CT Chest Routine

Updated 05/01/24
Reviewed 05/14/25

Indications - cough, shortness of breath, chest pain, infection, pneumonia, hemoptysis, dyspnea, lung nodule, lung mass, abnormal chest radiograph, etc.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - lung apices through adrenal glands (obtained during end inspiration).
Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Bl57 / B70f	lung	3	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet

CT Chest Routine

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	2.5	2.5	std full	400/40	head/feet

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	B	mediastinum	3	head/feet

CT Chest Low-Dose

Updated 05/01/24
Reviewed 05/14/25

Use this protocol when ordered/protocoled as low-dose, when recommended on a prior CT report or when a screening CT patient doesn't meet screening criteria.
This protocol's dose is intermediate between a screening chest dose and a routine chest dose.
Use regular CT chest charges. Do not use CT Lung RADS Screening / Follow-up charge.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - lung apices through adrenal glands (obtained during end inspiration).
Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
Recons are the same as routine chest protocol.
IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**60**	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	**31**	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	**60**	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	**66**	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	**37**	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	**40**	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	**31**	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Bl57 / B70f	lung	3	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).
Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet

CT Chest Low-Dose

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-300	**25.46**	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-300	**25.46**	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	50-300	**25.46**	on	2.5	40	0.984	39.375	0.5	30	70	3.8
Disc VCT 64	helical	large body	120	50-300	**25.46**	on	2.5	40	0.984	39.375	0.5	NA	NA	3.8

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	2.5	2.5	std full	400/40	head/feet

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	**55**	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	B	mediastinum	3	head/feet

CT Lung Cancer Screening

Updated 04/28/25
Reviewed 05/14/25

Indications - lung cancer screening **only** in patients who meet criteria (see patient questionnaire) and follow-up of prior screening CT (unless prior report indications a routine or low-dose protocol).
If patient doesn't meet screening criteria, use the low-dose protocol and use CT Chest w/o Contrast charge.
Per ACR guidelines, this exam should have a CTDI of less than 3.00 mGy for a normal size patient.
Use CT Lung RADS for Screening Follow-up charge.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - **Lung apices** through **lung bases** (obtained during end inspiration).
Do not image through adrenal glands as is done with routine chest CT.
Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
Recons are the same as routine chest protocol.
IV Contrast: not given for this protocol.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**25**	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	Sn110	**62**	on	on 15	0.80	32	0.7	0.8	13.4
Sensation 64	spiral	120	**25**	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	**28**	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	Sn100	**179**	on	on 15	0.80	64	0.6	0.33	3.2
Drive 128	spiral	120	**20**	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	Sn100	**101**	on	on	1.20	192	0.6	0.5	2.2

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Bl57 / B70f	lung	3	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

CT Lung Cancer Screening

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	40-130	**29.50**	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	40-130	**29.50**	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	30-110	**34.00**	on	2.5	40	0.984	39.375	0.5	0	70	3.8
Disc VCT 64	helical	large body	120	30-110	**34.00**	on	2.5	40	1.375	55.00	0.5	0	70	2.7

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	**23**	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet

CT Chest Routine High-Res

Updated 05/01/24
Reviewed 05/14/25

The following history/indications trigger a routine HRCT protocol whether or not ordered as HRCT: interstitial lung disease (ILD), pulmonary fibrosis, interstitial pulmonary fibrosis (IPF), usual interstitial pneumonitis (UIP), nonspecific interstitial pneumonitis (NSIP), bronchiectasis, asbestosis, sarcoidosis, hypersensitivity pneumonitis, connective tissue disease, rheumatoid, scleroderma and pneumoconiosis.

Use this **routine** HRCT protocol unless instructed to use the **full** HRCT protocol.

Use CT chest HRCT charges. Do not use regular CT chest charges.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage - lung apices through adrenal glands (obtained during end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Scan parameters are the same as routine chest protocol.

IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

CT Chest Routine High-Res

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Bl57 / B70f	lung	3	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX HRCT	1.0	5.0	Bl57 / B70f	lung	3	head/feet
COR HRCT	1.0	5.0	Bl57 / B70f	lung	3	front/back
AX THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet

CT Chest Routine High-Res

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX HRCT	1.25	5.0	bone plus full	1600/-600	head/feet
COR HRCT	1.25	5.0	bone plus full	1600/-600	front/back
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	2.5	2.5	std full	400/40	head/feet

CT Chest Routine High-Res

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX HRCT	1.0	5.0	YA	lung	3	head/feet
COR HRCT	1.0	5.0	YA	lung	3	front/back
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet

Send the above recons on the pre contrast scan (if without only) or on the post contrast scan (if IV given).

Send only the following recon on the pre contrast scan (if without and with).

AX SOFT PRE	3.0	3.0	B	mediastinum	3	head/feet

CT Chest Full High-Res

Updated 05/01/24
Reviewed 05/14/25

Indications - interstitial lung disease (ILD), pulmonary fibrosis, interstitial pulmonary fibrosis (IPF), usual interstitial pneumonitis (UIP), nonspecific interstitial pneumonitis (NSIP), bronchiectasis, asbestosis, sarcoidosis, hypersensitivity pneumonitis, connective tissue disease, rheumatoid, scleroderma and pneumoconiosis.

Only use this full HRCT protocol if ordered as full HRCT or protocoled by rad.

Use CT chest HRCT charges. Do not use regular CT chest charges.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage:

Supine end inspiration phase - **lung apices** through **adrenal glands** (obtained during end inspiration).

Supine end expiration phase - **lung apices** through **diaphragm** (obtained during end inspiration).

Prone end inspiration phase - **carina** through **diaphragm** (obtained during end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Scan parameters for the supine end inspiratory phase are the same as routine chest protocol.

Scan parameters for the supine end expiratory and prone end inspiratory phases are the same as low-dose chest protocol.

IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

CT Chest Full High-Res

SIEMENS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX INSP LUNG	3.0	3.0	Bl57 / B70f	lung	3	head/feet
AX INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX INSP HRCT	1.0	5.0	Bl57 / B70f	lung	3	head/feet
COR INSP HRCT	1.0	5.0	Bl57 / B70f	lung	3	front/back
AX INSP THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX INSP MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

For the **Supine End Expiration** and **Prone End Inspiration** phases:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**60**	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	**31**	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	**60**	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	**66**	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	**37**	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	**40**	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	**31**	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX EXP HRCT	1.0	5.0	Bl57 / B70f	lung	3	head/feet
AX PRONE HRCT	1.0	5.0	Bl57 / B70f	lung	3	head/feet

CT Chest Full High-Res

GE PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX INSP LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX INSP SOFT	2.5	2.5	std full	400/40	head/feet
COR INSP SOFT	2.5	2.5	std full	400/40	front/back
SAG INSP SOFT	2.5	2.5	std full	400/40	left/right
AX INSP HRCT	1.25	5.0	bone plus full	1600/-600	head/feet
COR INSP HRCT	1.25	5.0	bone plus full	1600/-600	front/back
AX INSP THINS	1.25	1.0	std full	400/40	head/feet
AX INSP MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

For the **Supine End Expiration** and **Prone End Inspiration** phases:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-300	**36.20**	on	1.25	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-300	**36.20**	on	1.25	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	50-300	**36.01**	on	1.25	40	0.984	39.375	0.5	30	70	3.8
Disc VCT 64	helical	large body	120	50-300	**36.01**	on	1.25	40	0.984	39.375	0.5	NA	NA	3.8

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX EXP HRCT	**1.25**	**5.0**	**bone plus full**	**1600/-600**	**head/feet**
AX PRONE HRCT	1.25	5.0	bone plus full	1600/-600	head/feet

Must be first recon.

CT Chest Full High-Res

PHILIPS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX INSP LUNG	3.0	3.0	YA	lung	3	head/feet
AX INSP SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR INSP SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG INSP SOFT	3.0	3.0	B	mediastinum	3	left/right
AX INSP HRCT	1.0	5.0	YA	lung	3	head/feet
COR INSP HRCT	1.0	5.0	YA	lung	3	front/back
AX INSP THINS	1.0	0.75	B	mediastinum	3	head/feet
AX INSP MIPS	8.0	2.0	B	lung	3	head/feet

For the **Supine End Expiration** and **Prone End Inspiration** phases:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	**55**	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX EXP HRCT	1.0	5.0	YA	lung	3	head/feet
AX PRONE HRCT	1.0	5.0	YA	lung	3	head/feet

CT Chest Teton High-Res

Updated 05/01/24
Reviewed 05/14/25

Indication - interstitial pulmonary fibrosis (IPF).
Use CT chest HRCT without Contrast charge. Do not use regular CT chest charge.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - lung apices through adrenal glands on both phases (obtained during end inspiration).
Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
Scan parameters for the supine end inspiratory phase are the same as routine chest protocol.
Scan parameters for the supine end expiratory phase are the same as low-dose chest protocol.
IV Contrast: not given for this protocol.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

CT Chest Teton High-Res

SIEMENS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX INSP LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet	
AX INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet	
COR INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back	
SAG INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right	
AX INSP HRCT	**1.0**	**0.8**	**Bl57 / B80f**	**lung**	**3**	**head/feet**	**Teton specific recon.**
COR INSP HRCT	1.0	5.0	Br57 / B70f	lung	3	front/back	
AX INSP MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet	

For the **Supine End Expiration** phase:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**60**	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	**31**	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	**60**	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	**66**	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	**37**	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	**40**	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	**31**	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX EXP HRCT	**1.0**	**0.8**	**Bl57 / B80**	**lung**	**3**	**head/feet**	**Teton specific recon.**

CT Chest Teton High-Res

GE PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
AX INSP LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**	**Must be first recon.**
AX INSP SOFT	2.5	2.5	std full	400/40	head/feet	
COR INSP SOFT	2.5	2.5	std full	400/40	front/back	
SAG INSP SOFT	2.5	2.5	std full	400/40	left/right	
AX INSP HRCT	**1.25**	**1.0**	**bone plus full**	**1600/-600**	**head/feet**	**Teton specific recon.**
COR INSP HRCT	1.25	5.0	bone plus full	1600/-600	front/back	
AX INSP MIPS	8.0	3.0	std full	1600/-600	head/feet	

For the **Supine End Expiration** phase:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-300	**36.20**	on	1.25	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-300	**36.20**	on	1.25	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	50-300	**36.01**	on	1.25	40	0.984	39.375	0.5	30	70	3.8
Disc VCT 64	helical	large body	120	50-300	**36.01**	on	1.25	40	0.984	39.375	0.5	NA	NA	3.8

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
AX EXP HRCT	**1.25**	**1.0**	**bone plus full**	**1600/-600**	**head/feet**	**Teton specific recon.**

CT Chest Teton High-Res

PHILIPS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX INSP LUNG	3.0	3.0	YA	lung	3	head/feet	
AX INSP SOFT	3.0	3.0	B	mediastinum	3	head/feet	
COR INSP SOFT	3.0	3.0	B	mediastinum	3	front/back	
SAG INSP SOFT	3.0	3.0	B	mediastinum	3	left/right	
AX INSP HRCT	**1.0**	**0.8**	**YA**	**lung**	**3**	**head/feet**	**Teton specific recon.**
COR INSP HRCT	1.0	5.0	YA	lung	3	front/back	
AX INSP MIPS	8.0	2.0	B	lung	3	head/feet	

For the **Supine End Expiration** phase:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time
Incisive 128	helical	120	**55**	19	on	1.00	64	0.625	0.75

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX EXP HRCT	**1.0**	**0.8**	**YA**	**lung**	**3**	**head/feet**	**Teton specific recon.**

