

ONE STOP QA

Routine QA with the CeIT phantom

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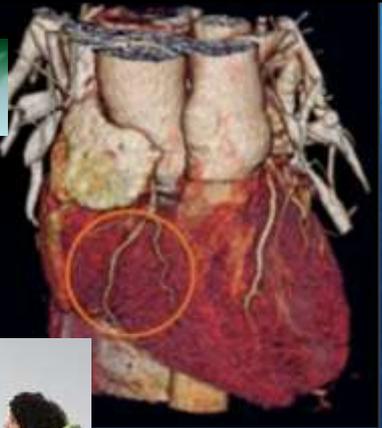
North Wales Medical Physics



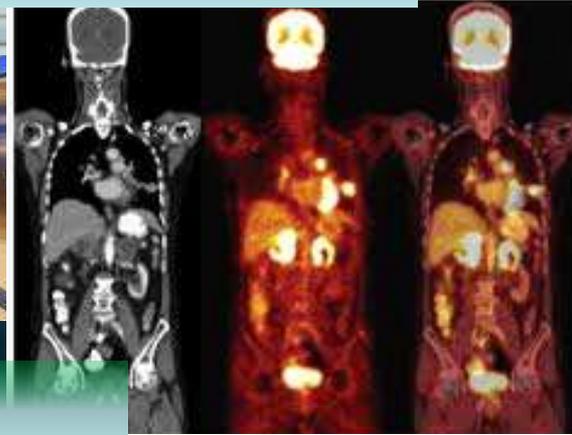
GIG
CYMRU
NHS
WALES

Bwrdd Iechyd Prifysgol
Betsi Cadwaladr
University Health Board

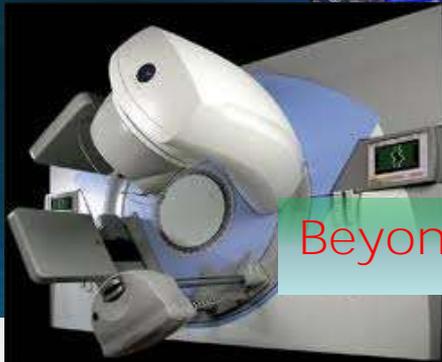
Extended Coverage



Dual Source



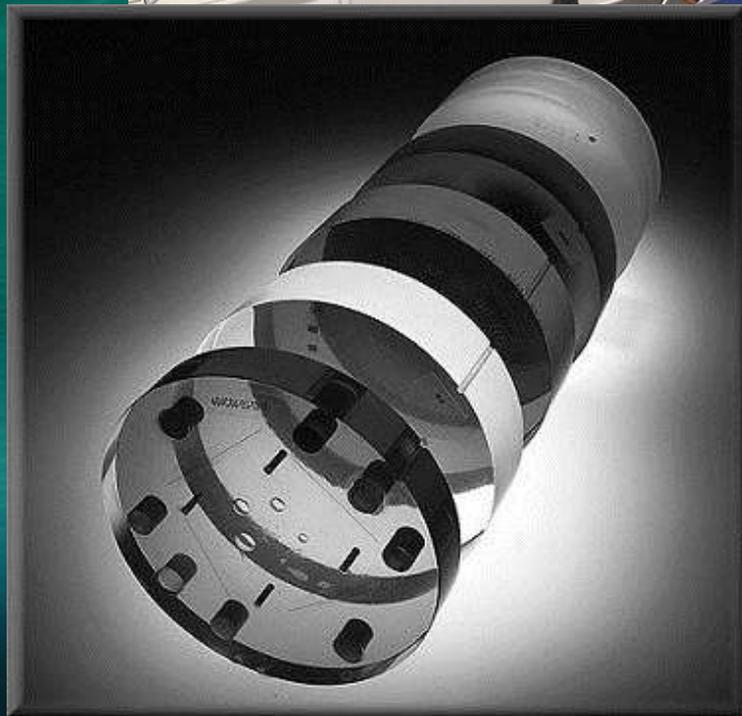
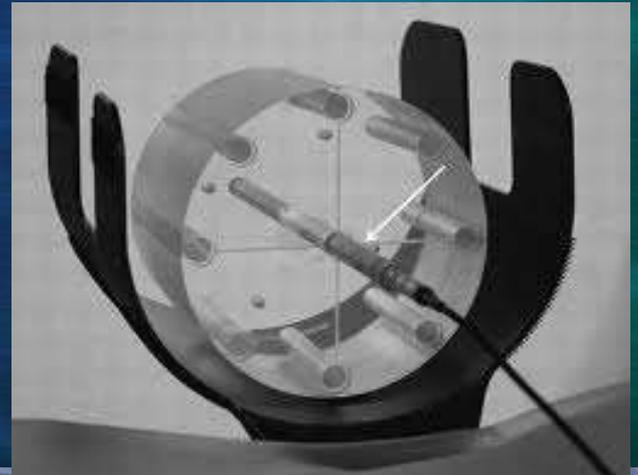
Beyond Radiology



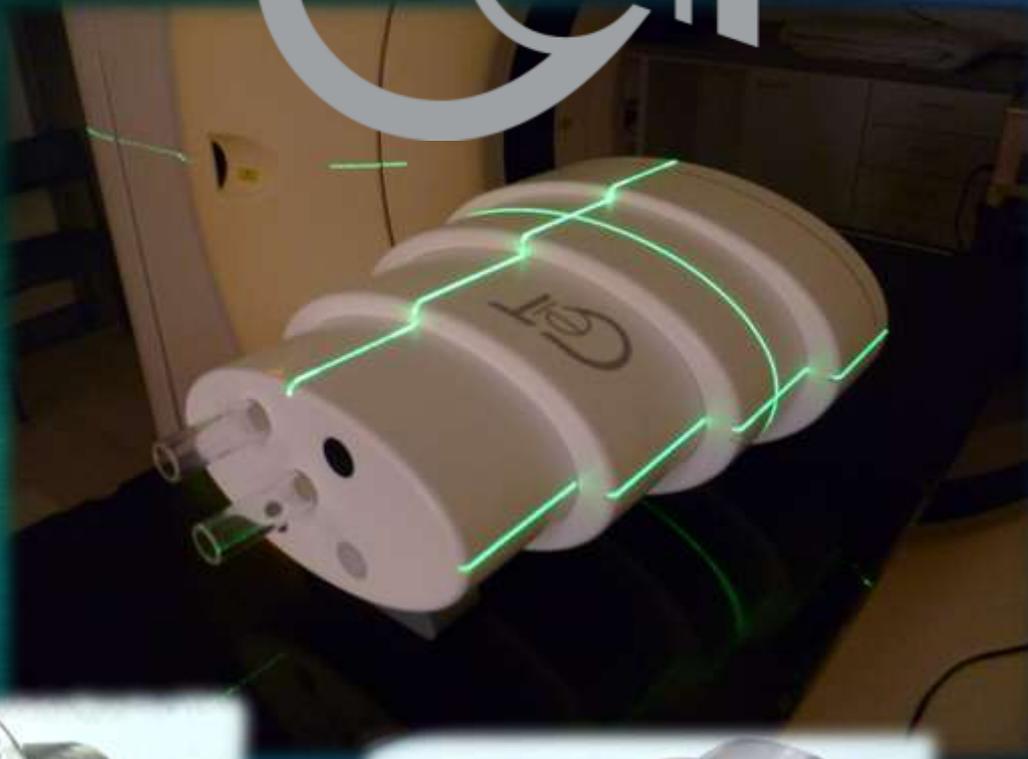
Dual Energy



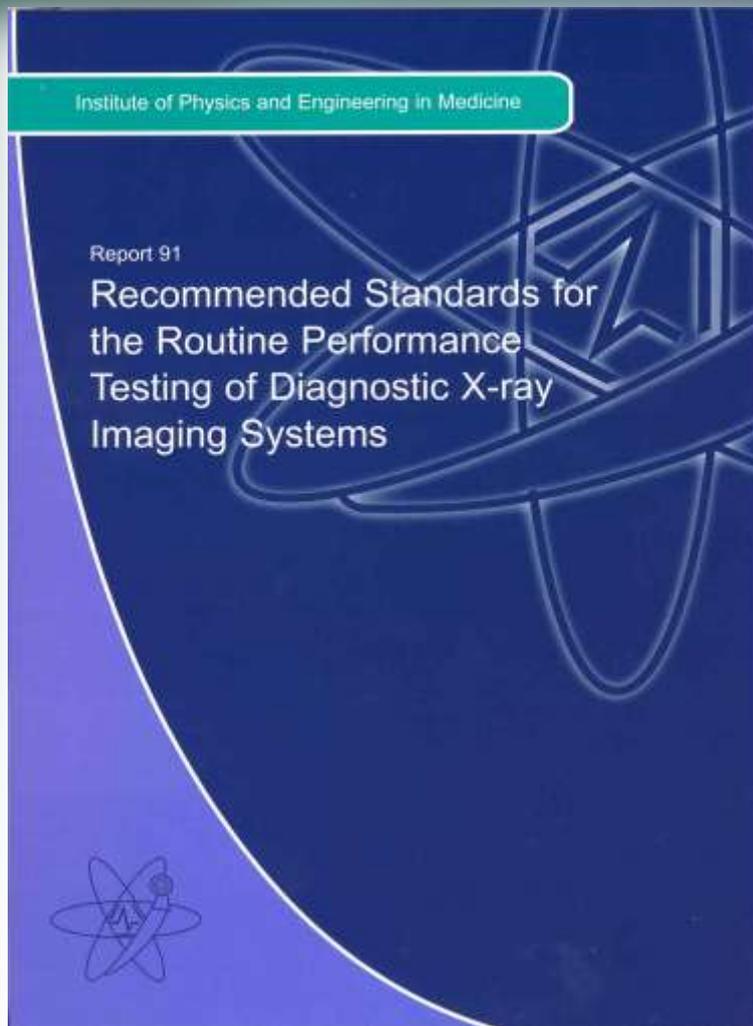
Hybrid Imaging



CET



IPEM Report 91



(CT01/CT06) Image Noise (SD)

