



# Photosensitivity

## **WHY IS PHOTSENSITIVITY IMPORTANT TO GEM?**

GEM aims to deliver an exceptional viewing experience for all users across devices and environments. Being aware of the potential adverse effects of flashing or strobing patterns is essential to safeguarding audience health.

## **WHAT IS PHOTSENSITIVITY?**

Photosensitivity refers to negative physical reactions triggered or worsened by flashing, strobing, or rapidly changing brightness or color patterns. Symptoms may include headaches, eyestrain, nausea, or seizures. Photosensitive Epilepsy (PSE) Tests assess whether content may provoke seizures.

More details, including environmental mitigation strategies, are available via the Epilepsy Foundation.

## **IS PSE TESTING REQUIRED FOR MY CONTENT?**

Refer to GEM's latest [Branded Delivery Specification] for requirements. GEM tests content using the [ITU-R BT.1702-3 standard]. Currently, only branded animated titles require mandatory testing. For live action, testing may be requested if content includes extensive visual effects, intense action, strobing scenes, or targets at-risk audiences (e.g. younger viewers).

If content fails PSE testing and cannot be corrected, an on-screen advisory will appear at playback start:

"Some scenes have a strobing effect that may affect photosensitive viewers."

GEM encourages productions to proactively minimize such risks.

## **WHICH CONTENT ELEMENTS CAN TRIGGER PHOTSENSITIVITY?**

- Rapid brightness flashes (>3 times per second) over  $\geq 25\%$  of the frame ("luminance flash error").
- Fast transitions (>3 times per second) to/from intense red hues ("red flash error").

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- Prolonged flashing/strobing (>5 seconds), even if within thresholds (“extended flash error”).
- High-contrast, tight spatial patterns, especially when moving (“spatial pattern error”).

## **HOW ARE PHOTSENSITIVITY RISKS DETECTED?**

Software tools analyze video for flashing and pattern risks—available standalone or as part of commercial QC suites. Do not use online upload tools due to content security concerns; approved tools are listed in the appendix.

## **EXAMPLES OF POTENTIALLY HARMFUL VISUALS INCLUDE:**

- Flickering lights (broken streetlights, neon).
- Display emissions from TVs or devices.
- Explosions, camera flashes, muzzle flashes, lightning.
- Concert lighting, reflections with motion.
- High-speed car chases with intermittent light.
- Flashy graphics and rapid title animations.
- Quick camera moves and rapid edits between bright/dark.
- Dense or quick-moving patterns like stripes or polka dots.
- Intermittent sunlight through moving leaves.
- Flashing red sirens or alarms.

## **HOW TO IDENTIFY AND PREVENT HARMFUL CONTENT**

Early flagging during script, production, or post enables manageable mitigations such as adjusting lighting, camera exposure, or editing patterns. Waiting until finishing limits options and may force creative compromises. Key pre- and post-production questions include:

- Are there club or red carpet scenes?
- Fast and tight graphics or title sequences?
- Environmental flashes (thunderstorms, sirens)?
- Flickering lights or camera-triggered flashes?
- Are terms like “strobing” or “flashing” scripted?

If yes, use caution with flashing/strobing content across all departments and consult your GEM representative.

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## HOW TO REMEDY PSE TEST FAILURES

When remediation is possible, productions can:

- Reduce frequency or duration of flashes in editing.
- Isolate flashing elements using mattes or VFX power windows.
- Decrease onscreen area of flashing effects in animation/VFX.
- Lower red saturation and contrast in flashing colors.
- Slow down or simplify graphic animations.
- Modify transitions to reduce rapid motion effects.

## FREQUENTLY ASKED QUESTIONS

### WHEN TO TEST?

Begin PSE testing early in editorial with sequences of at least 30 seconds plus handles, ideally with near-final VFX and animation. Changes after testing may impact results, so testing at this stage helps proactively address issues. Testing shorter clips risks false positives.

### WHAT TO SUBMIT FOR TESTING?

Submit your final IMF package or high-quality derivative (HDR ProRes XQ, SDR ProRes HQ, DNxHR 444) for testing before asset delivery. Coordinate testing through production.

### WHO CAN TEST?

You may purchase approved testing tools or partner with your Picture Finishing facility, which often offers testing services. Having direct access to tools helps iterate quickly. GEM may perform final testing upon prior approval.

### DO I NEED TO TEST HDR AND SDR?

GEM requires testing of either the HDR master or the SDR trim for results submission. Verify your testing tools support HDR formats.



## APPENDIX

### APPROVED PSE TESTING TOOLS

Be sure your tools are up to date and support ITU 1702 HDR testing. Avoid tools requiring uploads to third-party clouds for security reasons.

Company	Products	HDR Support	Notes
Cambridge Research	FPA Desktop, FPA Server, HardingFPA FX	Yes / No	May require licenses or add-ons
Telestream	Aurora, Vidchecker	Yes	Some feature limitations based on version
Interra	Baton	Yes	
Venera	Pulsar Professional, Standard, Basic	Yes / No	Pulsar PPU
LWKS	QScan	Yes	May require additional Harding FPA license

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This guidance helps ensure safe enjoyment of content for photosensitive audiences while supporting creative intent across GEM productions.