



Digital Radiography System

DICOM Conformance Statement

MAXXvue

Software Version 2.0

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1 INTRODUCTION

1.1 Intended Audience

The user of this document is involved with system integration and/or software design.

We assume that the reader is familiar with the terminology and concepts that are used in the DICOM 3.0 standard.

Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard itself, prior to reading this conformance statement.

1.2 Purpose of This Document

This document is the DICOM Conformance Statement for the DICOM services of the MAXXvue as an acquisition modality.

Its purpose is to specify compliance with the DICOM standard on the following MAXXvue supported service classes:

- Digital X-Ray Image Storage – For Presentation Service Class as an SCU
- Modality Worklist Service Class as an SCU
- Basic Grayscale Print Management Meta Service Class as an SCU

1.3 Sources for This Document

ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) V3.0. Current.

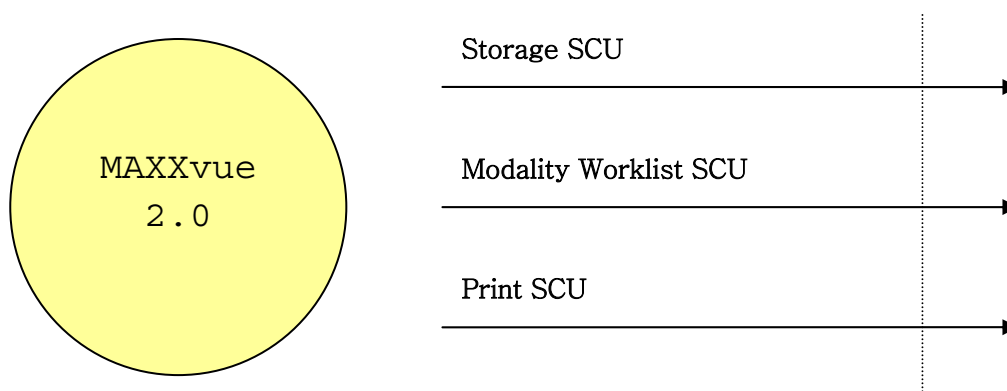


2 IMPLEMENTATION MODEL

The MAXXvue is a point-to-point image acquisition device for image transmission, storage between DICOM modalities and the DICOM network.

2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following Illustration:



DICOM Standard Interface

2.2 Functional Definitions of AE's

2.2.1 Storage SCU

MAXXvue Store SCU is implemented as an application entity for transmitting DX images. The DICOM Storage Service of DX image is used to send demographic information and pixel data to an external image manager.

Initiate a DICOM association to send the SC IOD

- Issue a C-STORE service
- Send the IOD with the pixel data processed as defined in the configuration of the



external user

- Access the local database to update the exam information.
- Close the Association

2.2.2 Modality Worklist SCU

MAXXvue Modality Worklist SCU is implemented as an application entity for retrieving the Modality Worklist from the Department System Scheduler/Order Filler. The DICOM C-Find Service of MWL is used to request the scheduled procedure steps.

- Initiate a DICOM association to request the Modality Worklist
- Issue a C-FIND request with the requested attributes IOD
- Send the IOD to the Department System Scheduler/Order Filler
- Access the local database to add or update the scheduled objects
- Close the Association

2.2.3 Basic Grayscale Print Management Meta SCU

MAXXvue Basic Print Management Meta SCU is implemented as an application entity for printing DX images.

The DICOM Basic Print Management Meta Service is used to print demographic information and pixel data to an external film printer.

- Initiate a DICOM association to send the SC IOD
- Issue N-GET request to get printer attributes.
- Issue N-CREATE request to create BASIC FILM SESSION.
- Issue N-CREATE request to create BASIC FILM BOX.
- Issue N-ACTION request to print the BASIC FILM BOX.
- Issue N-DELETE request to delete current FILM BOX.
- Access the local database to update the exam information.
- Close the Association



3 AE SPECIFICATIONS

3.1 Supported Services

MAXXvue provides Standard Conformance to the DICOM V3.0 SOP Classes as an SCU .

