

1	Status	Final Text
2	Date of Last Update	2015/03/18
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7	Submission Date	2014/09/02

8	Correction Number CP-1427	
9	Log Summary: Make Defined Term for 3D Dimension Organization Type used for US Volume mean equally spaced as well as parallel slices, and add Spacing Between Slices	
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11	Name of Standard	
12	PS3.3 2015a	
13	Rationale for Correction:	
14	The Enhanced US Volume IOD requires the use of equally spaced parallel slices, as described in the IOD itself.	
15	It also introduced Dimension Organization Type, with Defined Terms for "3D" and "3D_TEMPORAL", though described them only as parallel slices, without mentioning equal spacing, though it is believed that was intended.	
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17	A recipient may want to recognize an equally spaced set of parallel slices from Dimensions with indices that point to a Stack rather than the position attributes, or to position attributes that are other than those in the traditional patient-relative coordinate system (such as the new volume-based coordinate system introduced in the Enhanced US Volume IOD, or without understanding the details of the coordinate system. Making the Defined Terms of Dimension Organization Type would make that possible. Note that a Volumetric Properties value of VOLUME does not imply either parallel or equal spacing, so is not helpful in this respect.	
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19	Also, though the in-plane Pixel Spacing is always conveyed in the Enhanced family of objects, Spacing Between Slices is not encoded in most Enhanced IODs. If it were, however, a recipient without knowledge of the coordinate system could make use of the volume for MPRs and measurements. Since the existing Pixel Measures functional group macro already includes Slice Thickness, it makes sense to add Spacing Between Slices to it. Since Spacing Between Slices is encoded optionally in the top-level Data Set in the Enhanced MR Image IODs, it is removed for consistency in favor of the functional group macro.	
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27	Correction Wording:	

Amend DICOM PS3.3 as follows:

## C.7.6.17 Multi-frame Dimension Module

**Table C.7.6.17-1. Multi-frame Dimension Module Attributes**

Attribute Name	Tag	Type	Attribute Description
...	...	1	...
Dimension Organization Type	(0020,9311)	3	Dimension organization of the instance.  <b>Defined Terms:</b>  <b>3D</b> Spatial Multi-frame image of <b>equally spaced</b> parallel planes (3D volume set) <b>3D_TEMPORAL</b> Temporal loop of <b>equally spaced</b> parallel-plane 3D volume sets.
...	...	1	...

### C.7.6.16.2.1 Pixel Measures Macro

Table C.7.6.16-2 specifies the attributes of the Pixel Measures Functional Group Macro.

**Table C.7.6.16-2. Pixel Measures Macro Attributes**

Attribute Name	Tag	Type	Attribute Description
Pixel Measures Sequence	(0028,9110)	1	Identifies the physical characteristics of the pixels of this frame.  Only a single Item shall be included in this sequence.
>Pixel Spacing	(0028,0030)	1C	Physical distance in the imaging target (patient, specimen, or phantom) between the centers of each pixel, specified by a numeric pair - adjacent row spacing (delimiter) adjacent column spacing in mm. See ??? for further explanation of the value order.  <b>Note</b>  In the case of CT images with an Acquisition Type (0018,9302) of CONSTANT_ANGLE, the pixel spacing is that in a plane normal to the central ray of the diverging X-Ray beam as it passes through the data collection center.  Required if Volumetric Properties (0008,9206) is other than DISTORTED or SAMPLED. May be present otherwise.
>Slice Thickness	(0018,0050)	1C	Nominal reconstructed slice thickness (for tomographic imaging) or depth of field (for optical non-tomographic imaging), in mm.  See ??? for further explanation.  <b>Note</b>  Depth of field may be an extended depth of field created by focus stacking (see ???).  Required if Volumetric Properties (0008,9206) is VOLUME or SAMPLED. May be present otherwise.

Attribute Name	Tag	Type	Attribute Description
<b>&gt;Spacing Between Slices</b>	<b>(0018,0088)</b>	<b>3</b>	<b>Spacing between adjacent slices, in mm. The spacing is measured from the center-to-center of each slice, and if present shall not be negative.</b>

### C.8.13.1 Enhanced MR Image Module

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**Table C.8-79. Enhanced MR Image Module Attributes**

Attribute Name	Tag	Type	Attribute Description
...	...	...	...
<b>Spacing between Slices</b>	<b>(0018,0088)</b>	<b>3</b>	<b>Value of the prescribed spacing to be applied between the slices in a volume that is to be acquired. The spacing in mm is defined as the center-to-center distance of adjacent slices.</b>

*For reference DICOM PS3.3 :*

### A.59.1 Enhanced US Volume IOD Description

... Within each Enhanced US Volume instance, each Cartesian volume consists of a set of parallel planes, and each plane consists of one or more frames each of a single data type. All Cartesian volumes have the same spacing between adjacent planes.

#### A.59.4.1.2 Plane Position (Volume) and Plane Orientation (Volume) Macros

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Adjacent planes in the volume shall be equally spaced in the Z direction.