

Presentation of Dissertation for the BSc in Digital and Photographic Imaging,
University of Westminster

“Technical Progress and Resolution in Digital SLR Cameras”

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**Aims: Estimate the Signal Frequency Response (SFR)
of three Canon EOS DSLR cameras**

D60 (March 2002)



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10D (March 2003)



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D60 (March 2002)



10D (March 2003)



300D (Sept 2003)



Aims: Compare sharpness and assess Canons claims

D60 (March 2002)



10D (March 2003)



300D (Sept 2003)



“...superior image quality [from the 10D] thanks to peripheral circuitry improvements and a refined manufacturing process.”

Aims: Compare sharpness

D60 (March 2002)



10D (March 2003)

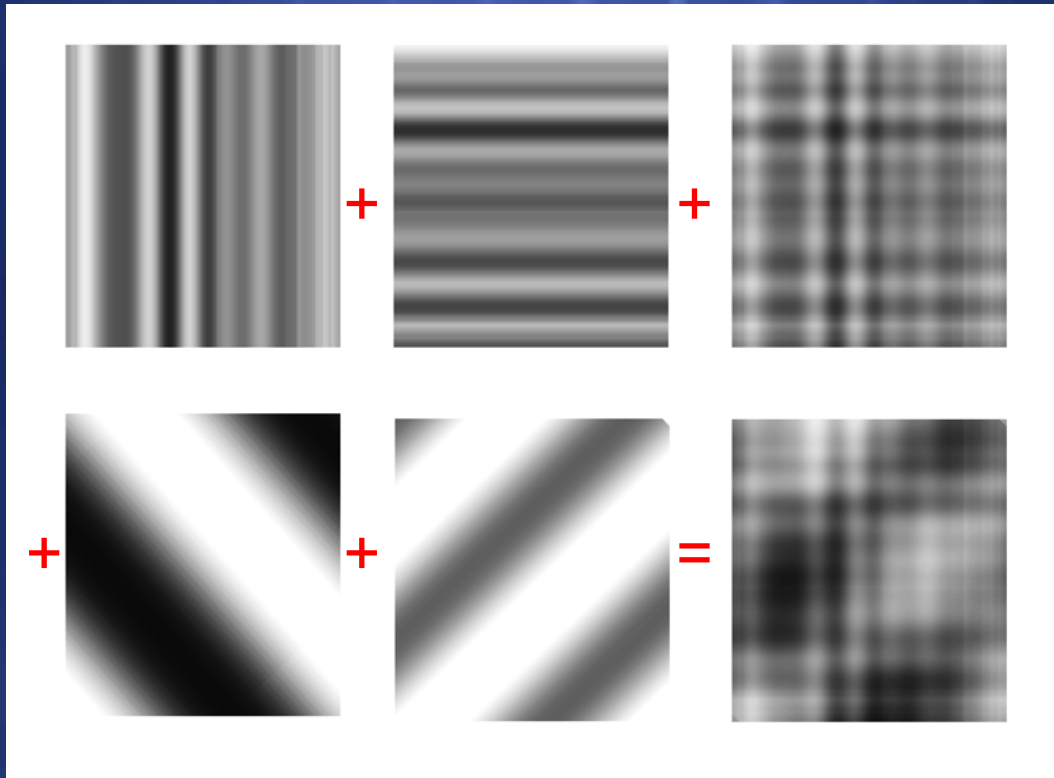


300D (Sept 2003)

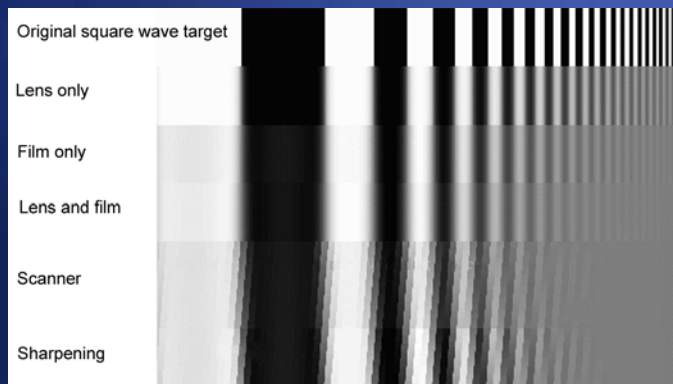


“...produce equivalent images...
resolution will not be changed” despite cheaper
manufacturing costs

