

1	Status	March 2019 Voting Packet
2	Date of Last Update	2019/01/17
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5	Submitter Name	QICR
6	Submission Date	2018/10/12

7	Correction Number CP-1857	
8	Log Summary: Factor out algorithm identification common to multiple observations	
9	Name of Standard	
10	PS3.16	
11	Rationale for Correction:	
12	TID 1500 includes the algorithm identification macro at the individual observation level but the same information may be common	
13	to many observations and it should be possible to encode it as device context at a higher level in the content tree, either at the	
14	Measurement Group level, or for all Imaging Measurements.	
15	The identification of the algorithm is distinct from the entire device that is specified in observer context or the General Equipment	
16	module.	
17	Also extend the algorithm identification information with coded equivalents of text values for consistency with the similar macro in	
18	PS3.3 used in non-SR objects.	
19	Correction Wording:	

Amend DICOM PS3.16 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

TID 300 Measurement

Type: Extensible
 Order: Significant
 Root: No

Table TID 300. Measurement

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	\$Measurement	1	M		UNITS = \$Units
2	>	HAS CONCEPT MOD	CODE	\$ModType	1-n	U		\$ModValue
3	>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		\$Method
...								
19	>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		

Content Item Descriptions

TID 1004 Device Observer Identifying Attributes

This Template (derived from the DICOM General Equipment Module of PS3.3) contains identifying (and optionally descriptive) attributes of devices that are observers.

Type: Extensible
 Order: Significant
 Root: No

Table TID 1004. Device Observer Identifying Attributes

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			UIDREF	EV (121012, DCM, "Device Observer UID")	1	M		
2			TEXT	EV (121013, DCM, "Device Observer Name")	1	U		Defaults to value of Station Name (0008,1010) in General Equipment Module
3			TEXT	EV (121014, DCM, "Device Observer Manufacturer")	1	U		Defaults to value of Manufacturer (0008,0070) in General Equipment Module
4			TEXT	EV (121015, DCM, "Device Observer Model Name")	1	U		Defaults to value of Manufacturer's Model Name (0008,1090) in General Equipment Module

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
5			TEXT	EV (121016, DCM, "Device Observer Serial Number")	1	U		Defaults to value of Device Serial Number (0018,1000) in General Equipment Module
6			TEXT	EV (121017, DCM, "Device Observer Physical Location During Observation")	1	U		
7			CODE	EV (113876, DCM, "Device Role in Procedure")	1-n	U		...
8			TEXT	EV (110119, DCM, "Station AE Title")	1	U		

Content Item Descriptions

...

TID 1410 Planar ROI Measurements

...

Type: Extensible
Order: Non-Significant
Root: No

Table TID 1410. Planar ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125007, DCM, "Measurement Group")	1	M		
...								
11	>	CONTAINS	INCLUDE	DTID 1419 "ROI Measurements"	1	M		...
12	>	CONTAINS	CODE	\$QualitativeEvaluations	1-n	U		
13	>	CONTAINS	TEXT	\$QualitativeEvaluations	1-n	U		

Content Item Descriptions

...	...
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TID 1411 Volumetric ROI Measurements

...

Type: Extensible
Order: Non-Significant
Root: No

Table TID 1411. Volumetric ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125007, DCM, "Measurement Group")	1	M		
...								
15	>	CONTAINS	INCLUDE	DTID 1419 "ROI Measurements"	1	M		...
16	>	CONTAINS	CODE	\$QualitativeEvaluations	1-n	U		
17	>	CONTAINS	TEXT	\$QualitativeEvaluations	1-n	U		

Content Item Descriptions

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TID 1419 ROI Measurements

...

Type: Extensible
Order: Non-Significant
Root: No

Table TID 1419. ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		\$Method
...								
4	>	HAS CONCEPT MOD	CODE	DT (G-A1F8, SRT, "Topographical modifier")	1	U		\$TargetSiteMod
4b		HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		
5			NUM	\$Measurement	1-n	M		UNITS = \$Units
...								
7	>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		\$Method
...								
20	>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		

Content Item Descriptions

...	
Row 4b	<u>Describes the algorithm that applies to all measurements in Row 5, unless overridden within the individual measurement at Row 20.</u>

TID 1420 Measurements Derived From Multiple ROI Measurements

...

