

Physical metrics of scanner introduced variation across 5 different makes and models of WSI scanner.

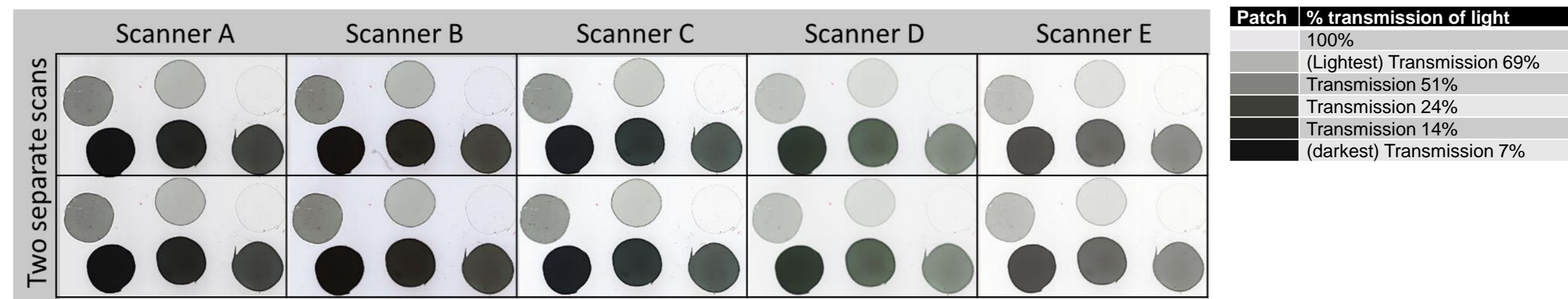
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Contrast

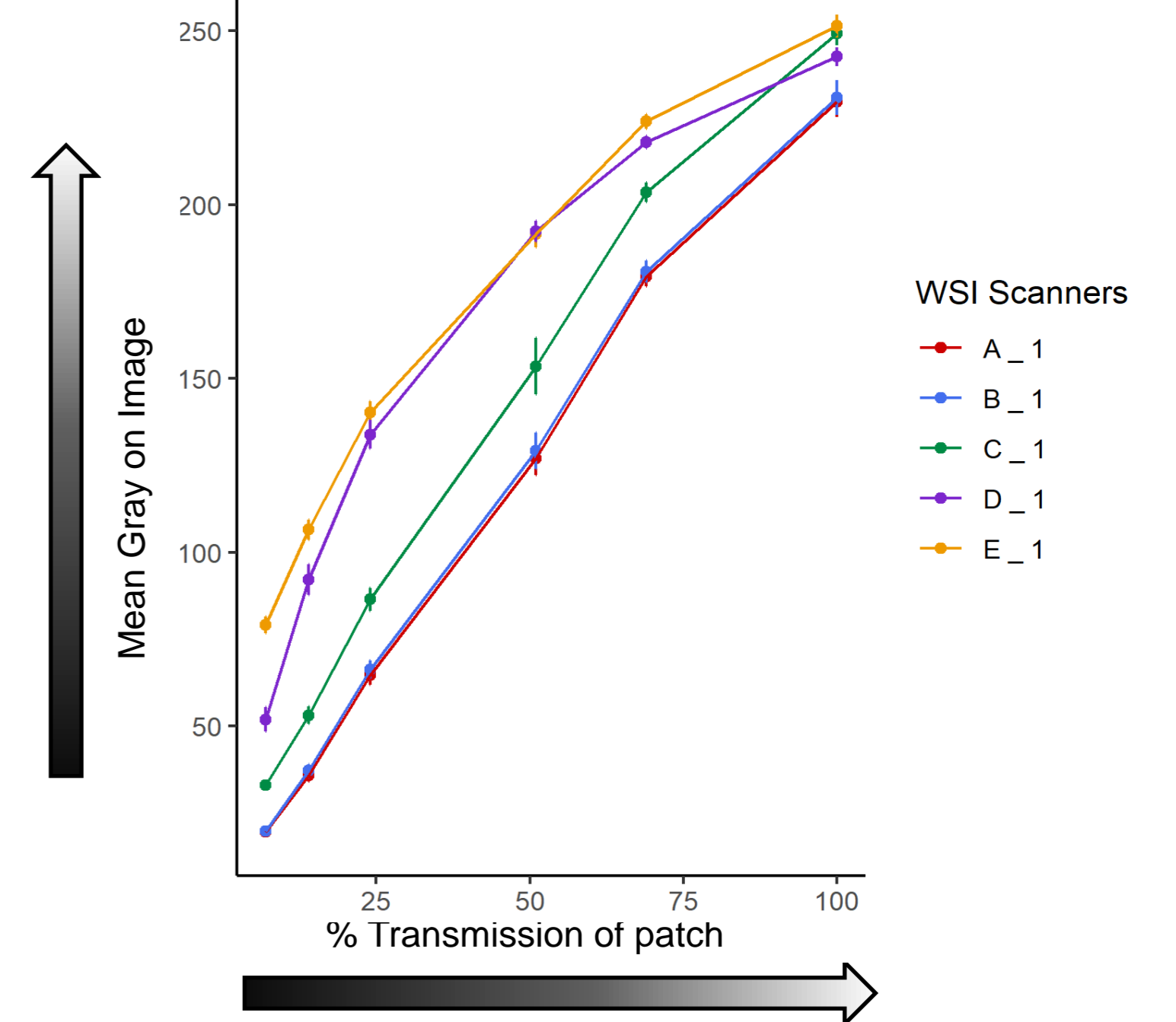
How it looks within the same image viewer:



Test object 1: A slide prepared with materials representing a range of contrast (neutral density filters between 100% transmission and 7% transmission),

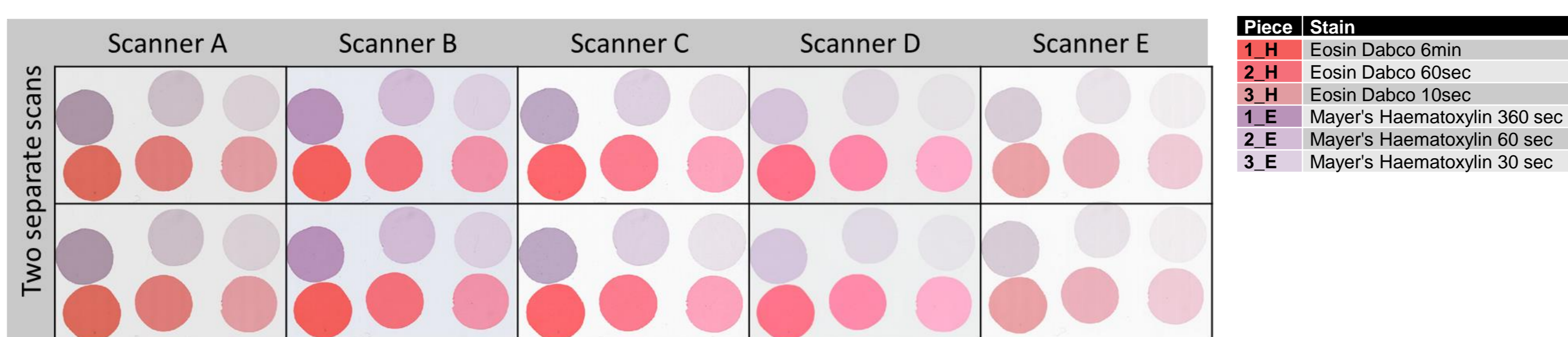
Summary: The range of contrast is digitised differently between scanners. In some, darker tones are shifted to a brighter intensity. Two scanners demonstrate a curved relationship and three a linear relationship across the contrast range.

