specifies the compliances of I-PACS CX ECG DICOM Gateway to DICOM. It details the DICOM Service Classes and the roles that are supported by this product.

## 2 DICOM Conformance Statement

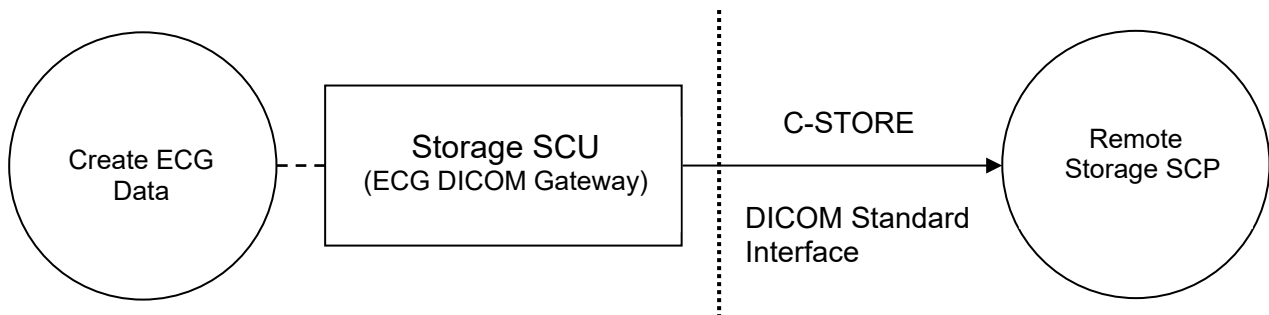
This conformance statement (CS) specifies the compliance of I-PACS CX ECG DICOM Gateway to DICOM. It details the DICOM Service Classes and the roles that are supported by this product. I-PACS CX ECG DICOM Gateway is a powerful PC-based DICOM Gateway running on Microsoft Windows Server 2012 R2. It uses DICOM services to store images.

Note that the format for this article strictly follows that of the DICOM Standard Part 2 (Conformance) Annex A. Thus, it is advised for the readers to refer to that part of the standard while reading this article.

### 2.1 Implementation Model

#### 2.1.1 Application Data Flow Diagram

The basic and specific application models for I-PACS CX ECG DICOM Gateway are shown in the following figure.



I-PACS CX ECG DICOM Gateway uses DICOM protocol to send images to a remote host and create DICOM image.

I-PACS CX ECG DICOM Gateway is related to the following Real World Activities:

- Send images to a remote host

#### 2.1.2 Fundamental Definition of AE's

I-PACS CX ECG DICOM Gateway AE acts as the following Service Class User (SCU):

- Storage Service Class

I-PACS CX ECG DICOM Gateway is a solution that converts output files from ECG devices to DICOM files and transmits them automatically.

I-PACS CX ECG DICOM Gateway supports the following functions:

- Initiate a DICOM association to send images to a remote host

If the negotiated service is accepted, I-PACS CX ECG DICOM Gateway sends the real world activities to the specified remote Application Entity according to the DICOM protocol.

#### 2.1.3 Sequencing of Real-World Activities

Not Applicable

## 2.2 AE Specifications

### 2.2.1 SOP Classes Supported

I-PACS CX ECG DICOM Gateway provides conformance to the following SOP Classes as an SCU.

SOP Class Name	SOP Class UID
Standard Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

Table 2-1: SOP Classes Supported as an SCU

#### 2.2.1.1 Association Establishment Policies

##### 2.2.1.1.1 General

Before any SOP Classes can be exchanged between I-PACS CX ECG DICOM Gateway and other DICOM applications, an association stage takes place to negotiate and exchange the capabilities of the SCU and SCP. ECG DICOM Gateway and other DICOM applications establish an association by using the Association Services of the DICOM Upper Layer. During association establishment stage, ECG DICOM Gateway negotiates the supported SOP classes.

The DICOM Application Context Name (ACN), which is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1
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The Maximum Length PDU negotiation is included in all association establishment requests. However, the Maximum Length PDU for an association can not be greater than:

Maximum Length PDU	64234 bytes
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The SOP Class Extended Negotiation is not supported. The user information items sent by this application are:

- Maximum PDU Length
- Implementation UID

##### 2.2.1.1.2 Number of Associations

The number of supported associations depends on the SCU/SCP role of I-PACS CX ECG DICOM Gateway.

