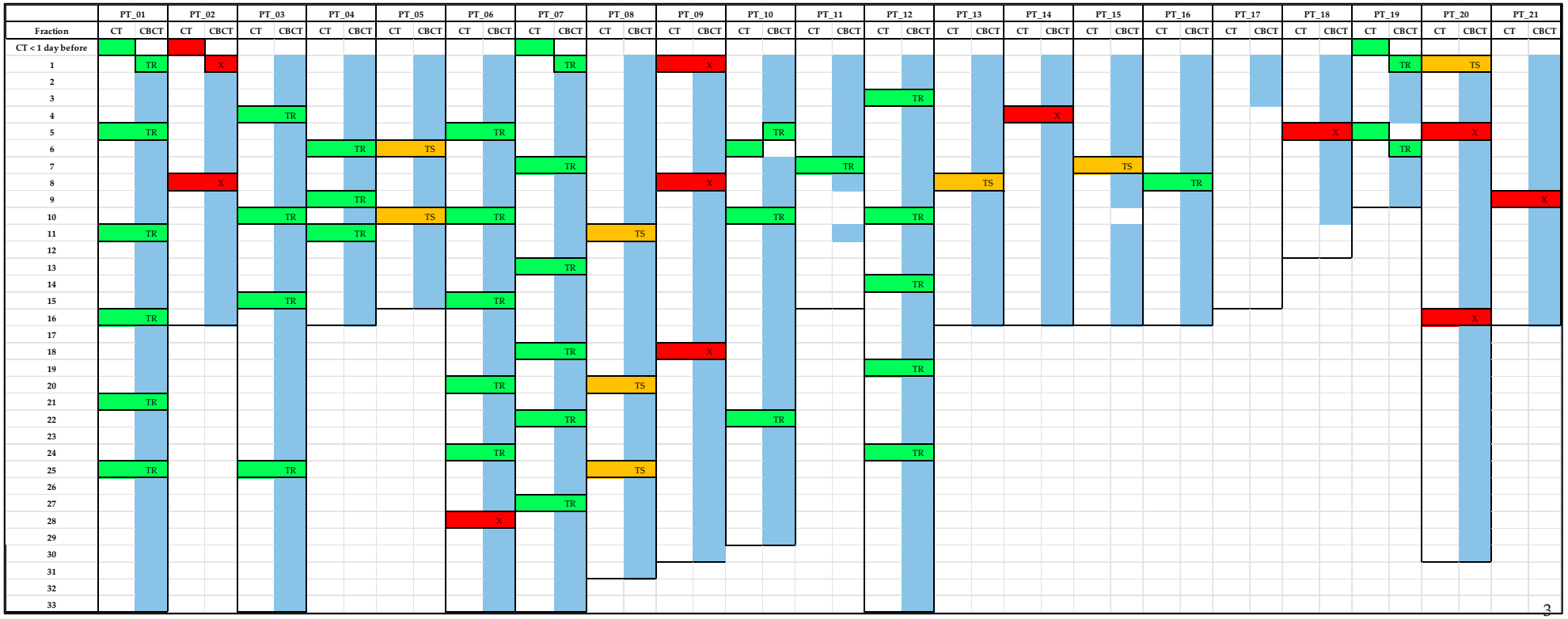
sensors

MDPI

Supplementary material

Figure S1. Dataset

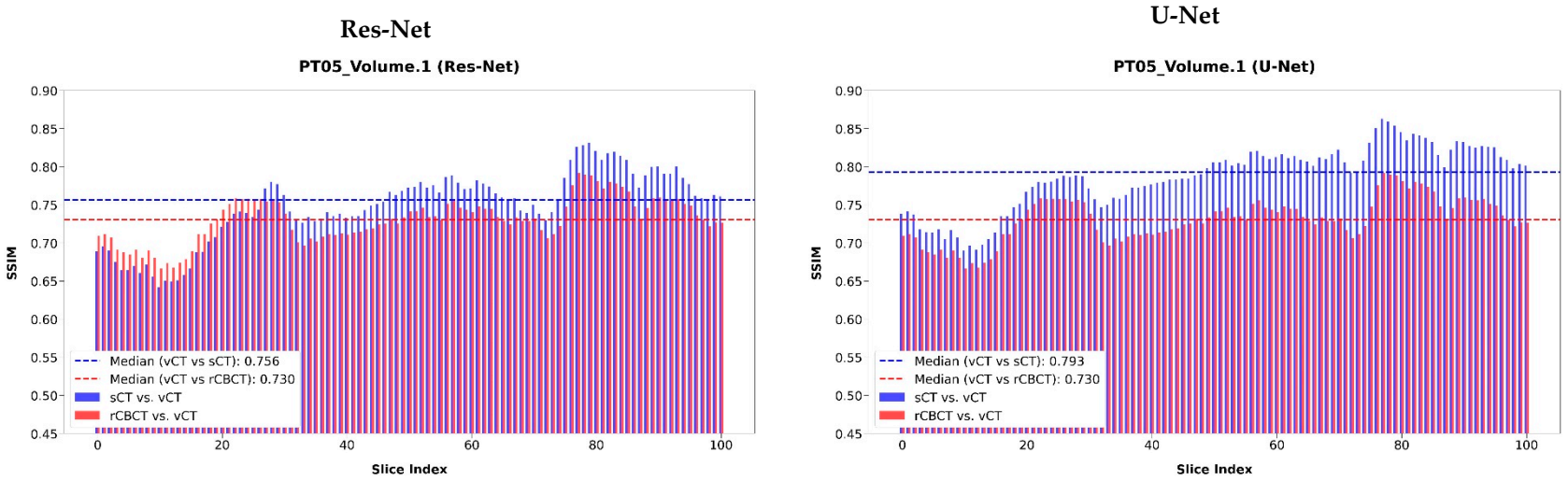


Legend: Light blue: all available CBCTs; green: same-day CBCTs used for training (TR); orange: same-day CBCTs used for testing (TS); red: same day CBCTs discarded (X).

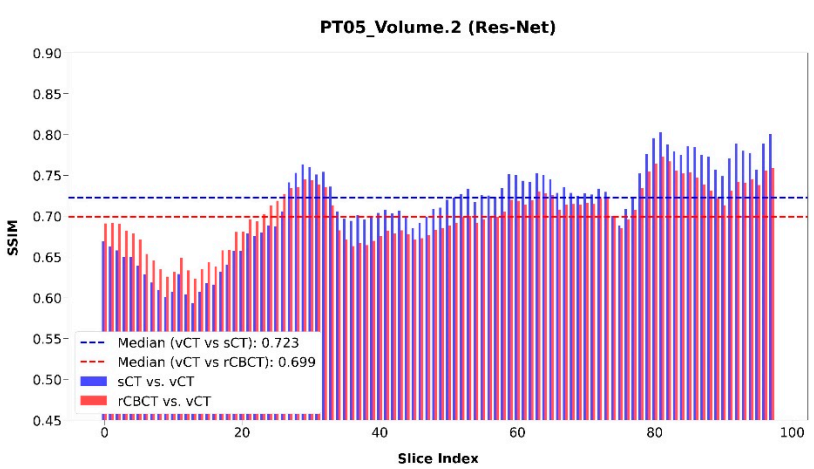
Abbreviations: CBCT: cone beam computed tomography; CT: computed tomography; PT_: patient.

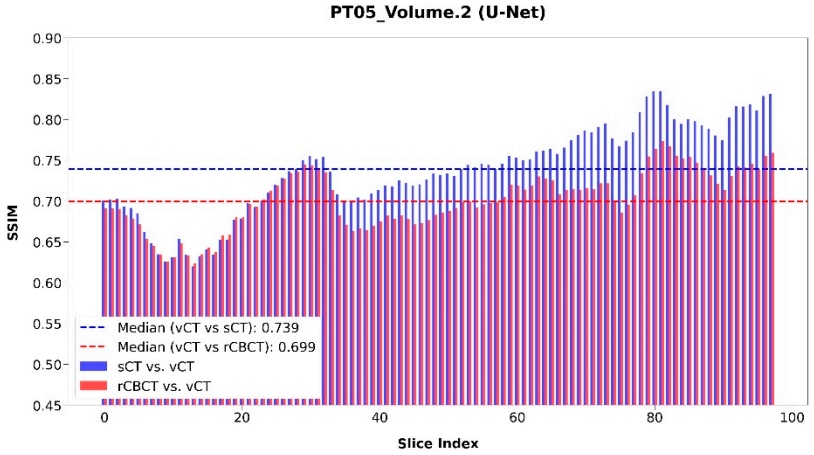
Figure S2. Slice-wise SSIM values before (rCBCT vs vCT) and after (sCT vs vCT) cycleGAN for both Res-Net (left) and U-Net (right) architectures. Median values are also reported.