(CT02/CT07) CT Number values

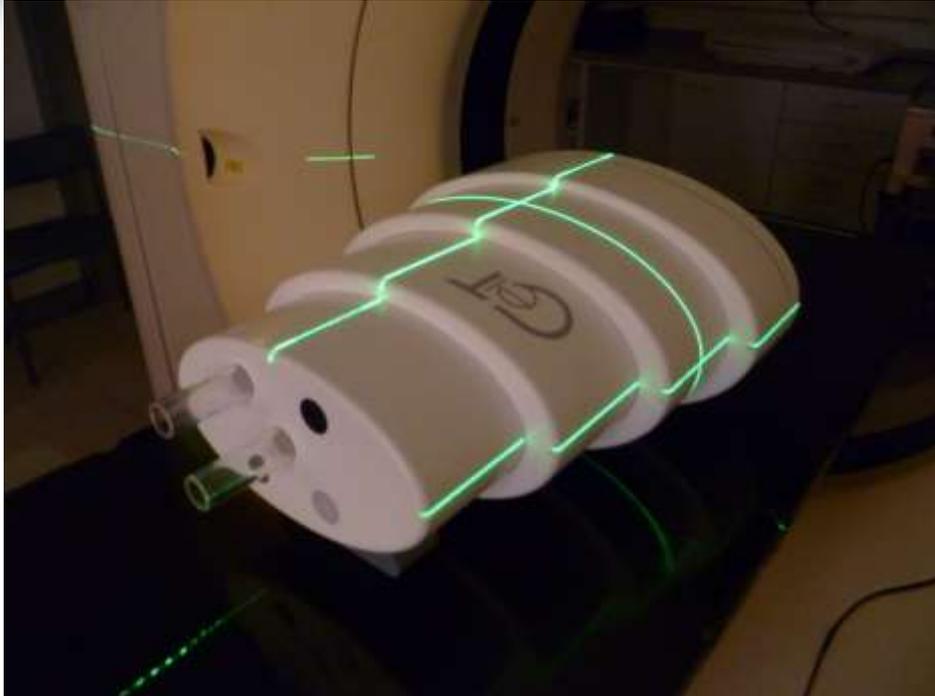
(CT08) CT Number Uniformity

(CT09) High Contrast Spatial Resolution

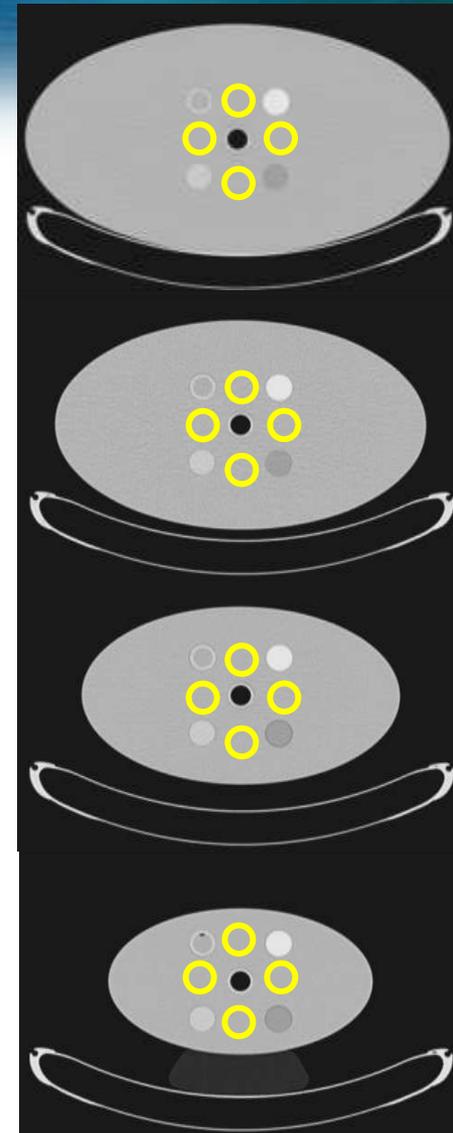
(CT10) Computed Tomography Dose Index

(CT11/PD07) $CTDI_{vol}$ for single slice

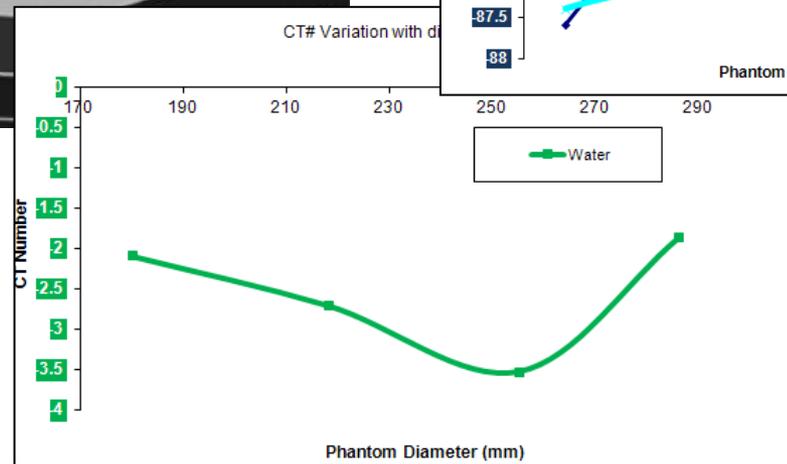
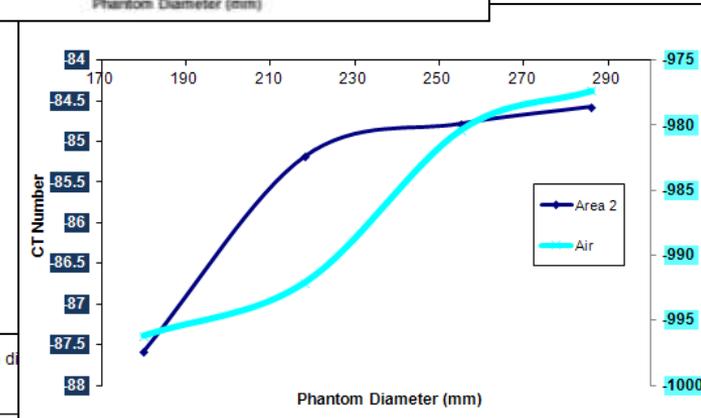
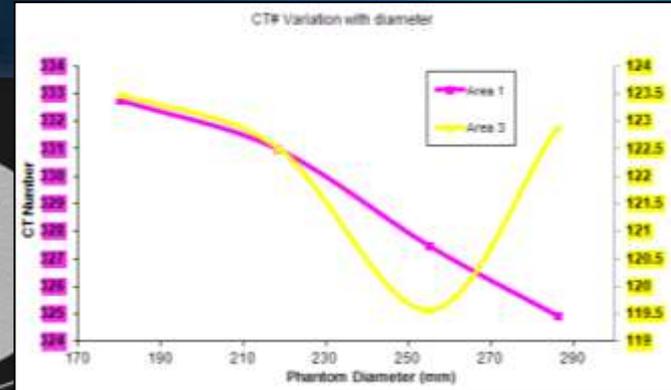
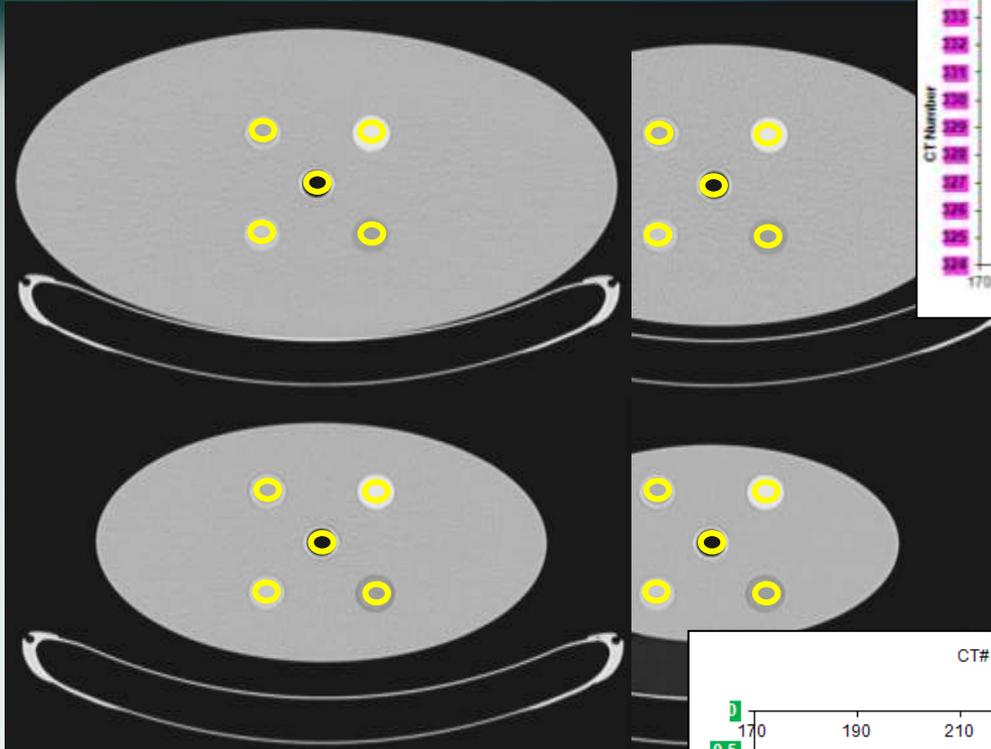
CT06 — Image Noise



Axial slices through each section of CeIT
Monitor image noise with time

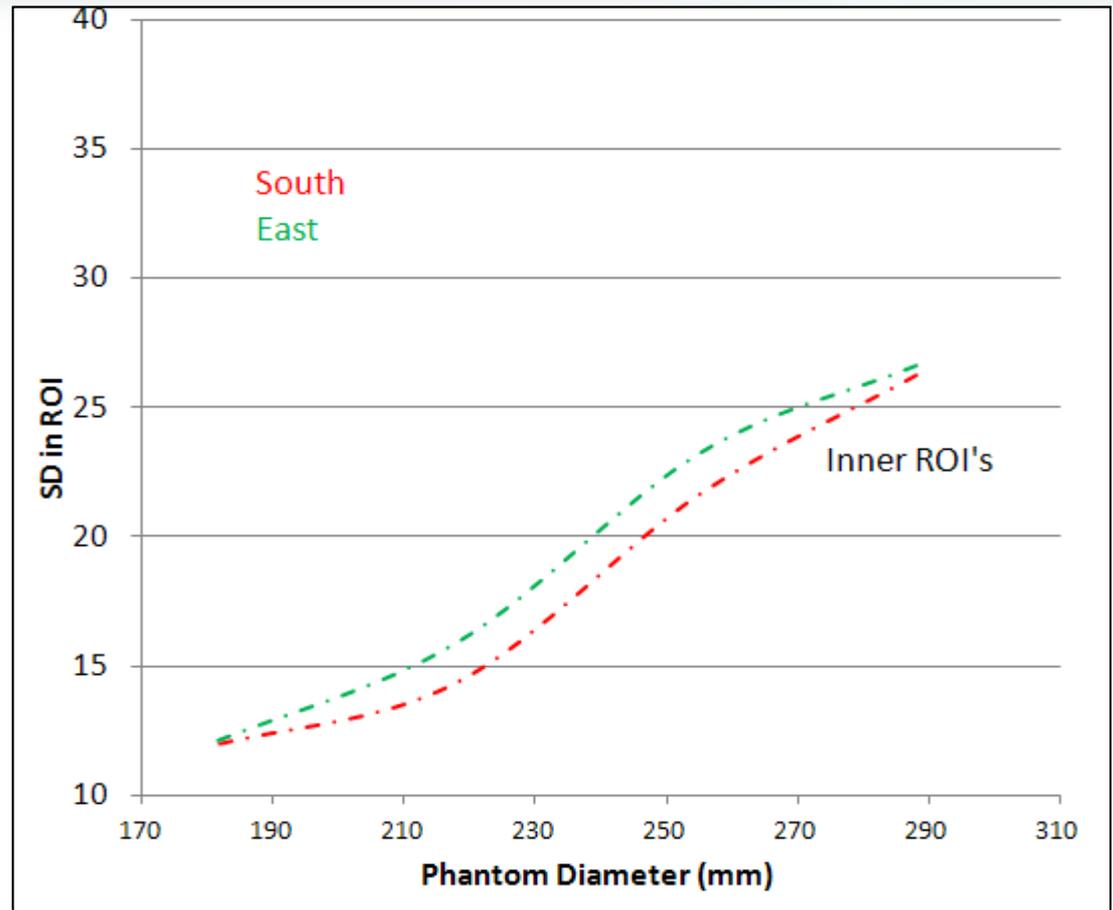
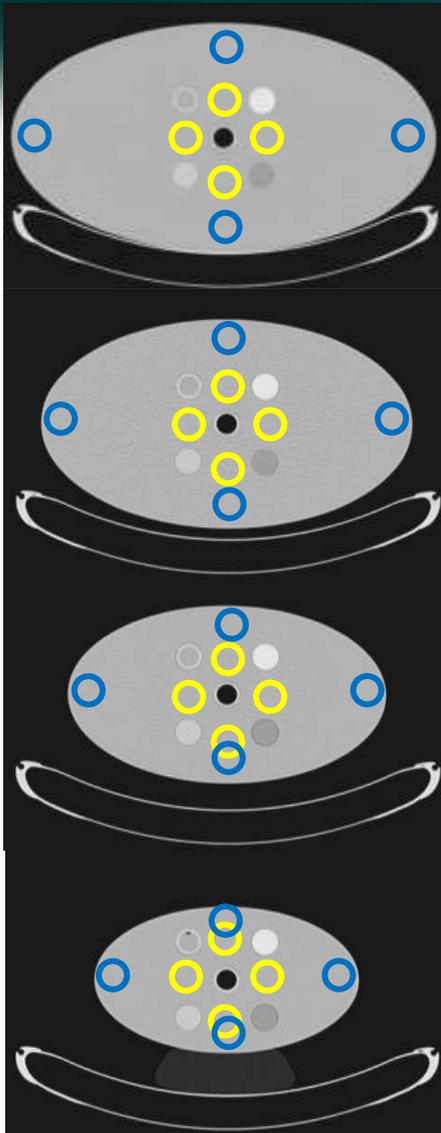


