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1	Status	Sep 2016 Voting Packet
2	Date of Last Update	2016/05/25
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7	Submission Date	2016/03/06

8	Correction Number CP-1593	
9	Log Summary: Add Magnetic Susceptibility to Image Model Component Semantics for Quantitative Susceptibility Parametric Maps	
10	Name of Standard	
11	PS3.16	
12	Rationale for Correction:	
13	There is no code for Magnetic Susceptibility, which is the quantity encoded in Quantitative Susceptibility Maps (QSM). A corresponding ppm unit is added.	
14		
15	Also, there is no code for R2*, though there is for R1 and R2, and T1, T2 and T2*; add it.	
16	Also improve the existing definitions of T1, T2 and T2*.	
17	Correction Wording:	

Amend DICOM PS 3.16 Content Mapping Resource - Context Groups as follows:

CID 7180 Abstract Multi-dimensional Image Model Component Semantics

Type: Extensible
Version: 20160419yyvymdd

Table CID 7180. Abstract Multi-dimensional Image Model Component Semantics

Coding Scheme Designator	Code Value	Code Meaning	SNOMED-CT Concept ID	UMLS Concept Unique ID
...
DCM	113063	T1		
DCM	113065	T2		
DCM	113064	T2*		
...
DCM	126393	R1		
DCM	126394	R2		
<u>DCM</u>	<u>ddd001</u>	<u>R2*</u>		
DCM	113098	Magnetization Transfer Ratio		
<u>DCM</u>	<u>ddd002</u>	<u>Magnetic Susceptibility</u>		
...

CID 7181 Abstract Multi-dimensional Image Model Component Units

Type: Extensible
Version: 20141110yyvymdd

Table CID 7181. Abstract Multi-dimensional Image Model Component Units

Coding Scheme Designator	Code Value	Code Meaning
...
UCUM	1	no units
UCUM	{ratio}	ratio
UCUM	[hnsfU]	Hounsfield Unit
UCUM	{counts}	Counts
UCUM	{counts}/s	Counts per second
UCUM	[arb'U]	arbitrary unit
<u>UCUM</u>	<u>ppm</u>	<u>ppm</u>
...
UCUM	cm/s	centimeter/second
...

Amend DICOM PS 3.16 - Content Mapping Resource - Controlled Terminology Definitions to add the following new concepts:

Table D-1. DICOM Controlled Terminology Definitions

Code Value	Code Meaning	Definition	Notes
113063	T1	Values are derived by calculating T1 values <u>The time constant for the decay of longitudinal magnetization caused by spin-lattice relaxation. The inverse of the longitudinal relaxation rate constant, i.e., $T1 = 1/R1$.</u>	
113064	T2*	Values are derived by calculating T2* values <u>The time constant for the decay of transverse magnetization caused by a combination of spin-spin relaxation and magnetic field inhomogeneity. The inverse of the transverse relaxation rate constant, i.e., $T2^* = 1/R2^*$.</u>	
113065	T2	Values are derived by calculating T2 values <u>The time constant for the decay of transverse magnetization caused by spin-spin relaxation. The inverse of the transverse relaxation rate constant, i.e., $T2 = 1/R2$.</u>	
126393	R1	The longitudinal relaxation rate constant <u>for the decay of longitudinal magnetization caused by spin-lattice relaxation</u> . The inverse of longitudinal relaxation time, i.e., $R1 = 1/T1$.	
126394	R2	The transverse relaxation rate constant <u>for the decay of transverse magnetization caused by spin-spin relaxation</u> . The inverse of transverse relaxation time, i.e., $R2 = 1/T2$.	
<u>ddd001</u>	<u>R2*</u>	<u>The transverse relaxation rate constant for the decay of transverse magnetization caused by a combination of spin-spin relaxation and magnetic field inhomogeneity. The inverse of transverse relaxation time, i.e., $R2^* = 1/T2^*$.</u>	
<u>ddd002</u>	<u>Magnetic Susceptibility</u>	<u>Magnetic Susceptibility is a measure of the amount of magnetization induced in a material when placed in an external magnetic field. It is the quantity encoded as the voxel intensity in Quantitative Susceptibility Map (QSM) images.</u> <u>It is a dimensionless quantity, usually recorded with units of parts per millions (ppm).</u> <u>See Liu T, Wisnieff C, Lou M, Chen W, Spincemaille P, Wang Y. Nonlinear formulation of the magnetic field to source relationship for robust quantitative susceptibility mapping. Magnetic Resonance in Medicine. 2013;69(2):467–76. http://dx.doi.org/10.1002/mrm.24272.</u> <u>See Wang Y, Liu T. Quantitative susceptibility mapping (QSM): Decoding MRI data for a tissue magnetic biomarker. Magnetic Resonance in Medicine. 2015;73(1):82–101. http://dx.doi.org/10.1002/mrm.25358.</u>	