The number of associations as an SCU is always 1 (one). This means I-PACS CX ECG DICOM Gateway makes only one association to the other DICOM application. In addition, ECG DICOM Gateway does not make multiple associations when transferring images to multiple DICOM applications.

##### 2.2.1.1.3 Asynchronous Nature

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

**2.2.1.1.4 Implementation Identifying Information**

The Implementation Version Name and the Implementation Class UID are as follows:

<b>Implementation Version Name</b>	<b>KM_CX_4.5</b>
<b>Implementation Class UID</b>	<b>1.2.392.200036.9107.660</b>

**2.2.1.2 Association Initiation Policy**

I-PACS CX ECG DICOM Gateway initiates a new association to transfer images. This association corresponds to two Real-World Activities.

**2.2.1.2.1 Real-World Activity – Send DICOM Images**

**2.2.1.2.1.1 Associated Real-World Activity**

Users can send all images of specified studies to the Folder of ECG Gateway can send to other remote host. ECG Gateway starts an association to the remote AE for every study. Then it transfers a C-STORE request using the established association. This association is released after transmission the all images finish.

**2.2.1.2.1.2 Proposed Presentation Contexts**

<b>Transfer Syntax Table - Proposed</b>	
<b>Transfer Syntax</b>	<b>UID</b>
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1

Table 2-3: Transfer Syntax List – Proposed

<b>Presentation Context Table – Proposed</b>				
<b>Abstract Syntax</b>		<b>Transfer Syntax</b>	<b>Role</b>	<b>Extended Negotiation</b>
<b>SOP Class Name</b>	<b>SOP Class UID</b>			
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 2-3	SCU	None

Table 2-4: Presentation Context List – Proposed



### 2.2.1.2.1.2.1 SOP Specific Conformance for Instance Storage SOP Classes

This implementation can perform multiple C-STORE operations over a single association.

Upon receiving a C-STORE confirmation containing a Successful status, this implementation will perform the next C-STORE operation. The association will be maintained if possible.

Upon receiving a C-STORE confirmation containing an Error or a Refused status, this implementation will terminate the association. The current C-STORE operation is considered as failed.

Upon receiving a C-STORE confirmation containing a Warning status, this implementation will treat it as a Success response.

The following timers are related to the Image Storage SCU. These timers can be configured by editing "MFDCM38.pro" configuration file. If any of these timers expires, the connection is closed and the operation is considered as failed.

Timer Name	Default (in sec.)	Meaning
ARTIM_TIMEOUT	90	The number of seconds to use as timeout waiting for association request or waiting for the peer to shut down an association
ASSOC_REPLY_TIMEOUT	60	The number of seconds to wait for reply to associate request
RELEASE_TIMEOUT	60	The number of seconds to wait for reply to associate response
WRITE_TIMEOUT	60	The number of seconds to wait for a network writing to be accepted
CONNECT_TIMEOUT	60	The number of seconds to wait for a network connection to be accepted
INACTIVITY_TIMEOUT	60	The number of seconds to wait for data between TCP/IP packets

Table 2-5: Timers for the Image Storage SCU

When I-PACS CX ECG DICOM Gateway initiates an association to issue a C-STORE operation, the image will be transmitted with the same elements in which it was received.

## 2.3 Communication Profiles

### 2.3.1 Supported Communication Stacks

DICOM Upper Layer (Part 8) is supported using TCP/IP.

### 2.3.2 TCP/IP Stack

The TCP/IP stack is inherited from the Microsoft Windows Socket implementation.

#### 2.3.2.1 API

Not Applicable

#### 2.3.2.2 Physical Media Support

DICOM is indifferent to the physical medium over which TCP/IP executes (e.g. Ethernet, Fast-Ethernet, FDDI, ATM, etc)

### **2.3.3 Point-to-Point Stack**

Not Applicable

## **2.4 Extension/Specialization/Privatization**

### **2.4.1 Standard Extended/Specialized/Private SOP**

None Supported

### **2.4.2 Private Transfer Syntaxes**

None Supported

## **2.5 Configuration**

### **2.5.1 AE Title / Presentation Address Mapping**

The Local AE Title is configurable in the Setting menu.