CT07 — CT Number Values



AIR + WATER
Materials for CT# range
-100 to +350

CT08 — CT Number Uniformity

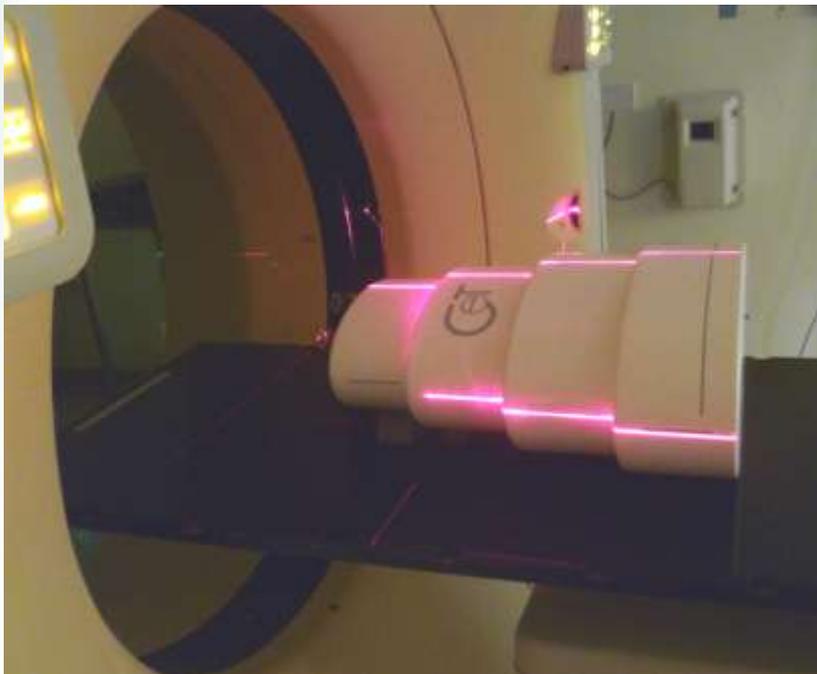
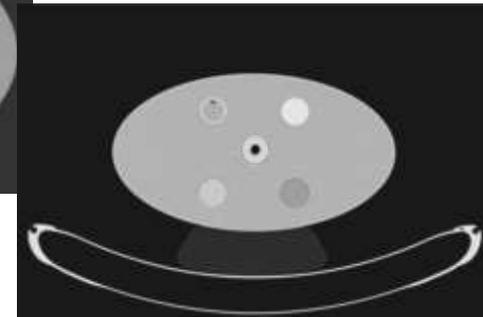
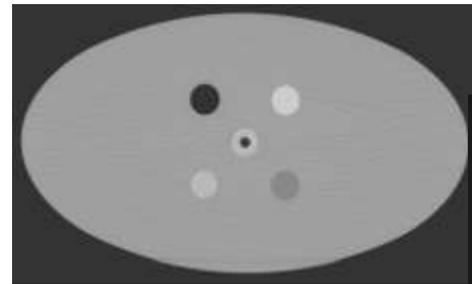


CT10 — Computed Tomography Dose Index



During commissioning use standard phantoms

- Determine scanner display accuracy
- Obtain baseline values in CeIT



Routinely consistency check

- Measured value
- Scanner indicated value

CT011 — $CTDI_{vol}$ for single slice or rotation

Support standard pencil chamber from CeIT in air and measure CTDI



IPEM 91 Routine Testing



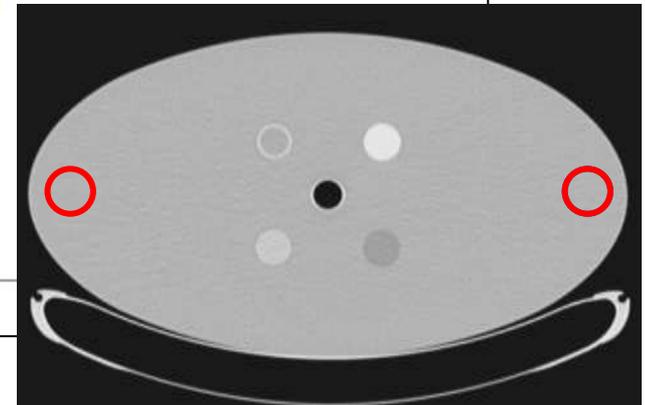
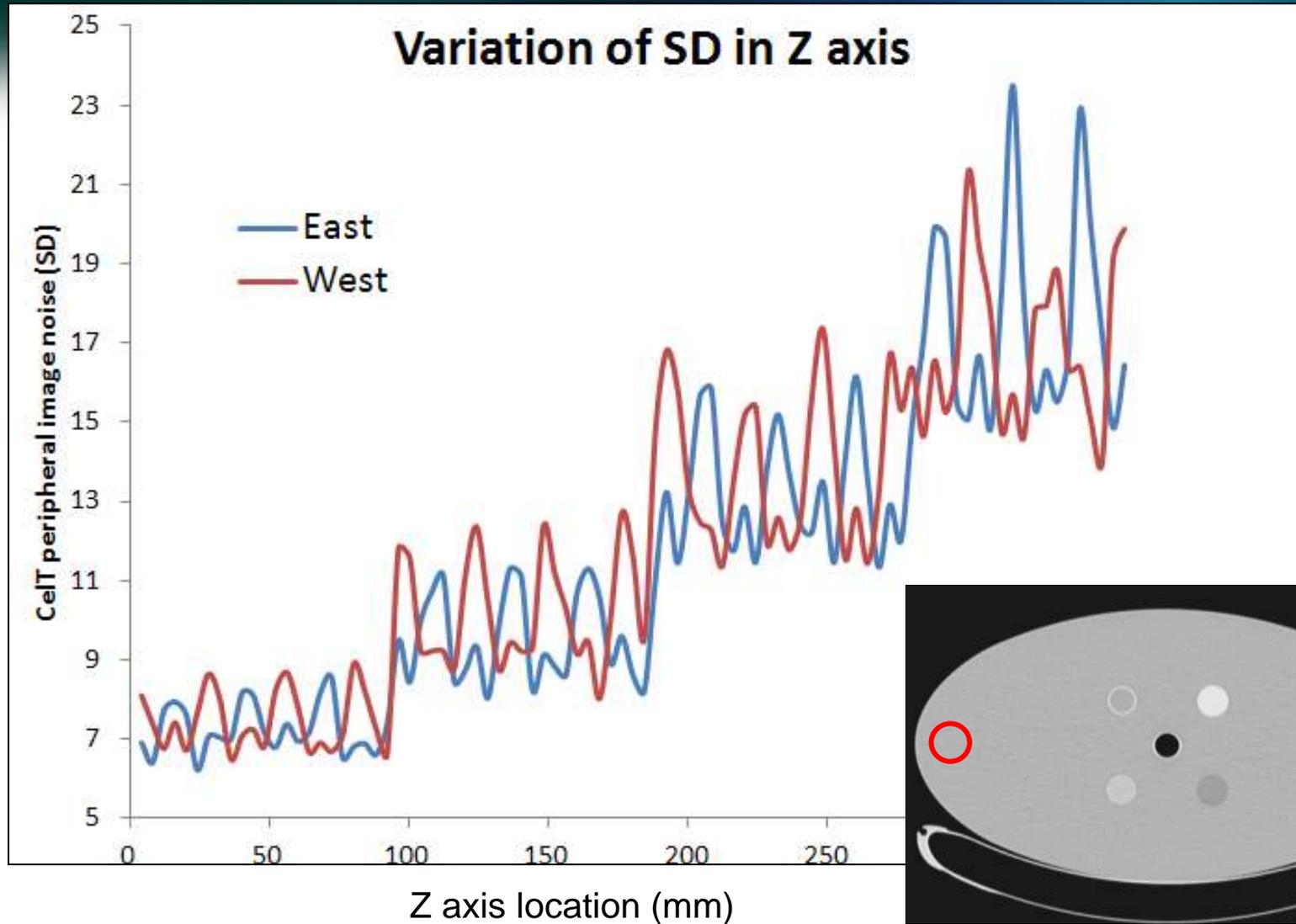
QA for MSCT - beyond IPEM 91



Beyond IPEM 91

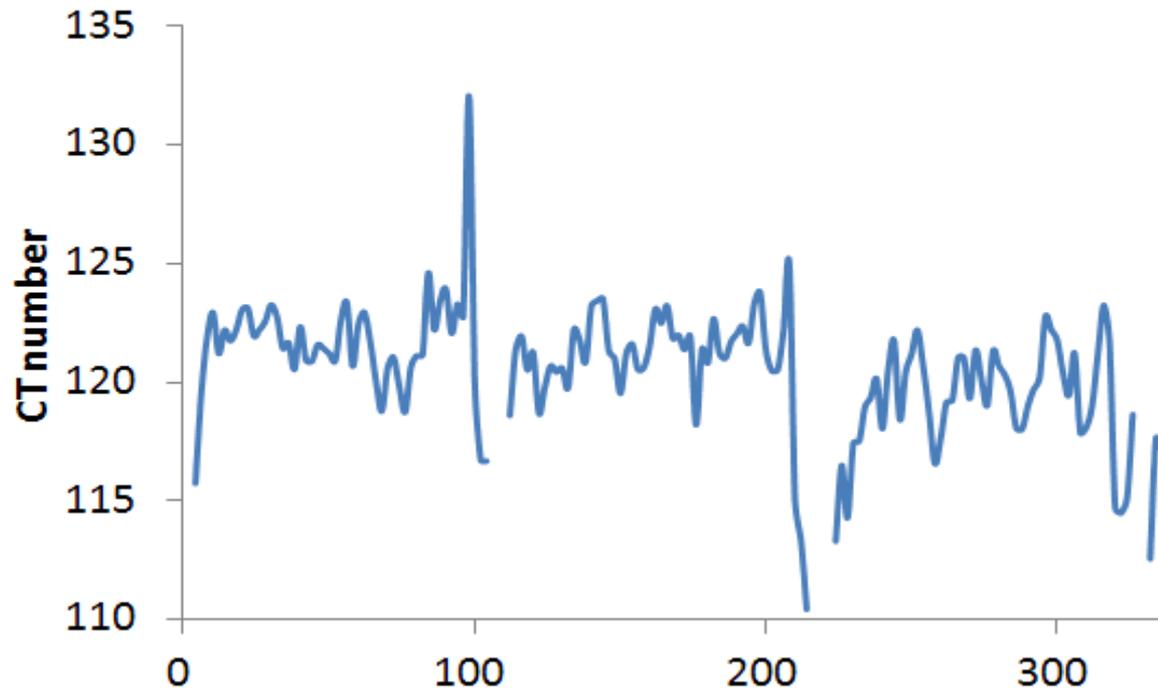
- All the slices?
- MPRs
- AEC
- Cone beam artefacts
- Other issues ?