Table 1: Historical HRCT Imaging Parameters (Screening/V1)	
Parameter	**Description**
Collimation	Sub-millimeter
Rotation Time	Shortest possible
Pitch	Highest possible
Tube Potential*	120 kVp
Tube Current*	≤ 240 mAs
Radiation Dose Control	Per institutional requirements (1-3 mSv recommended for inspiratory acquisition; ultralow-dose CT with < 1 mSv should be avoided)
Reconstruction Slice Thickness	≤ 1.5 mm (series with slices thicker than 1.5 mm will not be accepted)
Reconstruction Slice Gap	**Contiguous, overlapping. or interspaced slices (slice gap > 0 mm is permitted)**
Reconstruction Algorithm	High spatial frequency (bone/sharp); iterative reconstruction if available and validated
Reconstruction Orientation	Axial
Field-of-View (FOV)	Thoracic axial slices from most extreme lung apices to most extreme lung bases (costophrenic recesses included)
Acquisitions**	Single breath-hold full inspiration Single breath-hold full expiration
Image format	DICOM
Artifact	Images should not be significantly degraded by motion or metal artifact

**Tube current and potential should be adjusted based on subject size and dose control protocol*
*** Full inspiration is mandatory for all HRCT timepoints; expiratory scans are recommended for assessment of air trapping*

Table 2 below provides the minimum specifications for diagnostic on-study HRCT scan required for IPF assessment[1]

Table 2: On-Study HRCT Imaging Parameters (Screening/V2)	
Parameter	**Description**
Collimation	Sub-millimeter
Rotation Time	Shortest possible
Pitch	Highest possible
Tube Potential*	120 kVp
Tube Current*	≤ 240 mAs
Radiation Dose Control	Per institutional requirements (1-3 mSv recommended for inspiratory acquisition; ultralow-dose CT with < 1 mSv should be avoided)
Reconstruction Slice Thickness	≤ 1.5 mm (series with slices thicker than 1.5 mm will not be accepted)
Reconstruction Slice Gap	**Contiguous or overlapping (slice gap > 0 mm is NOT permitted)**
Reconstruction Algorithm	High spatial frequency (bone/sharp); iterative reconstruction if available and validated
Reconstruction Orientation	Axial
Field-of-View (FOV)	Thoracic axial slices from most extreme lung apices to most extreme lung bases (costophrenic recesses included)
Acquisitions**	Single breath-hold full inspiration Single breath-hold full expiration
Image format	DICOM
Artifact	Images should not be significantly degraded by motion or metal artifact

**Tube current and potential should be adjusted based on subject size and dose control protocol*
*** Full inspiration is mandatory for all HRCT timepoints; expiratory scans are recommended for assessment of air trapping*

During QC of Historical **Screening/V1** HRCT scans, ERT QC will raise a query if any of the following is detected:

- Field-of-view coverage does not include the entire left and right lung

Appendix 1: The Image Management Solution (IMS)

1.0 IMS Access and Training

1.1 Site User Access and Training

ERT will provide web-based training sessions for sites detailing the processes required to create subjects, add timepoints for subjects, and upload timepoint images in the IMS. Detailed instructions, workflows, and descriptions of IMS eCRF content are also provided in the Appendix of this document.

Following the training and completion of training documentation, ERT will email trained site users with a link to ERT's Global Single Sign-on (GSSO) page and associated registration instructions. If the site user has not previously registered for an ERT study, he/she will be required to self-register. **Note sites must use the Google Chrome internet browser to access and use the ERT IMS platform (Internet Explorer/Microsoft Edge do not support the IMS functionality).**

Site users should only use their designated accounts to access the study. If the person responsible for transferring imaging via the IMS is absent for an extended period, a new user at the site should be identified with a training request submitted to ERT for the user. Additionally, if a site user is no longer employed at the site or participating in the study, the site should notify ERT to inactivate the user's access to the study. Sites should contact the ERT Customer Care for any technical issues pertaining to the use of the IMS. Detailed instructions for image upload will be provided to the site in the IMS Image Transfer Instructions document.

1.2 Sponsor User Access and Training

ERT will provide a representative(s) from United Therapeutics access to the "data review" user role in the IMS. This is a read-only user role for United Therapeutics to review the information completed by the site user(s), QC user(s), and/or central reviewer(s). The data review user(s) will be able to:

- View all subject timepoints and their current workflow status
- View submitted images for timepoints within the IMS (post-QC)
- View reader annotations (read-only)
- View completed eCRFs/Reports:
    - Timepoint Submission
    - Reader Assessments
    - Timepoint QC
- Download Reports:
    - Site Compliance Report - provides an overview of site submission information, current workflow states, and number of submission cycles for each timepoint
    - QC Compliance Report - provides an evaluation of QC performance for each timepoint (outstanding query information and turnaround time)
    - Image Analysis Compliance Report - provides an evaluation of a central reviewer's performance for timepoint (read status and turnaround time)
    - User Access and Activity Report - provides a summary of the users that have access to the study, their training dates, activation status, and date/time of last access to the study
    - Imaging Study Tracker Report - provides an overall status for each timepoint created in the study and any associated queries
    - Eligibility Reports

The data review user(s) must complete an ERT IMS training session before ERT will grant the user access to the study.

2.0 IMS Image Upload

Following the creation of timepoints in the IMS, sites will be required to upload associated HRCT images prior to timepoint IMS eCRF signoff. The IMS platform does not require the sites to install or download any plugins to support the upload process.

The expected format of the images for this study is DICOM. The process for upload is detailed below:

- Images for upload can be selected as single files, multiple files within a folder or by selecting an entire folder of images.
    - For reduced size and faster transfers, it is recommended that images required for upload are placed in a single folder, "zipped" and uploaded as a single file.
- The IMS will display the number and total size of files selected for upload and will display a status bar indicating the transfer progress.
    - Note that the site user may use the browser and computer to perform other tasks during the upload but should not close the upload page to avoid interruption of the transfer.
- Once the upload is complete, the uploaded images will be queued and processed by ERT's server.
    - The upload page will indicate how many images are in the queue ("pending") and processing ("running"). When all images have been processed the transfer status will move to "Loading Complete".
- After all files are uploaded, several items including thumbnails, acquisition date, series description, number of images per series, and modality will be shown for each image/series uploaded.
- If the site user believes an image/series was uploaded in error, he/she may "archive" the image/series preventing downstream user (ERT QC, readers, etc.) access. A change reason will be required and stored in the study's audit trail.

3.0 IMS Image De-Identification

During the "processing" step of the image upload process described above, a copy of the original images will be created and common DICOM header tags that often contain PHI will be cleared or replaced. The Patient ID DICOM tag will be replaced with the Subject ID and the Accession DICOM tag will be replaced with the Timepoint ID (a full description of DICOM tags that will be edited will be defined in the study's Requirements Specification). Original images will be archived and encrypted, preventing downstream users of the IMS (ERT QC, readers, etc.) from accessing or downloading the images.

Post-processing, ERT QC Specialists will review HRCT to determine if additional sources of PHI such as annotations of the subject's name or medical record number are present in the images. If any images contain such PHI, they will be archived preventing downstream user access. If these images are required for centralized review, ERT QC will perform a redaction of the PHI.

4.0 IMS Image Display

Once a given image/series is processed by the ERT server, it may be viewed in the IMS by ERT study personnel, the site user, ERT reviewers, and sponsor/CRO. The IMS viewer will allow the users to zoom, pan, adjust window/level, view DICOM header tags and advance frames/slices (note that central reviewers will not be able to view DICOM header tags).

Additionally, manufacturer, serial number, date of birth, gender DICOM tags extracted from HRCT image series prior to de-identification will be presented above the viewer (visible to all users except the central reviewers).

CT Chest ION (Navigational)

Updated 05/01/24
Reviewed 05/14/25

Indications - pre navigational biopsy of a lung nodule, mass, lesion or opacity and should be ordered as ION protocol by Pulmonology.

Use CT Chest without Contrast charge.

GENERAL SCAN NOTES

The patient's arms must be over his/her head.

Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage - lung apices through adrenal glands (obtained during end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Scan parameters are the same as routine chest protocol.

IV Contrast: not given for this protocol.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet	
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right	
TLC INSP	**0.75**	**0.5**	**Br40 / B41f**	**mediastinum**	**3**	**head/feet**	**ION specific recon.**
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet	

CT Chest ION (Navigational)

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**	**Must be first recon.**
AX SOFT	2.5	2.5	std full	400/40	head/feet	
COR SOFT	2.5	2.5	std full	400/40	front/back	
SAG SOFT	2.5	2.5	std full	400/40	left/right	
TLC INSP	**0.75**	**0.5**	**std full**	**400/40**	**head/feet**	**ION specific recon.**
AX MIPS	8.0	3.0	std full	1600/-600	head/feet	

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX LUNG	3.0	3.0	YA	lung	3	head/feet	
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	B	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right	
TLC INSP	**0.75**	**0.5**	**B**	**mediastinum**	**3**	**head/feet**	**ION specific recon.**
AX MIPS	8.0	2.0	B	lung	3	head/feet	

ION Protocol Parameters

Table A-1 Minimum radiation dose (CTDIvol; unit mGy)

Recon. Method / Patient Size	Small-Average (BMI ≤25)	Larger (BMI>25)
Using non-iterative reconstruction	6	10
Using iterative reconstruction	3	5

Table A-2 Scanner Settings

Parameter	Rationale	Recommended Values
kVp	Reduced artifacts in the lung apexes	110 – 140 kV
Pitch	Reduced motion artifacts from breathing or cardiac cycle	≥ 1.0
Rotation time	Fastest rotation time reduces motion artifacts	NA
Slice spacing	Ensure high resolution to identify peripheral airways	0.5 mm – 0.8 mm
Slice thickness	Zero or slight overlap	0.5 mm – 1.0 mm
Field of View	Minimize the field of view to the lungs	≤ 32 cm
Iterative reconstruction	Low to medium strengths are compatible; defer to department specific lung imaging protocols	NA

Table A-3 Scanner Settings, Reconstruction Kernel

Parameter	Rationale	Recommended Values			
Reconstruction kernel	Multiple reconstruction kernels are compatible; medium sharpness is ideal	Siemens™	Philips™	GE™	Toshiba[3]
		B31f	C 0	Standard Body	FC05

Information taken from - PlanPoint Software IFU Appendix - PN554076

Intuitive Rep Gabbie Owens – Gabbie.Owens@intusurg.com – 904-655-3209

CT Chest Veran (Navigational)

Updated 05/01/24
Reviewed 05/14/25

Indications - pre navigational biopsy of a lung nodule, mass, lesion or opacity and should be ordered as Veran protocol by Pulmonology.
Use CT Chest without Contrast charge.

GENERAL SCAN NOTES

Remove any metal from the imaging field of view.
Have patient lift chin up.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - lung apices through adrenal glands on both phases (obtained during end inspiration).
Use smallest FOV without cropping anatomy or excluding vPad. Use the same FOV for both scans.
The vPad tracker should be clearly visible in the FOV.
The patients arms are **over his/her head** for the **end inspiratory phase**.
The patients arms are **by his/her side** for the **end expiratory phase**.
IV Contrast: not given for this protocol.
Veran Rep: Noel Kane 618-600-5922, noel.kane@veranmedical.com.

SIEMENS PARAMETERS & RECONS

For the **Supine End Inspiration** and **Supine End Expiration** phases:

	Scan Mode	kV	Eff mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**100/150**	**off**	NA	1.00	16	0.75	0.5	12.5
Go Up 32	spiral	120	**100/150**	**off**	**off**	1.00	32	0.6	0.5	7.8
Sensation 64	spiral	120	**105/160**	**off**	NA	1.00	64	0.6	0.5	7.8
Definition 64	spiral	120	**105/160**	**off**	**off**	1.00	64	0.6	0.5	7.8
Go Top 64	spiral	120	**105/160**	**off**	**off**	1.00	64	0.6	0.5	3.9
Drive 128	spiral	120	**110/170**	**off**	**off**	1.00	128	0.6	0.5	3.9
Force 192	spiral	120	**110/170**	**off**	**off**	1.00	128	0.6	0.5	3.9

Use lower mAs for BMI ≤25 or higher mAs for BMI >25.