Theory: Component Frequencies

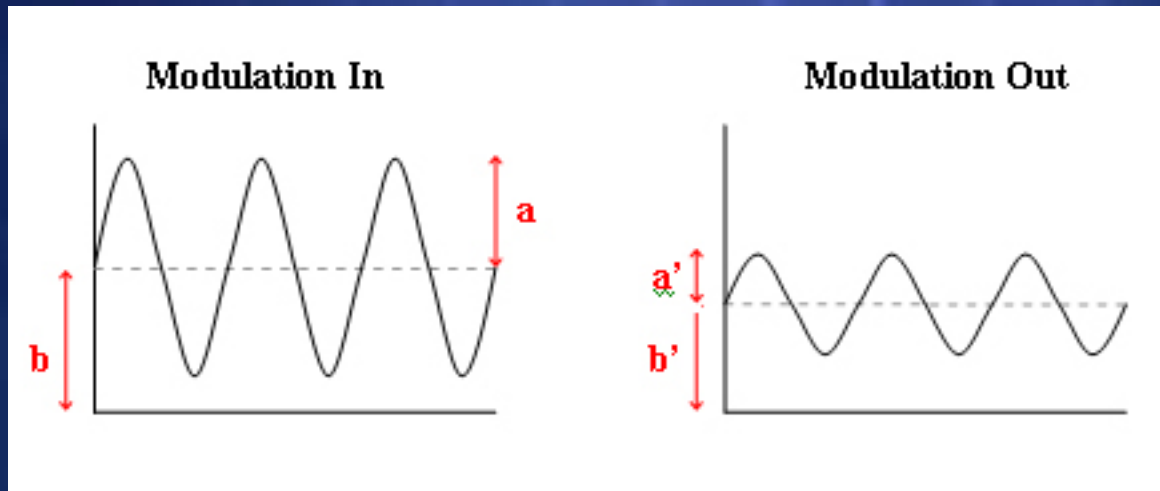


Theory: Modulation Transfer Function

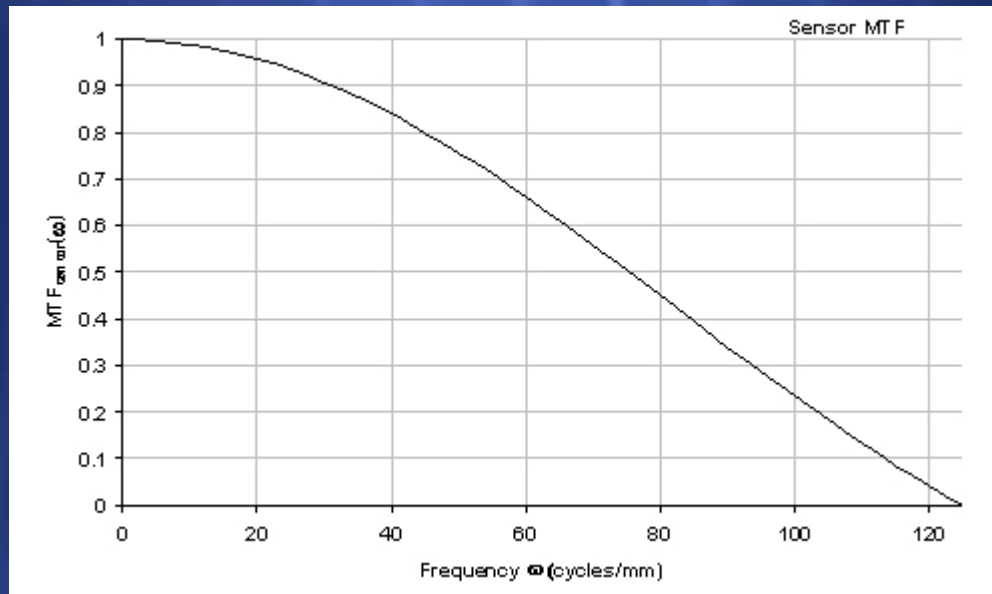


Modulation Transfer Factor (MTF)

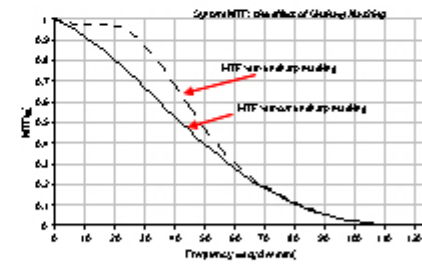
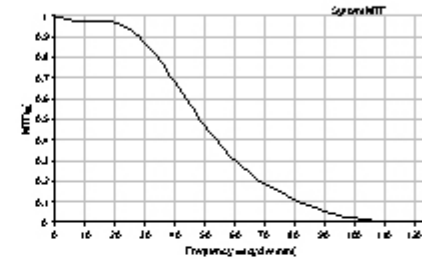
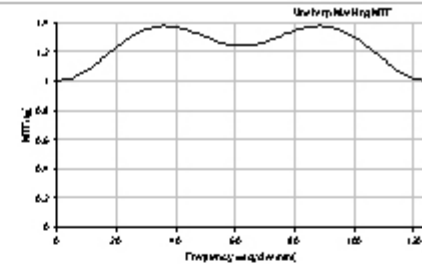
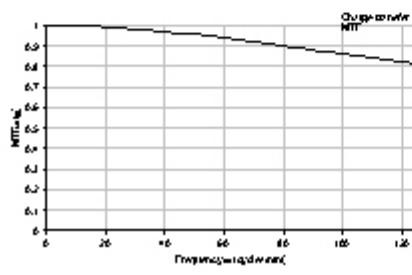
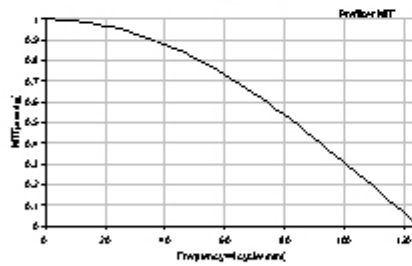
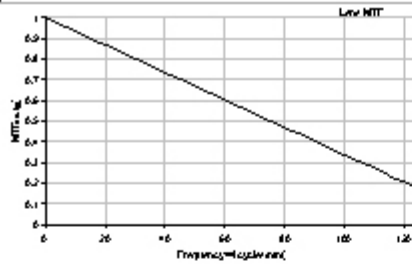
$$= \text{Modulation Out} / \text{Modulation In}$$
$$= \frac{(a'/b')}{(a/b)}$$