All the slices?

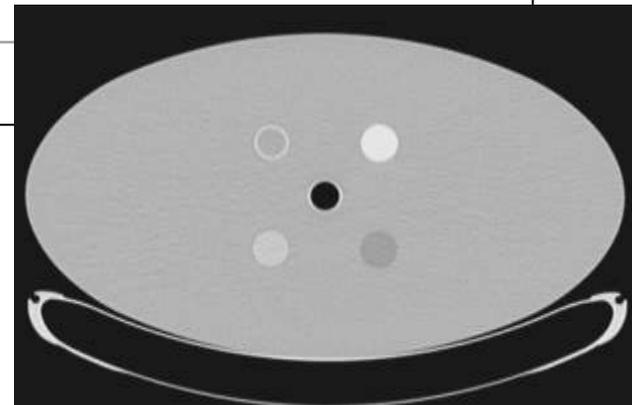


All the slices?

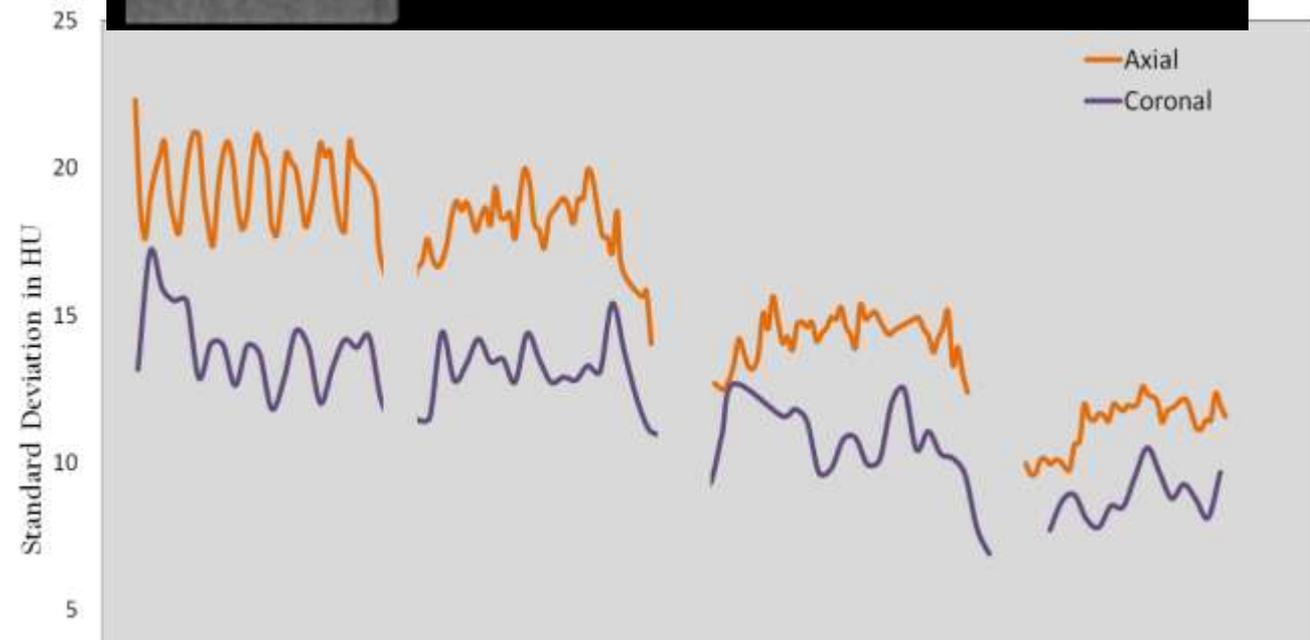
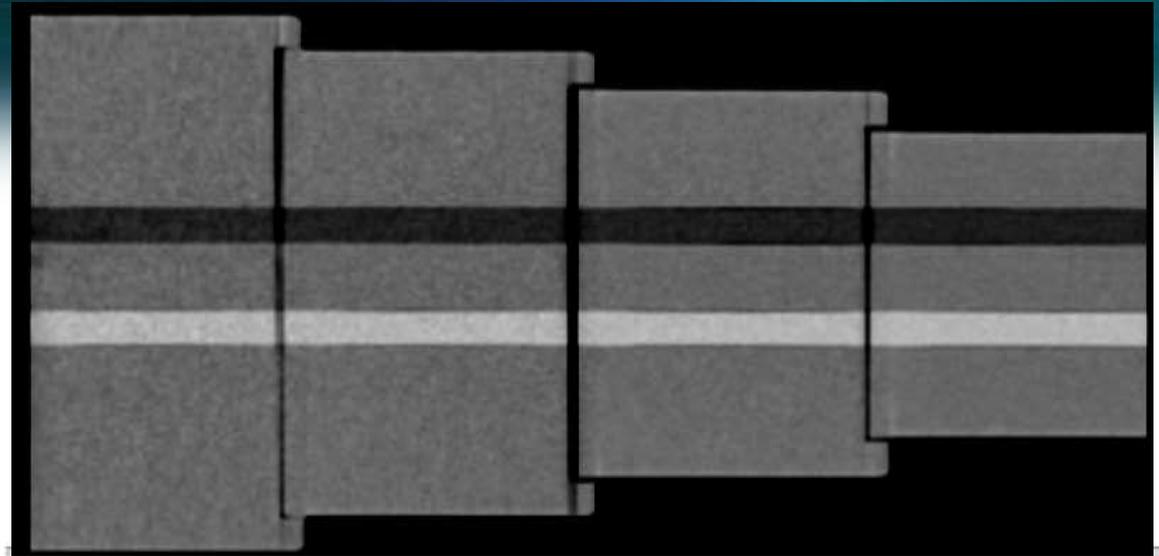
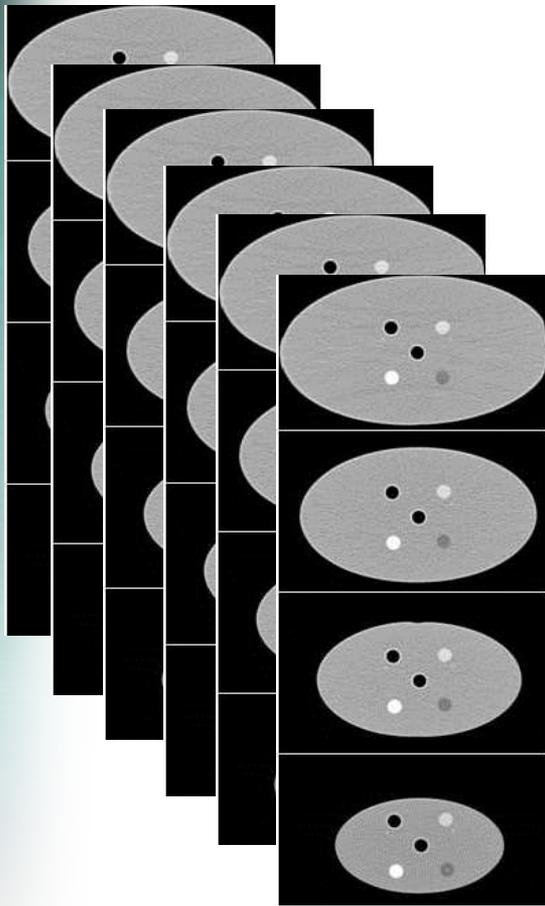
CeIT - PMMA



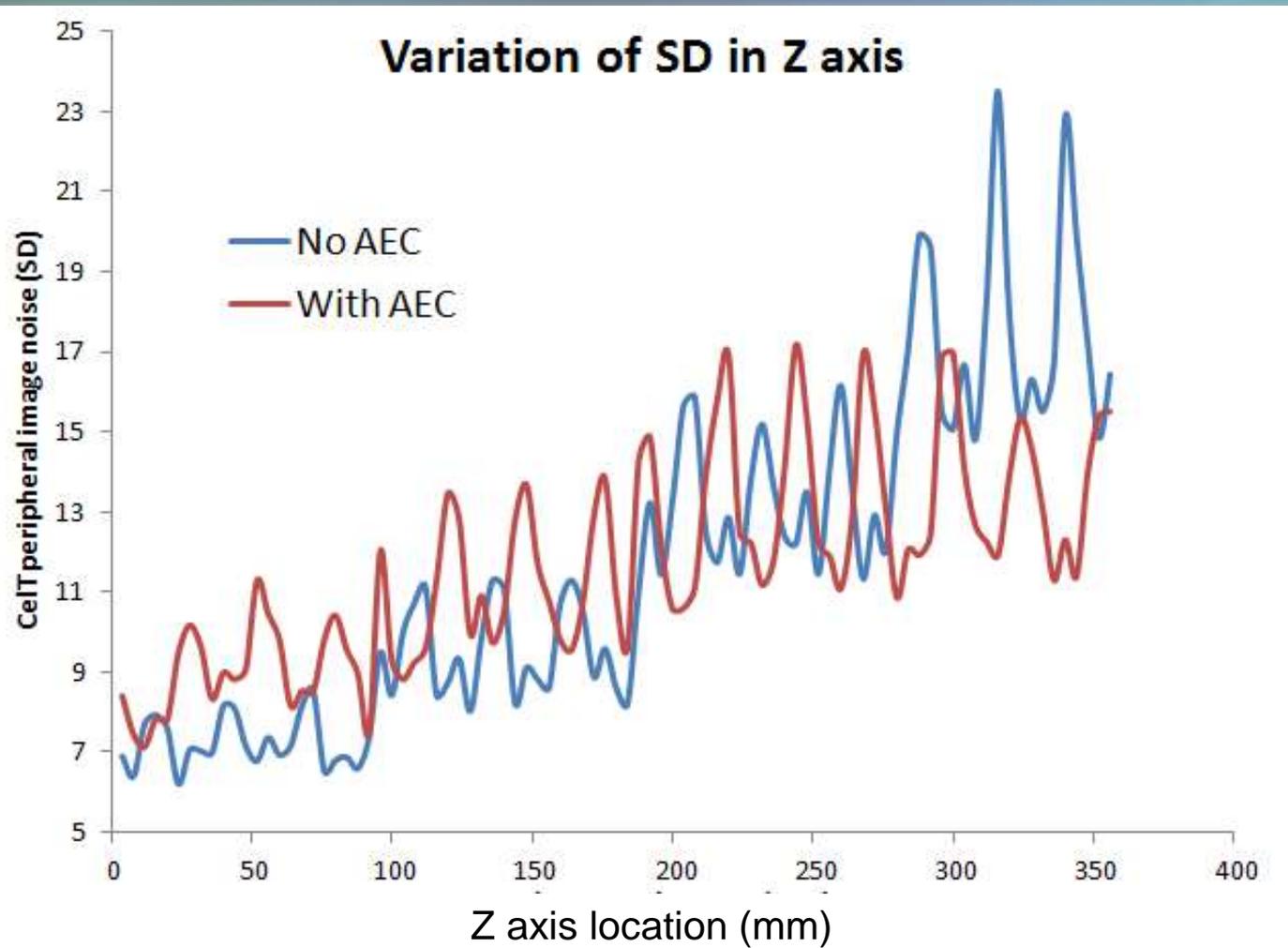
Z axis location (mm)



