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1. Scope of this document

This document contains an overview of the IHE-RO project scenarios and the rules these scenarios apply. A description of the supplied data sets is provided as well.

2. Beam Consumer Scenarios

The operation is similar for all beam consumer scenarios. Each beam consumer scenario however provides a different dataset and provides the option to select the beam modifiers supported for that consumer.

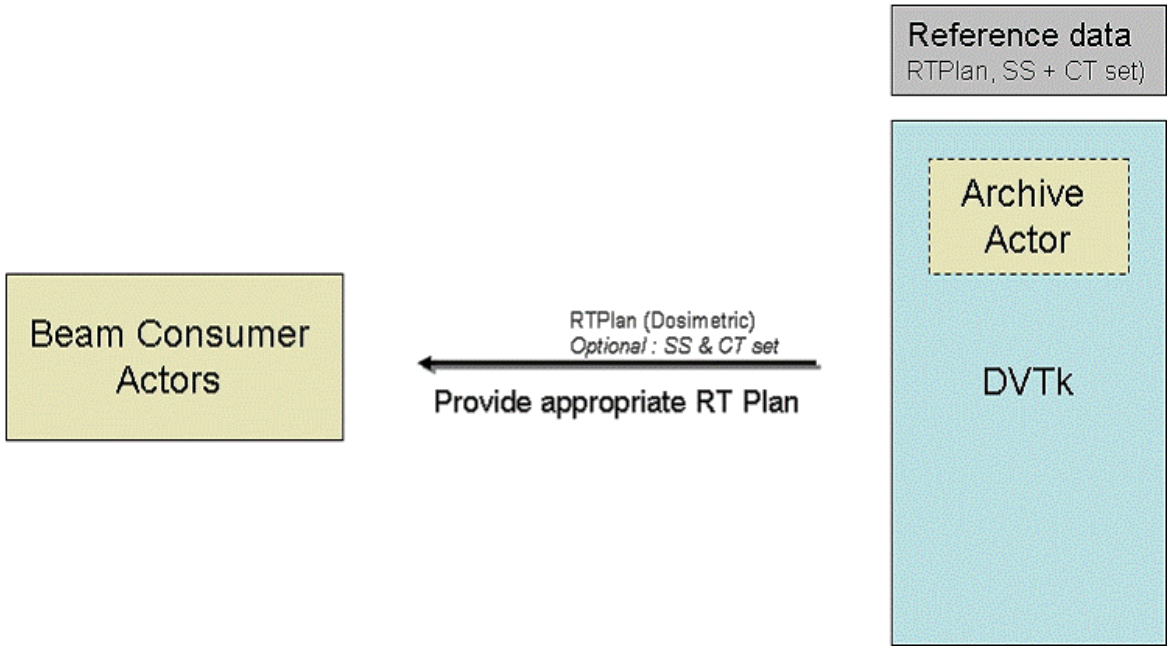
1. Before starting the scenario make sure the beam consumer is active and listening for data.

2. Start the scenario.

3. A pop-up will appear that asks whether or not you want to provide the structure set and CT set along with the RTPlan. (This is optional)

4. Another pop-up will ask you which beam modifiers you want to send along with the RTPlan. Only optional beam modifiers can be selected. Any required or modifiers that are not allowed are blanked out and cannot be added or removed.

5. The data is sent by DVTk to the SUT (System Under Test).



2. 1. Basic Static Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 2. Basic Static MLC Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 3. Arc Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

2. 4. MLC Arc Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

2. 5. Conformal Arc Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

2. 6. Hard Wedge Beam Consumer additional beam modifiers

The following beam modifier is required:

* Hard Wedge Beam

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 7. Virtual Wedge Beam Consumer additional beam modifiers

The following beam modifier is required:

* Hard Wedge Beam

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 8. Motorized Wedge Beam Consumer additional beam modifiers

The following beam modifier is required:

* Hard Wedge Beam

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 9. Static Electron Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Compensator Beam

2. 10. Step And Shoot Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Hard Wedge Beam

2. 11. Sliding Window Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

* Block Beam

* Hard Wedge Beam

2. 12. IMAT VMAT Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

2. 13. Photon Applicator Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

2. 14. Photon Applicator Arc Beam Consumer additional beam modifiers

The following beam modifiers can be added or removed from the RTPlan by selecting or deselecting them from the pop-up at the start of the scenario:

* Bolus Beam

3. Beam Producer Scenarios

Every beam producer scenario operates in a similar manner. Optionally an input dataset can be provided. After that the scenario receives an RT plan from the producer actor and validates it against the rules specific for its scenario.

