This FAQ answers questions that Discovery's suppliers, production, and logistics groups may have about Discovery's standards and procedures for Photosensitive Epilepsy (PSE) trigger testing.

What is Photosensitive Epilepsy (PSE)?

Photosensitive epilepsy is a condition that causes people to have seizures in response to some types of visual patterns and images. The condition mostly affects children, and about one child in every 4000 suffers from it. Television images can trigger those seizures, and major incidents stemming from broadcasts in Japan and the UK sparked PSE regulations in those countries.

What do PSE regulations require?

Both the UK and Japan require broadcasters to guard against triggering seizures in photosensitive epileptics. The UK's regulations are enforced by OFCOM, the UK's version of the American FCC. OFCOM's regulations govern all television signals that come into or originate from the UK, so their rules apply to all of Discovery's EMEA networks. OFCOM Rule 2.12 prohibits showing flashing images and harmful patterns on television. OFCOM requires broadcasters to run automated tests that look for PSE triggers within television materials. Programs that pass these tests get a certificate of compliance. Broadcasters must provide these certificates to defend against any complaints filed with OFCOM. Failure to provide certificates can result in fines and legal action. Because of this most UK broadcasters (and other broadcasters doing business in the UK) make PSE testing part of their content acceptance process. The BBC, Sky, Disney, and many other UK networks require content suppliers to provide PSE test certificates in advance for every program they deliver.

What are Discovery's standards on PSE testing?

The Discovery Global Tech Specs Version Five require that programs with frame rates of 23.98, 25, or 50 frames per second pass a valid PSE trigger test. Unlike the BBC and the other UK networks, Discovery does not require suppliers to submit their own PSE certificates. Instead, Discovery integrated PSE testing into the Producer's Portal upload process for programs with those frame rates. Suppliers can upload their own certificates or can choose to rely on Discovery's testing. Discovery does not hold suppliers accountable for programs delivered in 29.97 or 59.94 frames per second that fail PSE tests after conversion to one of the other frame rates. The Tech Specs Working Group didn't want to put a policy in place where it was impossible for suppliers to anticipate the test results.

Why did Discovery add PSE testing to its standards?

UK regulations have required Discovery to perform PSE testing since 2005. However, up until 2017 Discovery performed this testing as part of the international reversioning process. Discovery producers often had to fix programs shortly before their international airdates without

any possible replacement shots. The Tech Specs Working Group (composed of over 70 people from Discovery's production, logistics, and engineering groups around the world) studied this issue and concluded that Discovery should add PSE testing to the Global Tech Specs. The PSE testing requirement rolled out as one of the major changes in Tech Specs Version 5, released in September of 2017. It was highlighted as one of the top changes in multiple messages that went out to Discovery's suppliers.

What does an automated PSE test look for?

PSE tests look for two things in a program: flashing images and harmful regular patterns. The flashing images portion of the test looks for video that meets these criteria:

- More than three flashes within a one-second period
  - The flashes can be true flashes or rapidly changing image sequences
  - The flashes have more than a 10% (20 cd/m^2) difference in luminance between the flash and its surrounding frames
  - The combined area of the flashes takes up more than a quarter of the television screen
  - The flashes transition from some other color to a saturated red

Automated PSE tests look for harmful regular patterns in addition to flashing images. The harmful pattern detector looks for video that meets these criteria:

- Patterns of stripes or lines that alternate between light and dark where the difference in luminance between light and dark is 10% (20 cd/m^2) or greater
  - The pattern must have five or more pairs of light/dark lines
  - The pattern is static and takes up more than 40% of the screen
  - The pattern moves in multiple directions, flashes, or oscillates and takes up more than 25% of the screen

More than half a dozen companies make automated PSE tests. Dr. Graham Harding conducted much of the early work in automated testing for PSE triggers, and some those tests are consequently called "Harding Tests." Cambridge Research Systems, who worked directly with Harding, were the original developers of the automated test. In recent years many other companies have built their own tests. Discovery uses PSE tests from Telestream and Tektronix in the Producer's Portal upload testing workflow.

Why am I hearing more about PSE testing lately?

In May of 2018 the TE group began enforcing the Global Tech Specs photosensitive epilepsy testing requirement. The latest release of the Global Tech Specs (V5) included a requirement that all programs delivered with frame rates of 23.98, 25, and 50 frames per second pass an automated PSE trigger test. While the Tech Specs' PSE requirement went into effect between September 2017 and December 2017, the TE group couldn't effectively enforce it without a change to their tools. That tool change occurred in May, 2018.

What is the PSE testing process?

When a supplier uploads a piece of media to the Producer's Portal with a frame rate of 23.98, 25, or 50 frames per second that media automatically gets a PSE test from Telestream Vidchecker. If the media fails the PSE test for either harmful patterns or flashing images the automated workflow system tests the media again using Tektronix Aurora. Different PSE tests can sometimes have contradictory results when the potential triggers are borderline. If the media passes the Tektronix test then the media gets covered under that "passing" certificate. If the media fails both tests then the results of the test get automatically loaded into the TE report for that piece of media, and the media falls TE. The TE report calls out the areas of the media that have the flashing images or harmful patterns.

What happens if my show fails the PSE test?

When a program fails both PSE tests it can't progress through the automated supply chain. The acceptance process comes to a halt while Media Logistics works with the network and the supplier to resolve the issue.

How do I fix PSE issues in my program?

Fixing PSE issues can be relatively simple, and there are many techniques that suppliers and editors can use to make programs compliant.

- Slowing down shots with flashing so that there are not more than three flashes per second
- Reducing the luminance differential between light and dark in flashing areas
- De-saturating red flashes or quick cuts to red screens
- Removing moving patterns or limiting the pattern movement to a single direction
- Reducing the luminance differential in patterns
- Making flashing images take up less of the screen
- As a last resort, replacing shots

Why can't we make exceptions for the US premiere of programs?

Discovery's business is increasingly built around an efficient and automated global supply chain. While the US market doesn't currently have regulations around PSE, it's nearly certain that US-delivered content will make its way to a market that does. Social media platforms are also studying PSE testing and protections as more and more media consumption migrates to those platforms. The "good enough for US broadcast" waiver simply moves the problem downstream in the supply chain, often to a group far more separated from the original material by time and geography. While Discovery has not adopted the UK practice of requiring suppliers to conduct and provide their own PSE tests, we have moved the testing process to the front of the supply chain. That's the point where PSE failures can be addressed most easily and effectively.