Type: Extensible

Order: Non-Significant
Root: No

Table TID 1420. Measurements Derived From Multiple ROI Measurements

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			NUM	DCID 7465 "Measurements Derived From Multiple ROI Measurements"	1-n	M		
1b	>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		
2	>	R-INFERRED FROM	INCLUDE	DTID 1410 "Planar ROI Measurements"	1-n	MC	XOR Row 3	...
3	>	R-INFERRED FROM	INCLUDE	DTID 1411 "Volumetric ROI Measurements"	1-n	MC	XOR Row 2	...
4	>	HAS PROPERTIES	INCLUDE	DTID 320 "Image or Spatial Coordinates"	1	U		...

Content Item Descriptions

Row 1	Specifies the type of derived measurement reported, e.g., the mean of the individual ROI mean density values. Note that the units may be different from the units in the ROI measurements
Row 1b	<u>Describes the algorithm used to produced the derived measurement, as opposed to the referenced measurements from which this measurement was derived.</u>
Rows 2, 3	The measurement values of each ROI that contributes to the derived measurement, e.g., the mean density within an ROI. These are specified by reference, so as to not have to repeat the ROI information when it contributes to multiple derived measurements (e.g., if both mean and SD of ROI mean density values were specified).

TID 1500 Measurement Report

Type: Extensible
Order: Non-Significant
Root: Yes

Table TID 1500. Measurement Report

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DCID 7021 "Measurement Report Document Titles"	1	M		Root node
...								
3	>	HAS OBS CONTEXT	INCLUDE	DTID 1001 "Observation Context"	1	M		
...								
6	>	CONTAINS	CONTAINER	EV (126010, DCM, "Imaging Measurements")	1	C	IF row 10 and 12 are absent	
6b	>>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
7	>>	CONTAINS	INCLUDE	DTID 1410 "Planar ROI Measurements"	1-n	U		...
8	>>	CONTAINS	INCLUDE	DTID 1411 "Volumetric ROI Measurements"	1-n	U		...
9	>>	CONTAINS	INCLUDE	DTID 1501 "Measurement Group"	1-n	U		...
10	>	CONTAINS	CONTAINER	EV (126011, DCM, "Derived Imaging Measurements")	1	C	IF row 6 and 12 are absent	
10b	>>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		
11	>>	CONTAINS	INCLUDE	DTID 1420 "Measurements Derived From Multiple ROI Measurements"	1-n	U		
12	>	CONTAINS	CONTAINER	EV (C0034375, UMLS, "Qualitative Evaluations")	1	C	IF row 6 and 10 are absent	
12b	>>	HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		
13	>>	CONTAINS	CODE		1-n	U		
14	>>	CONTAINS	TEXT		1-n	U		

Content Item Descriptions

Rows 6, 10, 12	The conditions require that at least one of the "heading" containers be present, though any of them may be present but empty.
Row 6b, 10b, 12b	<u>Describes the algorithm that applies to all observations within the container, unless overridden at the group or individual observation level.</u>
Rows 7, 8, 9	The baseline context groups defined allow for generic intensity, size and texture measurements, regardless of the geometry of the ROI (e.g., linear distance can be measured on volumes, or volume can be estimated from a linear distance), and being baseline, do not constrain the invoker from using other appropriate concepts specific to the application.
Row 9	A Measurement Group is used to contain one or more individual measurements that are invocations of TID 300, consistent with TIDs 1410 and 1411, which both already have Measurement Group containers as their roots.
Rows 12, 13, 14	These Content Items allow encoding a flat list of name-value pairs that are coded questions with coded or text answers, for example, to record categorical observations related to the entire subject of the report rather than specific measurement groups.

TID 1501 Measurement Group

...

Type: Extensible
Order: Non-Significant
Root: No

Table TID 1501. Measurement Group

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1		CONTAINS	CONTAINER	EV (125007, DCM, "Measurement Group")	1	M		
...								
5	>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	U		\$Method
...								
9	>	CONTAINS	COMPOSITE	EV (126100, DCM, "Real World Value Map used for measurement")	1	U		SOP Class UID shall be Real World Value Mapping Storage ("1.2.840.10008.5.1.4.1.1.67")
9b		HAS CONCEPT MOD	INCLUDE	DTID 4019 "Algorithm Identification"	1	U		
10	>	CONTAINS	INCLUDE	DTID 300 "Measurement"	1-n	M		...
11	>	CONTAINS	CODE	\$QualitativeEvaluations	1-n	U		
12	>	CONTAINS	TEXT	\$QualitativeEvaluations	1-n	U		

Content Item Descriptions

Row 9b	<u>Describes the algorithm that applies to all measurements in TID 300 Row 1, unless overridden within the individual measurement at TID 300 Row 19.</u>
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TID 4019 Algorithm Identification

This Template details the algorithm unambiguously. Re-state the software identification from the General Equipment Module of the SR IOD if all algorithms are unambiguously defined by that module.