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX LUNG	3.0	3.0	Br57 / B70f	lung	none	head/feet	
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	head/feet	
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	front/back	
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	left/right	
TLC INSP	**0.75**	**0.5**	**Qr36 / B35f**	**mediastinum**	**none**	**head/feet**	**Veran specific recon.**
AX MIPS	8.0	3.0	Br40 / B41f	lung	none	head/feet	
TLC EXP	**0.75**	**0.5**	**Qr36 / B35f**	**mediastinum**	**none**	**head/feet**	**Veran specific recon.**

CT Chest Veran (Navigational)

GE PARAMETERS & RECONS

For the **Supine End Inspiration** and **Supine End Expiration** phases:

	Scan Type	SFOV	kV	**Manual mA**	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	**180/270**	off	0.625	10	1.375	13.75	0.5	NA	NA	10.9
Opt 540	helical	large	120	**180/270**	off	0.625	10	1.375	13.75	0.5	NA	NA	10.9
LS VCT 64	helical	large body	120	**180/270**	off	0.625	40	0.984	39.37	0.5	off	none	3.8
Disc VCT 64	helical	large body	120	**180/270**	off	0.625	40	0.984	39.37	0.5	NA	NA	3.8

Use 180 mAs for BMI ≤25 or 270 mAs for BMI >25.

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
TLC INSP	**0.625**	**0.5**	**std full**	**400/40**	**head/feet**	**This must be the first recon.**
AX LUNG	2.5	2.5	lung	1600/-600	head/feet	**Veran specific recon.**
AX SOFT	2.5	2.5	std full	400/40	head/feet	
COR SOFT	2.5	2.5	std full	400/40	front/back	
SAG SOFT	2.5	2.5	std full	400/40	left/right	
AX MIPS	8.0	3.0	std full	1600/-600	head/feet	
TLC EXP	**0.625**	**0.5**	**std full**	**400/40**	**head/feet**	**Veran specific recon.**

PHILIPS PARAMETERS & RECONS

For the **Supine End Inspiration** and **Supine End Expiration** phases:

	Scan Mode	kV	**Manual mA**	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	**130/190**	off	0.923	64	0.625	0.5	4.1

Use 130 mAs for BMI ≤ 25 or 190 mAs for BMI >25.

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX LUNG	3.0	3.0	YA	lung	none	head/feet	
AX SOFT	3.0	3.0	B	mediastinum	none	head/feet	
COR SOFT	3.0	3.0	B	mediastinum	none	front/back	
SAG SOFT	3.0	3.0	B	mediastinum	none	left/right	
TLC INSP	**0.67**	**0.5**	**B**	**mediastinum**	**none**	**head/feet**	**Veran specific recon.**
AX MIPS	8.0	2.0	B	lung	none	head/feet	
TLC EXP	**0.67**	**0.5**	**B**	**mediastinum**	**none**	**head/feet**	**Veran specific recon.**

- Breathe and relax (*Give the patient a few relax breaths. Talk the patient to insure they understand and will tolerate the breath hold. If they cannot hold their breath instruct them to do the best they can and set scanner to scan base to apex*)

- Now we are ready to scan so please
- Take a deep breath in (*watch chest to insure a deep breath in*)
- Let it out (*watch chest to insure air is out*)
- Now breathe all the way IN..IN..IN (*watch chest to insure a deep breath in as far as possible – begin scanning*)
- Keep holding your breath – DO NOT BREATHE!
- *At end of scan*: Breathe and relax

1.3 End Expiration CT Scan

- For the second part of this scan, I am going to ask you to take a couple of deep breaths in and out before we have you hold your breath all the out.
- First, let's practice
- Take a deep breath in (*watch chest to insure a deep breath in*)
- Let it out (*watch chest to insure air is out*)
- Take another deep breath in (*watch chest to insure a deep breath in*)
- Now let it out and hold it (*watch chest to insure subject is holding before starting the scan*)
- Keep holding your breath – DO NOT BREATHE! (*count 10 seconds*)
- Breathe and relax (*Give the patient a few relax breath. Talk the patient to insure they understand and will tolerate the breath hold. If they cannot hold their breath instruct them to do the best they can and set scanner to scan base to apex*.)
- Now we are ready to scan so please
- Take a deep breath in (*watch chest to insure a deep breath in*)
- Let it out (*watch chest to insure air is out*)
- Take another deep breath in (*watch chest to insure a deep breath in*)
- Now let it out and hold. (*watch chest to insure subject is holding – begin scanning*)
- Keep holding your breath out – DO NOT BREATHE!
- At end of scan: Breathe and relax

1.4 CT Patient Positioning

- Place patient in a supine position, lower legs supported.
- Inspiration CT (TLC) scan - the arms should be placed comfortably over the head in a head arm rest. The vPad (patient tracker) should be clearly visible in the scanner field of view.
- Expiration CT scan – the arms should be placed comfortably at the patient's sides. The vPad (patient tracker) should be clearly visible in the scanner field of view. Optimal navigation registration is obtained with the full expiration scan.
- Using the laser positioning lights, line up the patient so the chest is iso-center (in the middle) of the CT gantry.
- Move the table so the patient is in the correct position for a chest CT scan

1.5 CT Parameters for Inspiration (TLC) and Expiration scans

- The scout scan uses default parameters (only one scout AP/PA)
- TLC (Inspiration) scan is performed with **arms above** head.
- The expiration scan is performed with **arms down** at patient's sides.
- To select the proper Display FOV (DFOV) perform the TLC scan first and set the DFOV to be the smallest possible including lungs and vPad. Use the same DFOV set for the inspiration scan on the expiration scan to maintain the same scan resolution for both scans

Table 1: CT Protocol Siemens Definition AS PLUS, Siemens Definition AS, Siemens Sensation64 & GE VCT, Philips Brilliance 64, Philips Brilliance iCT

Scanner make	SIEMENS	SIEMENS	SIEMENS	SIEMENS	PHILIPS	PHILIPS
Scanner model	Definition (AS Plus) 128 slice	Definition (AS) 64 slice	Sensation 64 slice	Somotom 64 Slice Dual 64	Brilliance 64 slice	Brilliance iCT 256 slice
Scan Type	Spiral	Spiral	Spiral	Spiral	Spiral Helix	Spiral Helix
Scan FOV	No Selection	No Selection	No Selection	No Selection	No Selection	No Selection
Rotation Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Det. Configuration	(128) 64 x 0.6	64 x 0.6	(64)32 x 0.6	64 x 0.6	64 x 0.625	2 x 128 x 0.625 mm
Pitch	1.0	1.0	1.0	1.0	0.923	0.929
kVp	120	120	120	120	120	120
Siemens = Eff. mAs GE = mA setting Philips = mAs	Effective mAs: M-110 L-170	Effective mAs: M-105 L-160	Effective mAs: M-100 L-150	Effective mAs: M-105 L-160	mAs: M-130 L-190	mAs: M-115 L-175
Dose modulation	Care Dose OFF	Care Dose OFF	Care Dose OFF	Care Dose OFF	Dose Right (ACS) OFF	Dose Right (ACS) OFF
Beam Hardening Correction						
Recon 1 Algorithm	B35	B35	B35	B35	B	B
Additional Filter	No selection	No Selection	No Selection	No Selection	Do not use Adaptive filters	Do not use Adaptive filters
Thickness (mm)	0.75	0.75	0.75	0.75	0.67	0.67
Interval (mm)	0.5	0.5	0.5	0.5	0.5	0.5
Iterative recon (noise reduction algorithm)	Do Not use IRIS	Do Not use IRIS	No Selection	Do Not use IRIS	Do Not use iDose	Do Not use iDose
Scan Time (Sec) 30cm length	<10	<10	<10	<10	<10	<10

Scanner make	TOSHIBA	TOSHIBA	GE	GE	GE
Scanner model	Aquilion 64	Aquilion 16 Slice	VCT 64 slice	VCT Select 32 Slice	Lightspeed 16 Slice
Scan Type	Helical	Helical	Helical	Helical	Helical
Scan FOV	No Selection	No Selection	Large	Large	No Selection
Rotation Time (s)	0.5	0.5	0.5	0.5	0.5
Det. Configuration	64 x 0.5	16 x 1.0	64 x 0.625	20 x 0.625	16 x 0.625
Pitch	0.9 ≤ 1.1	0.9 < 1.1	0.984	0.969	1.375
kVp	120	120	120	120	120
Siemens = Eff. mAs GE = mA setting Philips = mAs	mAs: M – 140 L – 210 mA Field: M-280 L-420	mAs: M-140 L- 210 mA Field: M-280 L-420	mA: M-180 L-270	mA: M-180 L-270	mA: M-180 L-270
Dose modulation	OFF	OFF	Auto mA OFF	Auto mA OFF	Auto mA OFF
Beam Hardening Correction	Boost On	Boost On			
Recon 1 Algorithm	FC01	FC01	Standard	Standard	Standard
Additional Filter	No Selection	No Selection	No Selection	No Selection	No Selection
Thickness (mm)	1.0	1	0.625	0.625	0.625
Interval (mm)	0.5	0.5	0.5	0.5	0.5
Iterative recon (noise reduction algorithm)	Do Not Use	Do Not Use	Do Not use ASIR	Do Not use ASIR	Do Not use ASIR
Scan Time (Sec) 30cm length	<10	<15	<10	<10	<15

1.6 CT Radiation Dose Standardization

- CT Dose is standardized so each manufacturer and model are matched within ± 3% of the Target CTDIvol.

Table 1.6.1 (CTDIVol selection)

Body Size	CTDIvol mGy/cm
Large – L	11.4
Medium – M	7.6

1.7 Size Definition (mAs selection)

- Body Mass Index will be used to determine large or medium mAs setting. The technologist will use the chart below to select the mAs setting for a given BMI.

Table 1.4.1 (mAs selection)

BMI range	mAs selection
>25	Large
≤25	Medium

B. CT Dose Calculation Estimates

- Veran airway segmentation software has the capability to function with a much lesser dose than used on a standard clinical chest CT scan.
- Veran functionality will allow this protocol to include an inspiration & expiration scan while only using the dose equal to or below one standard clinical CT scan.

Effective Dose (E) mSv

- Effective dose (E) is used in radiation protection, to compare the stochastic risk of a non-uniform exposure of ionizing radiation, with the risks caused by a uniform exposure of the whole body. The stochastic risks are carcinogenesis and hereditary effects. It is not intended as a measure for acute or threshold effects of radiation exposure such as erythema, radiation sickness or death.

Cumulated Dose (One scan session)

- The effective dose (E) for a one scan session: Inspiration & Expiration is estimated to be 7mSv. The maximum amount of radiation from the clinical related radiation procedures (E) for subjects having a one scan session of this clinical protocol is equivalent to approximately 14% of the annual radiation limit for a medical worker.

Statement regarding dose estimates

- Although there are no proven harmful effects from this amount of radiation, long-term effects on the patient's health cannot be ruled out with certainty. This dose estimate takes into account only the exposure to procedures in this clinical procedure. If the patient has experienced other radiation exposure, they should be aware that the risk of effects of radiation exposure is thought to add up across all their exposures(including studies performed as part of your medical care).

Statement regarding breast shields

- It is recommended to have an offset or foam pad between the patient and the breast shield of at least 1 to 2 inches. This allows for optimal sensor recognition and airway segmentation.

C. CT Data Transfer

Data will be transferred via network DICOM or to a CD or USB device depending on each site's transfer mechanism.

Statement regarding the above Protocol:

Parameters such as slice thickness, slice spacing, rotation speed, pitch, and matrices, should be followed as per the above protocol or significant degradation of the scan airway segmentation will occur. The exposure settings (mA, mAs, or kv) settings in this protocol are only a recommendations based on the goals set forth in this protocol. The final determination and selection of the exposure parameters (mA, mAs, or kv) is the sole responsibility of the imaging institution performing these scans. Although there are no proven harmful effects from this amount of radiation, long-term effects on health cannot be ruled out with certainty.