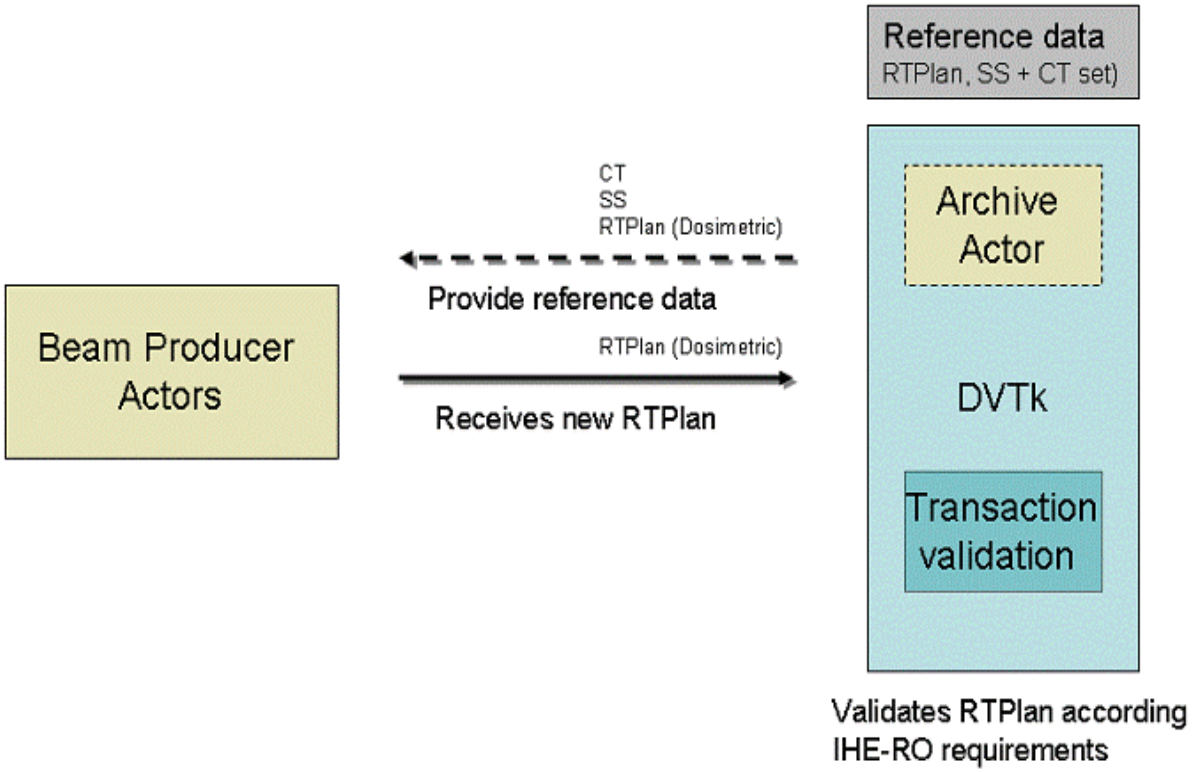
1. Start the scenario

2. A pop-up appears which asks whether or not you want to sent structure set, the CT set and the RTPlan. (This is optional)

3. DVTk starts to listen now for incoming messages. The RTPlan can now be sent by the Beam Producer Actor.

4. When data is sent by Beam Producer Actor, press '*stop listening start validation*'.

5. Validation of the transaction commences.



The following rules apply to all beam producer scenarios:

General Study Module				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
Study Instance UID	(0020,000D)	R	The study, where the series of the plan is contained, shall be the same study as the one containing the structure set referenced in the plan.	InteroperabilityRule

General Equipment Module				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
Manufacturer	(0008,0070)	R+*	IHE requires that this element be present, and should contain the manufacturer of the equipment creating the image, structure set, plan, or dose. If the equipment is storing and forwarding information, the value of this element shall be preserved. If a new plan is created from a previous plan, the manufacturer of the equipment producing the new plan shall insert their identifier in this element. If a new structure set is created from a previous structure set, the manufacturer of the equipment producing the new structure set shall insert their identifier in this element.	IsRequiredRule
Manufacturer's Model Name	(0008,1090)	R+*	If an application resamples and re-exports a series of CT images, or modifies an instance then this element must be present, and must contain the model name of the equipment doing the resampling.	