PT_05 V1

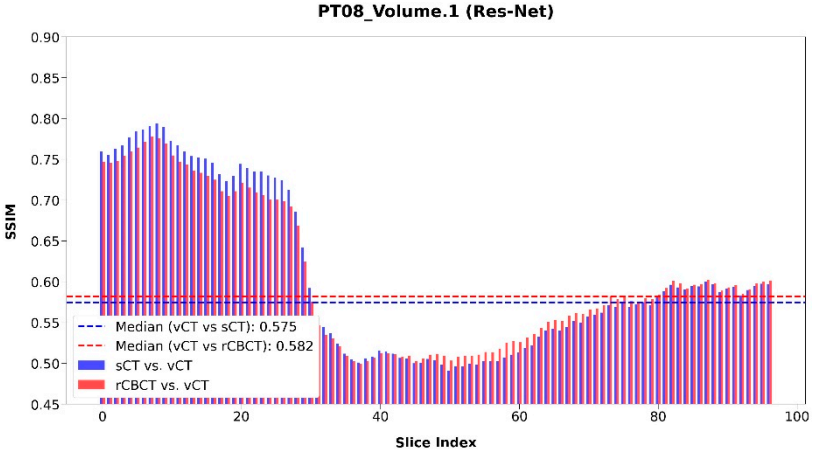


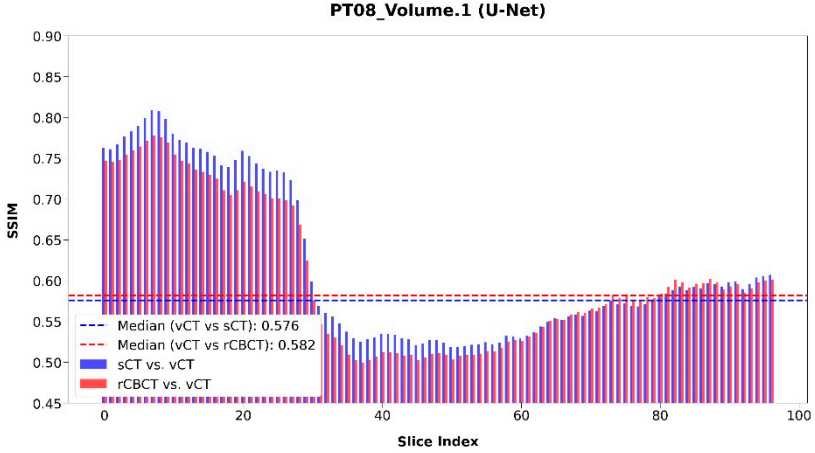
V2


PT05_Volume.2 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.723
Median (vCT vs rCBCT): 0.699
sCT vs. vCT
rCBCT vs. vCT

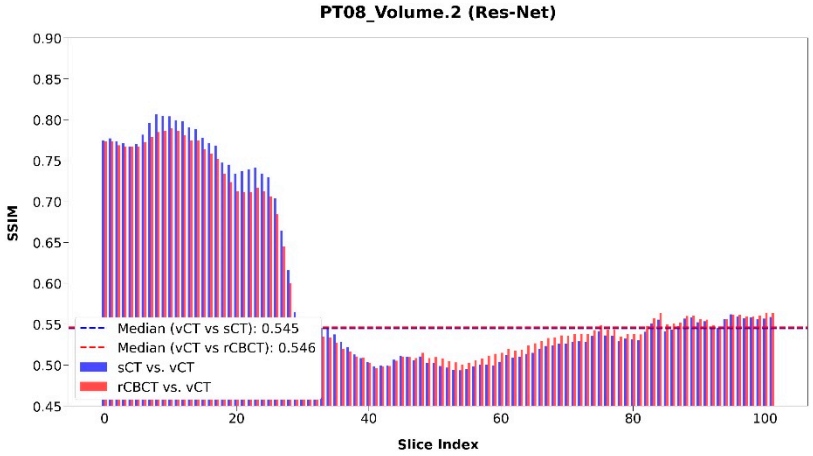

PT05_Volume.2 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.739
Median (vCT vs rCBCT): 0.699
sCT vs. vCT
rCBCT vs. vCT

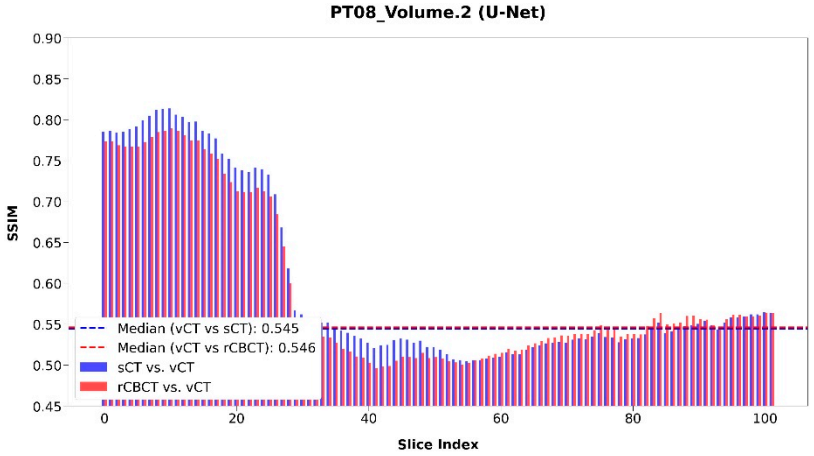
PT_08 V1


PT08_Volume.1 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.575
Median (vCT vs rCBCT): 0.582
sCT vs. vCT
rCBCT vs. vCT

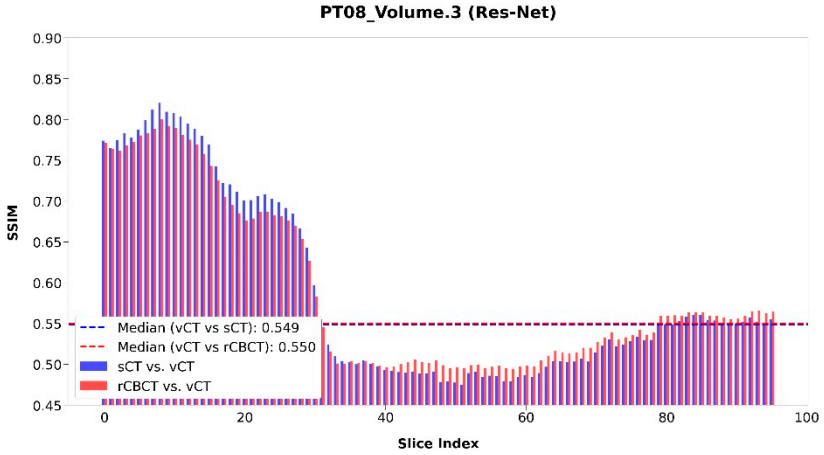

PT08_Volume.1 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.576
Median (vCT vs rCBCT): 0.582
sCT vs. vCT
rCBCT vs. vCT

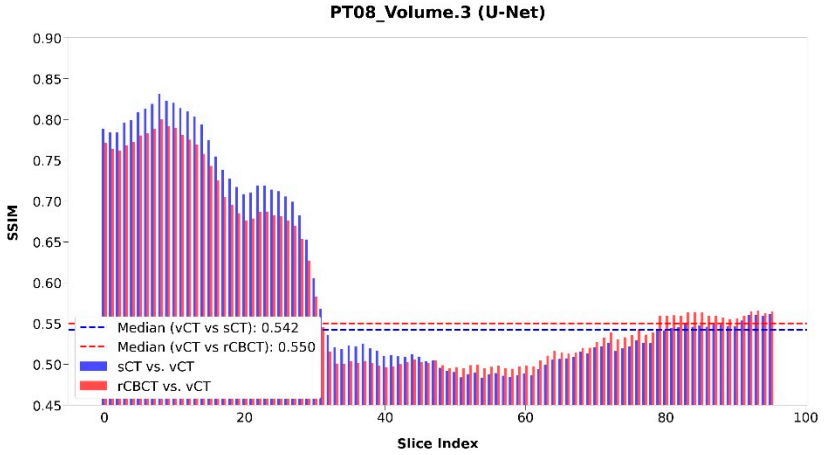
V2


PT08_Volume.2 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.545
Median (vCT vs rCBCT): 0.546
sCT vs. vCT
rCBCT vs. vCT