CT Chest Pulmonx Zephyr (Endobronchial Valve)

Updated 06/08/24
Reviewed 05/14/25

Indications - pre procedural imaging prior to endobronchial valve placement and should be ordered as Pulmonx Zephyr protocol by Pulmonology.

Use CT Chest without Contrast charge.

GENERAL SCAN NOTES

The patient's arms must be over his/her head.

Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage - lung apices through adrenal glands (obtained during **maximum** end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Scan parameters are the same as routine chest protocol.

IV Contrast: not given for this protocol.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	Can't scan this protocol on Sensation 16 due to thin slice limitations.									
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet	
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right	
TLC INSP	**≤0.625**	**≤0.625**	**Br38f / B30f**	**mediastinum**	3	**head/feet**	**Pulmonx specific recon.**
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet	

CT Chest Pulmonx Zephyr (Endobronchial Valve)

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	10	1.375	13.75	0.5	NA	NA	10.9
Opt 540	helical	large	120	100-440	16.36	on	2.5	10	1.375	13.75	0.5	NA	NA	10.9
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**	**Must be first recon.**
AX SOFT	2.5	2.5	std full	400/40	head/feet	
COR SOFT	2.5	2.5	std full	400/40	front/back	
SAG SOFT	2.5	2.5	std full	400/40	left/right	
TLC INSP	**≤0.625**	**≤0.625**	**standard**	**400/40**	**head/feet**	**Pulmonx specific recon.**
AX MIPS	8.0	3.0	std full	1600/-600	head/feet	

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX LUNG	3.0	3.0	YA	lung	3	head/feet	
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	B	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right	
TLC INSP	**≤0.625**	**≤0.625**	**B**	**mediastinum**	**3**	**head/feet**	**Pulmonx specific recon.**
AX MIPS	8.0	2.0	B	lung	3	head/feet	

CT Parameters

The following CT scan radiographic parameters have been optimized in order to provide appropriate inputs to the StratX® Lung Analysis Platform.

In order to produce quality output parameters displayed in the StratX Report, it is recommended to adhere as closely as possible to the ideal parameters detailed on page 2. If a scan can't be obtained with the ideal parameters, we have specified acceptable scan parameters on pages 3 and 4. Significant deviation from these parameters may result in reduced accuracy or an inability to analyze the CT scan.

For more specific information related to scan parameters or if your CT scanner manufacturer is not listed below, please contact us directly for support at **info@pulmonxstratxusa.com**.

General Information

1. Ensure all files are in standard .DICOM format
2. Only **SUPINE** position chest CT scans with **arms positioned above the head** are supported. Scans obtained in PRONE position can NOT be analyzed.
3. The CT scans must have a **slice thickness of 1.5mm or less** (smaller slices provide more information for fissure completeness).
4. The input image should NOT be reconstructed with a slice spacing larger than the slice thickness (**slice spacing should be less than or equal to slice thickness**, no gaps in the 3D volume are allowed).
5. The **complete lung** must be present on the CT scan. If parts of the lung are missing, the output parameters will be compromised.
6. Only **non-contrast TLC (inspiration) scans** are accepted for analysis.
7. Technologist should instruct the patient to take a **full inspiration breath** and hold. The scan should start once the patient has reached breath hold and relaxed their body.
8. Ensure the CT scan is not of poor quality (e.g., movement artifacts, artifacts due to metal, high noise levels due to dose level, etc.).
9. Please ensure the CT scan does NOT suffer from image artifacts such as streak artifacts from implants.
10. Scans taken from CT scanners with less than 16 detector rows are not recommended.
11. Any series containing less than 120 images will be automatically removed by the system.

Please note that CT scanners with less than 16 detector rows are not recommended.

Ideal Scan Parameters

Following these parameters will achieve the highest quality report possible

Highest Quality Report Parameters				
PARAMETERS	SIEMENS	PHILIPS	TOSHIBA	GE
Kernel Standard	B30	B	FC08	Standard
Tube Current	Regular Patient (<30 BMI): 80 mAs Large Patient (>30 BMI): 100 mAs ***No tube current modulation**			
KV	120			
Slice Thickness	0.625mm			
Reconstruction Interval (Slice Spacing)	≤0.625mm			
Pitch	Range: 0.5-1.2	Range: 0.5-1.2	Range: 0.5-1.0	Range: 0.5-1.375
Rotation or Gantry Speed (sec)	≤0.5			
Iterative Reconstruction	None			
Contrast	None			

Acceptable Scan Parameters

CT Scan Parameters WITHOUT Iterative Reconstruction

*No iterative reconstruction preferred

3-4mSv Dose				
PARAMETERS	SIEMENS	PHILIPS	TOSHIBA	GE
Tube Current	0mA - 900 mA ***No tube current modulation preferred**	20mA - 450 mA ***No tube current modulation preferred**	20mA – 600mA ***No tube current modulation preferred**	30mA – 770mA ***No tube current modulation preferred**
KV	120			
Dose Modulation	CareDose ON CarekV OFF	Z-Dom ON	SURE Exposure ON	Smart mA ON
Pitch	Range: 0.5-1.2	Range: 0.5-1.2	Range: 0.5-1.0	Range: 0.5-1.375
Rotation or Gantry Speed (sec)	≤0.5			
Kernel Standard	≤B45f	B, C	≤FC45	Bone, Standard
Slice Thickness	≤1.5mm ***Thinnest slice possible preferred**			
Slice Spacing	≤slice thickness			
Average mSv	<4.0			
Contrast	None			

Acceptable Scan Parameters

CT Scan Parameters WITH Iterative Reconstruction

*No iterative reconstruction preferred

1-2mSv Dose				
PARAMETERS	SIEMENS	PHILIPS	TOSHIBA	GE
Tube Current	0mA - 900 mA ***No tube current modulation preferred**	20mA - 450 mA ***No tube current modulation preferred**	20mA – 600mA ***No tube current modulation preferred**	30mA – 770mA ***No tube current modulation preferred**
KV	120			
Dose Modulation	CareDose ON CarekV OFF	V-Dom ON	SURE Exposure ON	Smart mA ON
Pitch	Range: 0.5-1.2	Range: 0.5-1.2	Range: 0.5-1.0	Range: 0.5-1.375
Rotation or Gantry Speed (sec)	≤0.5			
Iterative Reconstruction	Use SAFIRE, ADMIRE	Use IMR	Use ADIR 3D standard	Use VEO, ASiR
Iterative Strength	3	Routine 2	Standard	30-50
Kernel Standard	≤B45f	B, C	≤FC45	Bone, Standard
Slice Thickness	≤1.5mm ***Thinnest slice possible preferred**			
Slice Spacing	≤slice thickness			
Average mSv	<2.0			
Contrast	None			

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D1005EN_A – April 2020 4-page CT Parameters

pulmonX®

CT Chest Olympus (Endobronchial Valve)

Updated 05/01/24
Reviewed 05/14/25

Indications - pre procedural imaging prior to endobronchial valve placement and should be ordered as Olympus protocol by Pulmonology.

Use CT Chest without Contrast charge.

GENERAL SCAN NOTES

The patient's arms must be over his/her head.

Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage - lung apices through adrenal glands (obtained during **maximum** end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Scan parameters are the same as routine chest protocol.

See end of protocol for requirements for the **axial TLC thins** recons.

IV Contrast: not given for this protocol.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction	
AX LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet	
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right	
TLC INSP	**1.0**	**1.0**	**Br44 / B41f**	**mediastinum**	**3**	**head/feet**	**Olympus specific recon.**
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet	

CT Chest Olympus (Endobronchial Valve)

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction	
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**	**Must be first recon.**
AX SOFT	2.5	2.5	std full	400/40	head/feet	
COR SOFT	2.5	2.5	std full	400/40	front/back	
SAG SOFT	2.5	2.5	std full	400/40	left/right	
TLC INSP	**1.25**	**1.25**	**std full**	**400/40**	**head/feet**	**Olympus specific recon.**
AX MIPS	8.0	3.0	std full	1600/-600	head/feet	

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction	
AX LUNG	3.0	3.0	YA	lung	3	head/feet	
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet	
COR SOFT	3.0	3.0	B	mediastinum	3	front/back	
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right	
TLC INSP	**1.0**	**1.0**	**B**	**mediastinum**	**3**	**head/feet**	**Olympus specific recon.**
AX MIPS	8.0	2.0	B	lung	3	head/feet	

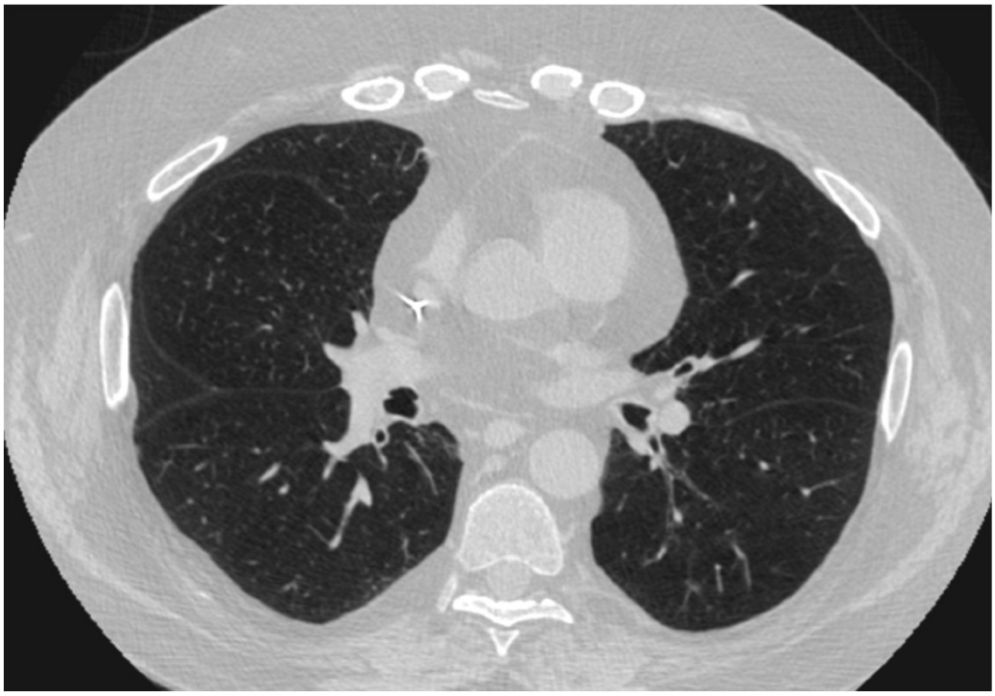
CT Chest Olympus (Endobronchial Valve)

For the **Axial TLC Thins** recons:

The cranial/top image should begin 1-2 slices above the top of both lungs.

The caudal/bottom image should stop 1-2 slices below the bottom of both lungs.

The FOV of the transverse/axial plane should tightly fit the lungs (outer rib to outer rib at widest part of the chest).



Transverse/Axial FOV

OLYMPUS®

CT Acquisition Guidelines
Quick Reference Guide

NOTE: To ensure an optimal QCT Analysis, please adhere to the following guidelines. It is important that the patient fully understands the breath hold and scanning procedure, and that any concerns are addressed prior to performing the CT scan. The technologist will ask women if they might be pregnant and will not scan them if they answer affirmatively.

CT Parameters

- Slice thickness of ≤1.5 mm
- Slice spacing ≤ slice thickness
- Complete anatomic coverage of lungs
- Smooth reconstruction kernel
- Breath-hold at TLC
- No severe motion artifacts
- Non-contrast-enhanced

Breath-Holding Instructions

1. **For the static TLC scan**, the patient is told to "take your biggest breath in until you feel your lungs are completely full, in the same way you do in the lung function laboratory and hold the breath."