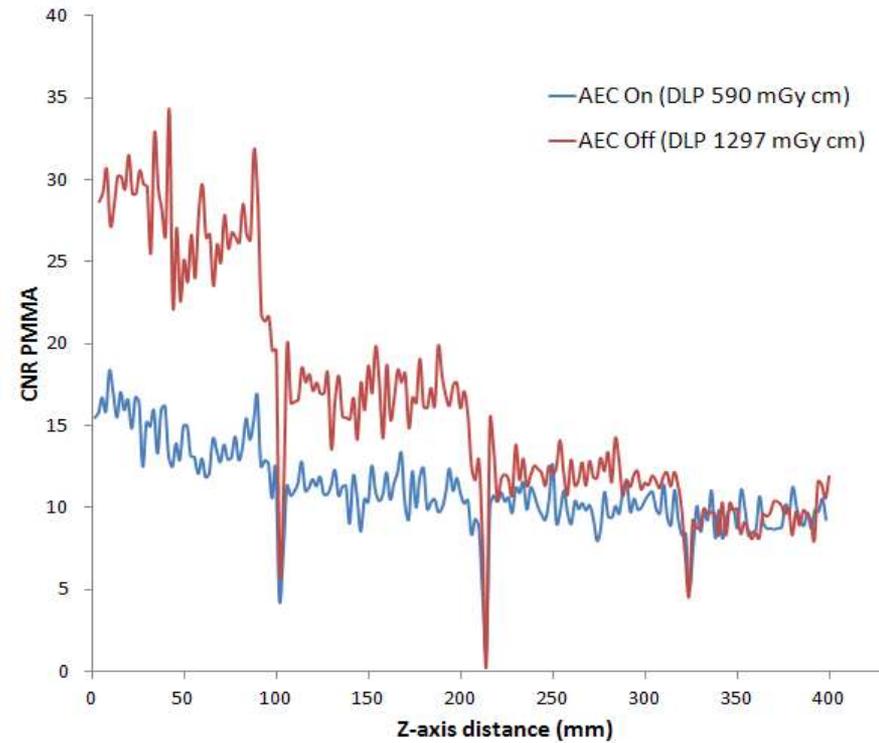
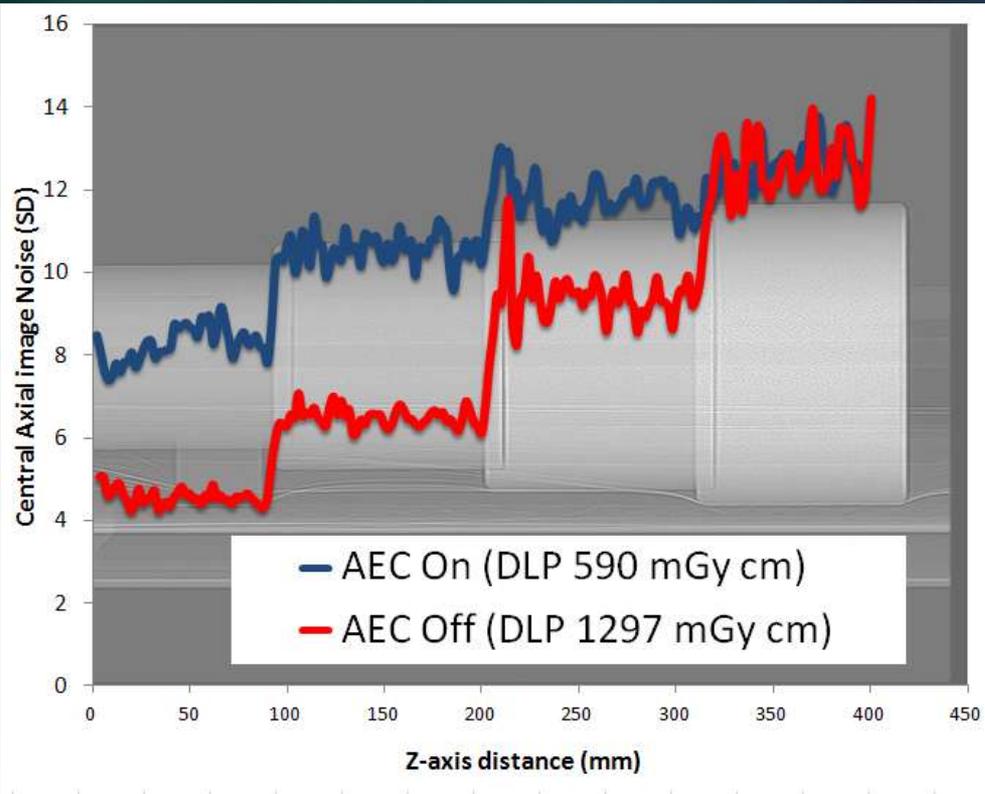
MPRs