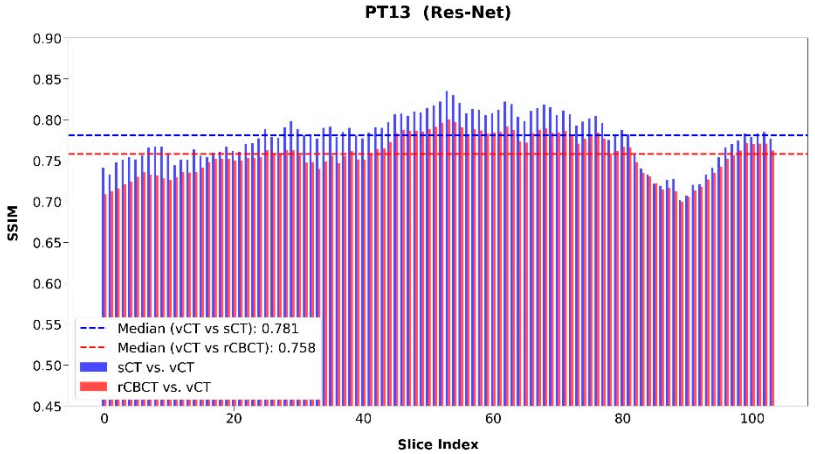

PT08_Volume.2 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.545
Median (vCT vs rCBCT): 0.546
sCT vs. vCT
rCBCT vs. vCT

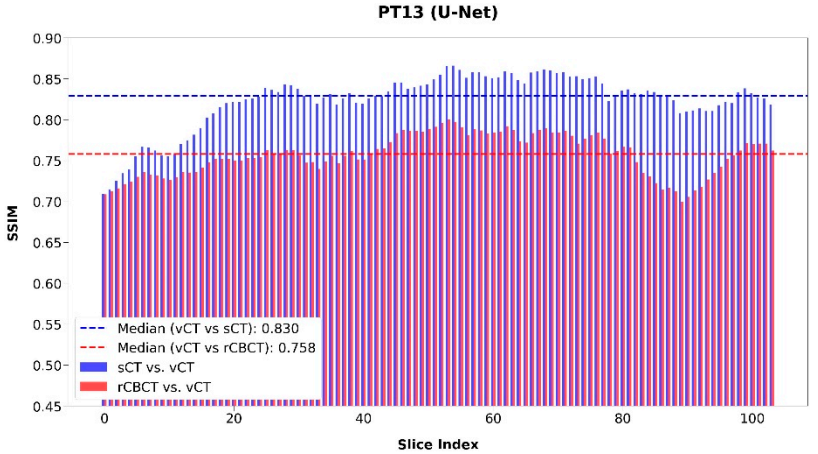
V3


PT08_Volume.3 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.549
Median (vCT vs rCBCT): 0.550
sCT vs. vCT
rCBCT vs. vCT

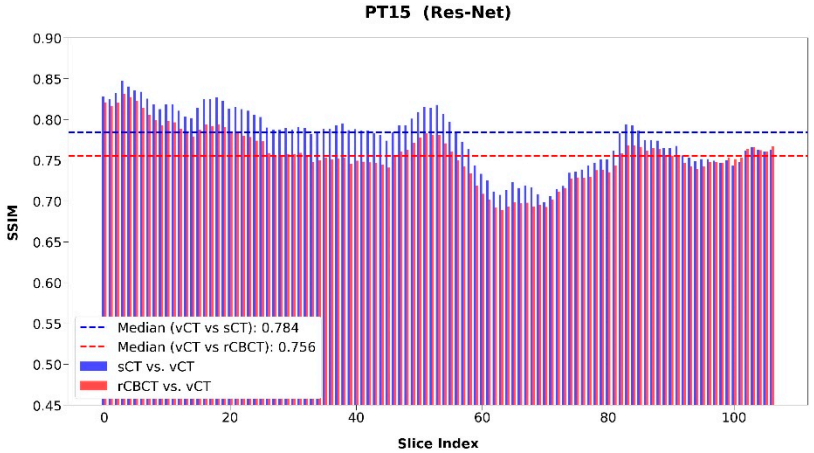

PT08_Volume.3 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.542
Median (vCT vs rCBCT): 0.550
sCT vs. vCT
rCBCT vs. vCT

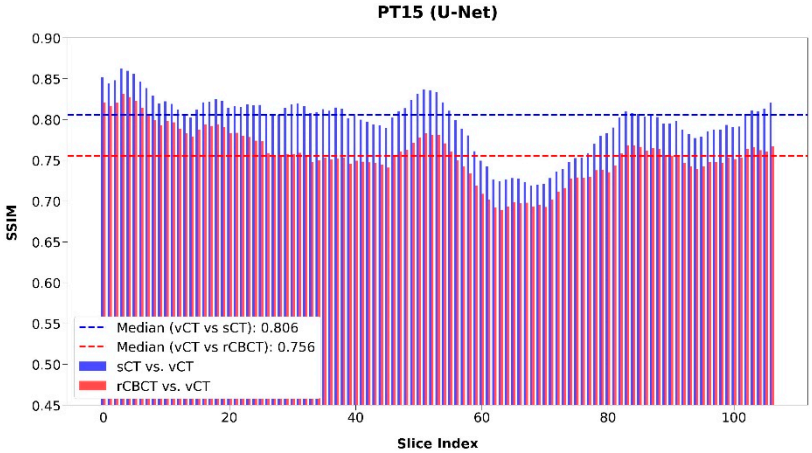
PT_13


PT13 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.781
Median (vCT vs rCBCT): 0.758
sCT vs. vCT
rCBCT vs. vCT

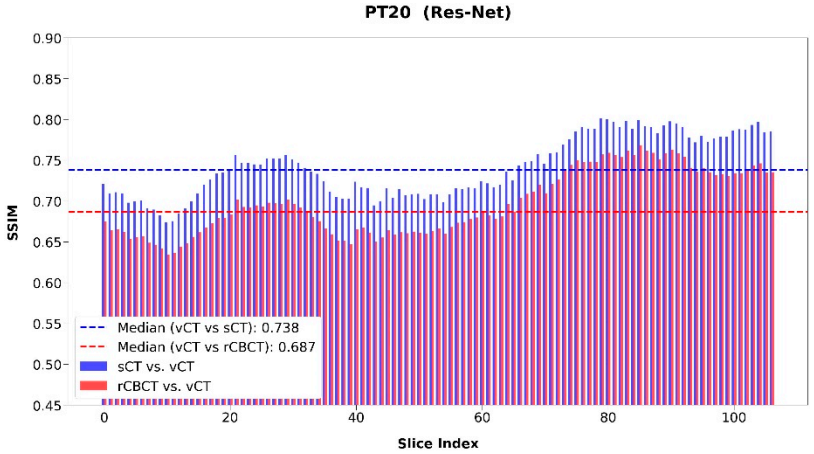

PT13 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.830
Median (vCT vs rCBCT): 0.758
sCT vs. vCT
rCBCT vs. vCT

PT_15


PT15 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.784
Median (vCT vs rCBCT): 0.756
sCT vs. vCT
rCBCT vs. vCT


PT15 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.806
Median (vCT vs rCBCT): 0.756
sCT vs. vCT
rCBCT vs. vCT

PT_20


PT20 (Res-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.738
Median (vCT vs rCBCT): 0.687
sCT vs. vCT
rCBCT vs. vCT