2. **Technologist should watch the chest to ensure that the breath hold maneuver is done properly and that the scanning only starts when the patient has reached breath hold and relaxed their body.**

Subject Positioning

1. The patient will lie in the **supine position going head first** into the CT gantry.

2. Place patient in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported. Using the laser positioning lights, line up the patient so the chest is at the iso-center (in the middle: left-right; up-down) of the CT gantry. Move the table so the patient is in the correct position for a chest CT scan.

MORE INSTRUCTIONS ON REVERSE

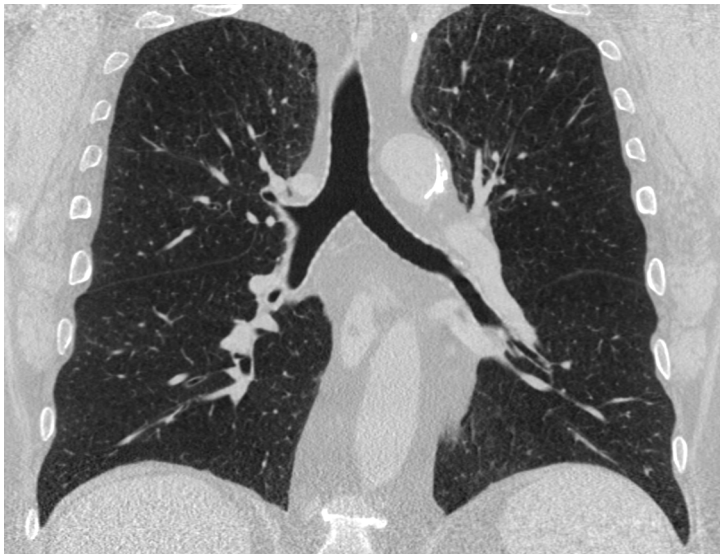
CT Acquisition Guidelines
Quick Reference Guide

2

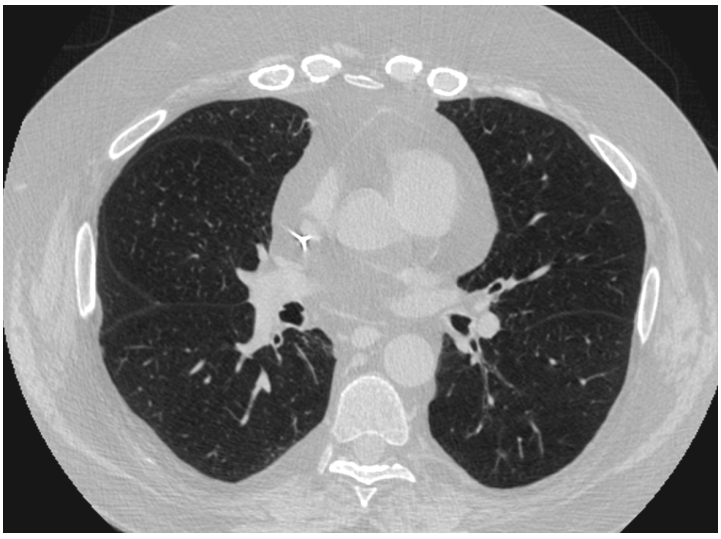
NOTE: To ensure an optimal QCT Analysis, please adhere to the following guidelines. It is important that the patient fully understands the breath hold and scanning procedure, and that any concerns are addressed prior to performing the CT scan. The technologist will ask women if they might be pregnant and will not scan them if they answer affirmatively.

Scan Coverage

1 CT scan must include the lungs, but ONLY the lungs. Start the scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs.



2 The DFOV should tightly fit the TLC lung (i.e. outer rib to outer rib at widest part of chest) for the QCT reconstruction.



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CT Acquisition Guidelines for SeleCT Portal

Quick Reference Guide

NOTE: To ensure an optimal QCT Analysis, please adhere to the following guidelines. It is important that the patient fully understands the breath hold and scanning procedure, and that any concerns are addressed prior to performing the CT scan. The technologist will ask women if they might be pregnant and will not scan them if they answer affirmatively.

CT Parameters

	SIEMENS	PHILIPS	TOSHIBA	GE
Breathhold AT	TLC	TLC	TLC	TLC
Slice Thickness	≤1.5mm	≤1.5mm	≤1.5mm	≤1.5mm
Slice Spacing	Contiguous	Contiguous	Contiguous	Contiguous
Anatomic Coverage (For guidance see Scan Coverage section)	Full coverage of the lungs	Full coverage of the lungs	Full coverage of the lungs	Full coverage of the lungs
Smooth Kernel Reconstruction	≤ B45, ≤ I45, ≤ Br45	B, C, or D	≤ FC52	Bone, Standard, Lung
Severe Motion Artifact	Absent	Absent	Absent	Absent
Contrast Enhanced	None	None	None	None

Breath-Holding Instructions

1. **For the static TLC scan**, the patient is told to “take your biggest breath in until you feel your lungs are completely full, in the same way you do in the lung function laboratory and hold the breath.”

2. **Technologist should watch the chest to ensure that the breath hold maneuver is done properly and that the scanning only starts when the patient has reached breath hold and relaxed their body.**

Subject Positioning

1. The patient will lie in the **supine position going head first** into the CT gantry.

2. Place patient in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported. Using the laser positioning lights, line up the patient so the chest is at the iso-center (in the middle: left-right; up-down) of the CT gantry. Move the table so the patient is in the correct position for a chest CT scan.

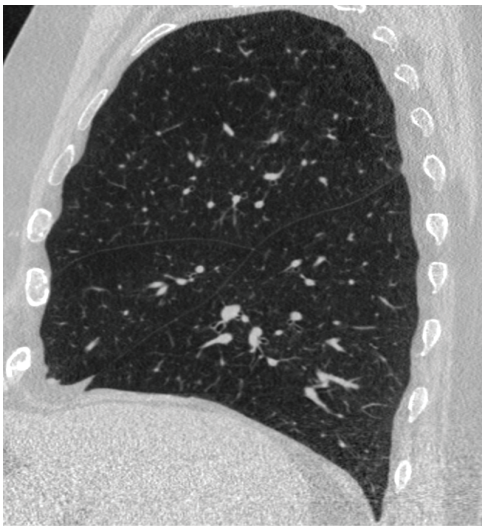
MORE INSTRUCTIONS ON REVERSE

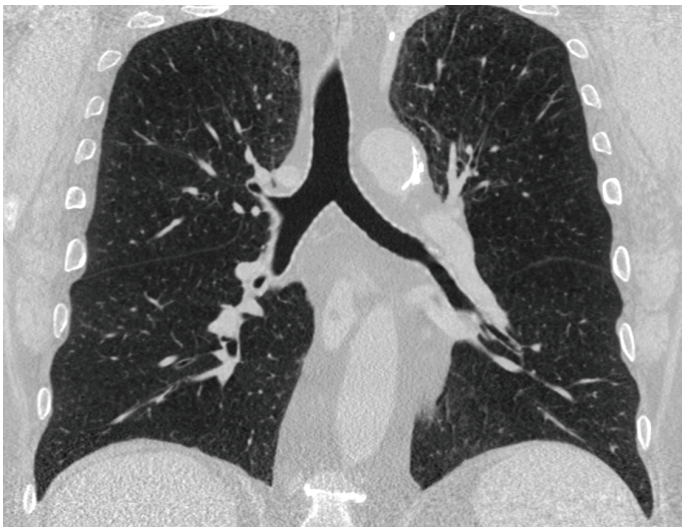
CT Acquisition Guidelines for SeleCT Portal

Quick Reference Guide

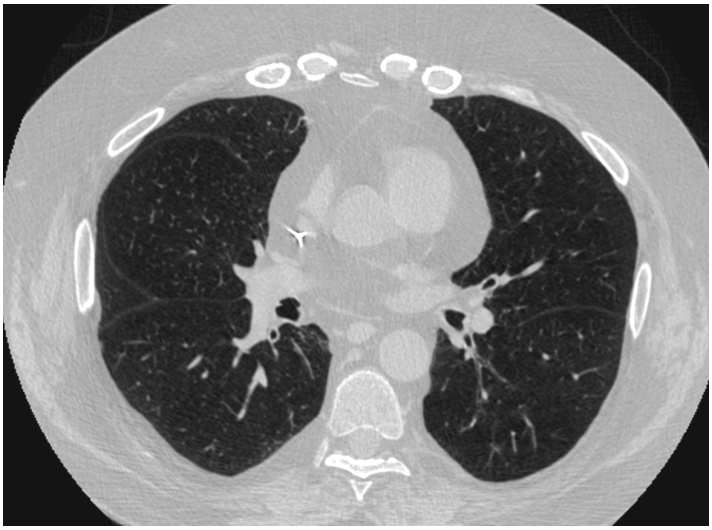
Scan Coverage

1 CT scan must include the lungs, but ONLY the lungs. Start the scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs.





2 The DFOV should tightly fit the TLC lung (i.e. outer rib to outer rib at widest part of chest) for the QCT reconstruction.



Should you have any questions regarding the CT acquisition guidelines, please contact your Olympus Sales Representative or SeleCT by MedQIA customer service at 855-832-0144.

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CT Chest VIDA (Quantitative)

Updated 05/01/24
Reviewed 05/14/25

Indications - quantitative CT (QCT) imaging in the setting of airway obstruction /COPD and should be ordered as VIDA protocol by Pulmonology.

Use CT Chest without Contrast charge.

GENERAL SCAN NOTES

The patient's arms must be over his/her head.

Remove any metal from the imaging field of view.

Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.

Topogram - lung apices through diaphragm (obtained during end inspiration).

Craniocaudal scan coverage - lung apices through adrenal glands (obtained during **maximum** end inspiration).

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.

Technique (mAs, kV, etc) and FOV must be the same for every scan for a given patient.

See end of protocol for requirements for the **axial thins** recons.

IV Contrast: not given for this protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	Eff mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**90/110/160**	**off**	NA	1.00	16	0.75	0.5	12.5
Go Up 32	spiral	110	**90/110/160**	**off**	**off**	1.20	32	0.75	0.8	8.3
Sensation 64	spiral	120	**80/100/150**	**off**	NA	1.00	64	0.6	0.5	7.8
Definition 64	spiral	120	**80/100/150**	**off**	**off**	1.00	64	0.6	0.5	7.8
Go Top 64	spiral	120	**80/100/150**	**off**	**off**	1.00	64	0.6	0.5	3.9
Drive 128	spiral	120	**100/125/180**	**off**	**off**	1.00	128	0.6	0.5	3.9
Force 192	spiral	120	**100/125/180**	**off**	**off**	1.00	128	0.6	0.5	3.9

Use lower mAs for BMI <20, mid mAs for BMI 20-30 and higher mAs for BMI >30.

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Br57 / B70f	lung	none	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	none	left/right
TLC INSP 1	**0.75**	**0.5**	**Qr36f / B35f**	**mediastinum**	**none**	**head/feet**
TLC INSP 2	**0.75**	**0.5**	**Br46f / B45f**	**mediastinum**	**none**	**head/feet**
AX MIPS	8.0	3.0	Br40 / B41f	lung	none	head/feet

VIDA specific recons.

CT Chest VIDA (Quantitative)

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	**Manual mA**	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	**145/180/270**	off	0.625	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	**145/180/270**	off	0.625	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	**145/180/270**	off	0.625	40	0.984	39.37	0.5	off	none	3.8
Disc VCT 64	helical	large body	120	**145/180/270**	off	0.625	40	0.984	39.37	0.5	NA	NA	3.8

Use lower mAs for BMI <20, mid mAs for BMI 20-30 and higher mAs for BMI >30.

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
TLC INSP	**0.625**	**0.5**	**std full**	**400/40**	**head/feet**
AX LUNG	2.5	2.5	lung	1600/-600	head/feet
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

This must be the first recon.