Type: Non-Extensible
Order: Significant
Root: No

Table TID 4019. Algorithm Identification

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			TEXT	EV (111001, DCM, "Algorithm Name")	1	M		<u>May be the same as the Manufacturer's Model Name (0008,1090) in General Equipment Module.</u>
1b			CODE	EV (111001, DCM, "Algorithm Name")	1	U		
2			TEXT	EV (111003, DCM, "Algorithm Version")	1	M		<u>May be the same as Software Versions (0018,1020) in General Equipment Module.</u>
3			TEXT	EV (111002, DCM, "Algorithm Parameters")	1-n	U		
4			CODE	EV (ddd001, DCM, "Algorithm Family")	1	U		

D DICOM Controlled Terminology Definitions (Normative)

Table D-1. DICOM Controlled Terminology Definitions (Coding Scheme Designator "DCM" Coding Scheme Version "01")

Code Value	Code Meaning	Definition	Notes
111001	Algorithm Name	The name assigned by a manufacturer to a specific software algorithm.	
111002	Algorithm Parameters	The input parameters used by a manufacturer to configure the behavior of a specific software algorithm.	
111003	Algorithm Version	The software version identifier assigned by a manufacturer to a specific software algorithm.	
ddd001	Algorithm Family	<u>The family of algorithm(s) that best describes the software algorithm used.</u>	

DICOM PS3.3 for reference unchanged:

10.16 Algorithm Identification Macro

Table 10-19 describes the Attributes for encoding the algorithm used to create or derive a SOP Instance contents. An algorithm is described by the Algorithm Family, a specific Algorithm Name, and an Algorithm Version. A character string containing parameters that were used in the algorithm can be included.

Table 10-19. Algorithm Identification Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Algorithm Family Code Sequence	(0066,002F)	1	The family of algorithm(s) that best describes the software algorithm used. Only a single Item shall be included in this Sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>			Context ID may be defined in the Macro invocation.
Algorithm Name Code Sequence	(0066,0030)	3	The code assigned by a manufacturer to a specific software algorithm. Only a single Item is permitted in this Sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>			<i>No Baseline CID is defined.</i>
Algorithm Name	(0066,0036)	1	The name assigned by a manufacturer to a specific software algorithm.
Algorithm Version	(0066,0031)	1	The software version identifier assigned by a manufacturer to a specific software algorithm.
Algorithm Parameters	(0066,0032)	3	The input parameters used by a manufacturer to configure the behavior of a specific software algorithm.
Algorithm Source	(0024,0202)	3	Source of the algorithm, e.g., the name of the manufacturer, researcher, university, etc.

C.7.5.1 General Equipment Module

Table C.7-8 specifies the Attributes that identify and describe the piece of equipment that produced a Series of Composite Instances.

Table C.7-8. General Equipment Module Attributes

Attribute Name	Tag	Type	Attribute Description
Manufacturer	(0008,0070)	2	Manufacturer of the equipment that produced the Composite Instances.
Institution Name	(0008,0080)	3	Institution where the equipment that produced the Composite Instances is located.
Institution Address	(0008,0081)	3	Mailing address of the institution where the equipment that produced the Composite Instances is located.
Station Name	(0008,1010)	3	User defined name identifying the machine that produced the Composite Instances.
Institutional Department Name	(0008,1040)	3	Department in the institution where the equipment that produced the Composite Instances is located.
Manufacturer's Model Name	(0008,1090)	3	Manufacturer's model name of the equipment that produced the Composite Instances.
Device Serial Number	(0018,1000)	3	Manufacturer's serial number of the equipment that produced the Composite Instances. Note This identifier corresponds to the device that actually created the images, such as a CR plate reader or a CT console, and may not be sufficient to identify all of the equipment in the imaging chain, such as the generator or gantry or plate.
Software Versions	(0018,1020)	3	Manufacturer's designation of software version of the equipment that produced the Composite Instances. See Section C.7.5.1.1.3.
...

C.7.5.1.1 General Equipment Attribute Descriptions**Note**

The Attributes Manufacturer (0008,0070), Manufacturer's Model Name (0008,1090) and Device Serial Number (0018,1000) are intended to be a primary identification of the system that produces the data (e.g., modality or workstation application providing the content of the SOP Instance) and not the identification of the component that encodes the SOP Instance (e.g., a commonly used DICOM encoding toolkit).

C.7.5.1.1.3 Software Versions

Software Versions (0018,1020) is a multi-valued Attribute. For equipment that is composed of several components, it may be used to identify the name and version for each of those components. This may also include the identifier and version of libraries or configuration files that significantly affect the production of the SOP Instance.