AEC

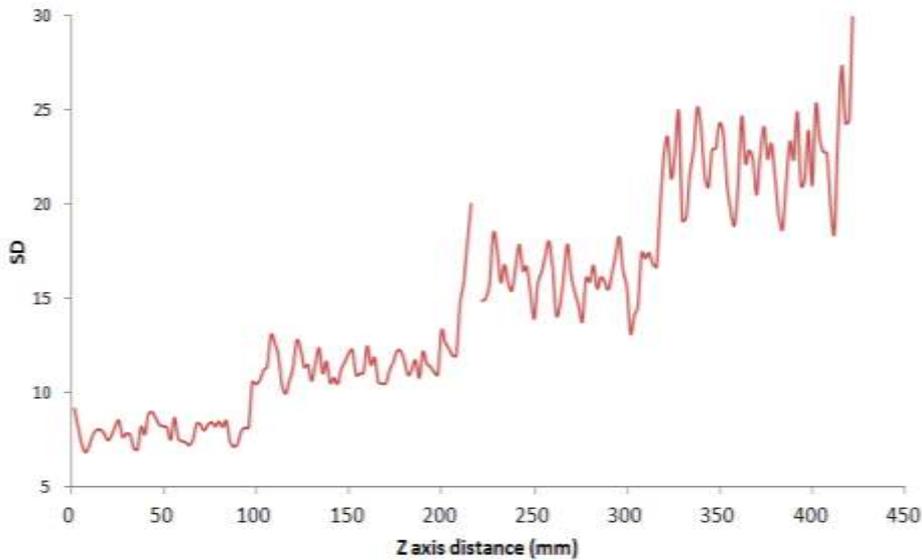


AEC

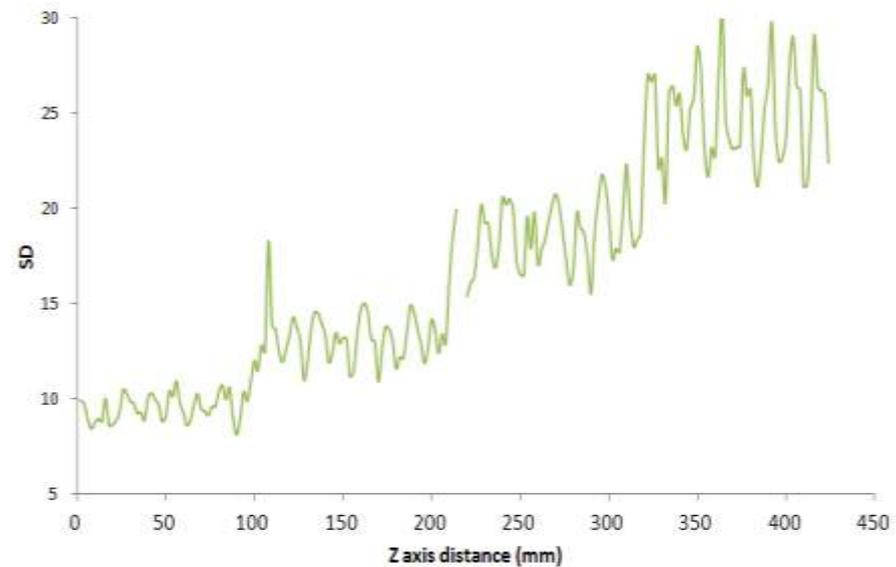


AEC

SD Variation with measurement location - North



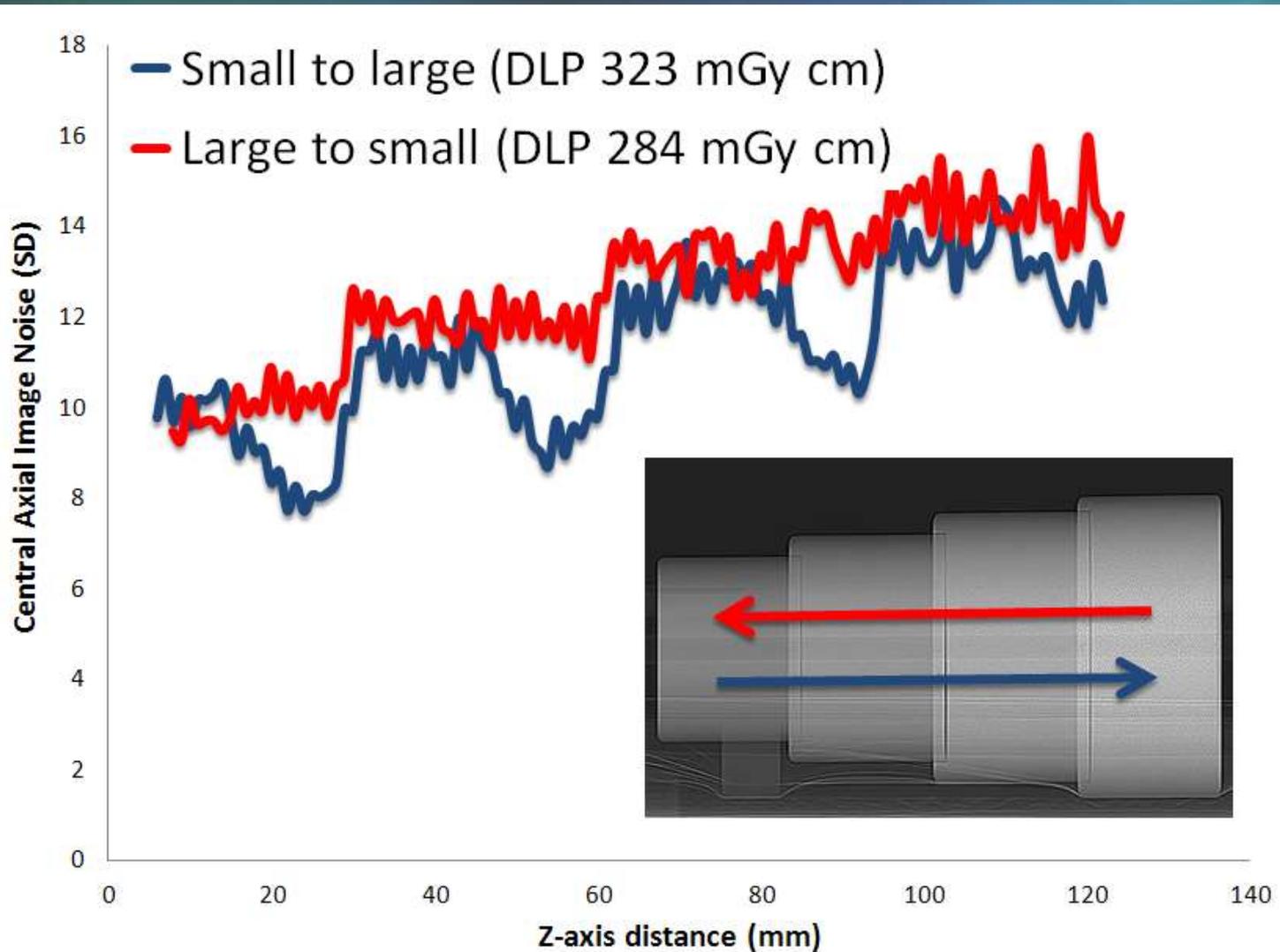
SD Variation with measurement location - East



No AEC

WITH AEC

AEC



AEC and MPR

Fixed
mAs

6.0

8.4

11.4

16.2

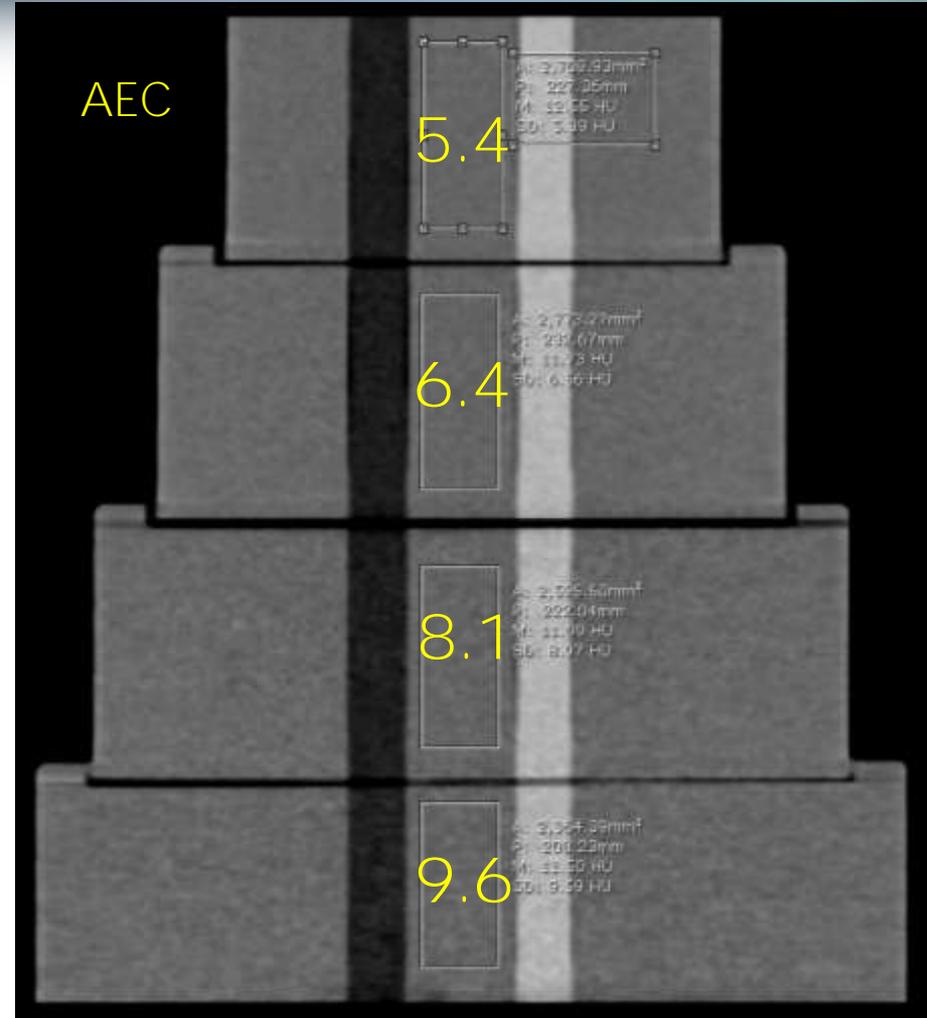
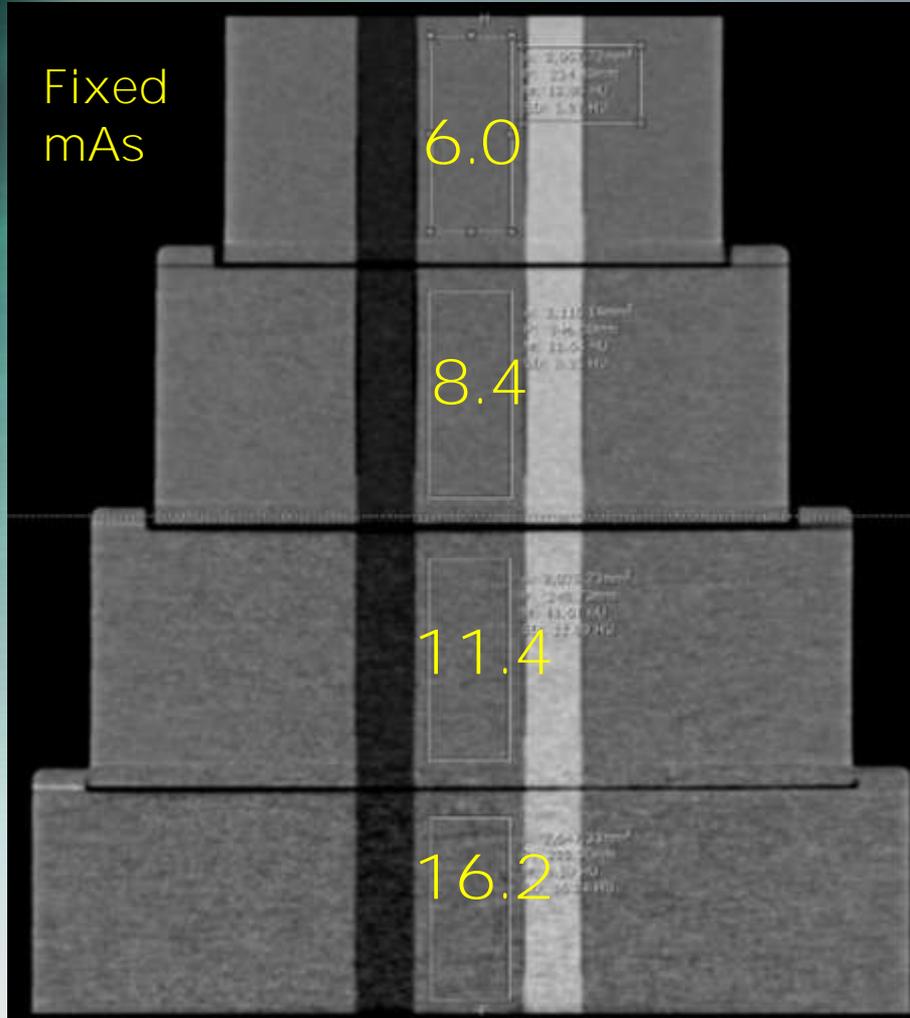
AEC

5.4

6.4

8.1

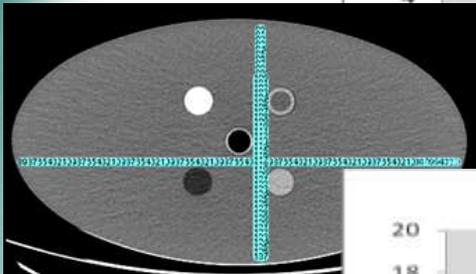
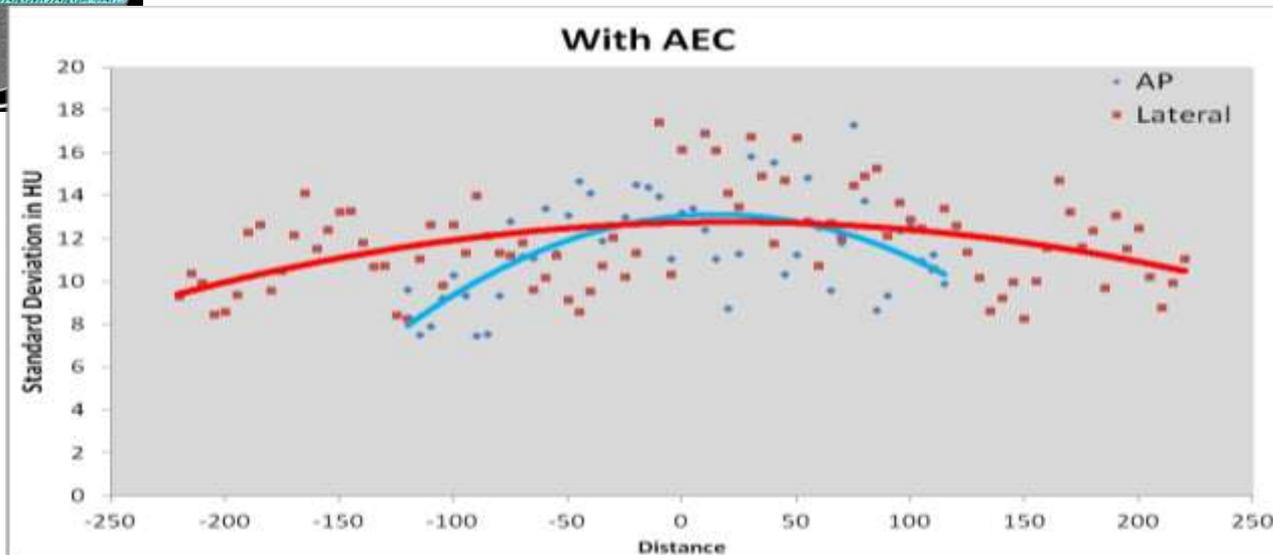
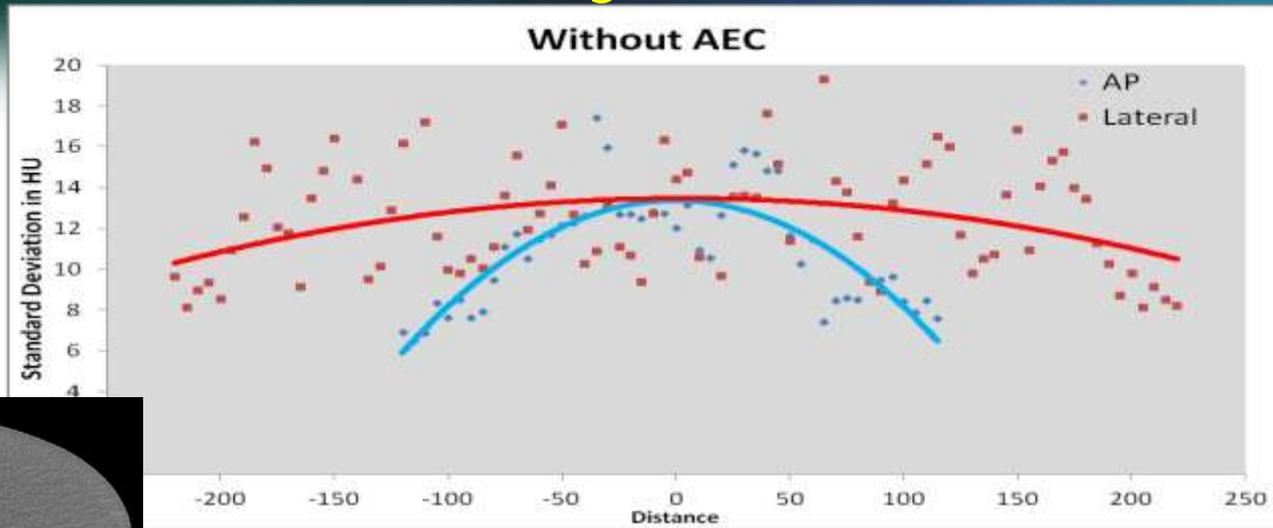
9.6