VIDA specific recon.

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	**mA**	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	**105/130/190**	off	0.923	64	0.625	0.5	4.1

Use lower mAs for BMI <20, mid mAs for BMI 20-30 and higher mAs for BMI >30.

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	none	head/feet
AX SOFT	3.0	3.0	B	mediastinum	none	head/feet
COR SOFT	3.0	3.0	B	mediastinum	none	front/back
SAG SOFT	3.0	3.0	B	mediastinum	none	left/right
TLC INSP	**0.75**	**0.5**	**B**	**mediastinum**	**none**	**head/feet**
AX MIPS	8.0	2.0	B	lung	none	head/feet

VIDA specific recon.

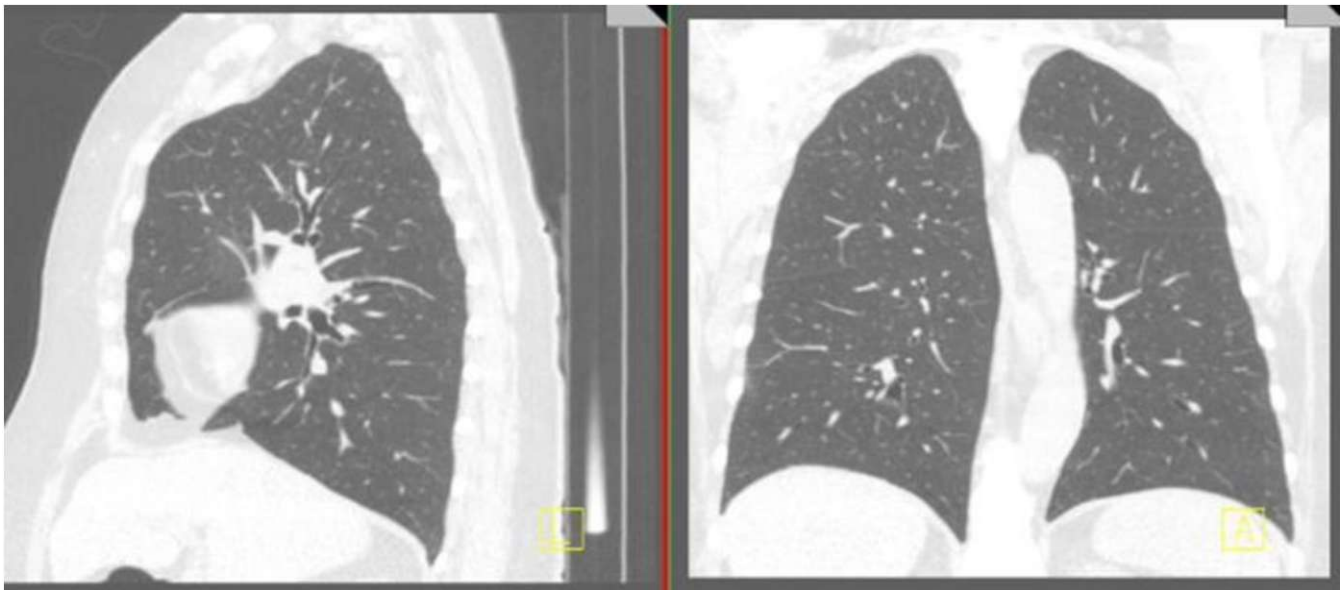
CT Chest VIDA (Quantitative)

For the **Axial TLC Thins** recons:

The cranial/top image should begin 1-2 slices above the top of both lungs.

The caudal/bottom image should stop 1-2 slices below the bottom of both lungs.

The FOV of the transverse/axial plane should tightly fit the lungs (outer rib to outer rib at widest part of the chest).



It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan. If this is a subsequent visit to the baseline visit, participants must be scanned with the same CT acquisition and reconstruction parameters used during the baseline CT visit.

Subject Positioning

- Place subject in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported.
- Using the laser positioning lights, line up the subject so the chest is iso-center (in the middle: left-right; up-down) of the CT gantry. *Correcting an off-center subject during image reconstruction is not acceptable. Proper positioning must be ensured prior to scanning.*
- Move the table so the subject is in the correct position for a chest CT scan.
- Once the subject is comfortably and properly positioned, remain in the scanner room and work with the subject to rehearse the breathing instructions used during CT acquisition several times. *It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan.*

Scan Coverage

CT scan must include the entire lungs, but ONLY the lungs. Start the scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs as shown in Figure 1.

- The DFOV should tightly fit the TLC lung for the QCT reconstruction as shown in Figure 2.
- The same DFOV should be used for all time points of a given subject.

Figure 1

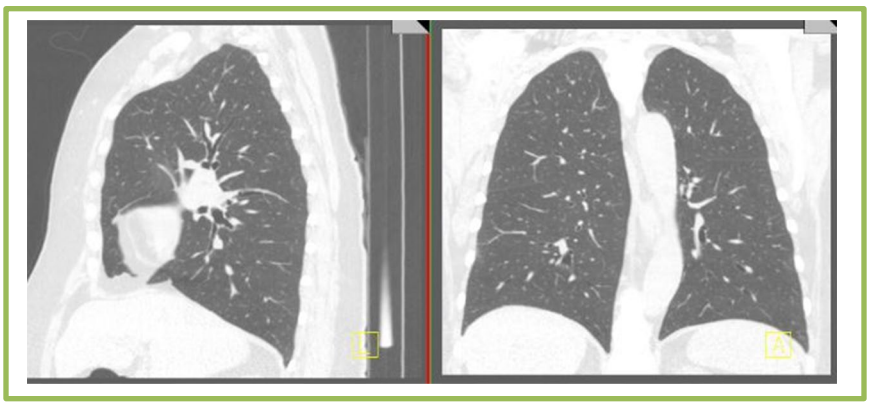


Figure 2

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CT Parameters

- The following parameters must be implemented for these CT scans.
- Scout scan uses default parameters (Site discretions on type and number of scouts, however must maintain ALARA principle).

Table 1: CT Protocol Siemens Somatom Drive

	INSPIRATION (TLC)
Scanner	Siemens Somatom Drive
Scan Type	Spiral
Rotation Time (s)	0.5
Det. Configuration	128 x 0.6mm
kV	120
Pitch	1.0
Dose Modulation	Off
Recon Algorithm 1 (For QCT analysis)	B35
Recon Algorithm 2 (For Visual analysis)	B45
Iterative Recon (noise reduction)	Do not use IRIS or SAPHIRE
Thickness (mm)	0.75
Interval (mm)	0.5
Est. Scan Time (Sec) 30cm length	<10

Effective mAs Selection

Small, medium or large effective mAs settings for these scans are based upon the Body Mass Index (BMI). The BMI must be provided to the technologist to set the effective mAs.

All subject scanning visits post-screening will be assigned to a different dose category only if the BMI changes between clinical visits by more than 3 AND crosses the 20 or 30 BMI thresholds.

Please use the table below to select the correct effective mAs setting based on the subject's BMI.

Inspiration (TLC)
Effective mAs as a function of BMI: TLC Scan

BMI Range	Size	Eff. mAs setting to be used
< 20	Small (S)	100
20-30	Medium (M)	125
> 30	Large (L)	180

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The following breathing instructions must be given to the subject:

* **Bold instructions are what must be said to the subject during CT.**

** ***(Italic)* information represents reminders directed towards the CT technologist.**

SCANNING:

Use the breathing instructions to perform:

- A practice breathing session
- Scouts - as needed - to position the FOV to cover the entire lung and as little soft tissue as possible
- The Inspiration CT scan (TLC)

Inspiratory CT (TLC)

BREATHING INSTRUCTIONS:

For this scan, I am going to ask you to take a couple of deep breaths in and out before we have you breathe all the way in and hold your breath.

Ok, let's get started,

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Now breathe all the way IN...IN...IN *(watch chest to ensure a deep breath in as far as possible)*

Keep holding your breath – DO NOT BREATHE!

At end of scan or practice: - **Breathe and relax**

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It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan. If this is a subsequent visit to the baseline visit, participants must be scanned with the same CT acquisition and reconstruction parameters used during the baseline CT visit.

Subject Positioning

- Place subject in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported.
- Using the laser positioning lights, line up the subject so the chest is iso-center (in the middle: left-right; up-down) of the CT gantry. *Correcting an off-center subject during image reconstruction is not acceptable. Proper positioning must be ensured prior to scanning.*
- Move the table so the subject is in the correct position for a chest CT scan.
- Once the subject is comfortably and properly positioned, remain in the scanner room and work with the subject to rehearse the breathing instructions used during CT acquisition several times. *It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan.*

Scan Coverage

CT scan must include the entire lungs, but ONLY the lungs. Start the scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs as shown in Figure 1.

- The DFOV should tightly fit the TLC lung for the QCT reconstruction as shown in Figure 2.
- The same DFOV should be used for the TLC and RV scans.
- The same DFOV should be used for all time points of a given subject.

Figure 1

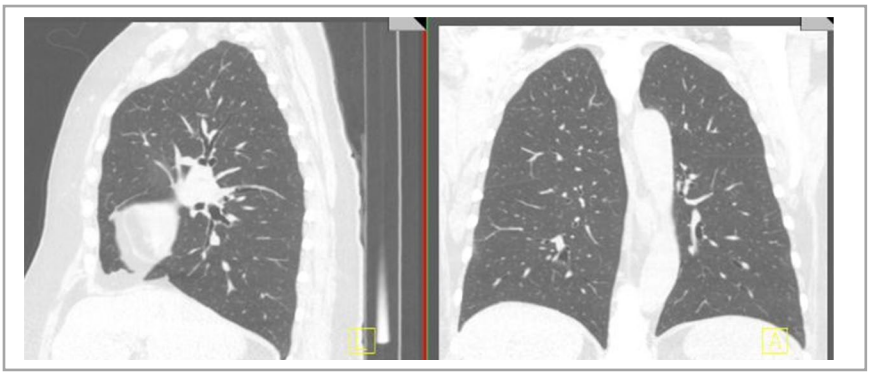
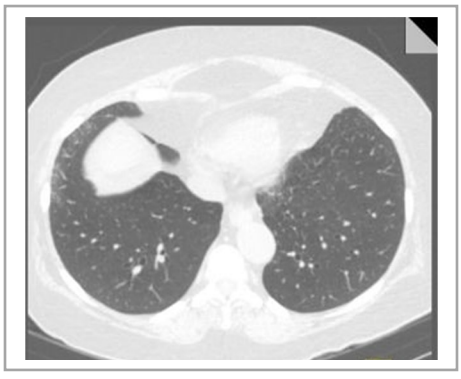


Figure 2



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The following breathing instructions must be given to the subject:

*** Bold instructions are what must be said to the subject during CT.**

**** *(Italic)* information represents reminders directed towards the CT technologist.**

SCANNING:

Use the breathing instructions to perform:

- A practice breathing session
- Scouts - as needed - to position the FOV to cover the entire lung and as little soft tissue as possible
- The Inspiration CT scan (TLC)

Inspiratory CT (TLC)

BREATHING INSTRUCTIONS:

For this scan, I am going to ask you to take a couple of deep breaths in and out before we have you breathe all the way in and hold your breath.

Ok, let's get started,

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Now breathe all the way IN...IN...IN *(watch chest to ensure a deep breath in as far as possible)*

Keep holding your breath – DO NOT BREATHE!

At end of scan or practice: - **Breathe and relax**

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CT Parameters

- The following parameters must be implemented for these CT scans.
- Scout scan uses default parameters (Site discretions on type and number of scouts, however must maintain ALARA principle).