Software Versions	(0018, 1020)	R+	For actors participating in the Advanced RT Objects Interoperability Profile	IsRequiredRule

RT General Plan Module				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
RT Plan Label	(300A,0002)	R+	The label which serves as the identification of the plan for the user.	IsRequiredRule
RT Plan Date	(300A,0006)	R+	The date when the plan was last modified.	IsRequiredRule
RT Plan Time	(300A,0007)	R+	The time when the plan was last modified.	IsRequiredRule
Plan Intent	(300A,000A)	R+		IsRequiredRule
RT Plan Geometry	(300A,000C)	R+*	Shall be PATIENT. This implies that the RT Structure Set exists and is referenced in the General Plan module.	IsRequiredRule ValueRule

RT Fraction Scheme Module				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
Fraction Group Sequence	(300A, 0070)	R+*	Shall have only a single item in the sequence	IsRequiredRule SequenceRangeRule
>Number of Fractions Planned	(300A, 0078)	R+		IsRequiredRule
>Referenced Beam Sequence	(300C, 0004)	R+*		IsRequiredRule
>>Beam Dose	(300A, 0084)	R+		IsRequiredRule
>>Beam Dose Specification Point	(300A, 0082)	R+		IsRequiredRule
>>Beam Meterset	(300A, 0086)	R+		IsRequiredRule

RT Prescription Module				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
Dose Reference Sequence	(300A, 0010)	R+*	See Dose rreference requirements in the RT Beams module for the ASTI transactions.	IsRequiredRule
>Dose Reference UID	(300A, 0013)	R+*		IsRequiredRule

>Dose Reference Description	(300A, 0016)	R+		IsRequiredRule

Control Point Fixed Attribute List				
Attribute	**Tag**	**IHE-Rule**	**Description**	**Code Rule**
>> Patient Support Angle	(300A,0122)	R+*	Shall be constant.	ConstantValueRule
>> Patient Support Rotation Direction	(300A,0123)	R+*	Shall be NONE.	IsRequiredRule ValueRule
>> Table Top Eccentric Axis Distance	(300A,0124)	O+*	If present, shall be constant.	ConstantValueRule
>> Table Top Eccentric Angle	(300A,0125)	R+*	Shall be constant.	ConstantValueRule
>>Table Top Eccentric Rotation Direction	(300A,0126)	R+*	Shall be NONE.	ValueRule
>> Table Top Pitch Angle	(300A,0140)	R+*	Shall be constant.	ConstantValueRule
>> Table Top Pitch Rotation Direction	(300A,0142)	R+*	Shall be NONE.	ValueRule
>> Table Top Roll Angle	(300A,0144)	R+*	Shall be constant.	ConstantValueRule
>> Table Top Roll Rotation Direction	(300A,0146)	R+*	Shall be NONE	ValueRule
>> Table Top Vertical Position	(300A,0128)	R+*	Shall be constant.	ConstantValueRule
>> Table Top Longitudinal Position	(300A,0129)	R+*	Shall be constant.	ConstantValueRule
>> Table Top Lateral Position	(300A,012A)	R+*	Shall be constant.	ConstantValueRule

2.1 Additional Beam Modifier Rules

Bolus Beam Modifier				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Number of Boli	(300A,00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	
> Referenced Bolus Sequence	(300A,00B0)	R+*		NrOfSequenceItemRule