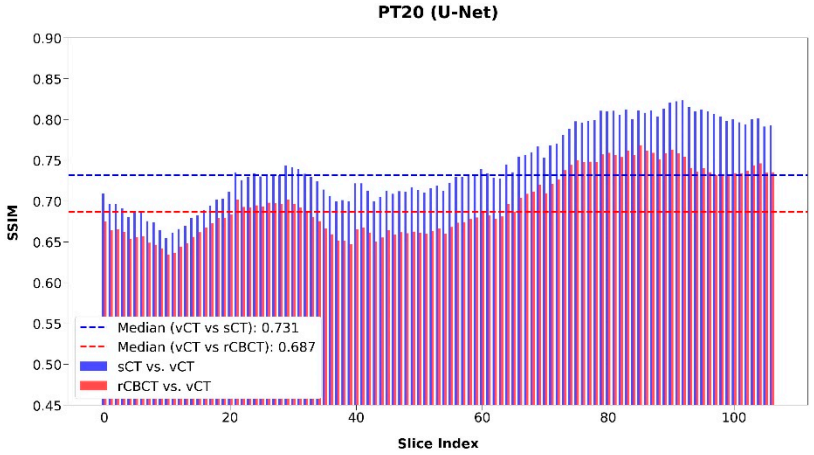
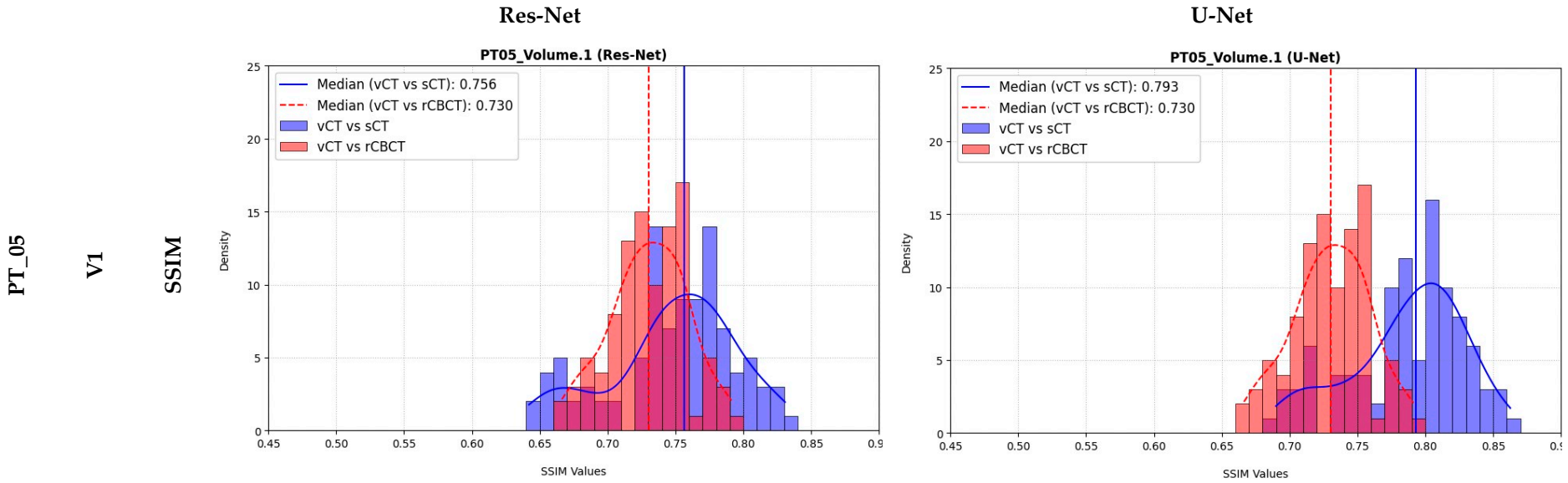
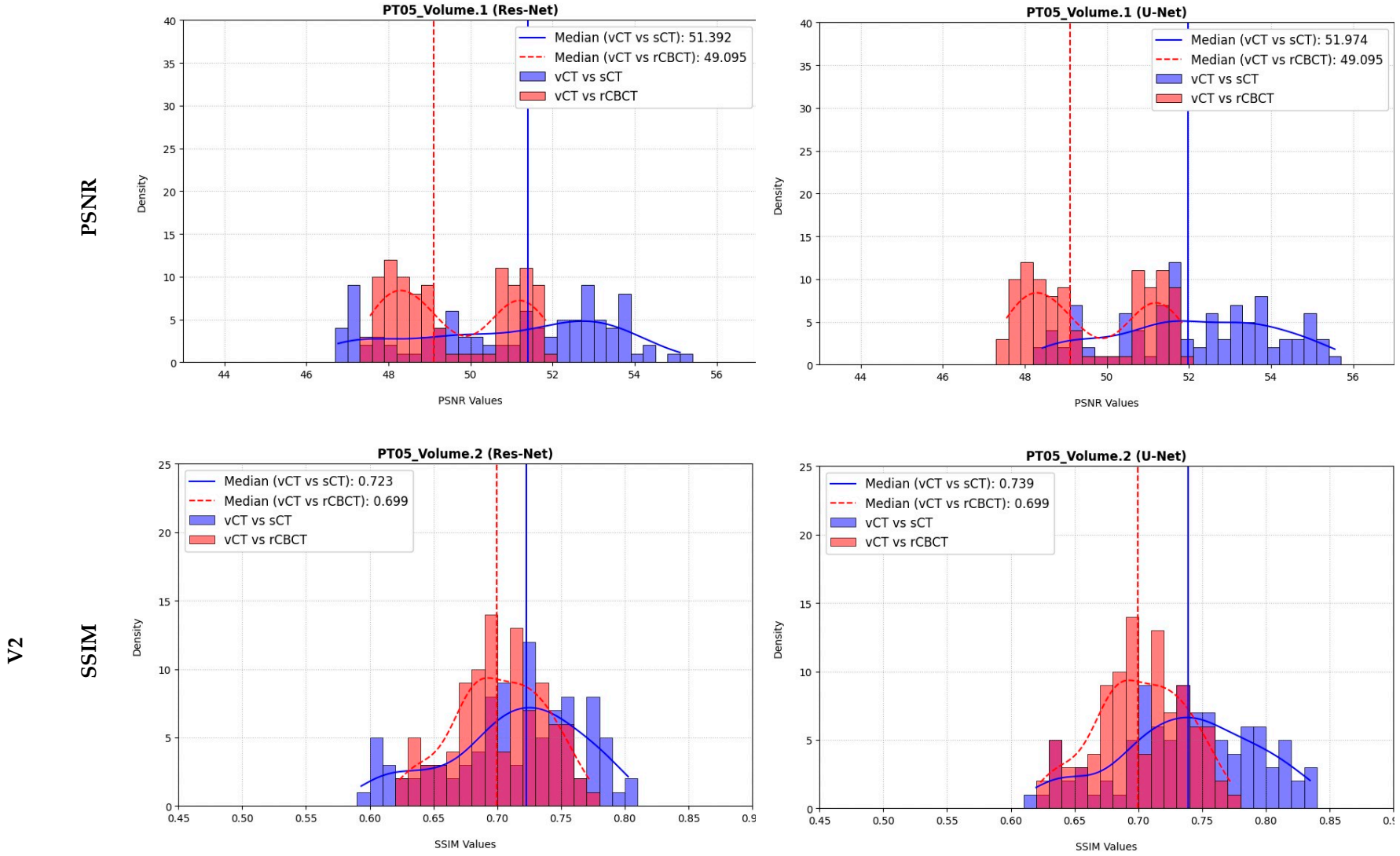

PT20 (U-Net)
SSIM
Slice Index
Median (vCT vs sCT): 0.731
Median (vCT vs rCBCT): 0.687
sCT vs. vCT
rCBCT vs. vCT

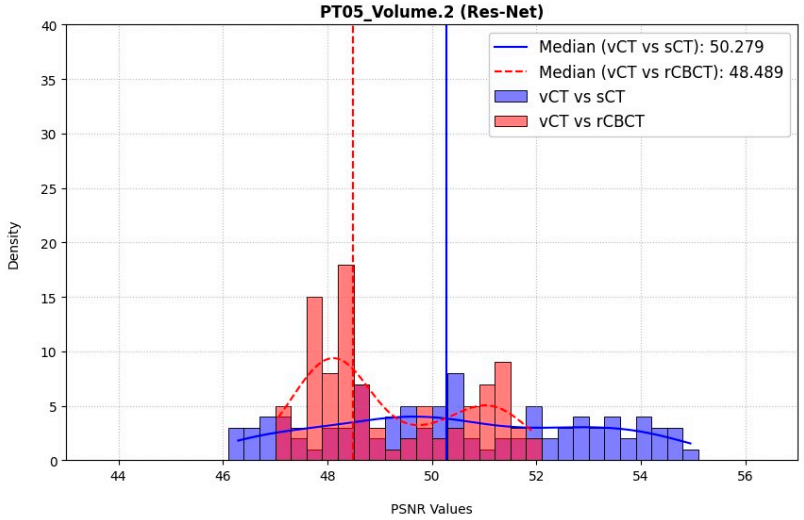
Figure S3. SSIM (up) and PSNR (down) values distribution before (vCT vs rCBCT) and after (vCT vs sCT) cycleGAN, for both architectures (Res-Net, left and U-Net, right). Median values are also reported.