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
Standard Digital X-ray Image Storage (For Presentation)	1.2.840.10008.5.1.4.1.1.1.1

Table 3.1
SOP Classes
Supported as
an SCU

3.1.1

Association Establishment Policies

3.1.1.1 General

Before any SOP Classes can be exchanged between the MAXXvue (SCU) and the SCP, an association stage takes place to negotiate the capabilities of the SCU and SCP

The maximum PDU length for an association initiated by the MAXXvue is

Maximum Length PDU	16384 bytes
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3.1.1.2 Number of Associations

The MAXXvue opens one association for querying worklist items, but can different associations for archiving to multiple destinations simultaneously.

There is no inherent limit to the number of associations other than limits imposed by the computer operating system.



3.1.1.3 Asynchronous Nature

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

3.1.1.4 Implementation Identifying Information

The MAXXvue SCU will respond with the following implementation identifying parameters:

Implementation Class UID	Implementation Version Name
1.2.840.10008.5.1.4.1.1.1.1	

All associations will be use a single implementation Class UID

3.1.2 Association Initiation Policy

MAXXvue attempts to initiate a new association for every service.

3.1.2.1 Proposed Presentation Context Table

Presentation Context Table – Proposed				
Abstract Syntax		Transfer Syntax		Role
SOP Class Name	SOP Class UID	Transfer Syntax Name	UID	
Verification	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Standard Digital X-ray Image Storage (For Presentation)	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU

Table 3.2 Presentation Context List – Proposed



3.1.2.2 Called/Calling AE-Titles

This can be modified during configuration via a configuration setting. The calling AE title is case sensitivity.

3.1.2.3 Association Initiation by Real World Activity

3.1.2.3.1 Storage

The MAXXvue DX Image Storage AE initiates a new association for each set of images it needs to transfer.

If the SCP AE rejects the Association, then the MAXXvue issues a warning message.

3.1.2.3.2 Modality Worklist

The MAXXVUE Worklist SCU AE initiates a separate Association for each Worklist of items to be obtained.

If the SCP AE rejects the Association, then the MAXXvue issues a warning message.

3.1.2.3.3 Basic Grayscale Print Management Meta

The MAXXvue DX Image Storage AE initiates a new association for each set of images it needs to print.

If the SCP AE rejects the Association, then the MAXXvue issues a warning message.



3.1.3 SOP Specific Conformance

3.1.3.1 SOP Specific Conformance – Storage SCU

3.1.3.1.1 Supported attributes

Attribute Name	Tag	DICOM Type	MAXXvue DX Type	Available values	Remark
Patient Module					
Patient's Name	(0010,0010)	2	2		Configurable
Patient ID	(0010,0020)	2	2		Configurable
Patient's Birth Date	(0010,0030)	2	2		Configurable
Patient Sex	(0010,0040)	2	2	M,F,O	Configurable
Other Patient IDs	(0010,1000)	3	3		
Patient Comments	(0010,4000)	3	3		Configurable
General Study					
Study Instance UID	(0020,000D)	1	1		
Study ID	(0020,0010)	2	2		
Study Date	(0008,0020)	2	2		
Study Time	(0008,0030)	2	2		
Accession Number	(0008,0050)	2	2		
Study Description	(0008,1030)	3	2		
Referring Physician Name	(0008,0090)	2	2		
Patient Study					
Patient's Age	(0010,1010)	3	3		Configurable
Patient's Size	(0010,1020)	3	3		Configurable
Patient's Weight	(0010,1030)	3	3		Configurable
General Series					
Modality	(0008,0060)	1	1	DX	
Series Instance UID	(0020,000E)	1	1		
Series Number	(0020,0011)	2	2		
Series Description	(0008,103E)	3	3		
Series Date	(0008,0021)	3	3		
Series Time	(0008,0031)	3	3		
Operator Name	(0008,1070)	3	3		