Block Beam Modifier				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	
> Block Sequence	(300A,00F4)	R+*		NrOfSequenceItemRule
>> Block Tray ID	(300A,00F5)	R+	See Note 1.	IsRequiredRule
>> Source to Block Tray Distance	(300A,00F6)	R+		IsRequiredRule
>> Block Divergence	(300A,00FA)	R+*		IsRequiredRule
>> Block Mounting Position	(300A,00FB)	R+	Shall be present, and shall be handled safely for enumerated values not supported.	IsRequiredRule
>> Material ID	(300A,00E1)	R+		IsRequiredRule
>> Block Thickness	(300A,0100)	R+		IsRequiredRule
>> Block Number of Points	(300A,0104)	R+*		IsRequiredRule

Compensator Beam Modifier				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Number of Compensators	(300A,00E0)	R+*	Shall be 0 or 1. If 1, see Compensator Beam Modifier.	

> Compensator Sequence	(300A,00E3)	R+*		NrOfSequenceItemRule
>> Compensator Type	(300A,00EE)	R+*	Shall be STANDARD.	IsRequiredRule ValueRule
>> Material ID	(300A,00E1)	R+*		IsRequiredRule
>> Compensator ID	(300A,00E5)	R+*		IsRequiredRule
>> Source to Compensator Tray Distance	(300A,00E6)	R+*		IsRequiredRule
>> Compensator Divergence	(300A,02E0)	R+*		IsRequiredRule
>> Compensator Mounting Position	(300A,02E1)	R+*	Shall be PATIENT_SIDE or SOURCE_SIDE.	IsRequiredRule ValueListRule
>> Compensator Transmission Data	(300A,00EB)	R+*		IsRequiredRule

Hard Wedge Beam Modifier				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Number of Wedges	(300A,00D0)	R+*	Shall be 1.	
> Wedge Sequence	(300A,00D1)	R+*	Shall be present.	NrOfSequenceItemRule
>> Wedge Type	(300A,00D3)	R+*	Shall be STANDARD (static)	IsRequiredRule ValueRule
>> Wedge ID	(300A,00D4)	R+		IsRequiredRule
>> Wedge Angle	(300A,00D5)			IsRequiredRule
>> Wedge Orientation	(300A,00D8)	R+		IsRequiredRule
>> Source to Wedge Tray Distance	(300A,00DA)	R+		RequiredConditionalRule
> Control Point Sequence	(300A,0111)			IsRequiredRule

>> Wedge Position Sequence	(300A,0116)	R+*	Shall be present and consistent with the Wedge Sequence (300A,00D1).	NrOfSequenceItemRule

3. 2. Basic Static Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, MLC shall not be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	O+*	NA (no MLC)	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule

>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	RequiredConditionalRule

3. 3. Basic Static MLC Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule

> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall have at least 1 MLC	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule

>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	RequiredConditionalRule

3. 4. Arc Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be DYNAMIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule

> High-Dose Technique Type	(300A,00C7)	O+*	If present, shall be NORMAL	OptionalRule / ValueRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, MLC shall not be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	O+*	NA (no MLC)	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2. Skip arcs are not tested in this transaction.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule

>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be CW or CC for Control Point 0. Can be NONE for Control Point 1.	ValueListRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 5. MLC Arc Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be DYNAMIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, shall be NORMAL.	OptionalRule / ValueRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule

> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall have at least 1 MLC.	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs.	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2. Skip arcs are not tested in this transaction.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be CW or CC for Control Point 0. Can be NONE for Control Point 1.	ValueListRule

>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 6. Conformal Arc Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be Dynamic.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, or at least 1 jaw and 1 MLC.	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs.	

> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	If the Consumer has a limit, it shall document this and safely handle input that exceeds that limit.	IsRequiredRule / ValueEqualOrHigherRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be constant (CW or CC) for all CP except last one. Can be NONE for final CP	ValueListRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule

>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 7. Hard Wedge Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall have at least 2 jaws or at least 1 jaw and 1 MLC.	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs,.	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 1.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule

Sequence				
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall be present and consistent with the Wedge Sequence (300A,00D1).	
>>> Wedge Position	(300A,0118)	R+*	Shall be IN.	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	RequiredConditionalRule

