

## DICOM Correction Item

Correction Number	CP-380
Log Summary: Mixed image multi-frame functional group requirements in Enhanced MR	
Type of Modification	Name of Standard
Clarification	PS 3.3 2003
<p>Rationale for Correction</p> <p>The Enhanced MR IOD specifies whether or not a frame is ORIGINAL or DERIVED at the frame level.</p> <p>When some frames are ORIGINAL and some DERIVED, an Image Type of MIXED is used.</p> <p>It is often the case that detailed descriptions of acquisition technique that are appropriate for ORIGINAL frames are not appropriate, meaningful or available for DERIVED frames (e.g. they may be derived from multiple originals with different acquisition characteristics).</p> <p>The majority of the functional group macros that describe the acquisition are conditionally present depending on Image Type value 1 being ORIGINAL or DERIVED. Furthermore, these macros general consist of a single Type 1 sequence with one Item required.</p> <p>Since these functional group macro sequences must always be present in every per-frame functional group item, the attributes within those sequences are conditionally present based on Frame Type value 1 being ORIGINAL (and may be present otherwise).</p> <p>However, there are some functional group macros that must always be present whose attributes are not conditionally present. These are the MR Echo, MR Receive Coil, MR Transmit Coil, MR Averages, MR Metabolite and MR Velocity Encoding macros. This means that somewhat arbitrarily one cannot construct MIXED image types when this information is not available or can not be meaningfully described for the DERIVED frames.</p>	
Sections of documents affected	
PS 3.3 C.8.13.5.X	
Correction Wording:	

**C.8.13.5.4 MR Echo Macro**

Table C.8.13-18 specifies the attributes of the MR Echo Functional Group macro.

**Table C.8.13-18  
MR ECHO MACRO ATTRIBUTES**

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>Attribute Description</b>
MR Echo Sequence	(0018,9114)	1	Identifies echo timing of this frame. Only a single Item shall be permitted in this sequence.
>Effective Echo Time	(0018,9082)	<u>1C</u>	The time in ms between the middle of the excitation pulse and the peak of the echo produced for kx=0. <b><u>Required if Frame Type (0008,9007)</u></b> <b><u>Value 1 of this frame is ORIGINAL.</u></b> <b><u>May be present otherwise.</u></b>

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**C.8.13.5.7 MR Receive Coil Macro**

Table C.8.13-21 specifies the attributes of the MR Receive Coil Functional Group macro.

**Table C.8.13-21  
MR RECEIVE COIL MACRO ATTRIBUTES**

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>Attribute Description</b>
MR Receive Coil Sequence	(0018,9042)	1	A sequence that provides information about each receive coil used. Only a single Item shall be permitted in this sequence.
>Receive Coil Name	(0018,1250)	1C	Name of receive coil used. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>
>Receive Coil Manufacturer Name	(0018,9041)	2C	Name of manufacturer of receive coil. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>
>Receive Coil Type	(0018,9043)	1C	Type of receive coil used. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>  Defined Terms: BODY VOLUME = head, extremity, etc.  SURFACE MULTICOIL
>Quadrature Receive Coil	(0018,9044)	1C	Indicates whether the receive coil is quadrature. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>  Enumerated Values: YES = quadrature or circularly polarized NO = linear

>Multi-Coil Definition Sequence	(0018,9045)	1C	<p>A sequence that provides information regarding each element of a multi-coil. It should include attributes for all elements, whether used in the current acquisition or not. One or more Items shall be present.</p> <p>Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL and Receive Coil Type (0018,9043) equals MULTICOIL. May be present otherwise only if Receive Coil Type (0018,9043) equals MULTICOIL.</p>
>>Multi-Coil Element Name	(0018,9047)	1	Name of element of multi-coil.
>>Multi-Coil Element Used	(0018,9048)	1	<p>Indicates whether the multi-coil element was used in the current acquisition.</p> <p>Enumerated Values:  YES  NO</p>
>Multi-Coil Configuration	(0018,9046)	3	A textual description of the configuration of multi-coil elements which was used in the current acquisition.

