

DICOM Correction Proposal

STATUS	Assigned
Date of Last Update	2019/02/18
Person Assigned	Wim Corbijn
Submitter Name	Wim Corbijn
Submission Date	2018/11/23

Correction Number	CP-1880
Log Summary: Update Linear_Exact formula	
Name of Standard PS3.3	
Rationale For Correction: <p style="margin-left: 40px;">The else part of the following formula seems not correct as it will not result in range of ymin to ymax if you take the boundary values $x=c-w/2$ and $x=c+w/2$.</p> <p style="margin-left: 40px;">if $(x \leq c - w/2)$, then $y = y_{min}$ else if $(x > c + w/2)$, then $y = y_{max}$ else $y = (x - c) / w * (y_{max} - y_{min}) + y_{min}$</p> <p>Also the first note seems out of context as Rescaling is not part of this section. And the given rescale values (RI=0 and RS=1/65535) don't give the identity transformation. Propose to remove the first note.</p>	
Correction Wording:	

Item #1: update PS3.3 Section C.11.2.1.3.2 LINEAR_EXACT Function

C.11.2.1.3.2 LINEAR_EXACT Function

If the value of VOI LUT Function (0028,1056) is LINEAR_EXACT, the function to be used to convert the output of the (conceptual) Modality LUT values to the input of the (conceptual) Presentation LUT is given by the following pseudo-code, where x is the input value, y is an output value with a range from y_{min} to y_{max} , c is Window Center (0028,1050) and w is Window Width (0028,1051):

if $(x \leq c - w/2)$, then $y = y_{min}$

else if $(x > c + w/2)$, then $y = y_{max}$

else $y = \underline{(x - c) / w + 0.5} * (y_{max} - y_{min}) + y_{min}$

Window Width (0028,1051) shall always be greater than 0.

Note

1. For example, given stored unsigned pixel values from 0 to 65535, a Rescale Intercept of 0 and a Rescale Slope of 1.0/65535, a Window Width of 1.0 and a Window Center of 0.5 would specify the entire range of values (the identity transformation for those rescale values).
2. Window Width (0028,1051) is required to be greater than zero to prevent division by zero (quite apart from being meaningless).