3. 8. Virtual Wedge Beam Producer Additional Rules

C8.8.14 RT Beams Module				

Attribute	Tag	IHE -Rule	Description	Code Rule
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall have at least 2 jaws or at least 1 jaw and 1 MLC.	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs,.	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 1 or 2. If 2, see Hard Wedge Beam Modifier.	IsRequiredRule / ValueRangeRule
>>Source to Wedge Tray Distance	(300A,00DA)	R+	Shall not be present.	NotPresentRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule

>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall be present and consistent with the Wedge Sequence (300A,00D1).	
>>> Wedge Position	(300A,0118)	R+*	Shall be IN.	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	RequiredConditionalRule

3. 9. Motorized Wedge Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule

Technique Type				
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall have at least 2 jaws or at least 1 jaw and 1 MLC.	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs,.	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 1 or 2. If 2, see also Hard Wedge Beam Modifier	IsRequiredRule / ValueRangeRule
>>Source to Wedge Tray Distance	(300A,00DA)	R+	Shall not be present.	NotPresentRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 4.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall be present and consistent with the Wedge Sequence (300A,00D1).	

>>> Wedge Position	(300A,0118)	R+*	For Motorized Wedge, shall be IN for CPs 0 and 1, OUT for CPs 2 and 3. Shall be IN for optional Hard Wedge	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	RequiredConditionalRule

3. 10. Static Electron Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be ELECTRON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule

>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, MLC shall not be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	O+*	NA (no MLC)	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall contain 1 item.	IsRequiredRule NrOfSequenceItemRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule

>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule
>> Source to Surface Distance	(300A,0130)	R+*	Required if Patient Setup Technique (300A, 01B0) is FIXED_SSD.	

3. 11. Step And Shoot Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, shall be NORMAL	OptionalRule / ValueRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	At least 1 MLC shall be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs.	

> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0 or 1. If 1, see Hard Wedge Beam Modifier	IsRequiredRule / ValueRangeRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2n, where n is the number of unique field shapes composing the beam	IsRequiredRule / ValueEqualOrHigherRule
>> Cumulative Meterset Weight	(300A,0134)	R+	CP[0]=0.0 :: CP[2n + 1]=Cumulative Meterset Weight after completion of delivery of the field shape :: CP[2n+1] = CP[2n + 2]	IsRequiredRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	See Hard Wedge Beam Modifier. If present, may not be ignored	
>>> Wedge Position	(300A,0118)	R+*	Shall be IN.	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule

>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 12. Sliding Window Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be DYNAMIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, shall be NORMAL	OptionalRule / ValueRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	At least 1 MLC shall be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs.	

> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0 or 1. If 1, see Hard Wedge Beam Modifier	IsRequiredRule / ValueRangeRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0-8. If > 0, see Block Beam Modifier.	IsRequiredRule / ValueRangeRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall >2.	IsRequiredRule / ValueInRangeRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	See Hard Wedge Beam Modifier. If present, may not be ignored	
>>> Wedge Position	(300A,0118)	R+*	Shall be IN.	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule

>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 13. IMAT VMAT Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be DYNAMIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, shall be NORMAL or HDR, may not be ignored.	OptionalRule / ValueListRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	At lest 1 MLC shall be present	IsRequiredRule BeamLimitingDeviceRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
>> Leaf Position Boundaries	(300A,00BE)	R+*	Shall be present for MLCs.	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule

> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Applicator Sequence	(300A,0107)	R+*	Shall not be present.	NotPresentRule
> Number of Control Points	(300A,0110)	R+*	Shall be > 2.	IsRequiredRule / ValueInRangeRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be present as Nominal Dose Rate.	IsRequiredRule ConstantValueRule / ValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present.	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be constant (CW or CC) for all CP except the last CP, which can be NONE.	ValueListRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	If present,shall not be ignored.	