Patient Position	(0018,5100)	2C	2C		
Laterality	(0020,0060)	2C	2C		
Body Part Examined	(0018,0015)	2	1		
General Equipment					
Manufacturer	(0008,0070)	2	2	RAYSIS Co.,Ltd Configurable	
Station Name	(0008,1010)	3	2		
Institution Name	(0008,0080)	3	3		
Institution Address	(0008,0081)	3	3		
Institutional Department Name	(0008,1040)	3	3		
Manufacture Model Name	(0008,1090)	3	1	RXDN-6000 Configurable	
Device Serial Number	(0018,1000)	3	3	Configurable	
Software Versions	(0018,1020)	3	3		
General Image					
Instance Number	(0020,0013)	2	1		
Image Type	(0008,0008)	3	1		
Content Date	(0008,0023)	2C	2C		
Content Time	(0008,0033)	2C	2C		
Acquisition Date	(0008,0022)	3	3		
Acquisition Time	(0008,0032)	3	3		
Acquisition Number	(0020,0012)	3	3		
Images In Acquisition	(0020,1002)	3	3		
Image Comments	(0020,4000)	3	3		
Lossy Image Compression	(0028,2110)	3	3		
Image Pixel					
Samples per Pixel	(0028,0002)	1	1		
Photometric Interpretation	(0028,0004)	1	1		
Rows	(0028,0010)	1	1		
Columns	(0028,0011)	1	1		
Bits Allocated	(0028,0100)	1	1		
Bits Stored	(0028,0101)	1	1		



High Bit	(0028,0102)	1	1		
Pixel Spacing	(0028,0030)	3	3		
Pixel Representation	(0028,0103)	1	1		
Pixel Data	(7FE0,0010)	1	1		
Smallest Image Pixel Value	(0028,0106)	1	1		
Largest Image Pixel Value	(0028,0107)	1	1		
VOI LUT					
Window Center	(0028,1050)	3	3		
Window Width	(0028,1051)	1C	1C		
SOP Common					
SOP Class UID	(0008,0016)	1	1		
SOP Instance UID	(0008,0018)	1	1		
Specific Character Set	(0008,0005)	1C	1C		

Table 3.3 C-Store SCU Standard DICOM Attributes



3.1.3.2 SOP Specific Conformance – Modality Worklist SCU

3.1.3.2.1 Supported attributes

Attribute Name	Tag	Expected Matching Key Type	Expected Returned Key Type	Associated DICOM DX Element Comments
Scheduled Procedure Step Sequence	(0040,0100)	R	1	N/A
>Scheduled Station AE Title	(0040,0001)	R	1	N/A
>Scheduled Procedure Step Start Date	(0040,0002)	R	1	Study Date (0008,0020)
>Scheduled Procedure Step Start Time	(0040,0003)	O	1	Study Time(0008,0030)
>Modality	(0008,0060)	R	1	Modality (0008,0060)
>Scheduled Performing Physician's Name	(0040,0006)	O	2	Performing Physician's Name(0008,1050)
>Scheduled Procedure Step Description	(0040,0007)	O	1C	Study Description (0008,1030)
>Scheduled Procedure Step Location	(0040,0011)	O	2	N/A
>Scheduled Procedure Step ID	(0040,0009)	O	1	N/A
Requested Procedure Description	(0032,1060)	O	1C	N/A
Study Instance UID	(0020,000D)	O	1C	Study Instance UID ((0020,000D)
Accession Number	(0008,0050)	R	2	Accession Number (0008,0050) Configurable
Patient's Name	(0010,0010)	R	1	Patient's Name (0010,0010) Configurable
Patient ID	(0010,0020)	R	1	Patient ID (0010,0020) Configurable
Patients Birth Date	(0010,0030)	O	2	Patients Birth Date (0010,0030) Configurable



Patient's Sex	(0010,0040)	O	2	Patient's Sex (0010,0040) Configurable
Patient's Age	(0010,1010)	O	3	Patient's Age (0010,1010) Configurable
Patient's Comments	(0010,4000)	O	3	Patient's Comments (0010,4000) Configurable

Table 3.4 Modality Worklist Information Model Attributes

3.1.3.3 SOP Specific Conformance – Print SCU

The Basic Grayscale Print Management Meta SOP Class is defined by the following set of supported SOP classes.

SOP Class Name	SOP Class UID
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Printer SOP Class	1.2.840.10008.5.1.1.16

Table 3.5 Print SOP Classes supported by the Grayscale Print SCU

3.1.3.3.1 Basic Film Session SOP Class

The MAXXvue supports the following DIMSE Service Elements for Basic Film Session SOP Class.

N-CREATE : Requests to create an instance of Basic Film Session.