The measured greyscale variation:



Colour

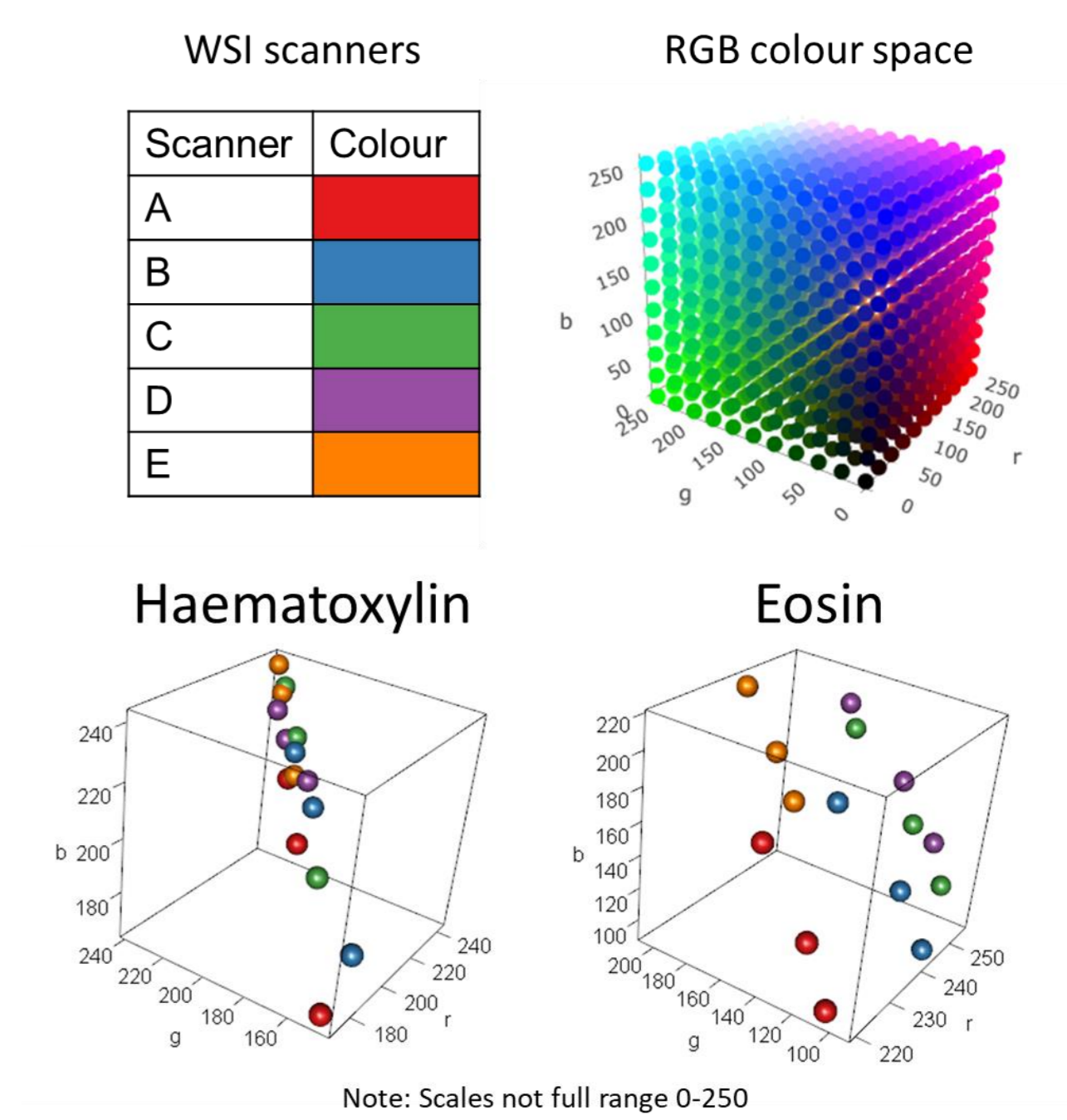
How it looks within the same image viewer:



Test object: A slide prepared with materials representing a range of colour in relation to H&E staining (stained biopolymer representing 3 intensities of haematoxylin stain and 3 intensities of eosin stain)

