Blue Light Management & Certification for World Leaders in Consumer Electronics

China International Import Expo 2019

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JUSTIN BARRETT

Eyesafe CEO

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BLUE LIGHT SUMMIT 2019

First Annual Forum of Electronics Manufacturers and Eye Care Professionals

Attendees included:

- 40+ device manufacturers representing the majority of consumer electronics produced
- From 14 countries
- Renowned leaders in Optometry and Ophthalmology

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Eyesafe Vision Health Advisory Board Includes World Leaders in Optometry and Ophthalmology

RALPH CHU, MD

H. BURKHARD DICK, MD, PHD

CHAD DOCKTER, OD

DAVID FRIESS, OD

GARY HEITING, OD

MITCHELL JACKSON, MD

PAUL KARPECKI, OD

RICHARD LINDSTROM, MD

SHERI ROWEN, MD

VANCE THOMPSON, MD

WILLIAM TRATTLER, MD

ROBERT WEINSTOCK, MD

VISION HEALTH ADVISORY BOARD

The distinguished ophthalmologists and optometrists who comprise the Eyesafe® Vision Health Advisory Board help guide research regarding the effects of blue light on the eyes and visual system and the development of Eyesafe® standards to protect public health.

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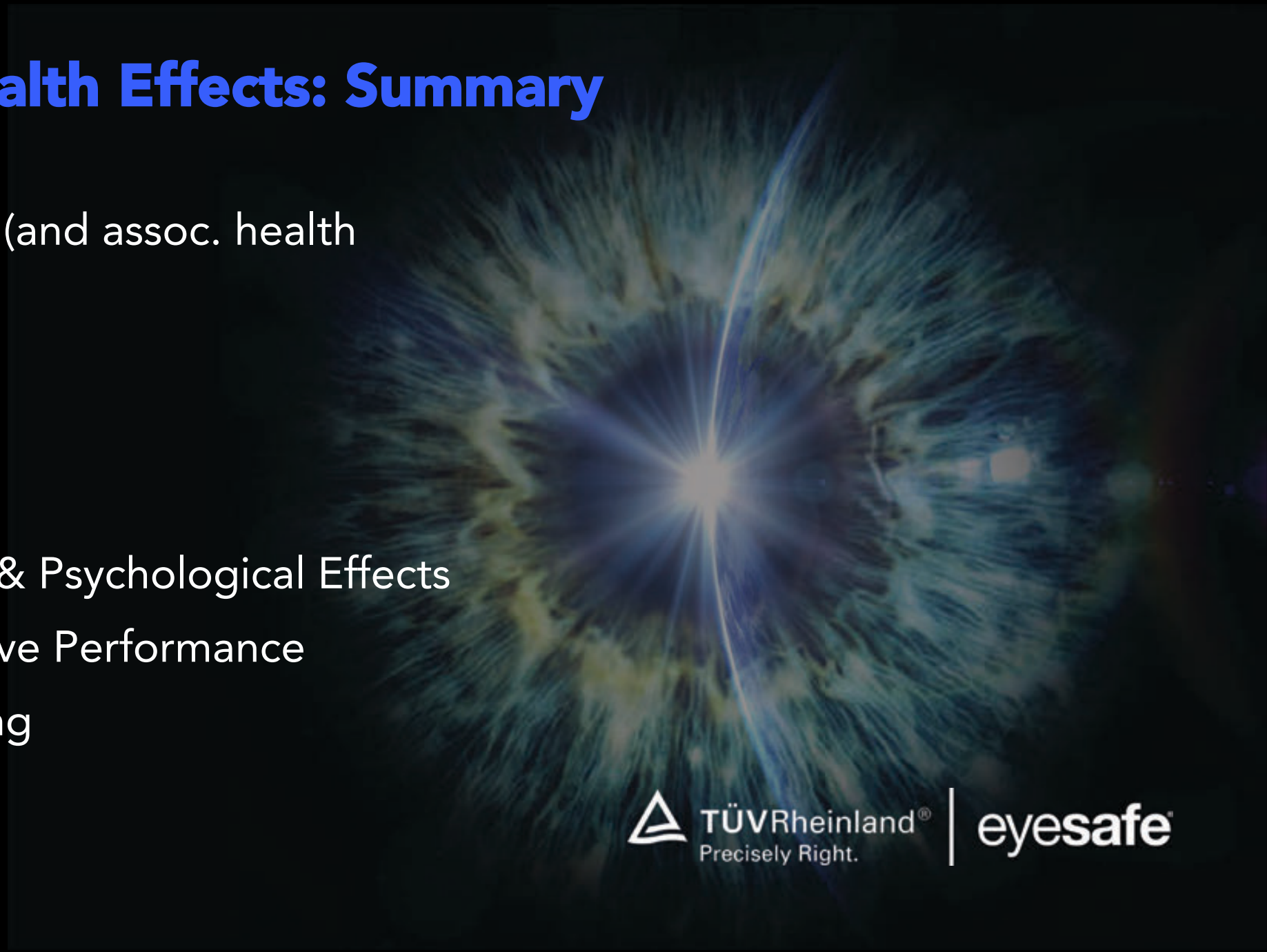
Source: Nielsen, U.S. average time per day on screens and media in 2018