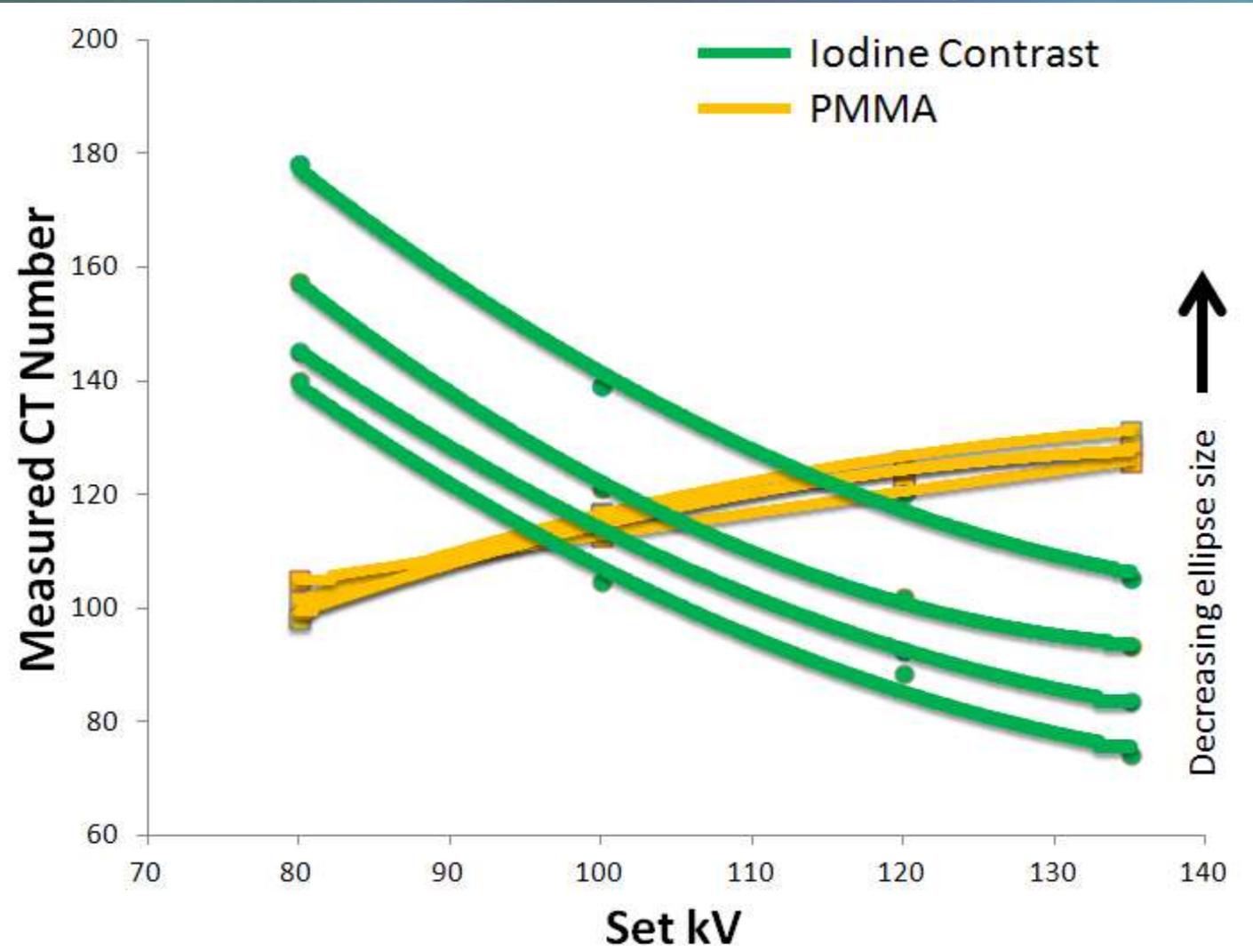
Cone Beam Artefact

- **Not yet considered....but, may be difficult with CeIT**

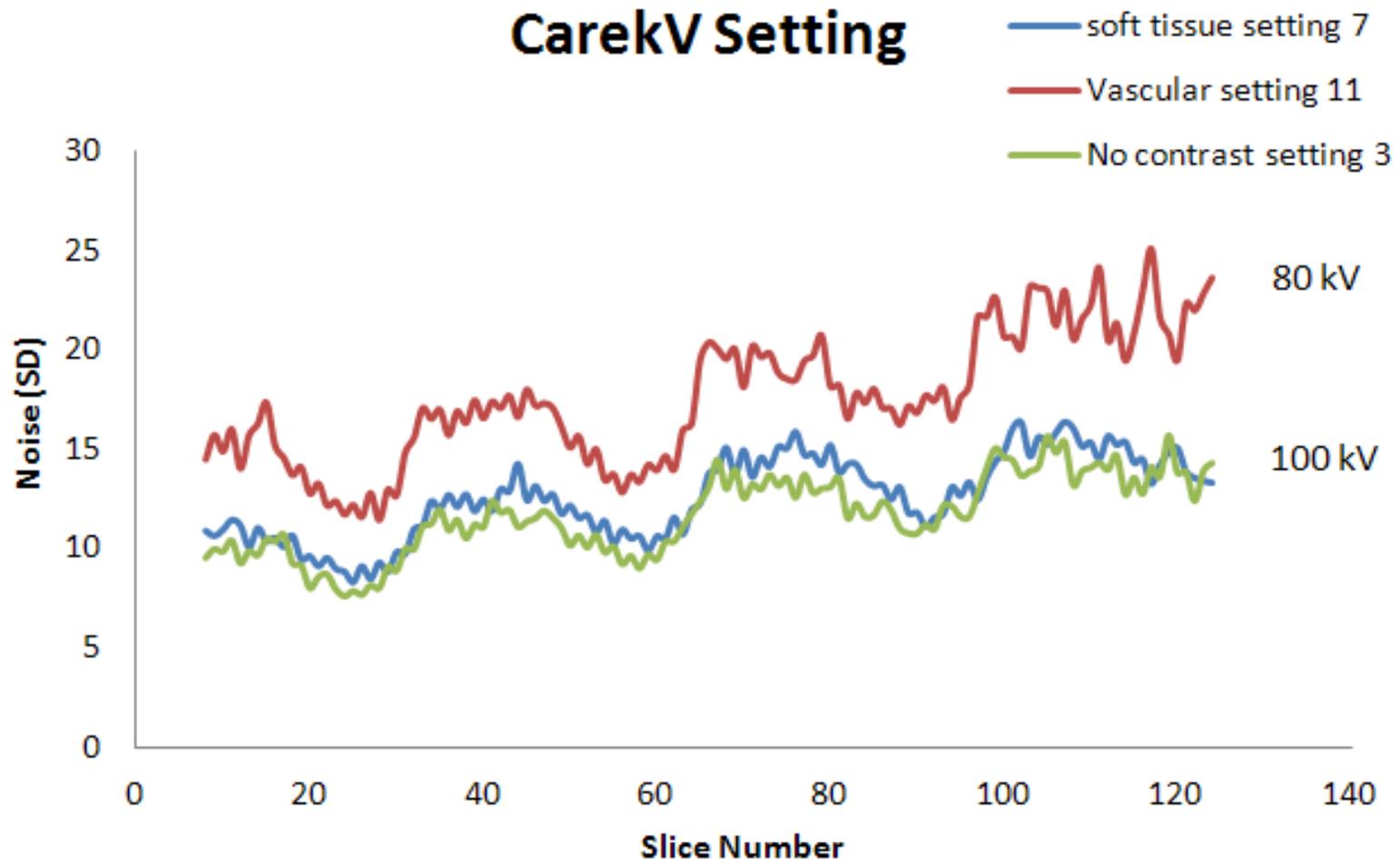
Other Issues?- Uniformity of noise



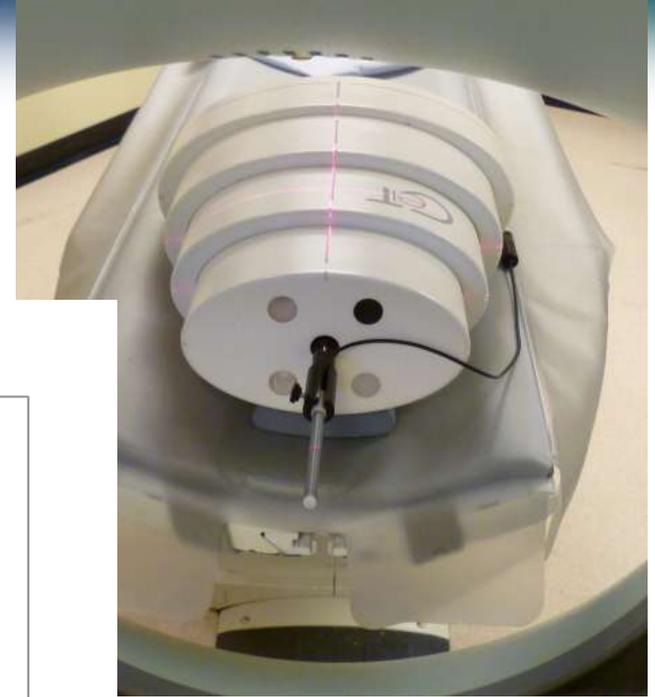
Other Issues?- Iodine Contrast response



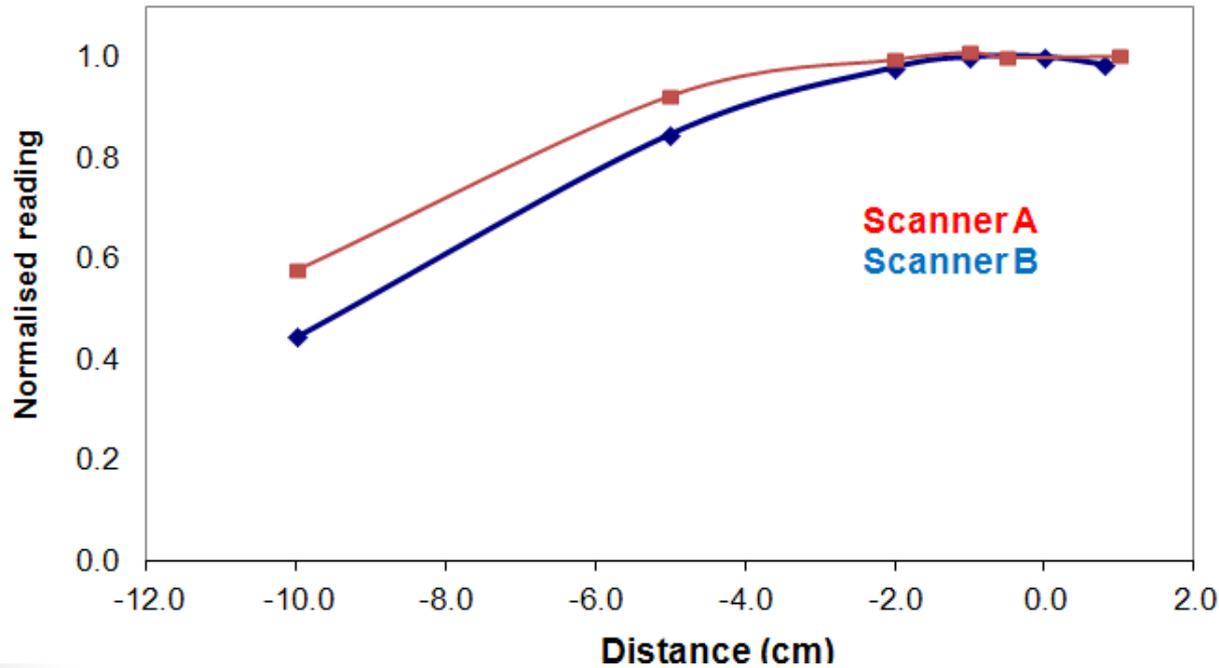
Other Issues?- Auto kV response



Other Issues? - Profiles - in air



Beam Profile



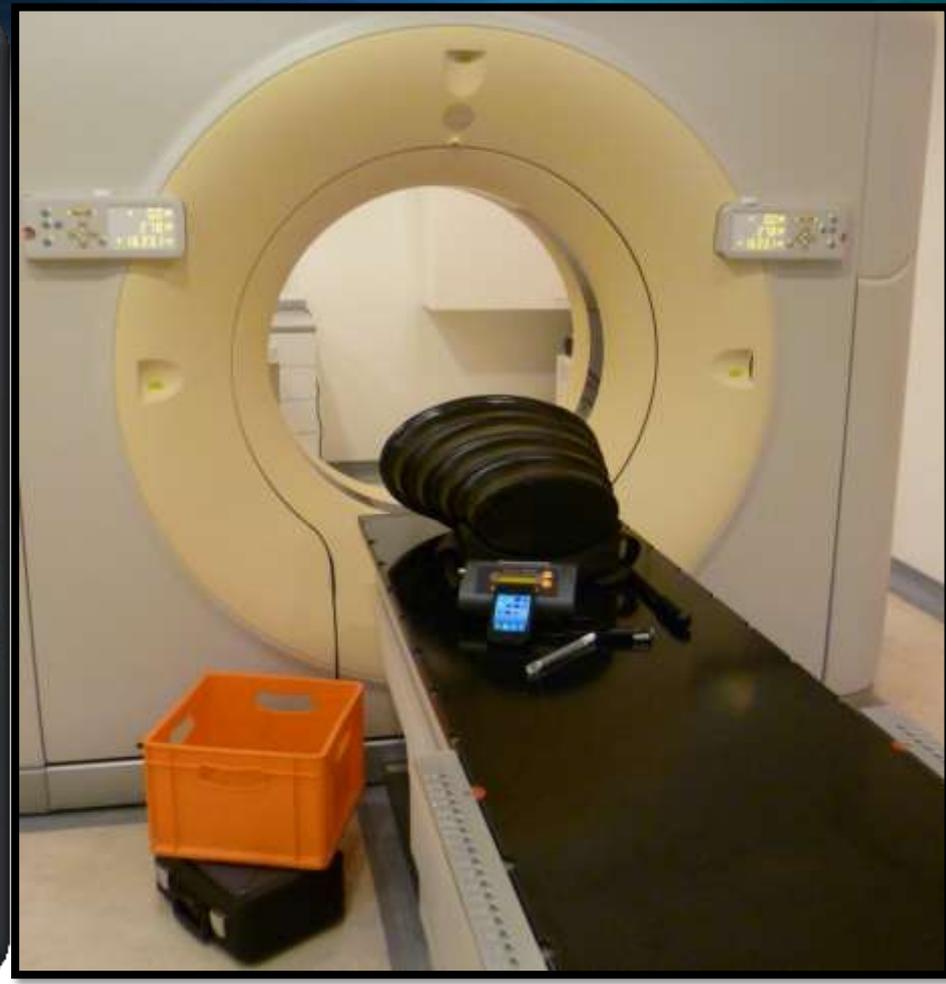
Other Issues? - Profiles - in phantom





- Single Standard Phantom for RT
 - Manual handling

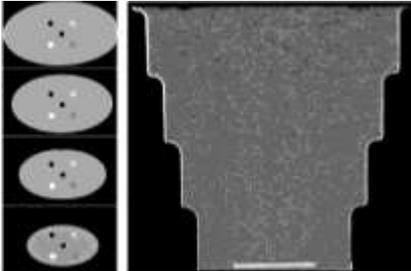
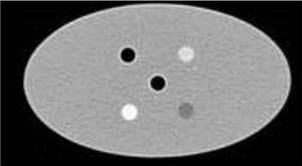
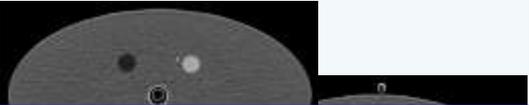
