

Hepatology Plus, DICOM Conformance Statement

Conformance Statement Overview

This DICOM conformance statement applies to the following versions of Hepatology Plus:

- Hepatology Plus v3.3.0. v3.3.1
- Hepatology Plus v3.4.1

Hepatology Plus is a post-processing tool for MR images. It operates on and optionally creates DICOM images. All DICOM interaction is through the file system; it provides no network services (SCU or SCP).

Hepatology Plus enforces a one-exam-per-folder requirement, where one exam is typically all images under one StudyUID. See section 1.3 for details.

Hepatology Plus requires certain DICOM tags to be present for traceability, data association, and processing. See section 1.4 for summary.

Hepatology Plus only supports classic DICOM format. Multi-frame enhanced DICOM is not supported at this time.

Hepatology Plus only supports uncompressed images. Lossless compression may be supported in the future.

1 Requirements – All supported data types

Input Requirements		
Tag Name	Tag	Support
Modality	(0008,0060)	MR
PhotometricInterpretation	(0028,0004)	MONOCHROME
PatientName	(0010,0010)	<i>Must not be blank</i>
PatientID	(0010,0020)	<i>Must not be blank</i>
StudyDate	(0008,0020)	<i>Must not be blank</i>
StudyTime	(0008,0030)	<i>Must not be blank</i>
SeriesNumber	(0020,0011)	Must associate related series through sequential (2,3,4) or derived (3, 300, 301) values

Transfer Syntax		
Syntax	UID	Supported
Implicit VR Little Endian	1.2.840.10008.1.2	No ¹
Explicit VR Little Endian	1.2.840.10008.1.2.1	Yes
Explicit VR Big Endian	1.2.840.10008.1.2.2	Yes
RLE Lossless	1.2.840.10008.1.2.4.57	No
JPEG Lossless proc 14	1.2.840.10008.1.2.5	No
JPEG Lossless proc 14 sv1	1.2.840.10008.1.2.4.70	No
JPEG LS Lossless	1.2.840.10008.1.2.4.80	No
JPEG2000 Lossless	1.2.840.10008.1.2.4.90	No
JPEG2000 Multi-component Lossless	1.2.840.10008.1.2.4.92	No
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	No
JPEG Baseline (Process 2 and 4)	1.2.840.10008.1.2.4.51	No
JPEG LS Lossy	1.2.840.10008.1.2.4.81	No
JPEG2000	1.2.840.10008.1.2.4.91	No
JPEG2000 Multi-component	1.2.840.10008.1.2.4.93	No

1- Implicit VR Little Endian not supported when required private tags contain quantitative data.

1.1 Requirements: MRE

MRE processing requires the MRE magnitude and phase difference contrasts as inputs. SeriesNumber is used to associate related series.

1.2 Requirements: Fat/Water

F/W processing requires contrasts derived from 6-pt Dixon with complex reconstruction. 2-pt Dixon is not supported. Magnitude based 6-pt Dixon is not supported.

F/W requires the PDFF and Water contrasts. R2* is optional, and will affect ROI creation if present.

Series number is used to associate related series.

1.3 Folder Structure Requirement for Input Data

Hepatogram Plus requires that one folder contain images from a single exam, where an exam is identified by identical StudyUID. The first image discovered will be used to identify related files; all files with non-matching StudyUID will be ignored. There is no specification or rule as to what constitutes the first file to be discovered.

DICOM files must be at the same subfolder depth to be parsed; and files deeper than the top-most DICOM file will be ignored.

1.4 DICOM tag requirements:

See Release notes for source/sequence specific requirements.

1.5 Data association:

Quantitative imaging often spans multiple series: Such as MRE Magnitude, Phase, Stiffness, and Wave images, or F/W contrasts PDF, Water, Fat, R2*. MREplus will parse available data exam to find related contrasts. When said contrasts are in separate series, the Series Number is the primary method of association. For example, MRE magnitude data in series 2 and phase data in series 3 will be interpreted as related. PDF data in series 4, 400, 401 will be group as related.

2 Tags Maintained and Modified

HepPlus has two configurations that determine the content of DICOM metadata in generated outputs: “essential” and “copied”.

Copied will copy the majority of metadata from one of the images in a related series to the output. Certain tags noted below will be removed.

Essential will only copy the following subset of data:

In any of the above cases, the following tags are set for all outputs by HepPlus:

Tag	Tag Name	Set to
(0008,0008)	Image Type	”DERIVED\\SECONDARY\\PROCESSED” or ”DERIVED\\SECONDARY\\PROCESSED\\HEPPLUS”
(0008,0018)	SOP Instance UID	Random generated UID for new image
(0008,0021)	Series Date	Set to start date of post-processing
(0008,0023)	Content Date	Set to start date of post-processing
(0008,0031)	Series Time	Set to start time of post-processing

(0008,0033)	Content Time	Set to start time of post-processing
(0008,0070)	Manufacturer	"Resoundant"
(0008,103E)	Series Description	"Hepatogram Plus+ summary"
(0008,1090)	Manufacturer's Model Name	"Heptogram Plus v" + <i>HepPlus Version</i>
(0018,0022)	Scan Options	Removed
(0018,0023)	MR Acquisition Type	Removed
(0018,1250)	Receive Coil Name	Removed
(0020,000E)	Series Instance UID	Random generated UID for new series
(0020,0011)	Series Number	Lowest value series number in input data with "99" suffix. For example "399" or "1499" or "50099"
(0020,0013)	Instance Number	Incremental, starting with 1 for each output series
(0020,1002)	Images in Acquisition	Removed
(0028,0008)	Number of Frames	Removed (always 1)
(0028,0106)	Smallest Image Pixel Value	Removed
(0028,0107)	Largest Image Pixel Value	Removed
(7FE0,0010)	Pixel data	Output results

In the essential tag output mode, the following are copied from input to output. Values that are missing or mal-formed in input will be empty in output if they are required by DICOM standard, or absent if they are optional.

Tag	Tag Name	Notes
(0008,0016)	SOP Class UID	
(0008,0020)	Study Date	
(0008,0022)	Acquisition Date	

(0008,0030)	Study Time	
(0008,0032)	Acquisition Time	
(0008,0050)	Accession number	(HepPlus v.3.5.1 and later)
(0008,0060)	Modality	
(0008,0090)	Referring Physician Name	
(0010,0010)	Patient's Name	
(0010,0020)	Patient ID	
(0010,0030)	Patient Birth Date	
(0010,0040)	Patient's Sex	
(0010,1010)	Patient's Age	
(0010,1030)	Patient's Weight	
(0018,5100)	Patient Position	
(0020,000D)	Study Instance UID	
(0020,0010)	Study ID	
(0020,0020)	Patient Orientation	
(0020,1041)	Slice Location	Corresponds to PRIMARY or SECONDARY source for images; null for Summaries

3 Review, Approval, and Revisions

Reviewer Title	Current Revision Approval Date
Document Owner: See EQMS (QT9)	See EQMS (QT9)
Document Approver(s): See EQMS (QT9)	See EQMS (QT9)

4 Identification of Changes

Revision	Change Description	Release Date
1	Initial release, Hepatogram Plus version v3.3.0. v3.3.1, Hepatogram Plus v3.4.1	2022/12/15
2	Add Section 2: tags maintained and modified	2022/01/11