Table 1: CT Protocol Siemens Somatom Go.Up 32

	INSPIRATION (TLC)
Scanner	Somatom Go.Up
Scan Type	Spiral (single source)
Rotation Time (s)	0.8
Det. Configuration	32 x 0.7mm
kV	110
Pitch	1.2
Dose Modulation	Off
Recon Algorithm 1 (For QCT analysis)	B35
Recon Algorithm 2 (For Visual analysis)	B45
Iterative Recon (noise reduction)	Do not use IRIS or SAPHIRE
Thickness (mm)	0.75
Interval (mm)	0.5
Est. Scan Time (Sec) 30cm length	<20

Effective mAs Selection

Small, medium or large Effective mAs settings for these scans are based upon the Body Mass Index (BMI). The BMI must be provided to the technologist to set the Effective mAs.

All subject scanning visits post-screening will be assigned to a different dose category only if the BMI changes between clinical visits by more than 3 AND crosses the 20 or 30 BMI thresholds.

Please use the table below to select the correct Effective mAs setting based on the subject's BMI.

Inspiration (TLC)

Effective mAs as a function of BMI: TLC Scan

BMI Range	Size	Eff. mAs setting to be used
< 20	Small (S)	90
20-30	Medium (M)	110
> 30	Large (L)	160

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It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan. If this is a subsequent visit to the baseline visit, participants must be scanned with the same CT acquisition and reconstruction parameters used during the baseline CT visit.

Subject Positioning

- Place subject in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported.
- Using the laser positioning lights, line up the subject so the chest is iso-center (in the middle: left-right; up-down) of the CT gantry. Correcting an off-center subject during image reconstruction is not acceptable. Proper positioning must be ensured prior to scanning.
- Move the table so the subject is in the correct position for a chest CT scan.
- Once the subject is comfortably and properly positioned, remain in the scanner room and work with the subject to rehearse the breathing instructions used during CT acquisition several times. *It is important that the subject fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan.*

Scan Coverage

CT scan must include the lungs, but ONLY the lungs. Start the scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs as shown in figure 1.

- The DFOV should tightly fit the TLC lung for the QCT reconstruction as shown in figure 2.
- The same DFOV should be used for the TLC and RV scans.
- The same DFOV should be used for all time points of a given subject.

Figure 1

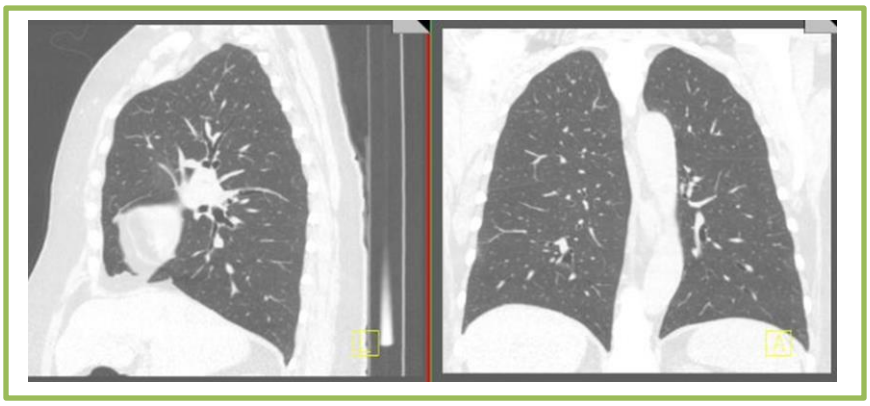

Figure 2

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CT Parameters

- The following parameters must be implemented for these CT scans.
- Scout scan uses default parameters (Site discretions on type and number of scouts, however must maintain ALARA principle).

Table 1: CT Protocol Siemens Sensation 64

Scanner	Sensation 64
Scan Type	Spiral
Rotation Time (s)	0.5
Det. Configuration	64 x 0.6mm
kV	120
Pitch	1.0
Dose Modulation	Off
Recon Algorithm 1 (For QCT analysis)	B35
Recon Algorithm 2 (For Visual analysis)	B45
Iterative Recon (noise reduction)	Do not use IRIS or SAPHIRE
Thickness (mm)	0.75
Interval (mm)	0.5
Est. Scan Time (Sec) 30cm length	<10

Effective mAs Selection

Small, medium or large effective mAs settings for these scans are based upon the Body Mass Index (BMI). The BMI must be provided to the technologist to set the effective mAs.

All subject scanning visits post-screening will be assigned to a different dose category only if the BMI changes between clinical visits by more than 3 AND crosses the 20 or 30 BMI thresholds.

Please use the table below to select the correct effective mAs setting based on the subject's BMI.

Effective mAs as a function of BMI: TLC Scan

BMI Range	Size	Eff. mAs setting to be used
< 20	Small (S)	80
20-30	Medium (M)	100
> 30	Large (L)	150

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The following breathing instructions must be given to the subject:

*** Bold instructions are what must be said to the subject during CT.**

**** *(Italic)* information represents reminders directed towards the CT technologist.**

SCANNING:

Use the breathing instructions to perform:

- A practice breathing session
- Scouts - as needed - to position the FOV to cover the entire lung and as little soft tissue as possible
- The Inspiration CT scan (TLC)

Inspiratory CT (TLC)

BREATHING INSTRUCTIONS:

For this scan, I am going to ask you to take a couple of deep breaths in and out before we have you breathe all the way in and hold your breath.

Ok, let's get started,

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Now breathe all the way IN...IN...IN *(watch chest to ensure a deep breath in as far as possible)*

Keep holding your breath – DO NOT BREATHE!

At end of scan or practice: - **Breathe and relax**

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Table 2. Scanner-Specific Protocol Settings

Scanner Make	Siemens	Siemens	Siemens	GE	GE	Philips
Scanner model	Definition (AS Plus) 128 slice	Definition (DS) 64 slice	Sensation 64 slice	VCT 64 slice/ Discovery STE	Discovery CT 750HD 64 slice	Brilliance 64 slice
Scan type	Spiral	Spiral single source	Spiral	Helical	Helical - standard	Spiral helix
Scan FOV	No selection	No selection	No selection	Large	Large	No selection
Rotation time, s	0.5	0.5	0.5	0.5	0.5	0.5
Detector configuration	128 × 0.6	64 × 0.6	64 × 0.6	64 × 0.625	64 × 0.625	64 × 0.625
Pitch	1.0	1.0	1.0	0.984	0.984	0.923
kVp	120	120	120	120	120	120
Inspiration (TLC)	Effective mAs	Effective mAs	Effective mAs	mA	mA	mAs
Small	90	85	80	145	145	105
Medium	110	105	100	180	180	130
Large	165	150	145	270	270	190
Expiration (RV)	Effective mAs	Effective mAs	Effective mAs	mA	mA	mAs
Extra small	60					
Small		55	50	100	100	70
Medium/large	90	85	80	145	145	105
Dose modulation	Care dose off	Care dose off	Care dose off	Auto mA off	Auto mA off	Dose right (ACS) off
Standard algorithm	B35	B35	B35	Standard	Standard	B
Lung algorithm	B30	B31	None	Detail	Detail	YB
Additional image filters	No selection	No selection	No selection	No selection	IQ enhance off	Adaptive filtering off
Thickness, mm	0.75	0.75	0.75	0.625	0.625	0.67
Interval, mm	0.5	0.5	0.5	0.5	0.5	0.5
Iterative reconstruction (noise reduction algorithm)	Do not use IRIS	Do not use IRIS	No selection	Do not use ASIR	Do not use ASIR	Do not use iDOSE
Scan time, 30-cm length, s	<10	<10	<10	<10	<10	<10
Reconstruction mode	N/A	N/A	N/A	Plus	Plus	N/A
Smart mA	N/A	N/A	N/A	Off	Off	N/A

Definition of abbreviations: ACS = automatic current selection; ASIR = adaptive statistical iterative reconstruction; CT = computed tomography; FOV = field of view; IQ = intelligent quantitation; IRIS = iterative reconstruction in image space; kVp = peak kilovoltage; mAs = milliamperage seconds; N/A = not applicable; RV = residual volume; TLC = total lung capacity.

Standardizing on volumetric computed tomography dose index, protocols were developed for each scanner type within SPIROMICS (Subpopulations and Intermediate Outcome Measures in COPD Study) so as to maximize the similarity of image data across sites. At each of the two lung volumes, the CT protocol specifies the scanner model, scan mode, scan FOV, rotation time, detector configuration, pitch, kVp, mAs, dose modulation setting, reconstruction kernels, post-processing filter settings, slice thickness, slice interval, iterative reconstruction algorithm setting, scan time for 30-cm length, reconstruction mode, smart mA setting, and IQ enhance setting. Effective mAs represents the tube current–time product.

Written directions for the technologist (Appendix 1A and 1B) accompany the patient and include instructions to: (*1*) position the subject at the center of the CT scanner aperture by use of laser beams for left-to-right and ventral-to-dorsal centering, (*2*) scan only the *z*-axis length needed to include the apical to basal extent of the lungs, (*3*) select the display field of view (DFOV) limited to the most lateral extents of the lungs (providing maximal spatial resolution) at TLC and to keep the DFOV the same for TLC (inspiratory volume) and RV (expiratory volume). A consistent DFOV across lung volumes and longitudinally is important for comparison of airway and density metrics.

Breathing/breath-hold instructions (Appendix 2) are supplied within the CT technologist form, and technologists are instructed to coach the subject, as in a pulmonary function testing laboratory, to achieve both TLC and RV with a series of proceeding deep inspirations. Recorded instructions should not be used, as this takes the technologist's attention off of the subject.

At the time of training, it is emphasized that positioning of the patient in the isocenter of the CT scanner aperture is critical, as discussed in the report from the American College of Radiology (ACR) CT accreditation program (24). Isocenter positioning serves to reduce cone-beam and scatter artifacts.

Step 2: CT scanner calibration status. SPIROMICS requires that each scanner pass an initial calibration check. Scanners must have 64 detector rows or higher to provide imaging speeds adequate for a breath-hold. Precertified scanner information must also be preloaded into the QCT-LAS before onset of subject imaging. Each CT manufacturer has their own scanner-specific test object ("phantom") that assesses the calibration of several general scanner parameters, such as the value of water that should be 0 HU. The SPIROMICS CT protocol includes a specialized CT test object (referred to as the "COPDGene 1" test object) developed in the COPDGene study (25). Assurance of measurement stability of a given CT scanner is critical to any quantitative CT effort. If test object Hounsfield unit values shift by more than 3 HU in any material, the site is alerted and action is taken. Guidelines have been developed for the automated assessment of the appropriate positioning of the test object within the scanner to assure that object misalignment is not contributing to measured deviations (26).

Step 3: Scan acquisition and data entry. SPIROMICS developed Procedural Verification Software (PVS) to provide scanner information and track scan data in real time (Figure E2A). PVS provides an automated web portal system requiring a local computer and Internet connection. The main function of PVS is to provide a mechanism for subject registration before scanning and to provide the study coordinator with subject- and scanner-specific scan parameters from the QCT-LAS database using the subject's BMI. In a longitudinal study, such as SPIROMICS, PVS assures that follow-up scans match the baseline scan in terms of scan protocol, including scanning on the same scanner. Details are provided in the online supplement.

Appendix 1

A

SPIROMICS

CT TECHNOLOGIST INSTRUCTION FORM

SIEMENS DEFINITION AS+ & FLASH SCANNERS

It is important that the patient fully understands the breath hold and scanning procedure and that all concerns are addressed prior to performing the CT scan. If this is a subsequent visit to the baseline visit, participants must be scanned with the same CT acquisition and reconstructions parameters used during the baseline CT visit. Study coordinators will provide the baseline effective mAs and DFOV setting to use for the follow-up visit. All other scan parameters are provided below in Table 1. If you do not have the appropriate baseline information, do not perform the CT scans.

Patient Positioning

- Place patient in a supine position, arms positioned comfortably above the head in a head-arm rest, lower legs supported.
- Using the laser positioning lights, line up the patient so the chest is iso-center (in the middle: left-right; up-down) of the CT gantry.
- Move the table so the patient is in the correct position for a chest CT scan.

