Supplementary information (SI): Quality of biological images, reconstructed using localization microscopy data

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Figure S1: Similarity measure in frequency space for different image distortion; Left column- distorted image; Central Column- phase agreement between the distorted image and the original image (\(\text{lin}(f_x, f_y)\text{cross}(f_x, f_y)\)); Right Column- Similarity measure \(Q_{\text{freq}}(f)\) in frequency space (shaded green area, left scale), frequency spectrum (red line, right scale); a) Test image after Gaussian blur (\(\sigma = 6.4 \text{ nm}\)); b) Test image after Gaussian blur (\(\sigma = 12.8 \text{ nm}\)); c) Test image after Gaussian blur (\(\sigma = 12.8 \text{ nm}\)) with added noise; d) Test image after Gaussian blur (\(\sigma = 25.6 \text{ nm}\)) with added noise; d) Test image after Gaussian blur (\(\sigma = 51.2 \text{ nm}\)) with added noise; scale bars = 500 nm

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Figure S2: Correlation coefficient as a function of emitters density for different rendered area size (side of square rendering), image CN (cellular nucleus)- top, NT (neuronal tissue)- bottom, emitter localization accuracy 25 nm.
Figure S3: Correlation coefficient as a function of rendered area size (side of square rendering) for different emitters density, image CN (cellular nucleus)- top, NT (neuronal tissue)- bottom, emitter localization accuracy 25 nm.
Figure S4: Agreement between binarized images as a function of emitters density for different rendered area size (side of square rendering), image CN (cellular nucleus)-top, NT (neuronal tissue)- bottom, emitter localization accuracy 25nm.
Figure S5: Normalized square $L_2$ norm as a function of emitters density for different rendered area size (side of square rendering), image CN (cellular nucleus)- top, NT (neuronal tissue)- bottom, emitter localization accuracy 25 nm.
Figure S6: Similarity measure in frequency space, image CN (cellular nucleus)- top, NT (neuronal tissue)- bottom, emitter localization accuracy 25 nm. The spectrum of similarity measure is shown as a function of emitters density, for different rendered area size (side of square rendering). Only the lowest 1/3 of the function with the sampling resulting from the reference image resolution has been displayed.
Figure S7: Reconstruction of the ROI for different rendering square size and emitter density, image CN (cellular nucleus)- top, NT (neuronal tissue)- bottom, emitter localization accuracy 25\textmu m.
Figure S8: Similarity measure in frequency space, for different image modalities, CN (cellular nucleus)- left, NT (neuronal tissue)- right
Figure S9: Resolution test for different values of $\sigma$. Histograms of the radii of the mean area ($\delta r$) are represented with mean (green diamonds), medians (red lines), 25/75 th percentiles (blue boxes) and 5/95 th percentiles (black whiskers).
Figure S10: Distribution of (emitter) sampling density for different values of $\sigma$. Histograms of the radii of the mean area ($\lambda r$) are represented with mean (green diamonds), medians (red lines), 25/75 th percentiles (blue boxes) and 5/95 th percentiles (black whiskers).
Figure S11: Comparison of rendering with a square area and Gaussian function. Top: reconstruction of ROI’s. Bottom: Quantitative measures for different renderings.