

DICOM Correction Proposal

STATUS	Letter Ballot
Date of Last Update	2020/03/09
Person Assigned	Christof Schadt
Submitter Name	Michael Moyers, MFMoyers@roadrunner.com
Submission Date	2019/06/11

Correction Number	CP1971
Log Summary:	RT Ion Beams Correction for Scan Spot Size Record
Name of Standard	PS3.3
Rationale for Correction:	<p>The attribute description of the Scanning Spot Size (300A,0398) is:</p> <p>"The Scanning Spot Size as calculated using the Full Width Half Maximum (FWHM). Specified by a numeric pair - the size measured in air at isocenter in IEC GANTRY X direction followed by the size in the IEC GANTRY Y direction (mm)."</p> <p>This definition did not support the recording of the delivered X and Y spot sizes for each spot position of each control point which can be used for evaluating the quality of the delivered beam. Without having the spot sizes for each spot of each control point, accurate recalculation of the delivered dose is not possible.</p> <p>This change proposal adds a new attribute to capture the spot sizes for each delivered spot.</p>

In PS 3.3, Section C.8.8.26 RT Ion Beams Session Record Module, the following changes are to be made.

C.8.8.26 RT Ion Beams Session Record Module

Table C.8.8.26-1 specifies the Attributes that describe the measured and recorded settings acquired during Ion Radiation Treatments.

Table C.8.8.26-1. RT Ion Beams Session Record Module Attributes

Attribute Name	Tag	Type	Description
>>Number of Scan Spot Positions	(300A,0392)	1C	Number of spot positions used to specify scanning pattern for current segment beginning at control point. Required if Scan Mode (300A,0308) is MODULATED or MODULATED_SPEC.
>>Scan Spot Position Map	(300A,0394)	1C	A data stream of (x,y) pairs that define the coordinates of the scan spots as projected onto the machine isocentric plane in the IEC GANTRY coordinate system (mm). Required if Scan Mode (300A,0308) is MODULATED or MODULATED_SPEC. Contains 2N values where N is the Number of Scan Spot Positions (300A,0392). See Section C.8.8.25.8.

>>Scan Spot Metersets Delivered	(3008,0047)	1C	A set of Meterset values delivered to the scan spot positions. The order of Metersets matches the positions in Scan Spot Position Map (300A,0394). The sum contained in all Metersets shall match the difference of the Delivered Meterset of the current control point to the following control point. Required if Scan Mode (300A,0308) is MODULATED or MODULATED_SPEC. See Section C.8.8.25.8.
>>Scan Spot Time Offset	(300A,038F)	3	<p>A set of time offsets (in microseconds). Each offset is the time from the Treatment Control Point Time (3008,0025) until both the beam has reached the X,Y position recorded in the Scan Spot Position Map (300A,0394) and ion delivery has started at this position.</p> <p>The order of values matches the order of positions in Scan Spot Position Map (300A,0394).</p> <p>The number of values shall equal the value of Number of Scan Spot Positions (300A,0392).</p>
>>Scanning Spot Size	(300A,0398)	3	The Scanning Spot Size as calculated using the Full Width Half Maximum (FWHM). Specified by a numeric pair - the size measured in air at isocenter in IEC GANTRY X direction followed by the size in the IEC GANTRY Y direction (mm).
<u>>>Scan Spot Sizes Delivered</u>	<u>(300A,XXXX)</u>	<u>3</u>	<p><u>A data stream of (x,y) pairs that define the delivered spot sizes using the Full Width Half Maximum (FWHM) as measured by the delivery monitoring system. Specified by a numeric pair where the sizes are projected in air to the isocenter in IEC GANTRY X direction followed by the size in the IEC GANTRY Y direction (mm).</u></p> <p><u>The order of values shall match the order of positions in the Scan Spot Position Map (300A,0394) and contain 2N values where N is the Number of Scan Spot Positions (300A,0392) at each control point.</u></p>
>>Number of Paintings	(300A,039A)	1C	<p>The intended number of times the scan pattern given by Scan Spot Position Map (300A,0394) and Scan Spot Meterset Weights (300A,0396) in the Referenced RT Plan was to be applied at the current control point.</p> <p>Required if Scan Mode (300A,0308) is MODULATED or MODULATED_SPEC.</p>
>>Scan Spot Reordered	(300A,0393)	3	<p>Indicates that the spots were delivered in a different order than in the plan.</p> <p>Enumerated Values:</p> <p>YES The delivery machine changed the spot order</p> <p>NO The delivery machine delivered the spots in the order as planned</p> <p>When absent it is not known if the treatment delivery device delivered or reported in the order as planned. See Note 1.</p>

>>Scan Spot Prescribed Indices	(300A,0391)	1C	<p>The indices of the prescribed spots corresponding to each delivered spot. These indices are the ordinal positions of the spots in the Scan Spot Meterset Weights (300A,0396) in the Ion Control Point Sequence (300A,03A8) of the referenced RT Ion Plan. The numbering of indices of the prescribed spots shall start at one (a value of one refers the first ordinal position).</p> <p>Required, if Scan Spot Reordered (300A,0393) equals YES.</p> <p>Contains N values where N is the Number of Scan Spot Positions (300A,0392).</p>
--------------------------------	-------------	----	---

PS 3, Part 6, Chapter 6

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM	
...					
(300A,XXXX)	<u>Scan Spot Sizes Delivered</u>	<u>Scan Spot Sizes Delivered</u>	FL	2-2N	
...					