3. 14. Photon Applicator Beam Producer Additional Rules

C8.8.14 RT Beams				

Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be STATIC.	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, MLC shall not be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	O+*	NA (no MLC)	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Applicator Sequence	(300A,0107)	R+*	Shall contain 1 item.	NrOfSequenceItemsRule
>> Applicator Type		R+*	Shall be PHOTON_CIRC	IsRequiredRule ValueRule
>> Applicator Geometry	(300A,0431)	R+*		IsRequiredRule

Sequence				
>>> Applicator Aperture Shape	(300A,0432)	R	Shall be SYM_CIRCULAR	IsRequiredRule ValueRule
>>> Applicator Opening	(300A,0433)	R		IsRequiredRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Angle	(300A,011E)	R+*	Shall be constant.	ConstantValueRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be NONE.	ValueRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule

3. 15. Photon Applicator Arc Beam Producer Additional Rules

C8.8.14 RT Beams Module				
Attribute	**Tag**	**IHE -Rule**	**Description**	**Code Rule**
> Beam Number	(300A,00C0)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Beam Type	(300A,00C4)	R+*	Shall be DYNAMIC..	IsRequiredRule / ValueRule
> Radiation Type	(300A,00C6)	R+*	Shall be PHOTON.	IsRequiredRule / ValueRule
> High-Dose Technique Type	(300A,00C7)	O+*	If present, may not be ignored.	OptionalRule
> Primary Fluence Mode Sequence	(300A,0050)	R+*		IsRequiredRule
>> Fluence Mode	(300A,0051)	R*		IsRequiredRule
>> Fluence Mode ID	(300A,0052)	R+	Shall be present with value FFF if Fluence Mode is NON_STANDARD.	IsRequiredRule / ConditionalRequiredValueRule
> Primary Dosimeter Unit	(300A,00B3)	R+	Shall be MU.	IsRequiredRule ValueRule
>> RT Beam Limiting Device Type	(300A,00B8)	R+*	Shall be 2 jaws, MLC shall not be present	IsRequiredRule BeamLimitingDeviceRule
>> Leaf Position Boundaries	(300A,00BE)	O+*	NA (no MLC)	
> Referenced Patient Setup Number	(300C,006A)	R+*	Shall be >= 1.	IsRequiredRule ValueEqualOrHigherRule
> Number of Wedges	(300A,00D0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Number of Boli	(300A, 00ED)	R+*	Shall be >= 0. If > 0, see Bolus Beam Modifier.	IsRequiredRule
> Number of Blocks	(300A,00F0)	R+*	Shall be 0.	IsRequiredRule / ValueRule
> Applicator Sequence	(300A,0107)	R+*	Shall contain 1 item.	NrOfSequenceItemsRule

>> Applicator Type		R+*	Shall be PHOTON_CIRC	IsRequiredRule ValueRule
>> Applicator Geometry Sequence	(300A,0431)	R+*		IsRequiredRule
>>> Applicator Aperture Shape	(300A,0432)	R	Shall be SYM_CIRCULAR	IsRequiredRule ValueRule
>>> Applicator Opening	(300A,0433)	R		IsRequiredRule
> Number of Control Points	(300A,0110)	R+*	Shall be 2.	IsRequiredRule / ValueRule
>> Referenced Dose Reference Sequence	(300C,0050)	R+*	Shall have at least one item for target dose accumulation.	IsRequiredRule
>>> Cumulative Dose Reference Coefficient	(300A,010C)	R+*	Shall be present.	IsRequiredRule
>> Nominal Beam Energy	(300A,0114)	R+	Shall be constant.	ConstantValueRule
>> Dose Rate Set	(300A,0115)	R+	Shall be constant.	IsRequiredRule ConstantValueRule
>> Wedge Position Sequence	(300A,0116)	R+*	Shall not be present	
>> Beam Limiting Device Position Sequence	(300A,011A)	R+*	Shall be consistent with the Beam Limiting Device Sequence (300A,00B6).	IsRequiredRule
>> Gantry Rotation Direction	(300A,011F)	R+*	Shall be CW or CC for Control Point 0, Can be NONE for Control Point 1.	ValueListRule
>> Gantry Pitch Angle	(300A,014A)	O+*	If not present, shall be assumed to be nominal position. If present, may not be ignored.	OptionalRule
>> Gantry Pitch Rotation Direction	(300A,014C)	O+*	If present, shall be NONE.	ValueRule
>> Beam Limiting Device Angle	(300A,0120)	R+*	Shall be constant.	IsRequiredRule / ConstantValueRule
>> Beam Limiting Device Rotation Direction	(300A,0121)	R+*	Shall be NONE.	ValueRule