DICOM Change Proposal

STATUS	Assigned
Date of Last Update	2024/12/19
Person Assigned	Wim Corbijn
Submitter Name	Heinz Blendinger (heinz.blendinger@t-online.de)
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Change Number	CP-2471
Log Summary: Correct Shared FG SQ description and inconsistencies	
Name of Standard PS3.3	

Rationale for Change:

Due to the evolvement of the Standard with new IODs making use of the Functional Group (FG) enhanced coding, some previous conditions for the Shared Functional Groups Sequence (5200,9229) in the Multi-frame Functional Groups Module became weak or even inconsistent. This also affects informative notes in PS 3.3

a) Shared Functional Groups Sequence – the "Macro Include" Statement is inconsistent with the Attribute Description
The statement referring to the inclusion of FG Macros is claiming
">Include one or more Functional Group Macros that are shared by all frames."
whereas the Attribute Description in the same line phrases the statement that
"The item may be empty if the requirements for inclusion of the Functional Groups are not satisfied."
This is the case for newer IODs (cf. the Segmentation IOD and the Multi-frame True Color Secondary Capture Image IOD), that specify Functional Group Macros w/o restrictions, allowing complete encoding in the Per-Frame Functional Groups Sequence (5200,9230). This renders the statement "">Include **one** or more Functional Group Macros […]" to be inconsistent with the IOD definitions. This needs to be corrected to allow "Zero macro" to be included for the Shared Functional Groups Sequence, having an empty Item then.
This is in alignment with the Type 1 requirements referred to in PS3.5 section 7.4.1 for a "Type 1 Sequence" (Note 2).

b) Inconsistent Note text under Segmentation Functional Group Macros table
The note text reflects that certain Macros are Type C and therefore the Per-Frame Functional Groups Sequence (5200,9230) can be "entirely omitted". This is incomplete information in that Note, as the Segmentation Functional Groups are defined in a way that all Macros could be encoded in the Per-Frame Functional Groups Sequence (5200,9230) and therefore the Shared Functional Groups Sequence (5200,9229) is to be encoded with an empty item. So, the note could either be removed or requires additional information to reflect all cases of Segmentation Functional Groups encoding.
Remark: The Multi-frame True Color Secondary Capture Image Functional Group Macros would also allow a complete encoding in the Per-Frame Functional Groups Sequence, causing the Shared Functional Groups Sequence to be encoded with empty item. As there is no Note about possible omission of the Per-Frame Functional Groups Sequence, there is no change in wording needed.

Change Wording:

C.7.6.16 Multi-frame Functional Groups Module

10 Table C.7.6.16-1 specifies the Attributes of the Multi-frame Functional Groups Module. This Module is included in SOP Instances even if there is only one frame in the Instance.

Table C.7.6.16-1. Multi-frame Functional Groups Module Attributes

Attribute Name	Tag	Type	Attribute Description
Shared Functional Groups Sequence	(5200,9229)	1	Sequence that contains the Functional Group Macros that are shared for all frames in this SOP Instance and Concatenation. Note The contents of this Sequence are the same in all SOP Instances that comprise a Concatenation. Only a single Item shall be included in this Sequence. See Section C.7.6.16.1.1 for further explanation.
>*Include ~~one~~ zero or more Functional Group Macros that are shared by all frames. The selected Functional Group Macros shall not be present in the Per-Frame Functional Groups Sequence (5200,9230).*			For each IOD that includes this Module, a table is defined in which the permitted Functional Group Macros and their usage is specified. The Item may be empty if the requirements for inclusion of the Functional Groups are not satisfied.
Per-Frame Functional Groups Sequence	(5200,9230)	1C	Sequence that contains the Functional Group Sequence Attributes corresponding to each frame of the Multi-frame Image. The first Item corresponds with the first frame, and so on. One or more Items shall be included in this Sequence. The number of Items shall be the same as the number of frames in the Multi-frame image. See Section C.7.6.16.1.2 for further explanation. Required if for any frame, there are Per-Frame Functional Groups that are not empty.
>*Include one or more Functional Group Macros.*			For each IOD that includes this Module, a table is defined in which the permitted Functional Group Macros and their usage is specified.

Attribute Name	Tag	Type	Attribute Description
			An Item may be empty if the requirements for inclusion of the Functional Groups for the corresponding frame are not satisfied.
Instance Number	(0020,0013)	1	A number that identifies this Instance. The value shall be the same for all SOP Instances of a Concatenation, and different for each separate Concatenation and for each SOP Instance not within a Concatenation in a Series.
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Option#1 – Modify PS 3.3. Section A.51.5 Segmentation Functional Groups – remove Note under table A.51-2 Segmentation Functional Group Macros.

….	.	
Derivation Image	C.7.6.16.2.6	C - Required if Pixel Measures (C.7.6.16.2.1) or either Plane Position (Patient) (C.7.6.16.2.3) or Plane Orientation (Patient) (C.7.6.16.2.4) (if the Frame of Reference is defined in the patient-relative Reference Coordinate System), or Plane Position (Slide) (C.8.12.6.1) (if the Frame of Reference is defined in the Slide Coordinate System) Functional Groups are not present. May be present otherwise. See Section A.51.5.1
Frame Content	C.7.6.16.2.2	C - Required if not empty. Shall not be used as a Shared Functional Group.
Segmentation	C.8.20.3.1	C - Required if Dimension Organization Type (0020,9311) is not TILED_FULL and Segmentation Type (0062,0001) is not LABELMAP.

Note

20 ~~The Plane Position (Slide), Frame Content and Segmentation Macros are Type C, which allows the Per-Frame Functional Group Sequence (5200,9230) to be entirely omitted in those cases in which there are no other Per-Frame Functional Group Macros with content (i.e., the Frame Content Macro is empty or absent).~~

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Option#2 – Modify PS 3.3. Section A.51.5 Segmentation Functional Groups – extend Note under table A.51-2 Segmentation Functional Group Macros to reflect all cases.

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Derivation Image	C.7.6.16.2.6	C - Required if Pixel Measures (C.7.6.16.2.1) or either Plane Position (Patient) (C.7.6.16.2.3) or Plane Orientation (Patient) (C.7.6.16.2.4) (if the Frame of Reference is defined in the patient-relative Reference Coordinate System), or Plane Position (Slide) (C.8.12.6.1) (if the Frame of Reference is defined in the Slide Coordinate System) Functional Groups are not present. May be present otherwise. See Section A.51.5.1
Frame Content	C.7.6.16.2.2	C - Required if not empty. Shall not be used as a Shared Functional Group.
Segmentation	C.8.20.3.1	C - Required if Dimension Organization Type (0020,9311) is not TILED_FULL and Segmentation Type (0062,0001) is not LABELMAP.

Note

1. The Plane Position (Slide), Frame Content and Segmentation Macros are Type C, which allows the Per-Frame Functional Group Sequence (5200,9230) to be entirely omitted in those cases in which there are no other Per-Frame Functional Group Macros with content (i.e., the Frame Content Macro is empty or absent).
2. As there are no conditions for a Macro to require exclusive use in the Shared Functional Group, the Shared Functional Groups Sequence (5200,9229) could contain no Functional Group Macro and therefore contains an empty item.
The Shared Functional Group Sequence (5200,9229) will contain an empty item when all included Functional Groups are part of the Per-Frame Functional Group Sequence (5200,9230).

Commented [WC1]: rephrase

Commented [WC2]: Alternative sentence