Theory: Modulation Transfer Function

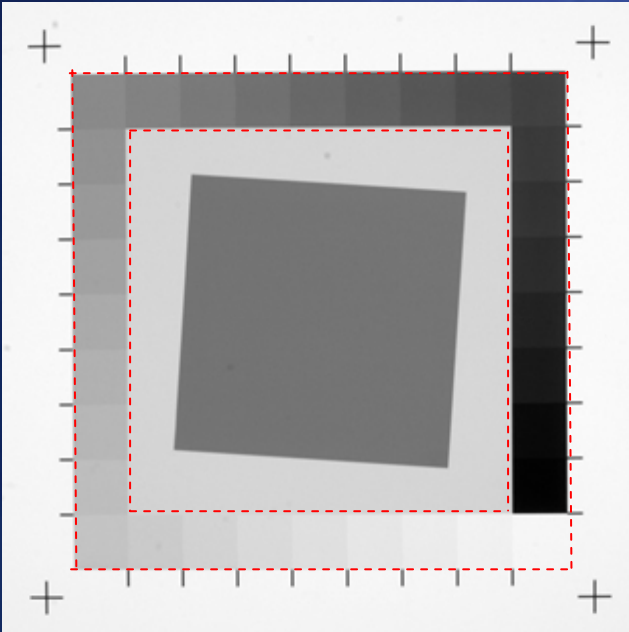


Theory: Component MTF curves



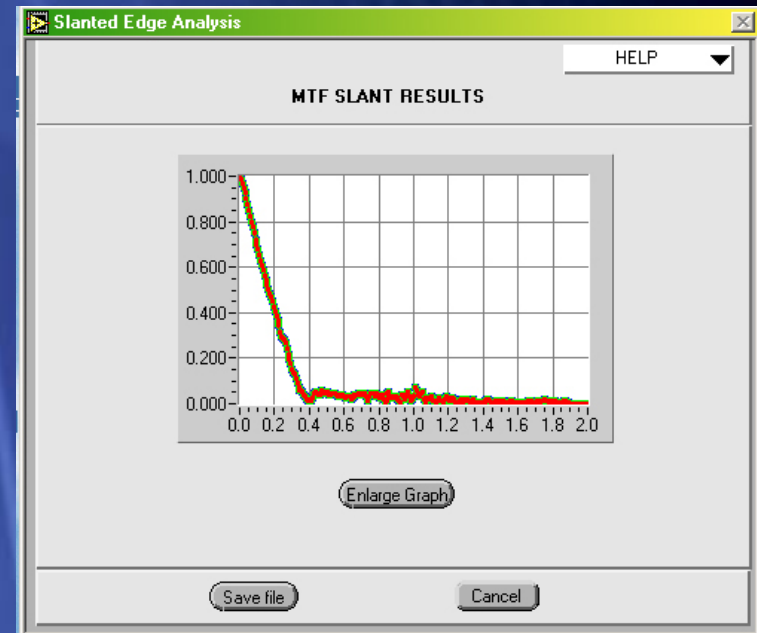
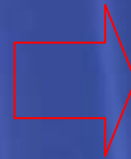
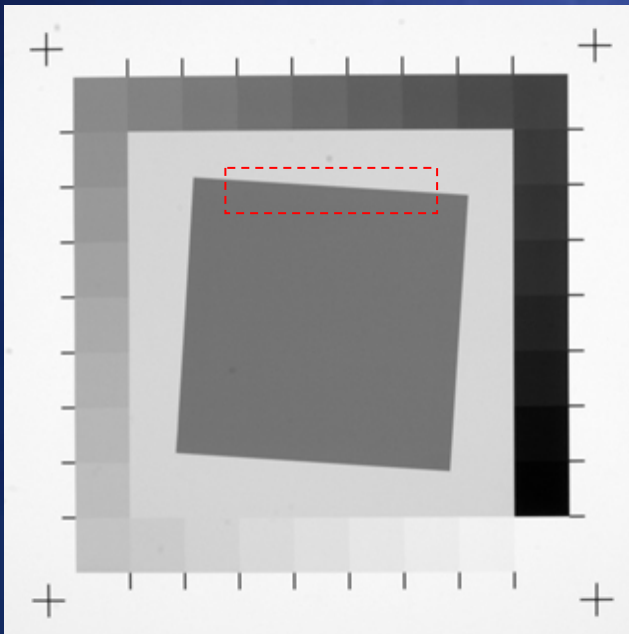
Method: Estimate SFR curves

(1) Photograph chart and derive LUTs



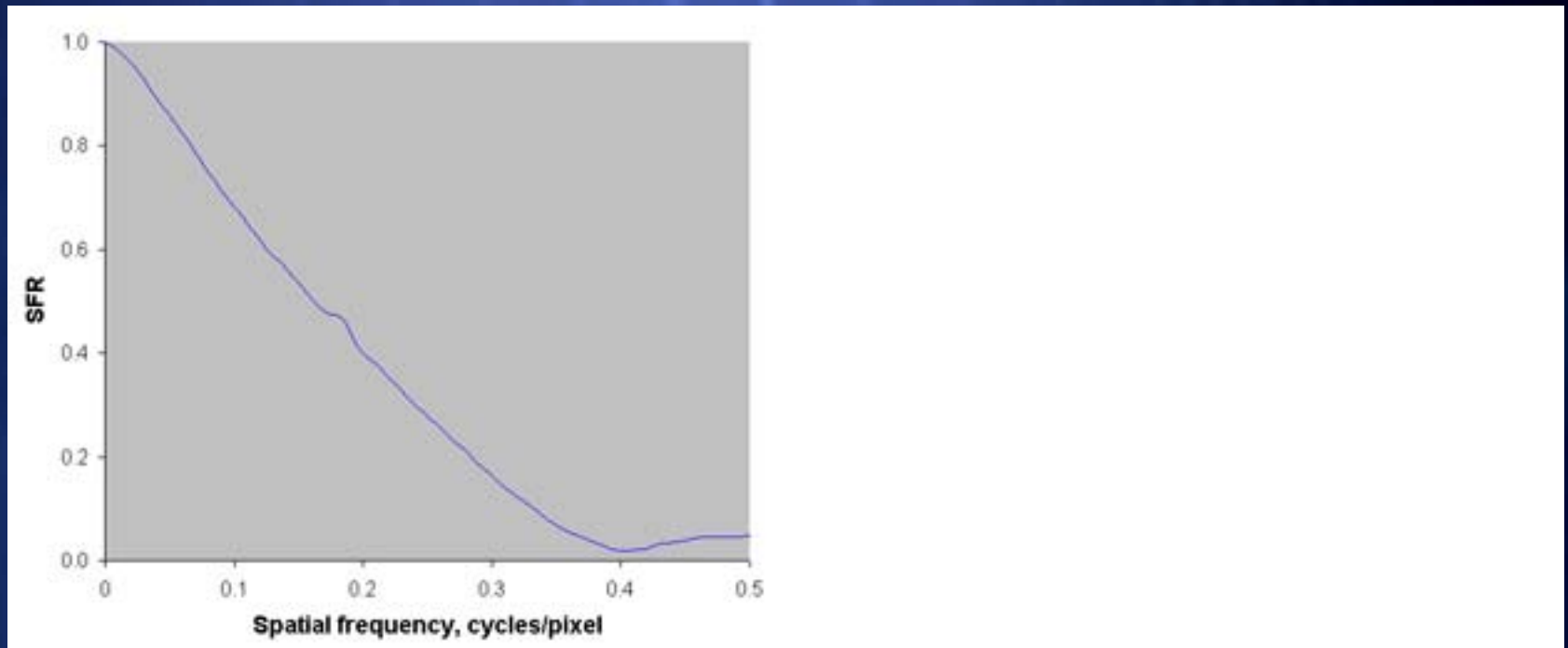
Method: Estimate SFR curves

- (1) Photograph chart and derive LUTs
- (2) Highlight ROI and generate SFR curves