### **2.5.2 Configuration Parameters**

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

- Local AE Title
- Local IP Address
- Local TCP Port Number
- Accept/Reject Policy for unknown called/calling AE Title

## **2.6 Supported Extended Character Sets**

This implementation supports the following extended character set:

- ISO-IR 6 = Default repertoire
- ISO-IR 13 = Japanese, Katakana
- ISO-IR 87 = Japanese, Kanji
- ISO-IR 192 = Unicode, UTF-8

### 3 Annex A: Attributes in Secondary Capture Image Storage SOP Class

All IODs to output are shown in the following tables in implementing Storage Service Class SCU in the ECG DICOM Gateway AE. In addition, these IODs conform to the DICOM Standard Part3.

Tag	Attribute Name	Type	Note
(0010,0010)	Patient's Name	2	Value from user input
(0010,0020)	Patient ID	2	Value from user input
(0010,0030)	Patient's Sex	2	"M", "F", "O"
(0010,0040)	Patient's Birth Date	2	Value from user input
(0010,4000)	Patient' Comment	3	Generated for each study or value

Table 3-1: Patient Module Attributes

Tag	Attribute Name	Type	Note
(0008,1080)	Admitting Diagnoses Description	3	Generated for each study or value

Table 3-2: Patient Study Module Attributes

Tag	Attribute Name	Type	Note
(0020,000D)	Study Instance UID	1	Generated for each study or value
(0008,0020)	Study Date	2	Generated for each study
(0008,0030)	Study Time	2	Generated for each study
(0008,1030)	Study Description	3	Generated for each study or value
(0020,0010)	Study ID	2	Generated for each study
(0008,0050)	Accession Number	2	Value from user input

Table 3-3: General Study Module Attributes

Tag	Attribute Name	Type	Note
(0008,0060)	Modality	1	"OT" (Default)
(0020,000E)	Series Instance UID	1	Generated for each series
(0008,0021)	Series Date	3	Generated for each series
(0008,0031)	Series Time	3	Generated for each series
(0020,0011)	Series Number	2	Generated sequentially
(0008,103E)	Series Description	3	Value from user input
(0008,0015)	Body Part Examined	3	Value from user input

Table 3-4: General Series Module Attributes

Tag	Attribute Name	Type	Note
(0008,0070)	Manufacturer	2	“KONICAMINOLTA”
(0008,0080)	Institution Name	3	Value from user input
(0008,1090)	Manufacturer’s Model Name	3	“KONICAMINOLTA”

Table 3-5: General Equipment Module Attributes

Tag	Attribute Name	Type	Note
(0020,0013)	Instance Number	2	Generated sequentially
(0008,0008)	Image Type	3	
(0008,0023)	Content Date	2C	Generated for each image
(0008,0033)	Content Time	2C	Generated for each image

Table 3-6: General Image Module Attributes

Tag	Attribute Name	Type	Note
(0028,0030)	Pixel Spacing	1	The size depend on device model

Table 3-7: Image Plane Module Attributes

Tag	Attribute Name	Type	Note
(0028,0002)	Sample per Pixel	1	3
(0028,0004)	Photometric Interpretation	1	“RGB”,
(0028,0010)	Rows	1	The size depend on device model
(0028,0011)	Columns	1	The size depend on device model
(0028,0100)	Bits Allocated	1	8
(0028,0101)	Bits Stored	1	8
(0028,0102)	High Bit	1	7
(0028,0103)	Pixel Representation	1	0
(7FE0,0010)	Pixel Data	1	

Table 3-8: Image Pixel Module Attributes

Tag	Attribute Name	Type	Note
(0028,1050)	Window Center	3	Variable from Scanning and Preset
(0028,1051)	Window Width	1C	Variable from Scanning and Preset

Table 3-10: VOI LUT Module Attributes

Tag	Attribute Name	Type	Note
(0008,0016)	SOP Class UID	1	“1.2.840.10008.5.1.4.1.1.7”
(0008,0018)	SOP Instance UID	1	Generated for each image

Table 3-11: SOP Common Module Attributes

Tag	Attribute Name	Type	Note
(0051,0010)	Private Field Name	1	“KM ECG”
(0051,1001)	Private Field Value	1	MFER waveform data

Table 3-12: ECG Waveform Module Attributes





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A9P8EA04JA02

2017-04-21  
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