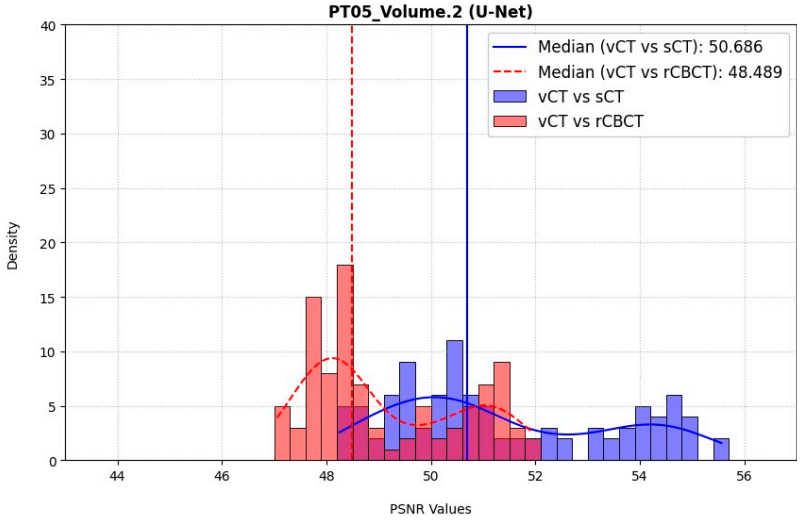



PSNR
SSIM
V2
PT05_Volume.1 (Res-Net)
Median (vCT vs sCT): 51.392
Median (vCT vs rCBCT): 49.095
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
PT05_Volume.1 (U-Net)
Median (vCT vs sCT): 51.974
Median (vCT vs rCBCT): 49.095
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
PT05_Volume.2 (Res-Net)
Median (vCT vs sCT): 0.723
Median (vCT vs rCBCT): 0.699
vCT vs sCT
vCT vs rCBCT
Density
SSIM Values
PT05_Volume.2 (U-Net)
Median (vCT vs sCT): 0.739
Median (vCT vs rCBCT): 0.699
vCT vs sCT
vCT vs rCBCT
Density
SSIM Values