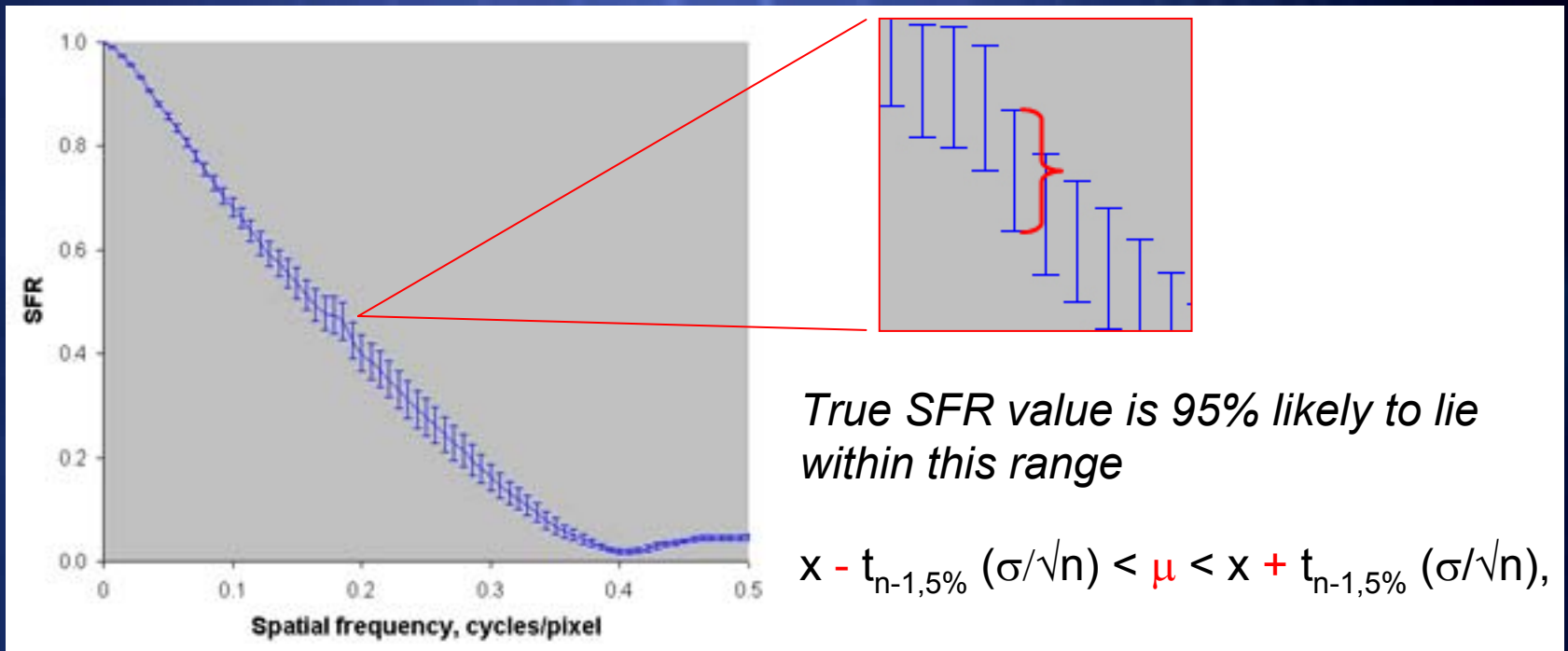
Method: Estimate SFR curves

- (1) Photograph chart and derive LUTs
- (2) Highlight ROI and generate SFR curves
- (3) Derive mean SFR curves and construct 95% confidence intervals



