Metric Blind-Spot Field Guide

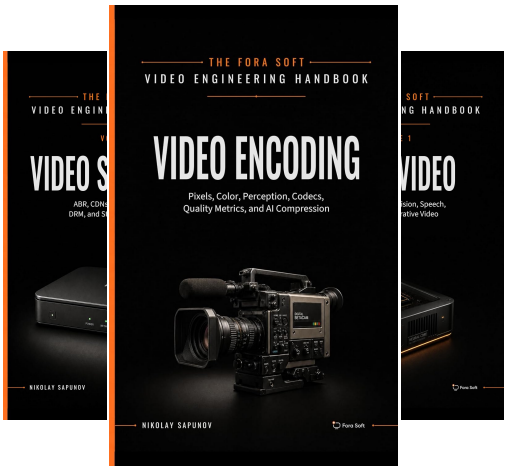
Where PSNR, SSIM and VMAF lie — and what to measure instead. Keep it beside your quality dashboard.

Content / case	Why the score lies	Metrics hit	What to measure instead
Film grain / texture	Random detail never lines up pixel-for-pixel; AV1 grain synthesis mismatches grain positions.	**PSNR, SSIM, VMAF**	Disable grain synthesis when measuring; measure the de-grained signal; confirm by eye.
High motion	Eye masks detail during motion; VMAF v0's motion feature is unbounded → overprediction.	**VMAF v0, PSNR**	Use the current VMAF model; keep frame rate fixed; spot-check the fastest scenes.
High frame rate (60 fps)	Consecutive-frame motion looks small, so v0 underpredicts vs 24/30 fps.	**VMAF v0**	Never compare across frame rates; use VMAF v1; always report fps.
Dark scenes / HDR	Few bright pixels to 'disagree'; no deployed public HDR VMAF model yet.	**PSNR, SSIM, VMAF**	Inspect shadows; weight subjective checks to dark scenes; treat HDR numbers as indicative.
Banding (skies, fades)	A smooth ramp becomes flat plateaus, which barely moves pixel statistics.	**PSNR, SSIM, VMAF v0**	Run CAMBI alongside VMAF; gate on banding separately.
Chroma / color	Luma-only computation ignores the color channels entirely.	**luma PSNR, SSIM, VMAF v0**	Measure chroma (U/V) or a chroma-aware model; check saturated regions.
Screen content, text, gaming	Trained on natural video; flat regions, hard text edges and patterns differ.	**PSNR, SSIM, VMAF**	Spot-check legibility; run a subjective test on the real content.
Animation / flat synthetic	Domain mismatch with photographic training; flat regions also band.	**PSNR, SSIM, VMAF**	Add a small subjective check; watch flat regions for banding.
Enhancement (sharpening)	The metric rewards looking different, not fidelity, so it is gameable.	**VMAF (standard)**	Check the gain against VMAF-NEG; if it vanishes, it was enhancement.

Before you trust a score

Read a panel of metrics, not one · pool for the worst case · measure on your own content · keep every comparison apples-to-apples (same resolution, frames, reference, model, pooling) · confirm the hard frames by eye. A metric is a model with a domain; outside it, the number lies confidently.

Companion to: 'Where Objective Metrics Lie: Content, Motion, and Edge Cases'
www.forasoft.com/learn/video-quality/articles-vqm/where-objective-metrics-lie



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This guide lists the content where PSNR, SSIM and VMAF mislead and what to measure instead. We wrote a seven-volume handbook on the video stack: start with Volume 1 for quality metrics, film grain and HDR encoding, then Volume 3 for QoE on real players and Volume 6 for AI models.

WHAT YOU WILL FIND INSIDE

- PSNR, SSIM and VMAF: what each one models
- HDR encoding and why dark scenes fool metrics
- Film grain synthesis and banding in AV1 and HEVC
- QoE monitoring on real players

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Not sure your VMAF numbers match what viewers see?

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