Attribute	DICOM Tag	Default Value
Number of Copies	(2000,0010)	1
Print Priority	(2000,0020)	MED
Medium Type	(2000,0030)	BLUE FILM
Film Destination	(2000,0040)	MAGAZINE
Film Session Label	(2000,0050)	



Table 3.6 Attribute Values supported by Basic Film Session SOP Class

3.1.3.3.2 Basic Film Box SOP Class

MAXXvue supports the following DIMSE Service Elements for Basic Film Box SOP Class.

N-CREATE : Requests to create an instance of Basic Film Box.

N-ACTION : Requests to print the Film Box onto Printer.

N-DELETE : Request to delete the Film Box instance.

Attribute	DICOM Tag	Default Value
Image Display Format	(2010,0010)	STANDARDWC,R – configurable
Film Orientation	(2010,0040)	PORTRAIT
Film Size Id	(2010,0050)	14INX17IN
Magnification Type	(2010,0060)	CUBIC
Border Density	(2010,0100)	BLACK
Empty Image Density	(2010,0110)	BLACK
Min Density	(2010,0120)	0
Max Density	(2010,0130)	4095
Trim	(2010,0140)	NO

Table 3.7 Attribute Values supported by Basic Film Box SOP Class

3.1.3.3.3 Basic Grayscale Image Box SOP Class

MAXXvue supports the following DIMSE Service Elements for Basic Grayscale Image Box SOP Class

N-SET: Requests to set the Image Box attributes.

Attribute	DICOM Tag	Default Value
Image Position	(2020,0010)	image-dependent
Polarity	(2020,0020)	NORMAL
Preformatted Grayscale Image Sequence	(2020,0110)	
> Samples per Pixel	(0028,0002)	1



> Photometric presentation	Inter-	(0028,0004)	MONOCHROME2
> Rows		(0028,0010)	image-dependent
> Columns		(0028,0011)	image-dependent
> Pixel Aspect Ratio		(0028,0034)	1W1
> Bits Allocated		(0028,0100)	16
> Bits Stored		(0028,0101)	12
> High Bit		(0028,0102)	11
> Pixel Representation		(0028,0103)	0
> Pixel Data		(7FE0,0010)	

Table 3.8 Attribute Values supported by Basic Grayscale Image Box SOP Class

3.1.3.3.4 Printer SOP Class

MAXXvue issues the request to retrieve the following attributes from DICOM-compliant printer.

C-GET: Request to retrieve printer information.

Attribute	DICOM Tag	Default Value
Printer Status	(2110,0010)	printer-dependent
Printer Status Info	(2110,0020)	printer-dependent
Printer Name	(2110,0030)	printer-dependent
Manufacturer	(0008,0070)	printer-dependent
Manufacturer Model Name	(0008,1090)	printer-dependent
Device Serial Number	(0018,1000)	printer-dependent
Software Versions	(0018,1020)	printer-dependent
Last Calibration Date	(0018,1200)	printer-dependent
Last Calibration Time	(0018,1201)	printer-dependent
Manufacturer	(0008,0070)	printer-dependent

Table 3.9 Attribute Values retrieved by Printer SOP Class



3.1.4 Association Acceptance Policy

Not applicable because the MAXXVUE (SCU) cannot accept an Association.

4 COMMUNICATION PROFILES

4.1 Supported Communication Stacks

DICOM Upper Layer (PS 3.8) is supported using TCP/IP..

4.2 TCP/IP Stack

The MAXXvue (SCU) uses TCP/IP for the protocol stacks.

4.3 Physical Media Support

The MAXXvue supports 10BaseT and 100BaseT.

5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

5.1 *Standard Extended/Specialized/Private SOPs*

None Supported

5.2 *Private Transfer Syntaxes*

None Supported



6 CONFIGURATION

See MAXXvue Configuration Manual for configuration.

6.1 AE Title/Presentation Address Mapping

The Local AE Title is configurable in the Preference setting menu.

6.2 Configuration Parameters

The following fields are configurable for this Store SCP:

- Local AE Title
- Local IP Address
- Local TCP Port Number

The following fields are configurable for this Store SCU and Query and Retrieve SCU:

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

The following fields are configurable for this Print SCU:

- Remote AE Title
- Remote IP Address
- Remote TCP Port Number
- Support for the optional Trim element in the Basic Film Box SOP Class (default: off)