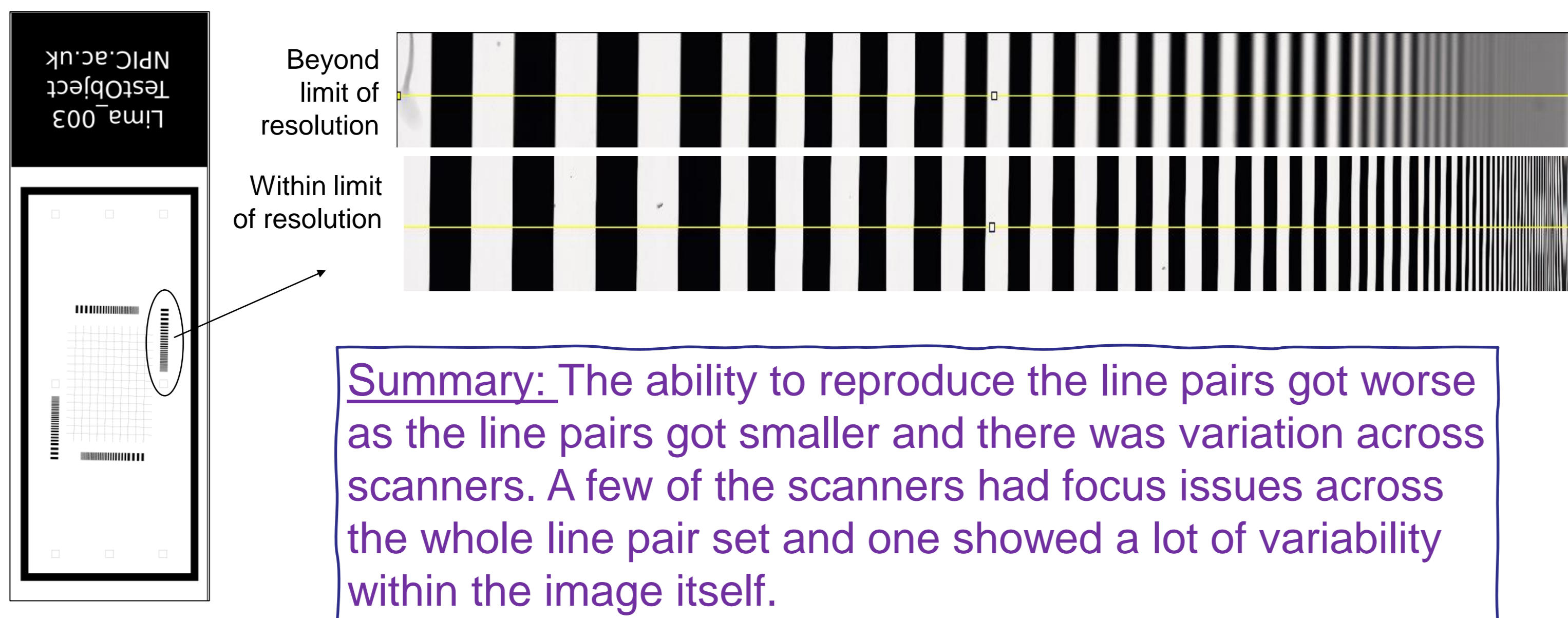
Summary: The range of colour is digitised differently between scanners. For the haematoxylin patches, shifts are limited to changes in brightness not colour, whereas the eosin patches show shifts within the colour space as well as in brightness

The measured RGB variation:

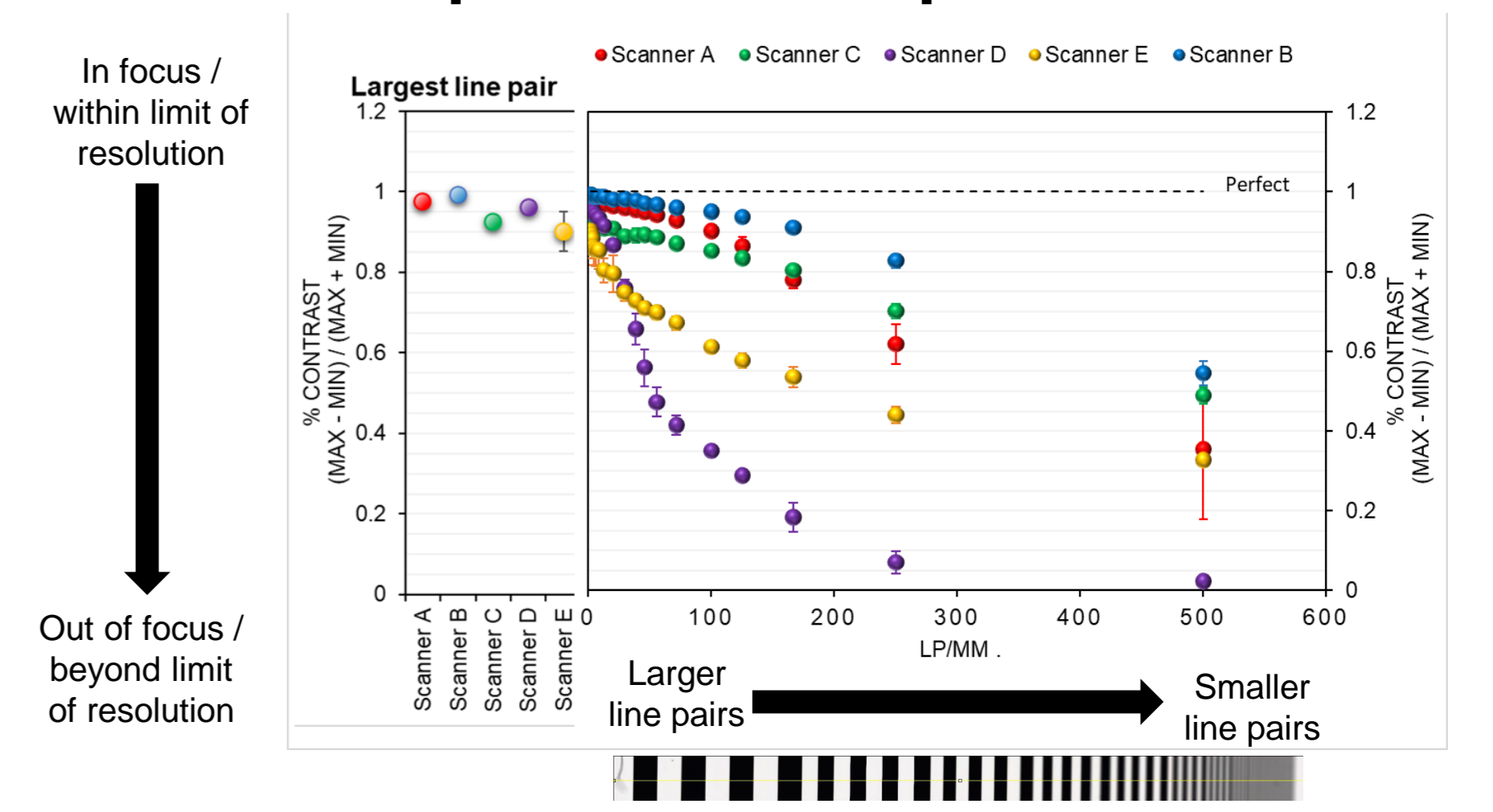


Resolution / Focus

Test object: A bespoke test slide with Line Pairs resolution test patterns, two vertical and two horizontal. Each pattern contains 18 groups of 4 x line pairs ranging from 300um to 1um.



Measured square wave response function:



So what? Variation in image generation must be described to allow computational analysis and AI developers to assess any impact, the introduction of quality processes and test tools at the point of scanning will also be key to monitoring, understanding, and if needed, reducing this image variability.

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NPIC QCC website:



Find out more about the NPIC Quality co-ordination center.

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