

**Page 1: ACRIN/NLST CT TECHNIQUE COMPARISON CHART: THESE TECHNIQUES ARE MANDATED BY THE NLST PROTOCOL**

- Planning views (e.g. scout, topogram, etc):**
- To spare breast dose, the primary scout will be PA, not AP.
  - A second, lateral scout should be avoided if possible.
  - Allowable scout techniques should be reviewed, and set as low as possible to minimize patient dose

Parameter	GE QXi 4-slice/0.8 sec	GE LS Plus 4-slice/ 0.5 sec	GE Ultra 8-slice/0.5 sec	GE – LS 16 16-slice/0.5 sec	GE – VCT(64) 64-slice/0.5 sec
kV	120	120	120	120	120
Gantry Rotation Time	0.8 sec	0.5 sec	0.5 sec	0.5 sec	0.5 sec
mA (Regular patient-Large patient values)	50-100	80-160	80-160	80-160	50-100
mAs (Regular -Large) <sup>1</sup>	40-80	40-80	40-80	40-80	25-50
Scanner effective mAs <sup>2</sup> (Reg-Lg)	26.7-53	26.7-53	29.6-59.2	29.1-58.2	27-53
Detector Collimation (mm) - T	2.5 mm	2.5 mm	1.25 mm	1.25 mm	0.625 mm
Number of active channels - N	4	4	8	16	64
Detector Configuration - N x T	4 x 2.5 mm	4 x 2.5 mm	8 x 1.25 mm	16 x 1.25 mm	64 x 0.625 mm
MODE (Thick/ Speed)	2.5/HS/15	2.5/HS/15	1.25/HS/13.5	1.25/1.375/ 27.5	.625/.984/ 39.37
Table incrementation (mm/rotation) - I	15 mm	15 mm	13.5 mm	27.5 mm	39.37 mm
Pitch ([mm/rotation] /beam collimation) - I/NT	1.5	1.5	1.35	1.375	0.984
Table Speed (mm/second)	18.75 mm/sec	30 mm/sec	22.5 mm/sec	55mm/sec	78.74 mm/sec
Scan Time (40 cm thorax)	22 sec	13 sec	18 sec	7.3 sec	5.1 sec
Nominal Reconstructed Slice Width	2.5 mm	2.5 mm	2.5 mm	2.5 mm	2.5 mm
Reconstruction Interval <sup>3</sup>	2.0 mm	2.0 mm	2.0 mm	2.0 mm	2.0 mm
Reconstruction Algorithm <sup>3</sup>	STD	STD	STD	STD	STD
# Images/Data set (40 cm thorax)	200	200	200	200	200
CTDI <sub>vol</sub> Dose in mGy <sup>4</sup> (Regular – Large )	2.8 – 5.6 mGy	2.4 - 4.9 mGy	3.1 - 6.2 mGy	2.7 - 5.4 mGy	2.2 – 4.4 mGy <sup>5</sup>

*Shaded fields are user input fields on the scanner console. Other values are either calculated or derived from user inputs.*

<sup>1</sup> The lower exposure bound is a guideline; lower exposures are acceptable provided diagnostic image quality is preserved. The upper exposure is a fixed limit.

<sup>2</sup> For Siemens and Philips scanners, users input “effective mAs” or “mAs slice” at the scanner console; which is defined as (mA• time)/pitch. For others, this value is calculated for comparison only.

<sup>3</sup> This table shows the reconstruction parameters required by the ACRIN protocol; sites may create additional reconstructions with other intervals and algorithms.

<sup>4</sup> CTDI<sub>vol</sub> represents dose measured in 32 cm acrylic (PMMA) phantom; it does not represent radiation dose to a patient. Individual sites may see variations up to ± 20%.

<sup>5</sup> Dose range provided by vendor, to be confirmed.

**Definitions**

**T** = Z axis collimation, or width of one data channel. In multi-detector CT scanners, several detector elements maybe grouped together to form one data channel.