**C.8.13.5.8 MR Transmit Coil Macro**

Table C.8.13-22 specifies the attributes of the MR Transmit Coil Functional Group macro.

**Table C.8.13-22  
MR TRANSMIT COIL MACRO ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
MR Transmit Coil Sequence	(0018,9049)	1	A sequence that provides information about the transmit coil used. Only a single Item shall be permitted in this sequence.
>Transmit Coil Name	(0018,1251)	1C	Name of transmit coil used. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>
>Transmit Coil Manufacturer Name	(0018,9050)	2C	Name of manufacturer of transmit coil. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>
>Transmit Coil Type	(0018,9051)	1C	Type of transmit coil used. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>  Defined Terms: BODY VOLUME = head, extremity, etc.  SURFACE

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**C.8.13.5.10 MR Averages Macro**

Table C.8.13-24 specifies the attributes of the MR Averages Functional Group macro.

**Table C.8.13-24  
MR AVERAGES MACRO ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
MR Averages Sequence	(0018,9119)	1	Identifies the averaging parameters of this frame. Only a single Item shall be permitted in this sequence.
>Number of Averages	(0018,0083)	1C	Maximum number of times any point in k-space is acquired. <b>Required if Frame Type (0008,9007)</b> <b>Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>

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**C.8.13.5.12 MR Metabolite Map Macro**

Table C.8.13-26 specifies the attributes of the MR Metabolite Map Functional Group macro.

**TABLE C.8.13-26  
MR METABOLITE MAP MACRO ATTRIBUTES**

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>Attribute Description</b>
MR Metabolite Map Sequence	(0018,9152)	1	Identifies chemical shift parameters of this frame. Only a single Item shall be permitted in this sequence.
>Metabolite Map Description	(0018,9080)	<b>1C</b>	Text describing the Metabolite Map. <b>Required if Frame Type (0008,9007) Value 1 of this frame is ORIGINAL.</b> <b>May be present otherwise.</b>
>Chemical Shift Sequence	(0018,9084)	3	The list of frequencies that were used to create the Metabolite Map. One or more Items may be included in this sequence.
>>Chemical Shift Minimum Integration Limit	(0018,9195)	1	Minimal value of Chemical Shift Frequency in Hz.
>>Chemical Shift Maximum Integration Limit	(0018,9196)	1	Maximum value of Chemical Shift Frequency in Hz.

**C.8.13.5.13 MR Velocity Encoding Macro**

Table C.8.13-27 specifies the attributes of the MR Velocity Encoding Functional Group macro.

**Table C.8.13-27  
MR VELOCITY ENCODING MACRO ATTRIBUTES**

<b>Attribute Name</b>	<b>Tag</b>	<b>Type</b>	<b>Attribute Description</b>
MR Velocity Encoding Sequence	(0018,9197)	1	Identifies the velocity encoding of this frame. Only a single Item shall be permitted in this sequence.
>Velocity Encoding Direction	(0018,9090)	1C	The direction cosines of the velocity encoding vector with respect to the patient. See C.7.6.2.1.1 for further explanation.  <b><u>Required if Frame Type (0008,9007)</u></b> <b><u>Value 1 of this frame is ORIGINAL.</u></b> <b><u>May be present otherwise.</u></b>
>Velocity Encoding Minimum Value	(0018,9091)	1C	Minimum velocity in cm/s. <b><u>Required if Frame Type (0008,9007)</u></b> <b><u>Value 1 of this frame is ORIGINAL.</u></b> <b><u>May be present otherwise.</u></b>
>Velocity Encoding Maximum Value	(0018,9217)	1C	Maximum velocity in cm/s. <b><u>Required if Frame Type (0008,9007)</u></b> <b><u>Value 1 of this frame is ORIGINAL.</u></b> <b><u>May be present otherwise.</u></b>