The ElectronRT App includes a set of QA Tools that allow the user to measure each treatment beam dose on a water phantom, compute dose on bolus simulation CT images and compare results, and export QA PDF reports. The QA Tools block is only enabled for approved treatment plans.

Dose QA

The Dose QA block computes and displays the dose for each beam in the treatment plan to a water phantom. For each beam, the user is able to define the SSD and the depth of a measurement plane. This measurement plane will be used to take a cross-sectional sample of the water phantom dose. The dimensions of the water phantom, as well as the default measurement plane depth and dose grid spacing, are defined and editable in the Site QA Options.

After defining the measurement plane depth for at least one beam, the user will be able to click the Export QA Dose Files button to export a QA Dose DICOM file for every measurement plane dose to a local directory. The exported DICOM will include:

- 1. A 1cm thick dose image around the set measurement plane
- 2. [optional] The full 3D water phantom dose if the user has selected the full 3D dose export option

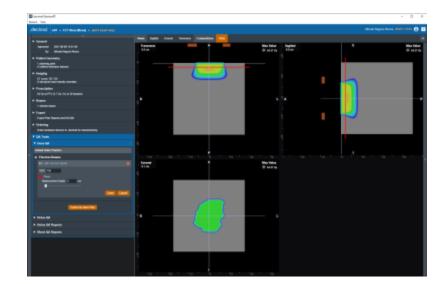


Fig. 1: Dose QA

Bolus QA

The Bolus QA block allows the user to import DICOM CT images and an optional structure set used for bolus simulation QA. The process is very similar to the DICOM Patient Import.

Re-Import Structures		
Select file(s) for import		
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CT-2.16.840.1.114460.178.1.1589548581.964.1471771.1.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.10.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.100.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.101.dcm		
CT-2 16.840.1.114460.178.1.1589548581.964.1471771.102.dcm CT-2 16.840.1.114460.178.1.1589548581.964.1471771.103.dcm		
CT-2 16.840 1.114460 178 1.1589548581.964 1471771 103.00m		
CT-2 16.840.1.114460.178.1.1589548581.964.1471771.104.0cm		
CT-2 16 840 1 114460 178 1 1589548581 964 1471771 106 dcm		
CT-2 16 840 1 114450 178 1 1589548581 964 1471771 107.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.108.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.109.dcm		
CT-2.16.840.1.114460.178.1.1589548581.964.1471771.11.dcm		
CT 5 42 846 4 44 446 478 4 46606 48664 624 4 474 774 448 down		
		Selected file(s): 123
Import Files		
Import Files		

Fig. 3: Bolus QA Import

Dose is computed on the re-imported CT images using the same beams as the treatment plan. The resulting dose image, as well as the original plan dose and a gamma comparison image, are then displayed in the UI. The user can edit the Bolus QA block controls to change the gamma parameters as well as shift the isocenter for each beam in the re-computed dose to account for positional shifts in the bolus simulation CT images.

The comparison view shows the three images simultaneously on the corresponding CT images as well as a graph displaying the DVHs for the original and computed dose images. The user can switch between Transverse, Sagittal, and Coronal for the comparison view in the Bolus QA Display Options in the right side controls.

Users can set the dose comparison options that are used to determine whether the gamma comparison of the original and recomputed dose passes. These options include:

- **Passing Rate:** The percentage of voxels that must be within tolerance in order for it to pass the dose comparison.
- **Spatial Tolerance:** The spatial tolerance is the distance that the voxel must be within in order to pass the dose comparison.
- **Value Tolerance:** The value tolerance percentage is the maximum difference between the original and the computed relative dose in order to pass the dose comparison.
- **Max Threshold:** The maximum threshold percentage is the relative dose value where voxels used for dose comparison calculations will no longer be include

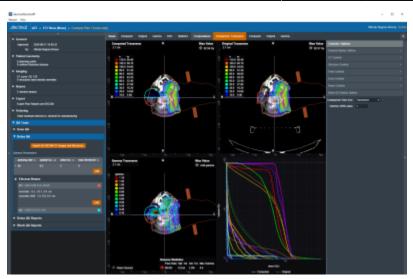


Fig. 4: Bolus QA

Bolus QA Reports

The Bolus QA Reports block allows the user to export PDF reports with data gathered from the Bolus QA block. Just like with Plan Reports, the user can add screenshots of the Bolus QA display UI to the Bolus QA report.

▼ QA Tools	
Dose QA	
Bolus QA	
▼ Bolus QA Rep	orts
Report Screen Shot Add or remove scree	ts enshots for exported reports
	TransverseCompare X
Scre	en Shot Name:
	Take Report Screen Shot
Export Bolus QA Re Export the Bolus QA Copen report after Copy PDF after e	Report (including saved screen shots) r export
Notes: Exar	nple notes for Bolus QA report.
	Export Plan QA Report
Block QA Rep	orts

Fig. 5: Bolus QA Reports UI

Bolus QA reports contain basic patient and treatment plan information as well as gamma analysis results, dose reference point data, and structure dose statistics.

decimal ET			
decimal ElectronRT			
Venion 9.8.1-2929.16d			
Bolus QA Report			
Patient			
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Plan			
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Gamma Analysis			
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Point Dose Verification			
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Structure Computed Dose Metrics			
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PTV 48048 0.460 70.37 49.85 205.89 87V 493 0.44 44.73 38.99 334.62			
ptv p5 0.56 89.49 47.85 151.75			
89 % [TheL]]_1 0.80 82.56 39.57 28.61 Ant avoid 0.00 82.56 11.51 448.22			
BOLUS ICN 0.00 46.21 1.78 144.38			
Cami 0.40 37.78 5.24 16.93 Cont-5 0.36 44.59 7.83 47.16			
Bectman Balas 0.00 59.43 0.38 455.44			
Li Eye 0.40 27.10 4.44 4.15 Rott avvid 0.00 59.46 7.39 043.98			
Rt Eye 0.72 26.46 2.42 7.69			
81 Pianuthi 0.377 4.38 1.53 11.46 none 0.04 69.30 42.55 5.19			
Freedom S Borton S Borton			
20m 0 445, 10m 0 4000			

Fig. 6: Bolus QA Report

Block QA Reports

The Block QA Reports block allows the user to export PDF printouts of the electron blocks used in the treatment plan. The user can choose to display each block as a physical (true size) or isocenter projection. There is also a printer-friendly option that removes the color from the block projection.

 Dose QA Bolus QA Bolus QA Reports Block QA Reports Block PDF Reports Export the plan electron block PDF reports b1: G80 C338 CL0; 20x20 × Block: 1-G80C338-APER-C55505 b2: G356 C0 CL0; 6x6 × Block: 2-G356C0-APER-C55505 Report Options Block Shape At: Physical Isocenter Use printer friendly graphics × Open report after export Copy PDF after export 	▼ QA Tools
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Export Block QA Reports	
	Export Block QA Reports

Fig. 7: Block QA Reports UI

Plan QA



Fig. 8: Block QA Report

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