Scan Coverage

CT scan must include the lungs, but ONLY the lungs. Start the Scan precisely at the apex of the lungs and stop it once the scan is through the base of the lungs as shown in figure 1.

- The DFOV should tightly fit the TLC lung as shown in figure 2, then use the TLC DFOV for the RV scan so that all the scan reconstructions have the same DFOV. If this is a subsequent to the baseline visit, participants must have the same diameter field of view (DFOV) used during the baseline CT visit. Again, refer to the study coordinator for this information.

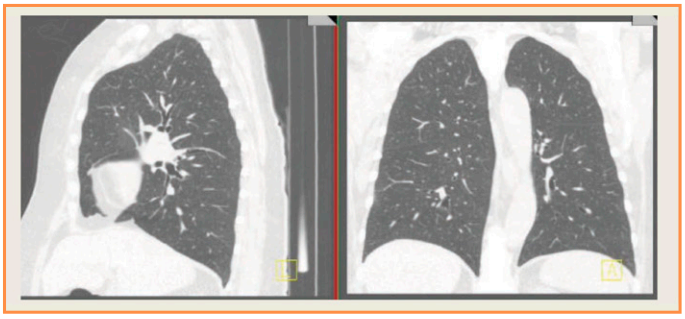

Figure 1

Figure 2

(*A* and *B*) Computed tomography (CT) technologist instruction forms. These forms provide information to ensure the technologists have all the proper information to complete the examinations within the guidelines of the study. The forms are made available through the Procedural Verification Software web system and may be downloaded and printed to take to the scanner room or used for study reference. ALARA = as low as reasonably achievable; DFOV = display field of view; mAs = milliamperage seconds; RV = residual volume; TLC = total lung capacity.

B

CT TECHNOLOGIST INSTRUCTION FORM

SIEMENS DEFINITION AS+ & FLASH SCANNERS

CT Parameters

- The following parameters must be implemented for these CT scans.
- Scout scan uses default parameters (Site discretions on type and number of scouts, however must maintain ALARA principle)

Table 1: CT Protocol Siemens Definition AS+ & FLASH

	INSPIRATION (TLC) EXPIRATION (RV)
Scanner	AS+ & FLASH
Scan Type	Spiral
Rotation Time (s)	0.5
Det. Configuration	128 x 0.6mm
kV	120
Pitch	1.0
Dose Modulation	Off
Recon Algorithm 1	B35
Recon Algorithm 2	B30
Iterative Recon (noise reduction)	Do not use IRIS or SAPHIRE
Thickness (mm)	0.75
Interval (mm)	0.5
Est. Scan Time (Sec) 30cm length	<10

Effective mAs Selection

Small, medium or large effective mAs settings for the SPIROMICS scans are based upon the Body Mass Index (BMI). The BMI must be provided to the technologist to set the effective mAs.

Please use the table below to select the correct mAs setting based on the patient's BMI.

If this is a subsequent visit to the baseline visit, please refer to the study coordinator for the appropriate effective mAs. Do not use these tables for the follow-up scans.

Effective mAs as a function of BMI: TLC Scan

BMI Range	Size	Eff. mAs setting to be used
< 20	Small (S)	85
20-30	Medium (M)	105
> 30	Large (L)	150

Effective mAs as a function of BMI: RV Scan

BMI Range	Size	Eff. mAs setting to be used
< 30	Small (S) Medium (M)	60
> 30	Large (L)	85

Appendix 2

CT TECHNOLOGIST INSTRUCTION FORM

SIEMENS DEFINITION AS+ & FLASH SCANNERS

The following breathing instructions must be given to the patient:

* **Bold instructions are what must be said to the subject during CT.**

** **(italic) information represents reminders directed towards the CT technologist.**

SCANNING:

Use the breathing instructions to perform:

- A practice breathing session
- Scouts - as needed - to position the FOV to cover the entire lung and as little soft tissue as possible
- The Inspiration CT scan (TLC)

Inspiratory CT (TLC)

BREATHING INSTRUCTIONS:

For this scan, I am going to ask you to take a couple of deep breaths in and out before we have you breathe all the way in and hold your breath.

Ok, lets get started,

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Now breathe all the way IN...IN...IN *(watch chest to ensure a deep breath in as far as possible)*

Keep holding your breath – DO NOT BREATHE!

At end of scan or practice: - **Breathe and relax**

SCANNING

Use the breathing instructions to perform:

- A practice breathing session
- Scouts - as needed - to position the FOV to cover the entire lung and as little soft tissue as possible
- The Expiration CT scan (RV)

Expiratory CT (RV)

BREATHING INSTRUCTIONS:

For the second part of this scan, I am going to ask you to take a couple of deep breaths in and out before we have you hold your breath all the way out.

Now we're ready again so please,

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take a deep breath in *(watch chest to ensure a deep breath in)*

Let it out *(watch chest to ensure air is out)*

Take another deep breath in *(watch chest to ensure a deep breath in)*

Now let it all the way OUT... OUT... OUT... as far as possible and hold it out *(watch chest to ensure all air is out before starting the scan)*

Keep holding your breath – DO NOT BREATHE! *Watch chest to ensure a deep breath as far in as possible, spine remains on the table, patient is not shaking and then start scan and watch for these signs throughout study!)*

Breathe and relax

Each computed tomography (CT) technologist form contains proper breathing instructions for a given site's scanner at the time of scanning the subjects. The form is made available through the Procedural Verification Software web system and may be downloaded and printed to take to the scanner room or used for study reference. FOV = field of view; RV = residual volume; TLC = total lung capacity.

CT Trachea

Updated 05/01/24
Reviewed 05/14/25

Indications - tracheal stenosis, tracheomalacia, inspiratory/expiratory stridor.
Only use this protocol when ordered/protocoled as such.
Use regular CT chest charges. Do not include a CT neck charge.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - hyoid bone through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage:

Supine end inspiration phase - **5 cm above clavicular heads** through **adrenal glands**.

Supine end expiration phase - **5 cm above clavicular heads** through **carina**.

Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
Scan parameters for the supine end inspiratory phase are the same as routine chest protocol.
Scan parameters for the supine end expiratory phase are the same as low-dose chest protocol.
IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.
For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

CT Trachea

SIEMENS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX INSP LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet
AX INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG INSP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX INSP THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX INSP MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

For the **Supine End Expiration** phase:

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	**60**	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	**31**	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	**60**	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	**66**	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	**37**	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	**40**	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	**31**	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX EXP LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet
AX EXP SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet

CT Trachea

GE PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	8.2
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	8.2
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	3.3
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	3.3

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

For the **Supine End Expiration** phase:

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-300	**25.46**	on	2.5	20	1.375	27.50	0.5	NA	NA	8.2
Opt 540	helical	large	120	100-300	**25.46**	on	2.5	20	1.375	27.50	0.5	NA	NA	8.2
LS VCT 64	helical	large body	120	50-300	**25.46**	on	2.5	40	0.984	39.375	0.5	30	70	5.7
Disc VCT 64	helical	large body	120	50-300	**25.46**	on	2.5	40	0.984	39.375	0.5	NA	NA	5.7

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet

Must be first recon.

CT Trachea

PHILIPS PARAMETERS & RECONS

For the **Supine End Inspiration** phase:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	8.4

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet

For the **Supine End Expiration** phase:

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	# Detect	Colli-mation	Rot Time	Scan Time
Incisive 128	helical	120	**55**	19	on	1.00	64	0.625	0.75	8.4

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet

CT Esophagram

Updated 03/24/25
Reviewed 05/14/25

Indications - concern for esophageal perforation or fistula.
Use CT Chest w/o Contrast if IV contrast is not given and CT Chest w/ Contrast if IV contrast is given.

GENERAL SCAN NOTES

Move the patient's arms over his/her head if possible. Remove any metal from the imaging field of view.
Have the patient cough a few times to clear secretions. This reduces incidence of small lung nodules.
Topogram - lung apices through diaphragm (obtained during end inspiration).
Craniocaudal scan coverage - lung apices through adrenal glands (obtained during end inspiration).
Adjust FOV (field of view) on topogram to smallest without cropping anatomy.
Scan parameters and recons are the same as routine chest protocol.
IV Contrast: 100 mL Omnipaque-300, inject at 2 mL/sec, 30 secs scan delay.
Oral Contrast:

Have the patient drink 8-16 ounces of **Omnipaque** oral contrast immediately before getting on the scanner.
Stop the patient from drinking more contrast if he/she begins to cough or choke.
Do not use **Gastrografin**, **Gastroview** or **barium** contrast even if the order comments say to use one of them.

For **GE scanners**, it is essential for the 1st recon thickness on the scanner to match the 1st recon thickness in this protocol book for the prescribed Noise Index to be valid. The 1st recon should generally be the thickest recon in the protocol.

SIEMENS PARAMETERS & RECONS

	Scan Mode	kV	mAs	Care Dose	Care kV & Lvl	Pitch	Acq	Coll	Rot Time	Scan Time
Sensation 16	spiral	120	100	on	NA	1.15	16	0.75	0.5	10.9
Go Up 32	spiral	130	51	on	on 80	1.50	32	0.7	0.8	7.1
Sensation 64	spiral	120	100	on	NA	1.40	64	0.6	0.5	5.6
Definition 64	spiral	120	110	on	on	1.20	64	0.6	0.5	6.5
Go Top 64	spiral	120	62	on	on 80	1.20	64	0.6	0.33	2.1
Drive 128	spiral	120	66	on	on	1.20	128	0.6	0.5	3.3
Force 192	spiral	110	51	on	on	1.20	192	0.5	0.5	2.6

Name of Series	Thick	Interval	Kernel	Window	IR Lvl	Recon Direction
AX LUNG	3.0	3.0	Br57 / B70f	lung	3	head/feet
AX SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	head/feet
COR SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	front/back
SAG SOFT	3.0	3.0	Br40 / B41f	mediastinum	3	left/right
AX THINS	1.0	0.8	Br40 / B41f	mediastinum	3	head/feet
AX MIPS	8.0	3.0	Br40 / B41f	lung	3	head/feet

CT Esophagram

GE PARAMETERS & RECONS

	Scan Type	SFOV	kV	mA Range	Noise Index	Smart mA	Slice Thick	Beam Coll	Pitch	Speed	Rot Time	Dose Red	ASIR	Scan Time
LS 16	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
Opt 540	helical	large	120	100-440	16.36	on	2.5	20	1.375	27.50	0.5	NA	NA	5.5
LS VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	50	50	2.2
Disc VCT 64	helical	large body	120	100-650	18.38	on	2.5	40	1.375	55.00	0.4	NA	NA	2.2

Name of Series	Thickness	Interval	Recon Algorithm	Window Width/Level	Recon Direction
AX LUNG	**2.5**	**2.5**	**lung**	**1600/-600**	**head/feet**
AX SOFT	2.5	2.5	std full	400/40	head/feet
COR SOFT	2.5	2.5	std full	400/40	front/back
SAG SOFT	2.5	2.5	std full	400/40	left/right
AX THINS	1.25	1.0	std full	400/40	head/feet
AX MIPS	8.0	3.0	std full	1600/-600	head/feet

Must be first recon.

PHILIPS PARAMETERS & RECONS

	Scan Mode	kV	Avg mAs	Dose Index	3D Dose	Pitch	Detect	Colli	Rot Time	Scan Time
Incisive 128	helical	120	92	19	on	1.00	64	0.625	0.75	5.6

Name of Series	Thick	Interval	Filter	Window	iDose	Recon Direction
AX LUNG	3.0	3.0	YA	lung	3	head/feet
AX SOFT	3.0	3.0	B	mediastinum	3	head/feet
COR SOFT	3.0	3.0	B	mediastinum	3	front/back
SAG SOFT	3.0	3.0	B	mediastinum	3	left/right
AX THINS	1.0	0.75	B	mediastinum	3	head/feet
AX MIPS	8.0	2.0	B	lung	3	head/feet