Blue Light Health Effects: Summary

- Sleep Disruption (and assoc. health problems)
- Digital Eye Strain
- Dry Eyes
- Retinal Damage
- Mood Disorders & Psychological Effects
- Reduced Cognitive Performance
- Accelerated Aging



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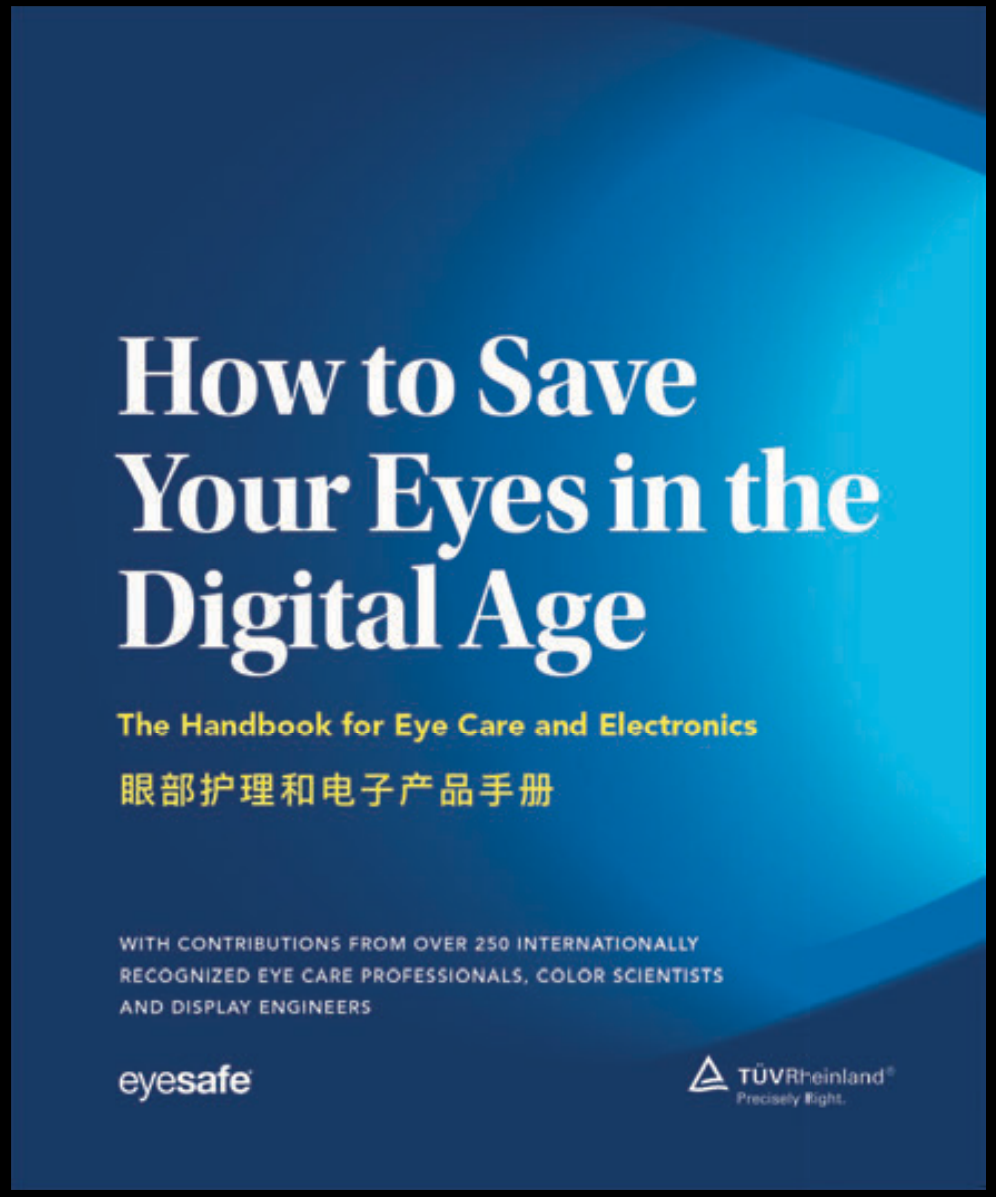

