CT TECHNOLOGIST INSTRUCTION FORM
MESA LUNG III/NON-SMOKERS
TWO NON-CONTRAST SCANS
SIEMENS DEFINITION FLASH SCANNER

This form should be readily available at all certified MESA LUNG III Flash scanners, or brought to the scanner with each subject.

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 scans. Study coordinators will provide the technologist with the PVS form which contains the mAs and DFOV setting (if baseline parameters are available) to use for this visit. All other scan parameters are provided below in Tables 1 and 2.

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 scans must include the lungs, but ONLY the lungs. Scanning can be performed either craniocaudal or caudocranial.
- The DFOV should match the baseline value *(provided by coordinator prior to the scan; located on PVS form).* If this is the baseline, then the DFOV should be set as tight as possible to include only the lungs with no more than 2cm of non-lung tissue on either side. *(see Figure 1 and 2 for an example of a tight DFOV)*

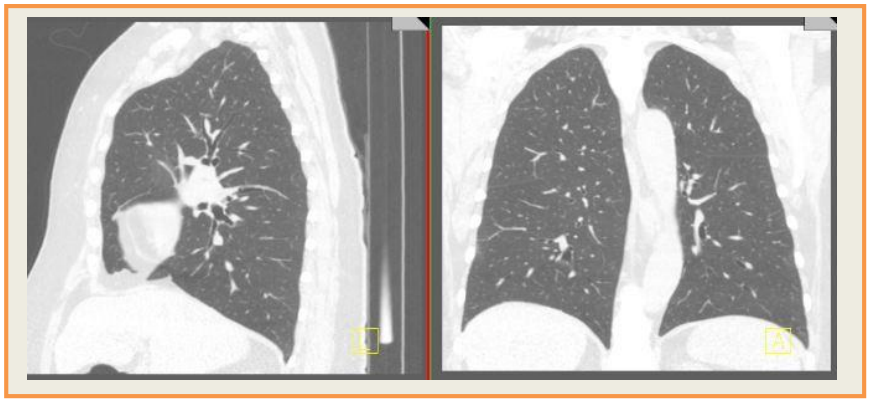

Figure 1

Figure 2

Non-contrast TLC CT Parameters

- The following parameters must be implemented for these CT scans.
  See Table 1 and 2 for volume specific parameters
- Scout scan uses default parameters (Site discretions on type and number of scouts, however must maintain ALARA principle)
- A scout scan should be performed at the appropriate lung volume prior to each lung volume scan. IE: TLC scout scan, TLC volume scan, FRC scout scan, FRC volume scan.
- Spiral scans may NOT be repeated.

Table 1: Perform one non-contrast scan of the lung at total lung capacity (TLC)

1.47mSv	Non-Contrast TLC Scan
Scanner	SOMATOM Flash
Scan Type	Helical
Rotation Time (s)	0.5
Det. Configuration	128 x 0.6mm
kV	120 kV
Quality Ref mAs	52
Pitch	1
Care Dose4D	ON
Recon Algorithm	I30
Iterative Recon	SAFIRE 5
Reconstructions Thickness X Interval (mm)	**R1**: 0.75 X 0.5
Est. Scan Time (Sec) 30cm length	<10
CTDIvol (mGy)	3.51*
RAW DATA	**SAVE RAW DATA****

***3.51 x 30cm x 0.014 = 1.47mSv for a standard 75kg/25 BMI subject.**
****Raw Data details and plan to be determined later**

TLC Breathing Instructions (for non-contrast scan)

- These breathing instructions will be live-coached; NOT recorded.
- Scouts and CT scans must follow these breathing instructions to minimize radiation amount

Practice all breathing with subject at least once prior to scanning.

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 and hold it 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**

Non-contrast FRC CT Parameters

Table 2: Perform one non-contrast scan of the lung at functional residual capacity (FRC)

1.47mSv	Non-Contrast FRC Scan
Scanner	SOMATOM Flash
Scan Type	Helical
Rotation Time (s)	0.5
Det. Configuration	128 x 0.6mm
kV	120 kV
Quality Ref mAs	52
Pitch	1
Care Dose4D	ON
Recon Algorithm	I30
Iterative Recon	SAFIRE 5
Reconstructions Thickness X Interval (mm)	**R1**: 0.75 X 0.5
Est. Scan Time (Sec) 30cm length	<10
CTDIvol (mGy)	3.51*
RAW DATA	**SAVE RAW DATA****

***3.51 x 30cm x 0.014 = 1.47mSv for a standard 75kg/25 BMI subject.**
****Raw Data details and plan to be determined later**

FRC Breathing Instructions (for non-contrast scan)

- These breathing instructions will be live-coached; NOT recorded.
- Scouts and CT scans must follow these breathing instructions to minimize radiation amount

Practice all breathing with subject at least once prior to scanning.

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 (FRC)

Expiratory CT (FRC)

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 your breath out slowly, relax, and hold your breath out *(watch chest to ensure all air is out and patient is relaxed before starting the scan)*

Keep holding your breath – DO NOT BREATHE!

(*Watch to make sure chest is not moving, spine remains on the table, and patient is not shaking, then start scan and watch for these signs throughout study!)*

Breathe normally