Manual Handling





- Single Standard Phantom for RT
 - Manual handling
 - Scanner time

Time Saving

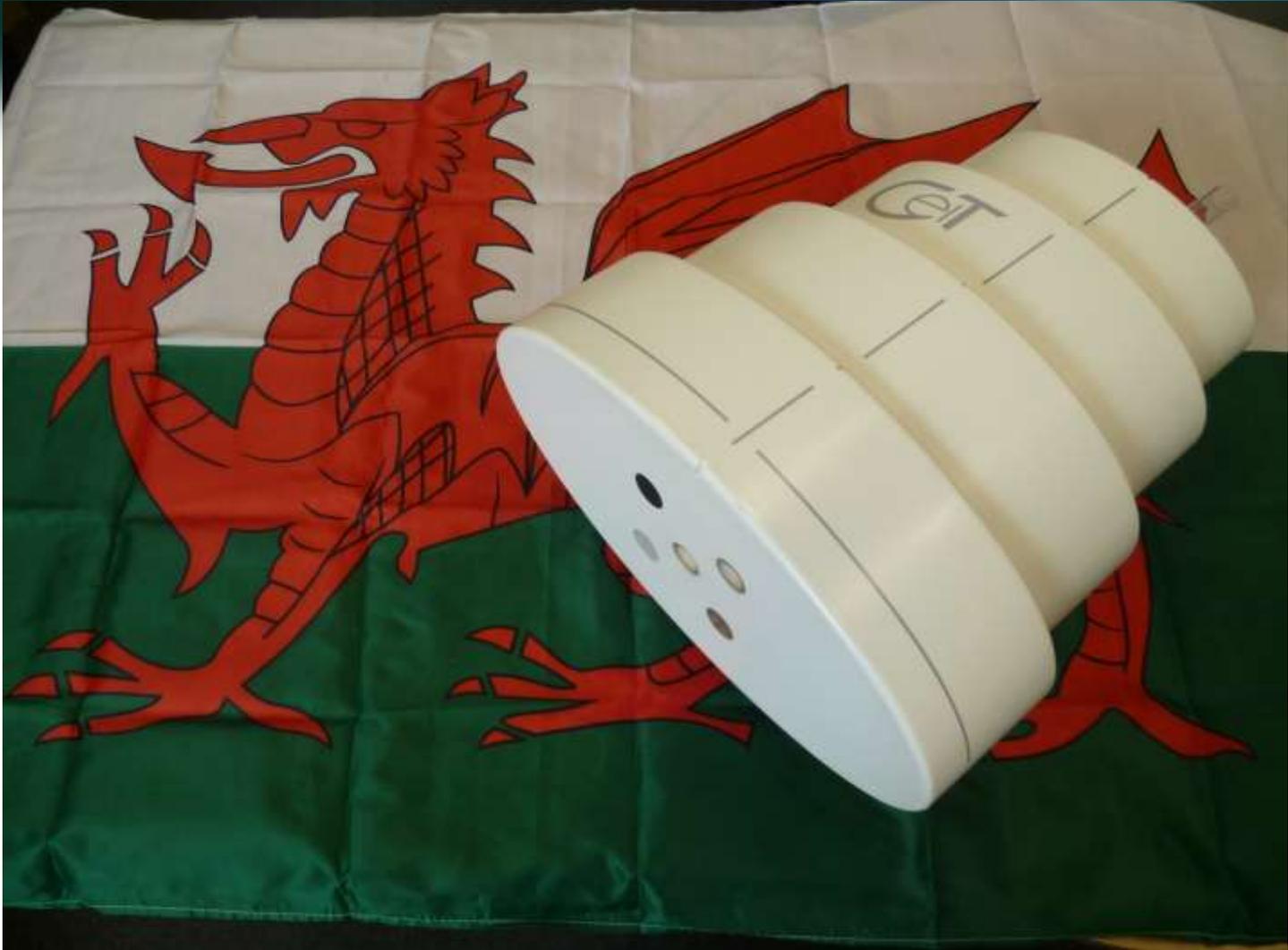
Parameter	Traditional	CeIT	Saving
Output in air / CTDI	 10 minutes	 2 minutes	8 minutes
Image Noise	 5 minutes per phantom	 CeIT already set-up	10 minutes
CT Number	 5 minutes	 CeIT already set-up	5 minutes
CTDI (head and body)	 5 minutes per phantom	 CeIT already set-up	5 minutes

30 MINUTES PER SURVEY



- Single Standard Phantom for RT
 - Manual handling
 - Scanner time
- Clinically relevant testing
IPEM 91 and beyond....

Diolch!



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