

March 10, 2022

BY MAIL and EMAIL

Pete Buttigieg, Secretary
United States Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590
DOTExecSec@dot.gov

Re: Point Source versus Surface Source

Dear Pete Buttigieg,

There are now two types of electromagnetic light in this world: point sources and surface sources. To our knowledge, not a single staff member or person in leadership role at the US Department of Transportation or its agencies has been trained in the differences between uniform point sources of light and non-uniform surface sources of light. The result has been a failure by the US Department of Transportation to regulate and protect Americans from the toxicity, dangers, and discrimination of surface source light.

Point Source: Examples of point sources are the sun, a candle, incandescent light bulb, tungsten/halogen headlight, compact fluorescent, and High-Pressure Sodium. Point sources emit light uniformly in all directions. The brightness of a point source is measured with luminous intensity in candela. "Point" refers to an infinitely small mathematical point.

The US government has created regulations and standards for point sources of light. These regulations include the National Highway Transportation Safety Administration Federal Motor Vehicle Safety Standard Section 108, Federal Aviation Administration regulations, and Federal Highway Administration Manual of Uniform Traffic Control Devices.

Surface Source: Examples of surface sources are lasers and Light Emitting Diodes. Surface sources emit light only in the forward direction from a flat surface, creating a non-uniform spatial shape called a Lambertian. The brightness of a surface source is measured with luminance in nits (candela per square meter). This non-uniform energy is toxic, dangerous, and discriminatory for humans and all cellular life forms. "Surface" refers to a flat, often rectangular, surface which can never be approximated as an infinitely small mathematical point.

The US government has created regulations for lasers to protect our eyes, but to our knowledge, the government has failed to create regulations or standards for similarly dangerous LEDs. This lack of regulation has led to unrestricted use of exceedingly intense and dangerous LED light in vehicle

headlights, airplanes, radio towers, and flashing lights on vehicles and signs. An example of an LED headlight is shown in Figure 1



Figure 1 - LED Headlight

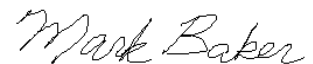
The LED display industry is fully aware of the differences between point source and surface source. LED televisions, for example, are sold by a brightness measurement such as 300 nits. Similarly, and outdoor LED advertising screen can be rated at 5,000 nits. On the other hand, the US DOT is invalidly using candela to measure LED brightness or relying on inapplicable standards that use candela. The correct metric for measuring surface source LED brightness is peak luminance, measured in nits (candela per square meter) and measured with high precision in a laboratory setting.

It is critical that the US DOT train and educate all leadership and staff at the US DOT, OST, OIG, NHTSA, NTSB, FAA, FHWA, FMCSA, FRA, FTA, MARAD, PHMSA and GLS on the differences between uniform light from a point source, and non-uniform light from a surface source. All government regulations for vehicle headlights and taillights, airplane lights, radio tower lights, flashing lights on vehicles, lights on maritime vessels and trains, lights on signs, floodlights and streetlights must be

written to contain two sections: the existing section for point source lights, and a new section for surface source LED lights. The surface source LED light section will include safety maximums for peak luminance, safety maximums for absolute spectral power distribution, and safety maximums for flicker.

Until staff and leadership are trained on the difference between point source and surface source, and until the standards and regulations are updated, Americans will continue to suffer eye damage, neurological trauma, epileptic seizures, migraines, panic attacks, anxiety, anger, rage, loss of vision, loss of motor skills, and discrimination due to the non-uniform energy of surface source LED light.

Sincerely,



Mark Baker

President

Soft Lights Foundation

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cc: US House Oversight Committee, US Access Board, FAA, NHTSA, NTSB, FHWA, FMCSA, NHTSA Whistleblower