**N** = # data channels, or the actual number of data channels used during an acquisition.

**I** = Increment, or the table increment *per rotation* of the x-ray tube in a helical scan.

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Parameter	Toshiba Aquilion 4- slice/0.5sec	Toshiba Aquilion 16- slice/0.5sec
kV	120	120
Gantry Rotation Time	0.5 sec	0.5 sec
mA (Regular patient-Large patient values)	80-160	80-160
mAs (Regular -Large) <sup>1</sup>	40-80	40-80
Scanner effective mAs <sup>2</sup> (Reg-Lg)	26.7-53.3	26.7-53.3
Detector Collimation (mm) - T	2 mm	2 mm
Number of active channels - N	4	16
Detector Configuration - N x T	4 x 2mm	16 x 2 mm
MODE (Thick/ Speed)	N/A	N/A
Table incrementation (mm/rotation) - I	12 mm	48 mm.
Pitch ([mm/rotation] /beam collimation) - I/NT	1.5	1.5
Table Speed (mm/second)	24 mm/sec	96 mm/sec
Scan Time (40 cm thorax)	17 sec	4.2 sec
Nominal Reconstructed Slice Width	2 mm	2 mm
Reconstruction Interval <sup>3</sup>	1.8 mm	1.8 mm
Reconstruction Algorithm <sup>3</sup>	FC 10	FC 10
# Images/Data set (40 cm thorax)	223	223
CTDI <sub>vol</sub> Dose in mGy <sup>4</sup> (Regular – Large )	3.0 - 6.0 mGy	2.7 - 5.4 mGy

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Parameter	Philips MX8000 4-slice/0.5 sec 4 x 2.5	Philips MX8000 4 slice/0.5 sec 4 x 1	Philips MX8000 16 slice/0.5 sec 16. x .75
kV	120	120	120
Gantry Rotation Time	0.5 sec	0.5 sec	0.5 sec
mA (Regular patient-Large patient values)	75-150	80-160	75-150
mAs (Reg-Lg) <sup>1</sup>	37.5-75	40-80	37.5-75
Scanner mAs/Slice <sup>2</sup> (Reg-Lg)	25-50	20-40	25-50
Detector Collimation (mm) - T	2.5 mm	1 mm	.75 mm
Number of active channels - N	4	4	16
Detector Configuration - N x T	4 x 2.5 mm	4 x 1 mm	16 x .75 mm
MODE (Thick/ Speed)	N/A	N/A	N/A
Table incrementation (mm/rotation) - I	15 mm	8 mm	18 mm
Pitch ([mm/rotation] /beam collimation) - I/NT	1.5	2	1.5
Table Speed (mm/second)	30 mm/sec	16 mm/sec	36 mm/sec
Scan Time (40 cm thorax)	13 sec	25 sec	11 sec
Nominal Reconstructed Slice Width	3.2 mm	2 mm	2 mm
Reconstruction Interval <sup>3</sup>	2.0 mm	1.8 mm	1.8 mm
Reconstruction Algorithm <sup>3</sup>	B or C	B or C	B or C
# Images/Data set (40 cm thorax)	200	223	223
CTDI <sub>vol</sub> (Dose in mGy) <sup>4</sup>	2.0 – 4.1 mGy	2.8 - 5.5 mGy	1.9 - 3.8 mGy

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Parameter	Siemens Vol Zoom/ Sensation 4 4-slice/0.5 sec 4 x 2.5	Siemens Vol Zoom/ Sensation 4 4-slice/0.5 sec 4 x 1	Siemens Sensation 16 16 x .75	Siemens Sensation 64 64x0.6 (beam collimation 32x0.6)
kV	120	120	120	120
Gantry Rotation Time	0.5 sec	0.5 sec	0.5 sec	0.50 sec
mA (Regular patient-Large patient values)	75-150	80-160	75-150	50-100
mAs (Reg-Lg) <sup>1</sup>	37.5-75	40-80	37.5-75	25-50
Scanner effective mAs <sup>2</sup> (Reg-Lg)	25-50	20-40	25-50	25-50
Detector Collimation (mm) - T	2.5 mm	1 mm	0.75 mm	0.6 mm
Number of active channels - N	4	4	16	32
Detector Configuration - N x T	4 x 2.5 mm	4 x 1 mm	16 x .75 mm	32 x 0.6 mm
Collimation (on operator console)	N/A	N/A	N/A	64x0.6mm
Table incrementation (mm/rotation) - I	15 mm	8 mm	18 mm	19.2 mm
Pitch ([mm/rotation] /beam collimation) - I/NT	1.5	2	1.5	1.0
Table Speed (mm/second)	30 mm/sec	16 mm/sec	36 mm/sec	38.4 mm/sec
Scan Time (40 cm thorax)	13 sec	25 sec	11 sec	11 sec
Nominal Reconstructed Slice Width	3 mm	2 mm	2 mm	2 mm
Reconstruction Interval <sup>3</sup>	2.0 mm	1.8 mm	1.8 mm	1.8 mm
Reconstruction Algorithm <sup>3</sup>	B30	B30	B30	B30
# Images/Data set (40 cm thorax)	200	223	223	223
CTDI <sub>vol</sub> (Dose in mGy) <sup>4</sup>	2.0 – 4.1 mGy	2.8 - 5.5 mGy	1.9 - 3.8 mGy	1.9 - 3.8 mGy

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