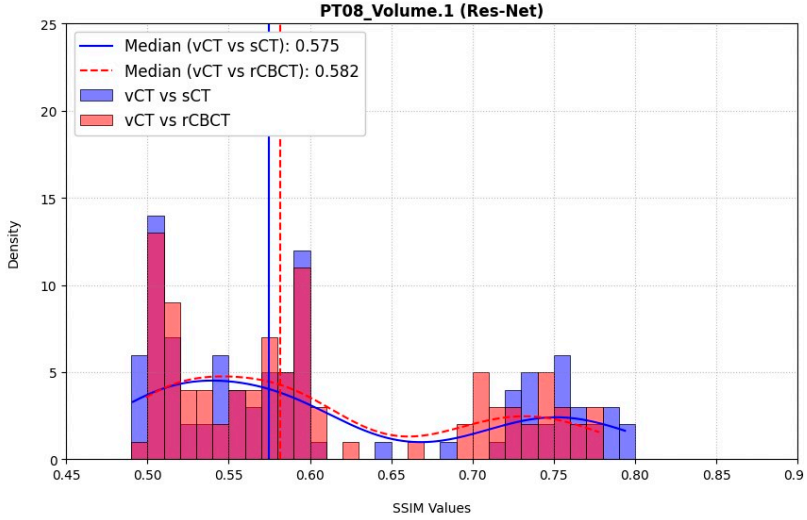
PT_08 V1

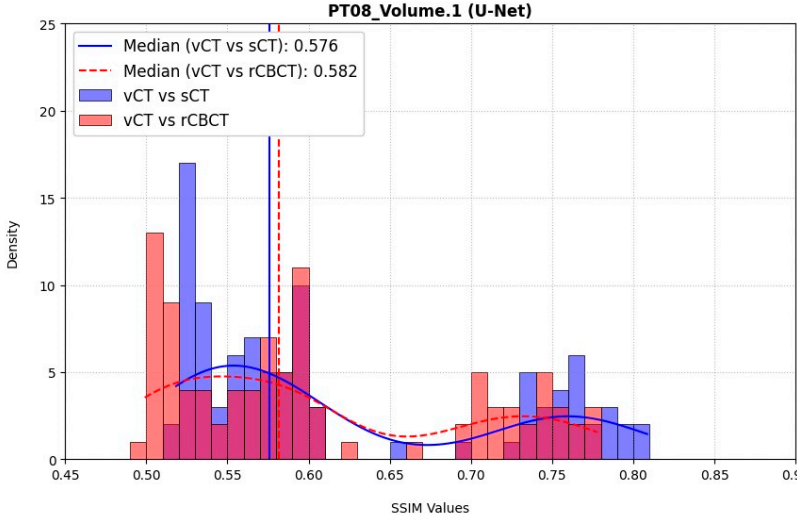
PSNR

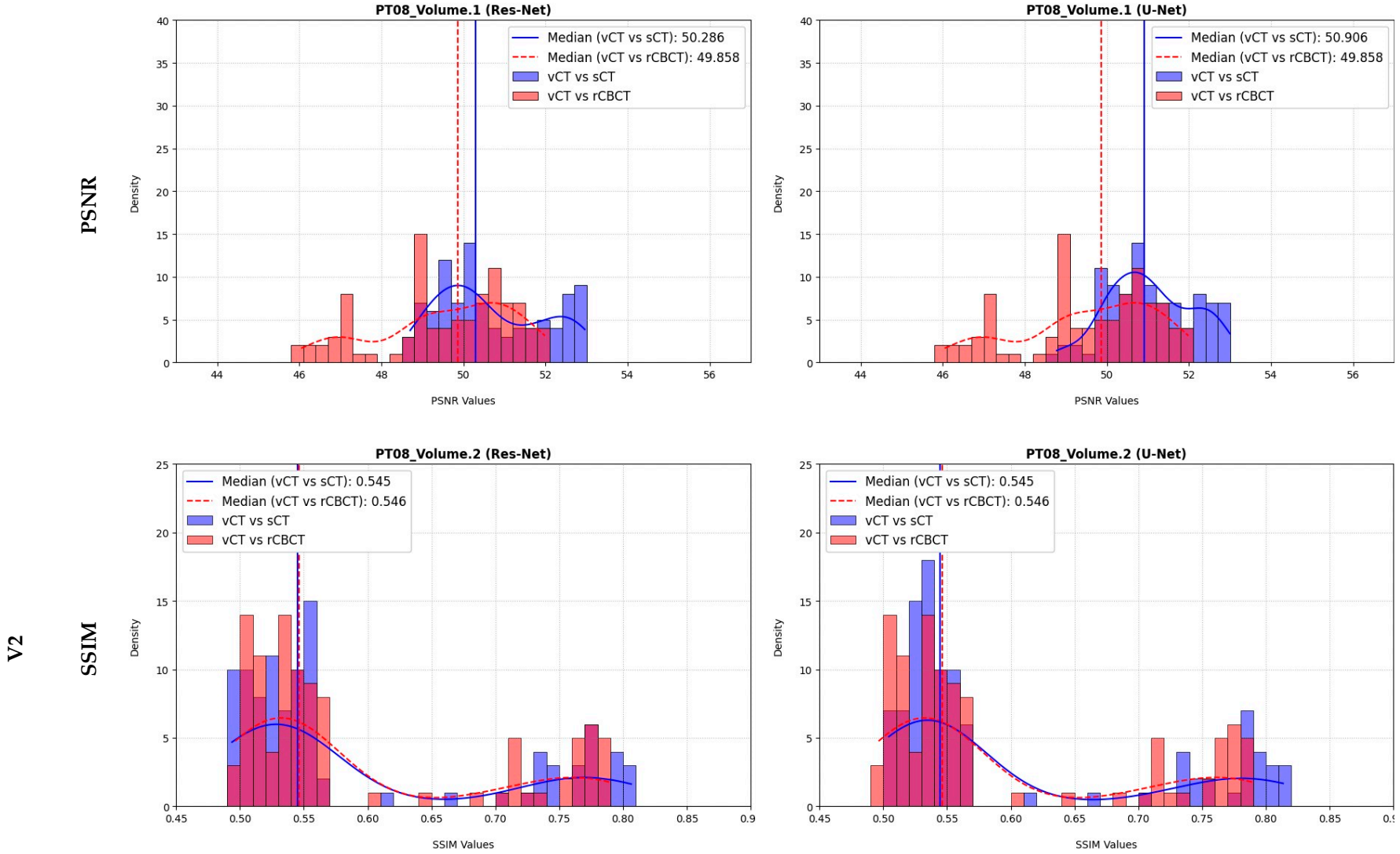


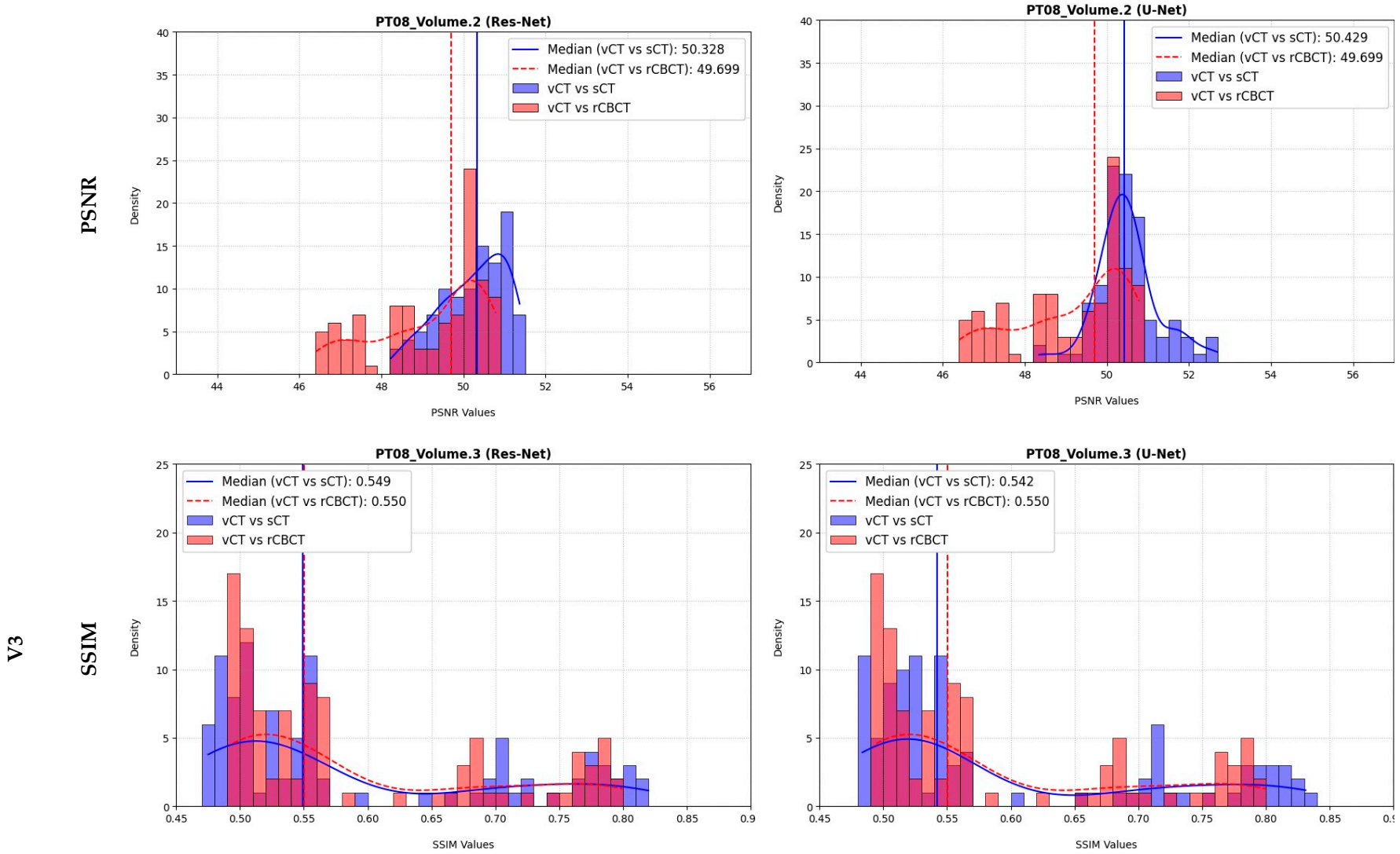


SSIM



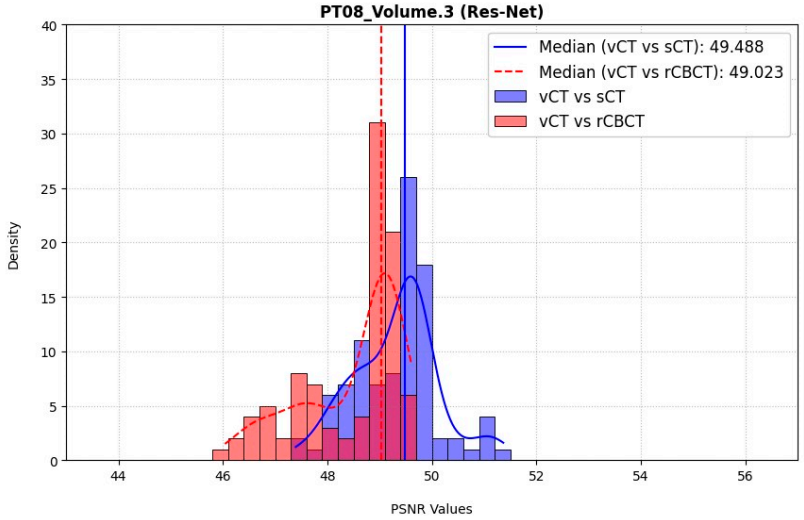


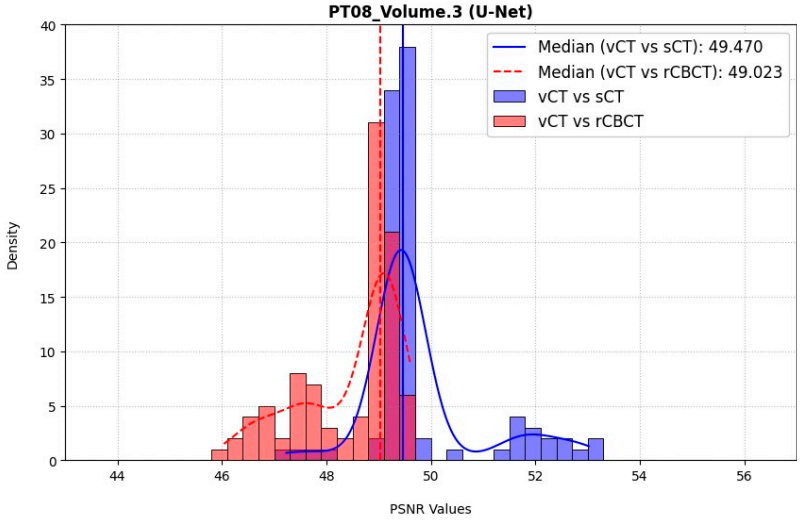

PSNR
SSIM
V2
PT08_Volume.1 (Res-Net)
PT08_Volume.1 (U-Net)
PT08_Volume.2 (Res-Net)
PT08_Volume.2 (U-Net)
Median (vCT vs sCT): 50.286
Median (vCT vs rCBCT): 49.858
Median (vCT vs sCT): 50.906
Median (vCT vs rCBCT): 49.858
Median (vCT vs sCT): 0.545
Median (vCT vs rCBCT): 0.546
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
SSIM Values