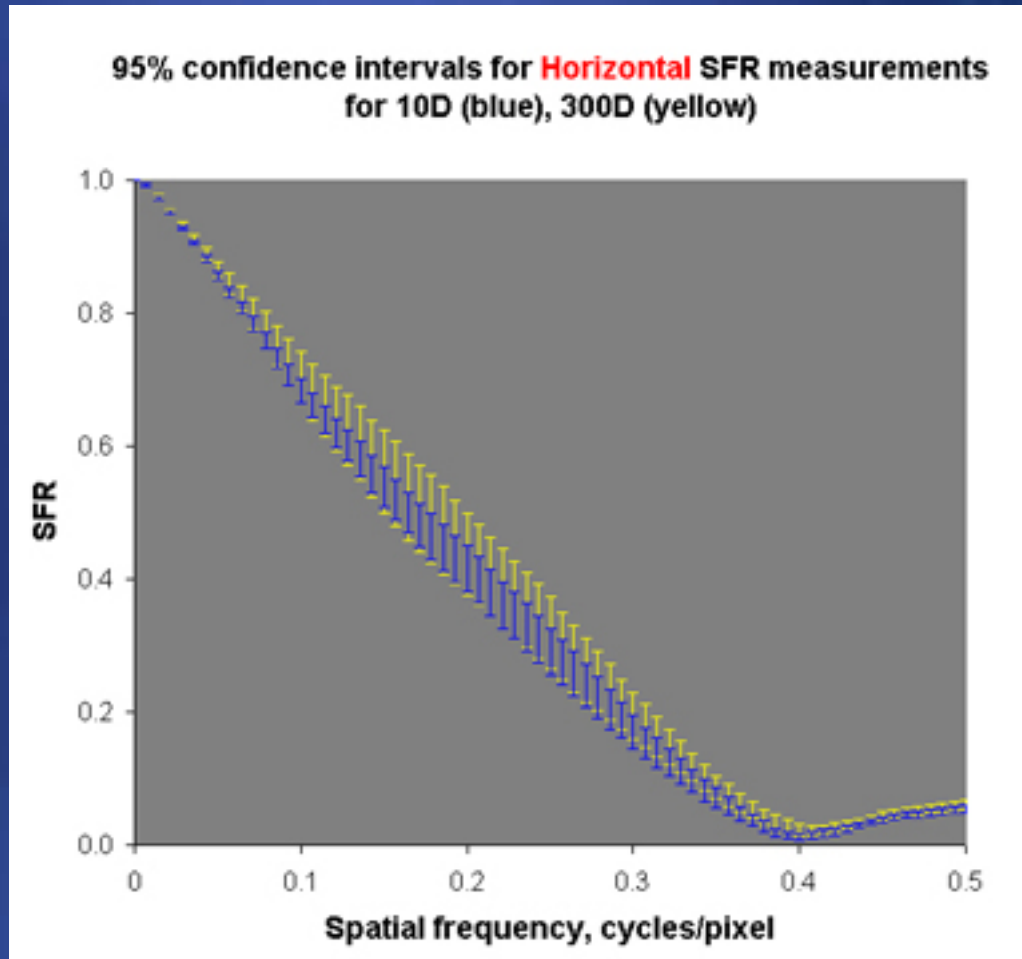
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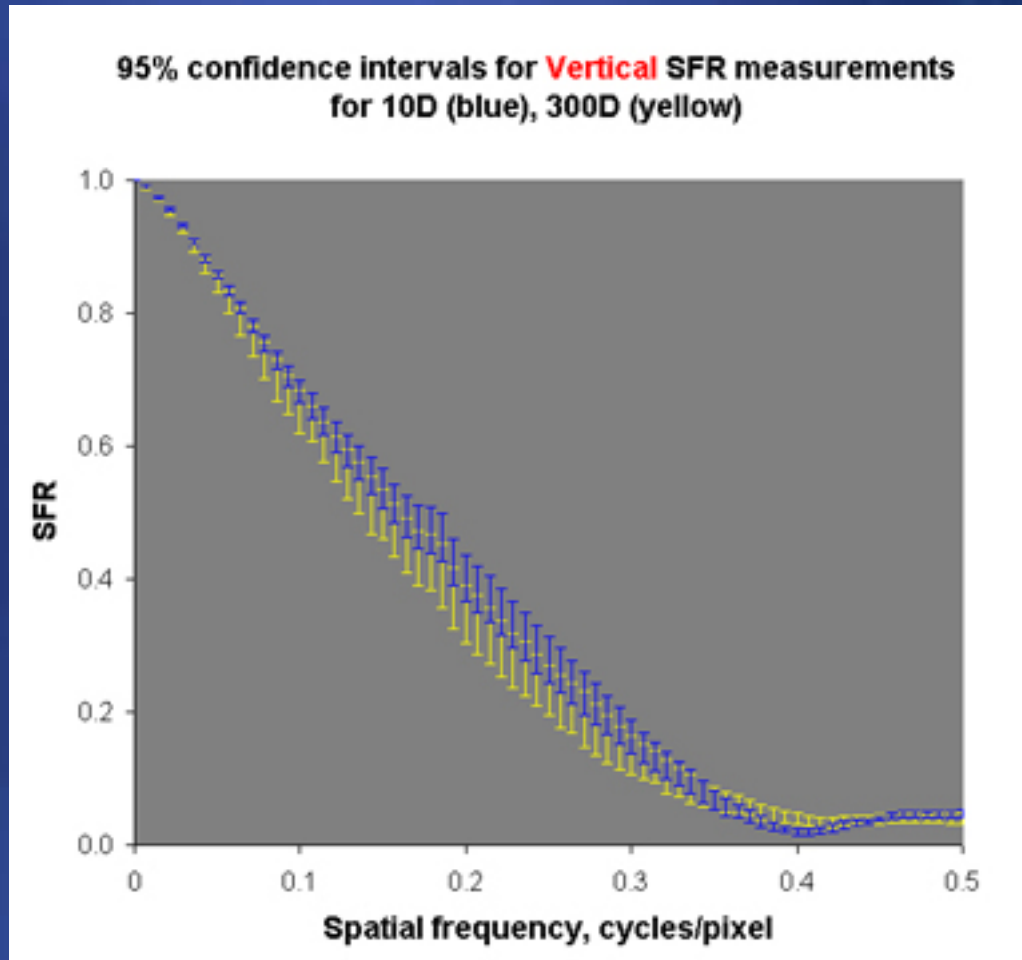
Results:

10D vs. 300D



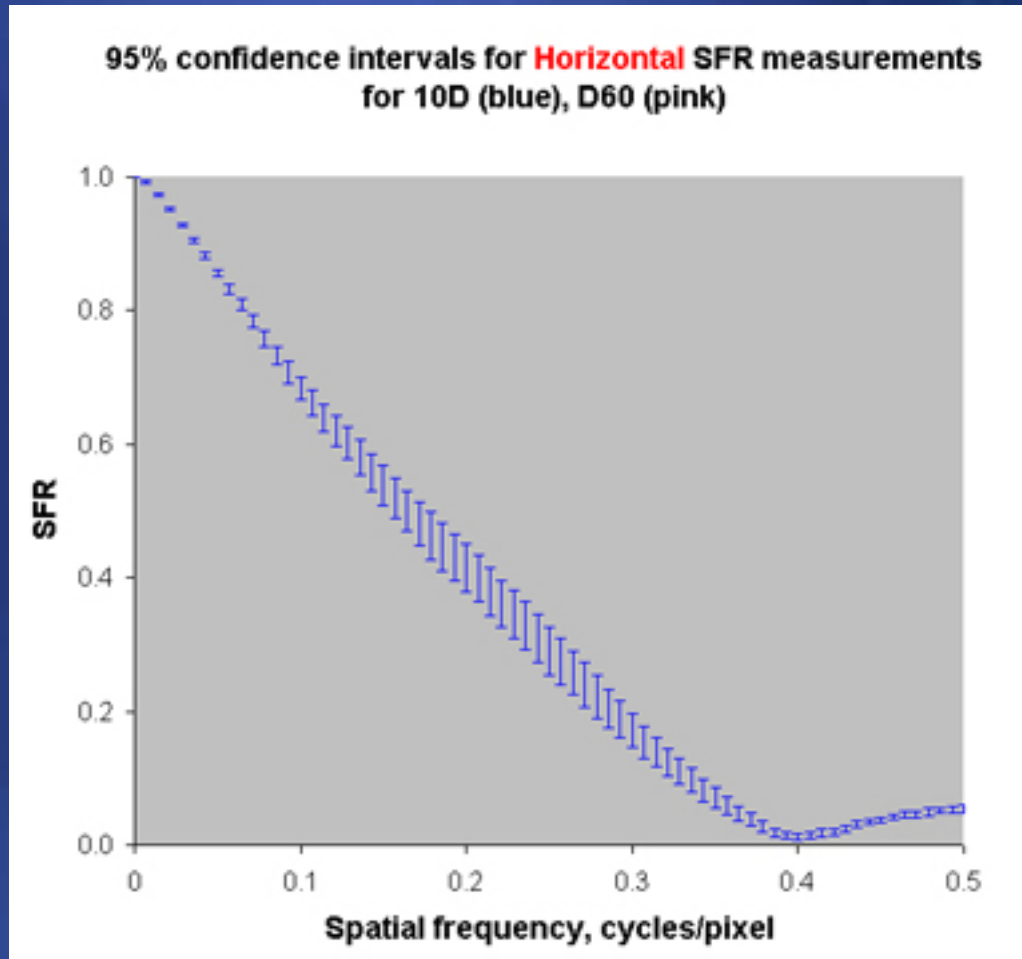
Results:

10D vs. 300D



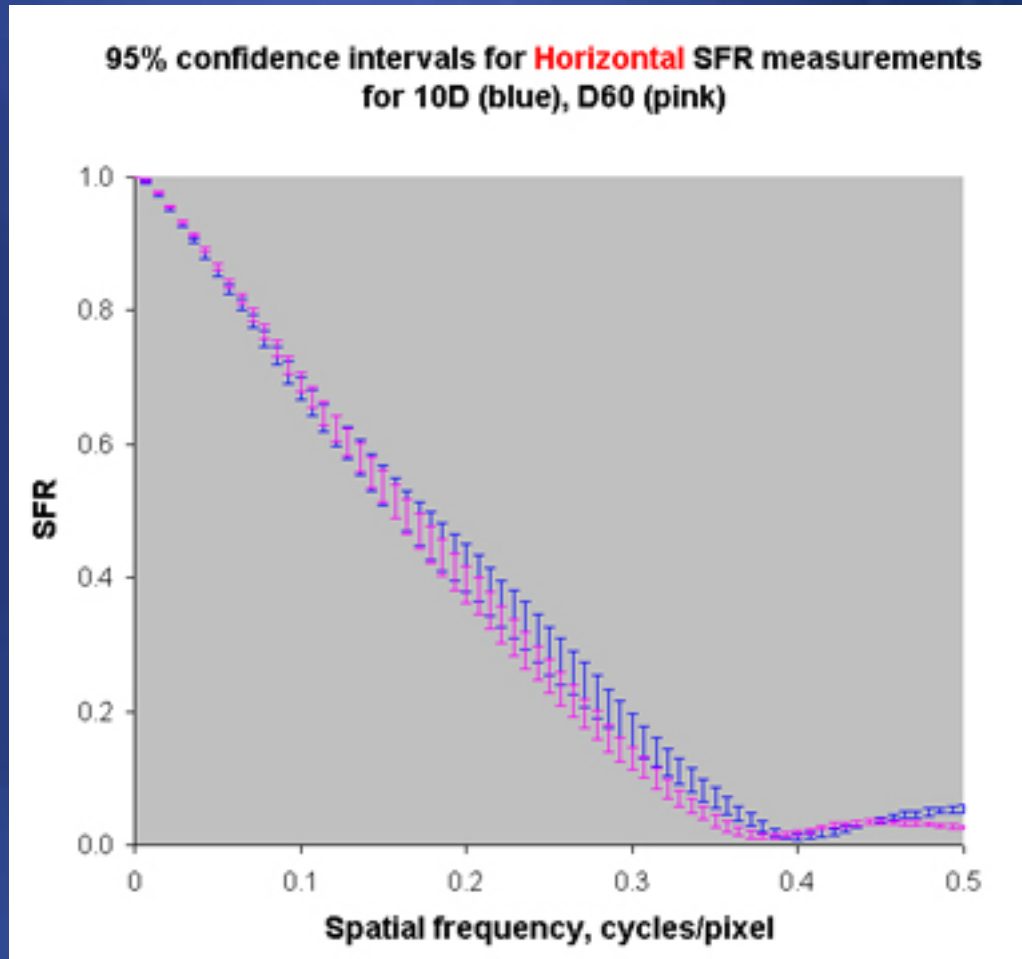
Results:

D60 vs. 10D



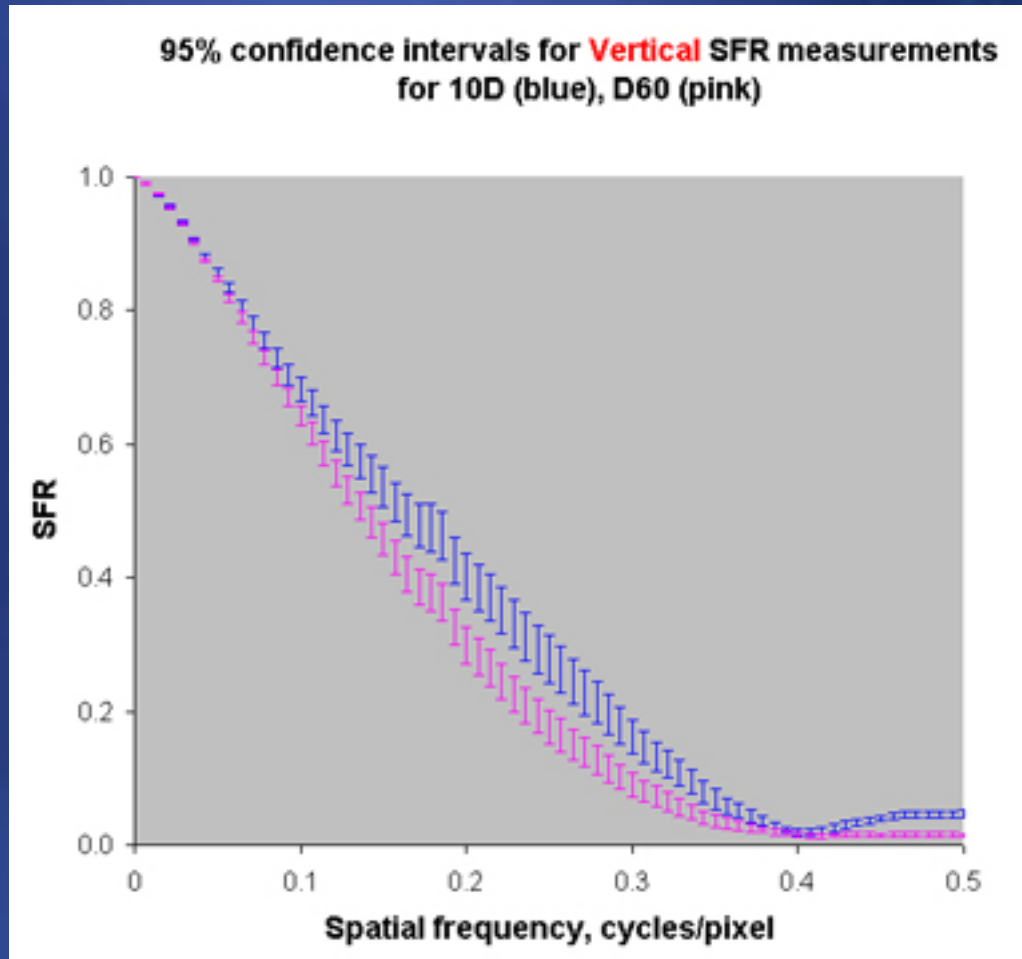
Results:

D60 vs. 10D



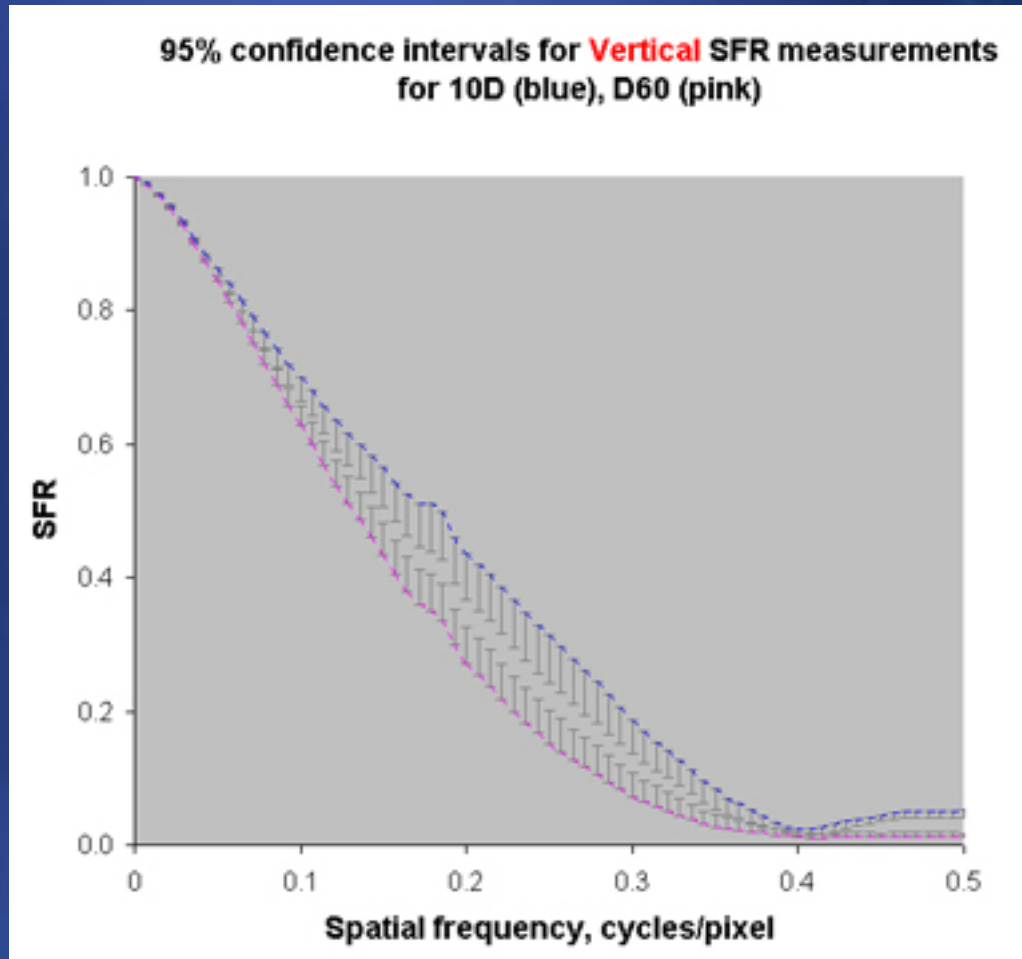
Results:

D60 vs. 10D



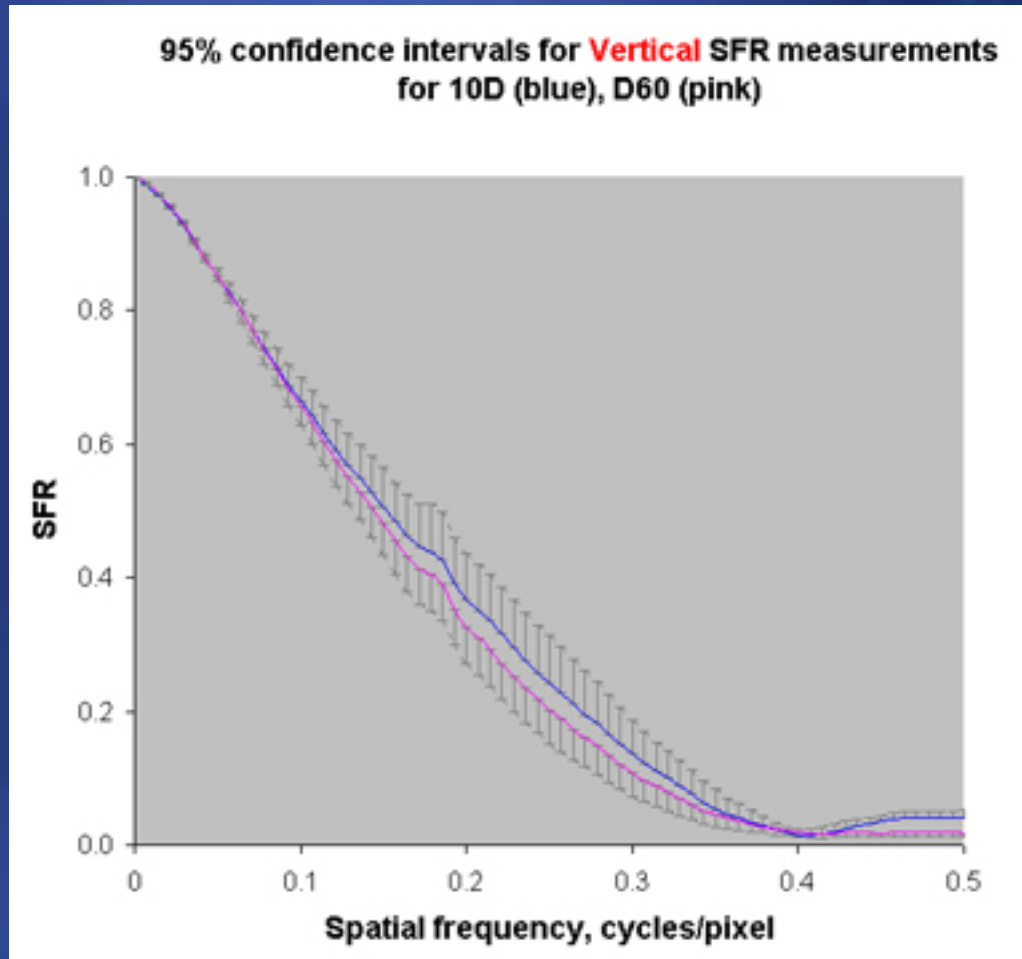
Results:

D60 vs. 10D



Results:

D60 vs. 10D



Results:

D60 vs. 10D (Subjective)



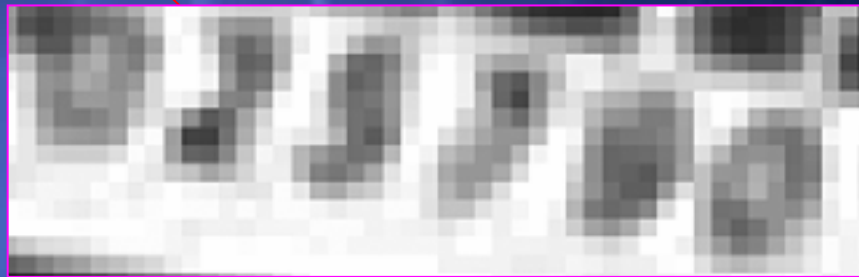
Results: D60 vs. 10D (Subjective)



10D



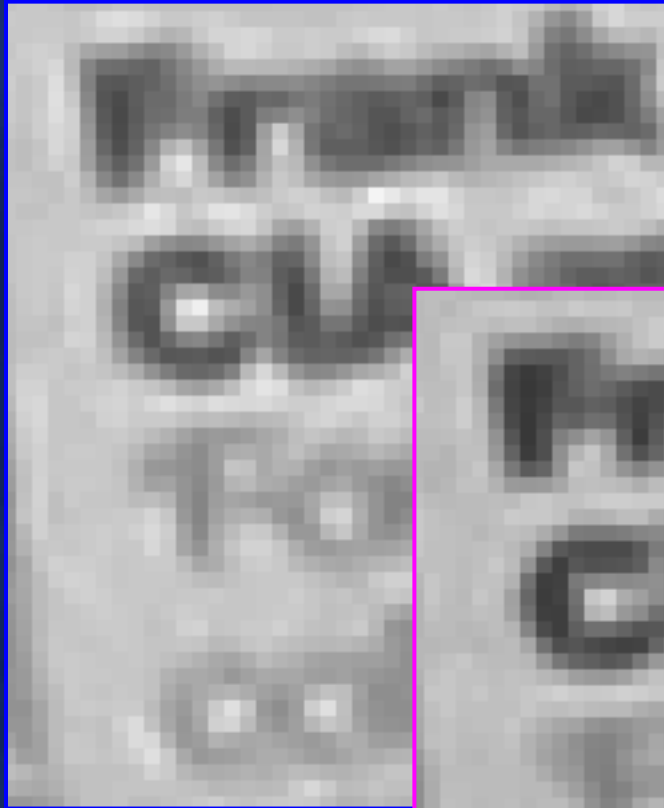
D60



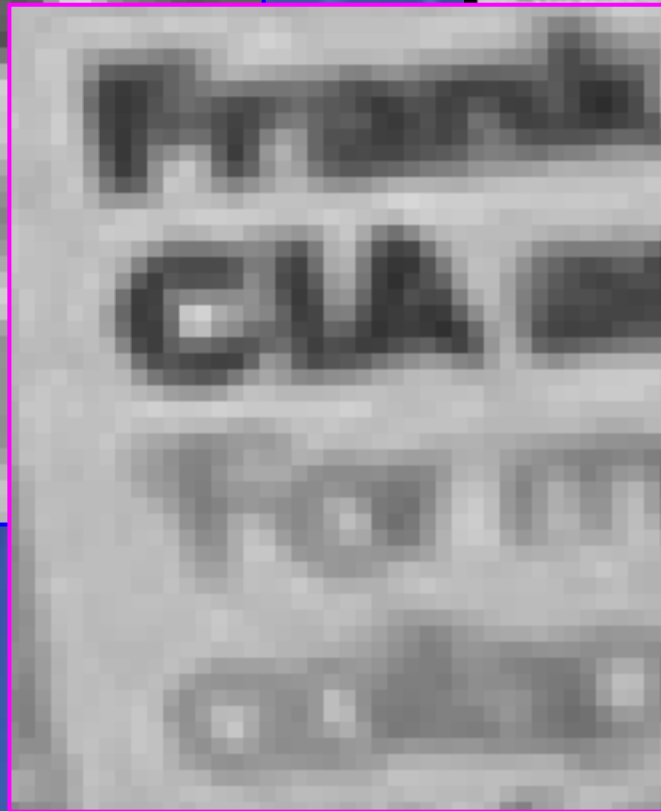
Results: D60 vs. 10D (Subjective)



Results: D60 vs. 10D (Subjective)



10D



D60



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Conclusions:

- For the frequency range 0.16 to 0.31, the EOS-10D is a significantly superior camera to the D60 in recording vertical detail. The degree of significance is 95%.
- The economy 300D EOS model is potentially as sharp as the earlier 10D model.
- The 10D and 300D exhibit notably sharper images than the D60 when printed to 10" x 6" at 300dpi.
- Prints from **all** test cameras appear to show signs of hardware sharpening. This is more severe in case of 300D and 10D models.

End of Presentation

Thank you.

Bibliography

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