

Statistical and Process Capability Analysis of Display Luminance and Chromaticity

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Definition of process capability indices

- *Process capability index (Cp) - measures **potential capability**, ignoring process centering:*

$$Cp = (USL - LSL) / 6\sigma$$

- *Upper capability index (Cpu) - Measures how close the process mean is to the **USL**:*

$$Cpu = (USL - \mu) / 3\sigma$$

- *Lower capability index (Cpl) - Measures how close the process mean is to the **LSL**:*

$$Cpl = (\mu - LSL) / 3\sigma$$

- *Process capability index - Corrected (Cpk) - Accounts for both the **process variability** and **process centering**:*

$$Cpk = \text{Min} [(\mu - LSL) / 3\sigma, (USL - \mu) / 3\sigma]$$

μ = process mean

σ = process standard deviation

USL = upper specification limit

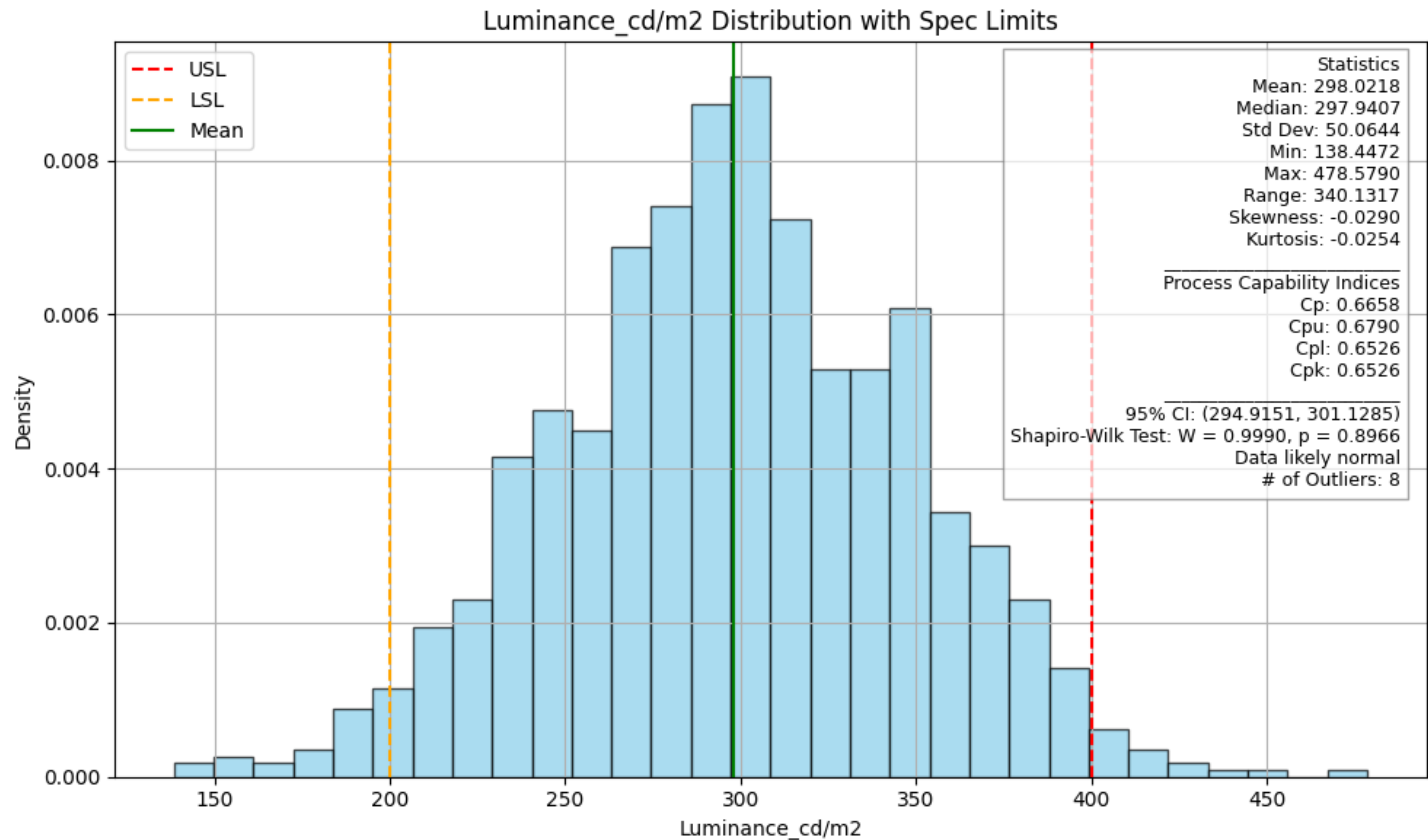
LSL = lower specification limit

CPK > 1.33: Good process capability

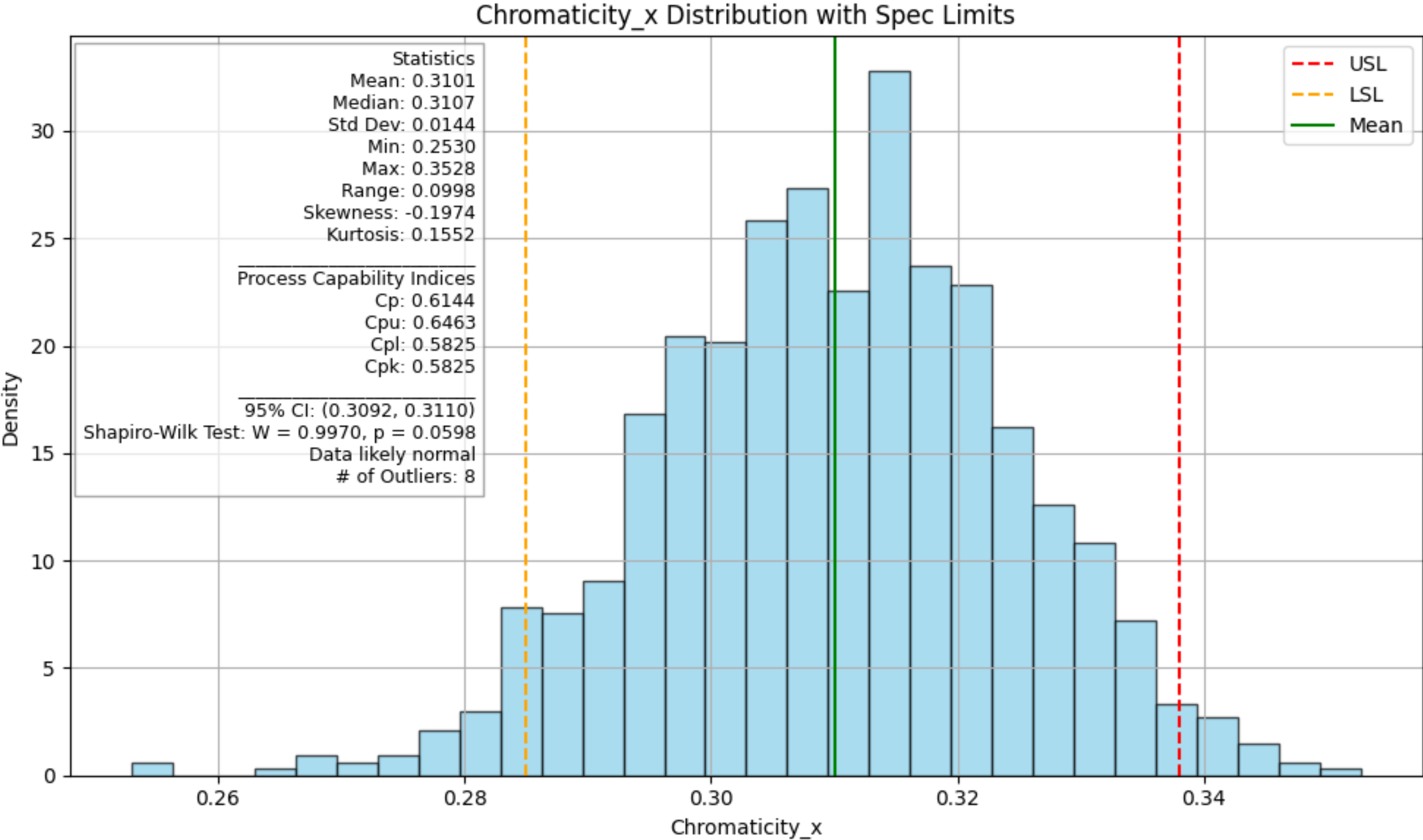
CPK = 1.0: Just meets specification

CPK < 1.0: Process is not capable (produces out-of-spec parts)

Statistical analysis of Luminance data of a display (USL = 400 cd/m², LSL = 200 cd/m²)



Statistical analysis of Chromaticity_x data of a display (USL = 0.338, LSL = 0.285)



Statistical analysis of Chromaticity_y data of a display (USL = 0.355, LSL = 0.320)