PSNR
SSIM
V3
PT08_Volume.2 (Res-Net)
Median (vCT vs sCT): 50.328
Median (vCT vs rCBCT): 49.699
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
PT08_Volume.2 (U-Net)
Median (vCT vs sCT): 50.429
Median (vCT vs rCBCT): 49.699
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
PT08_Volume.3 (Res-Net)
Median (vCT vs sCT): 0.549
Median (vCT vs rCBCT): 0.550
vCT vs sCT
vCT vs rCBCT
Density
SSIM Values
PT08_Volume.3 (U-Net)
Median (vCT vs sCT): 0.542
Median (vCT vs rCBCT): 0.550
vCT vs sCT
vCT vs rCBCT
Density
SSIM Values

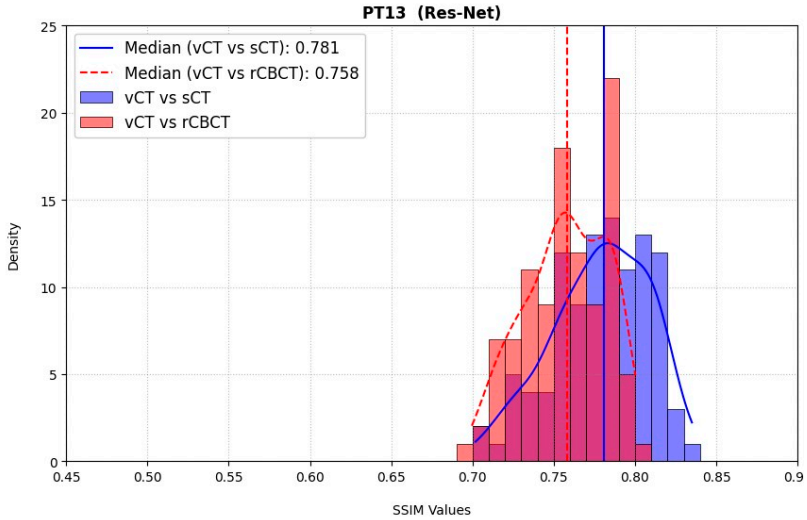
PT_13

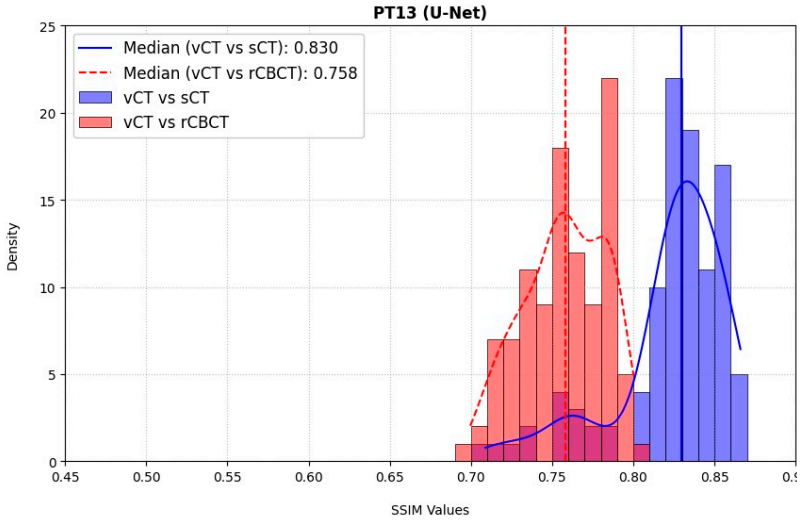
PSNR





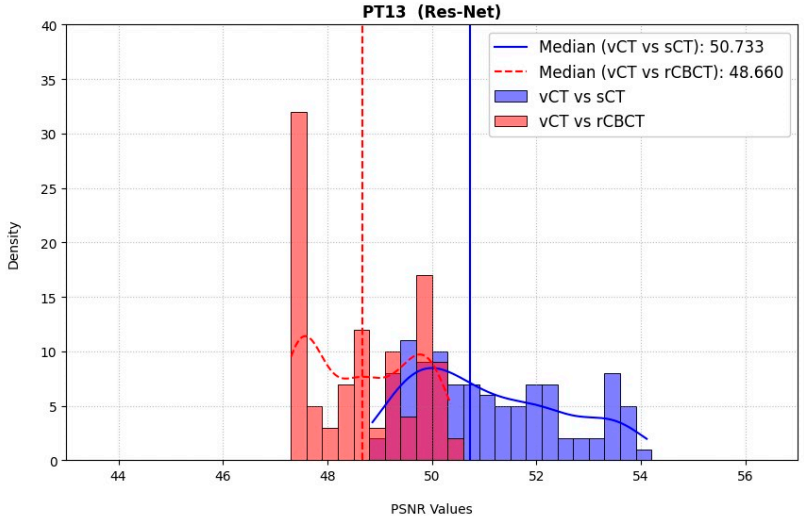
SSIM

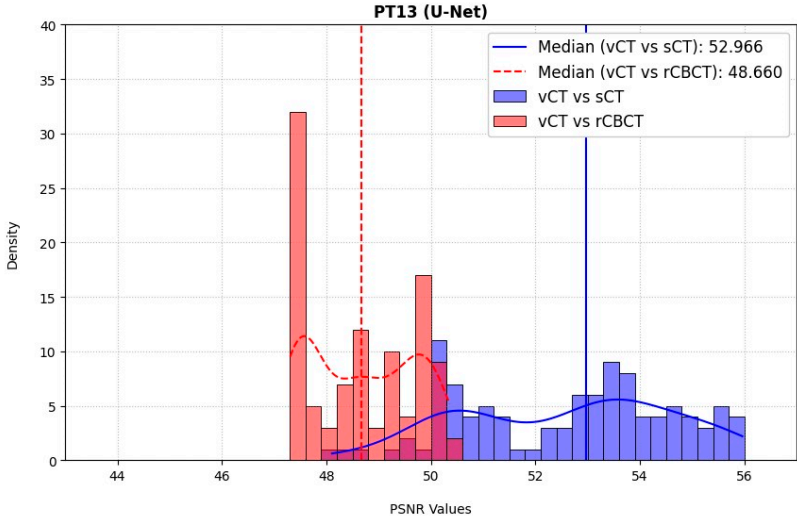




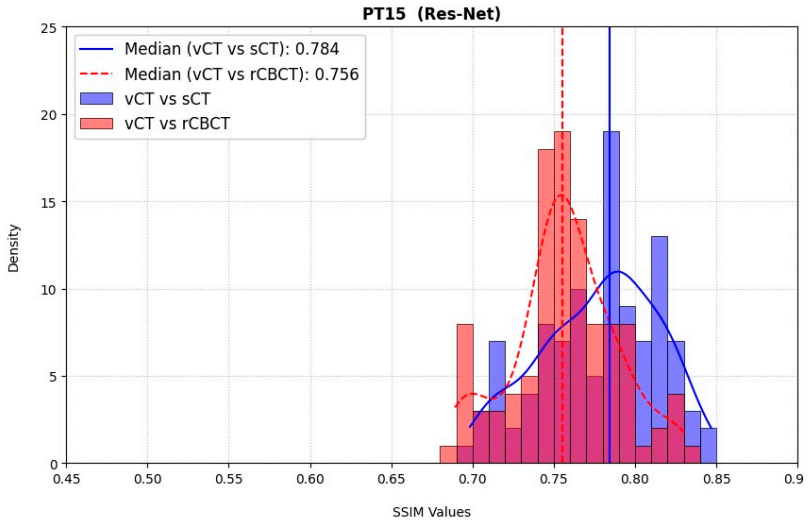
PT_15

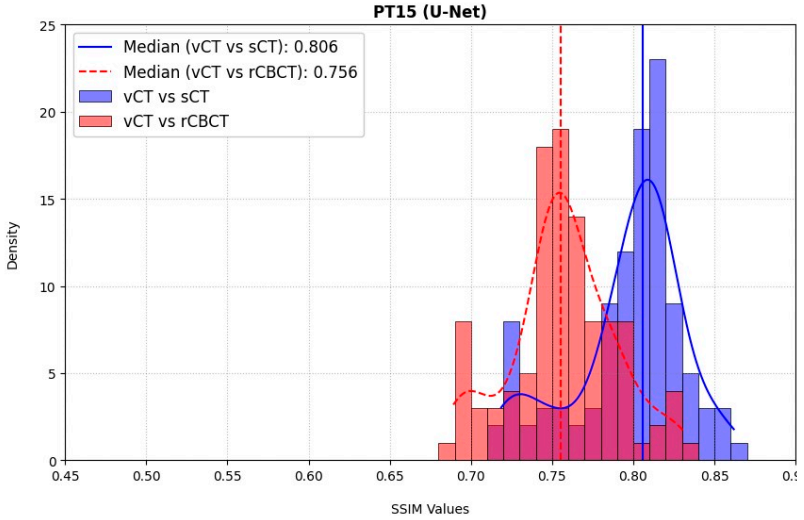
PSNR

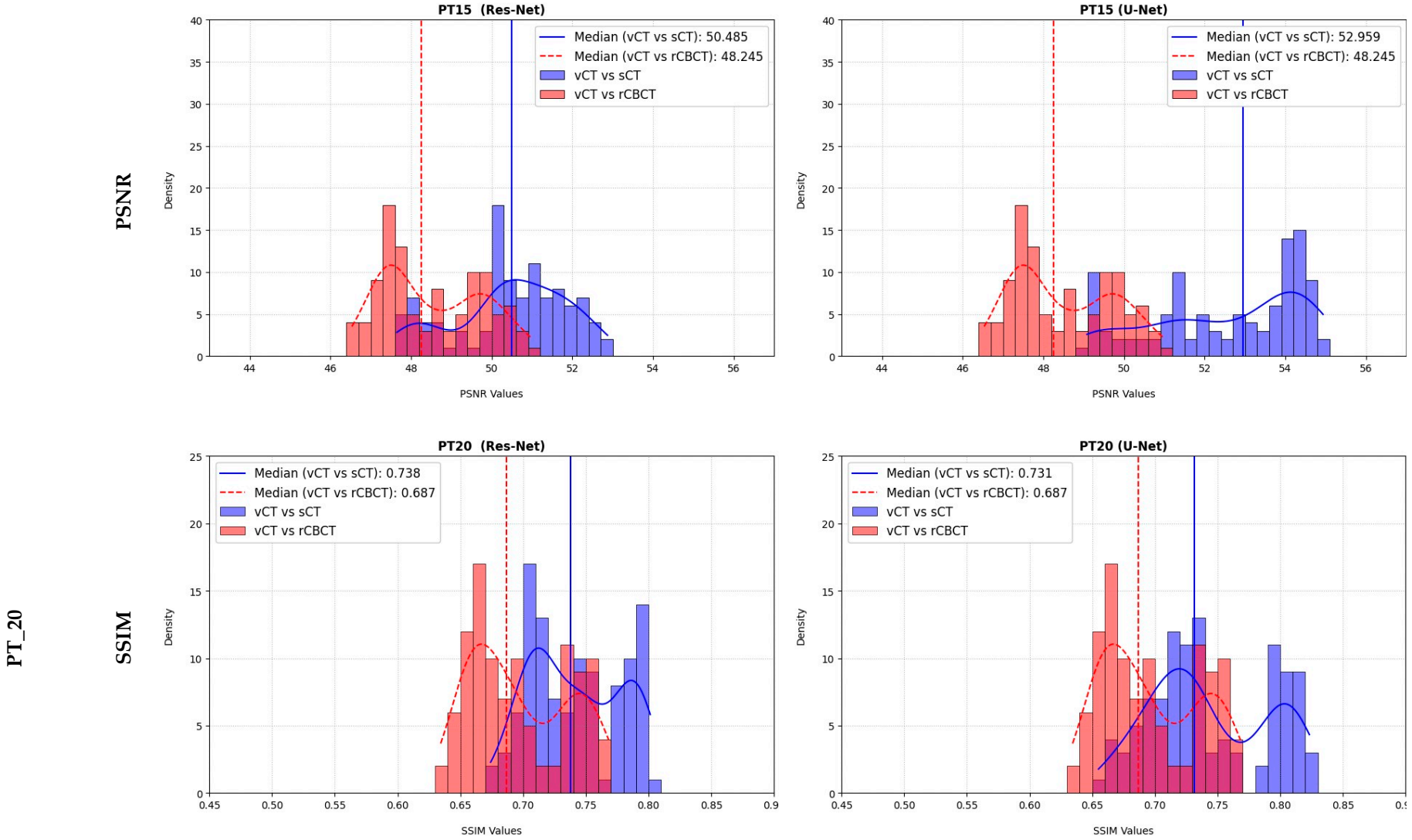


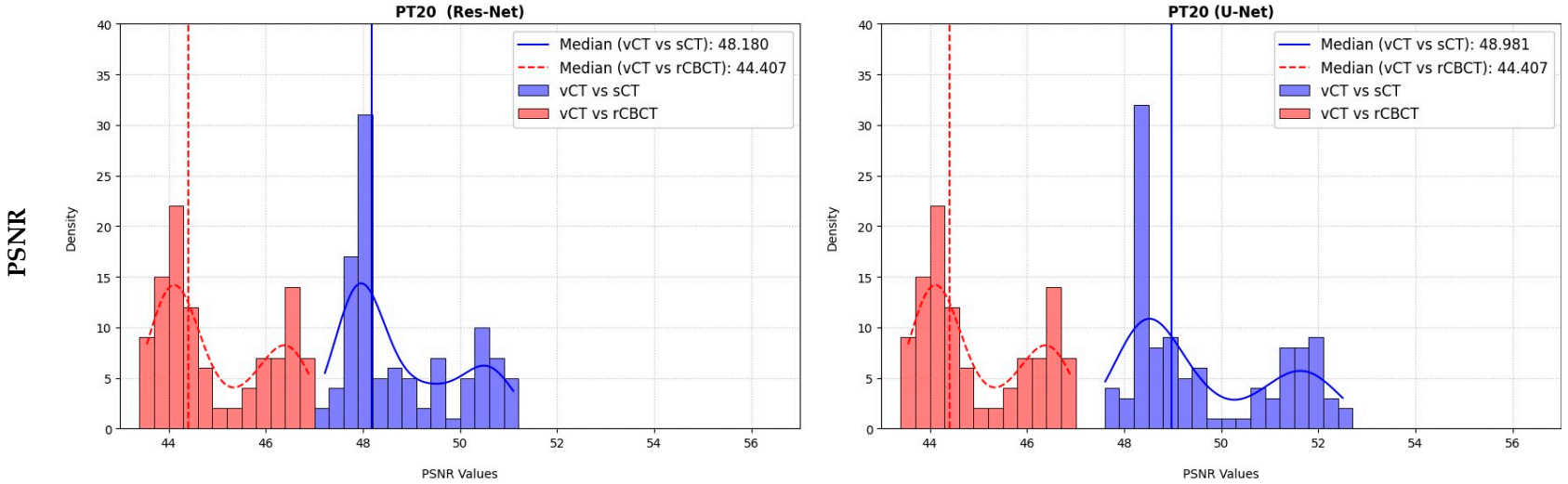


SSIM






PT_20
PSNR
SSIM
PT15 (Res-Net)
PT15 (U-Net)
PT20 (Res-Net)
PT20 (U-Net)
Median (vCT vs sCT): 50.485
Median (vCT vs rCBCT): 48.245
Median (vCT vs sCT): 52.959
Median (vCT vs rCBCT): 48.245
Median (vCT vs sCT): 0.738
Median (vCT vs rCBCT): 0.687
Median (vCT vs sCT): 0.731
Median (vCT vs rCBCT): 0.687
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
SSIM Values


PSNR
PT20 (Res-Net)
Median (vCT vs sCT): 48.180
Median (vCT vs rCBCT): 44.407
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values
PT20 (U-Net)
Median (vCT vs sCT): 48.981
Median (vCT vs rCBCT): 44.407
vCT vs sCT
vCT vs rCBCT
Density
PSNR Values

13

14