The Essential Blue Light Guide for Electronics Manufacturers and Eye Care Professionals

TO GET YOUR FREE COPY:

eyesafe.com/handbook

(English and Chinese available)

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Screen Time and Blue Light Research to Guide Standards

BLUE LIGHT SUMMIT 2019

- Research partnership on the health effects of blue light on the eye, visual system and overall health and wellness.
- Purpose of research is to guide development of Eyesafe industry standards
- Areas of study include dry eye and worker productivity impacts, among other topics

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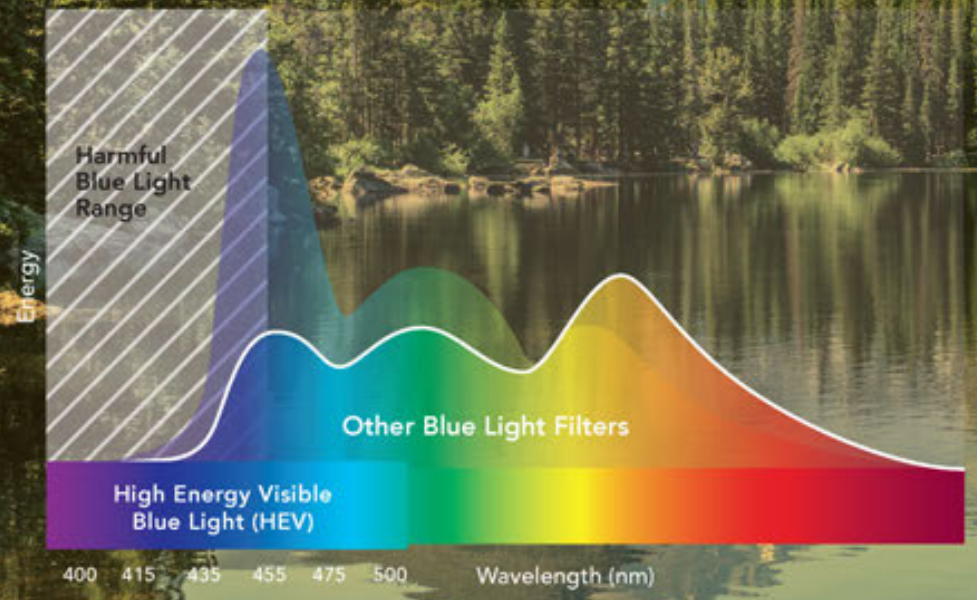
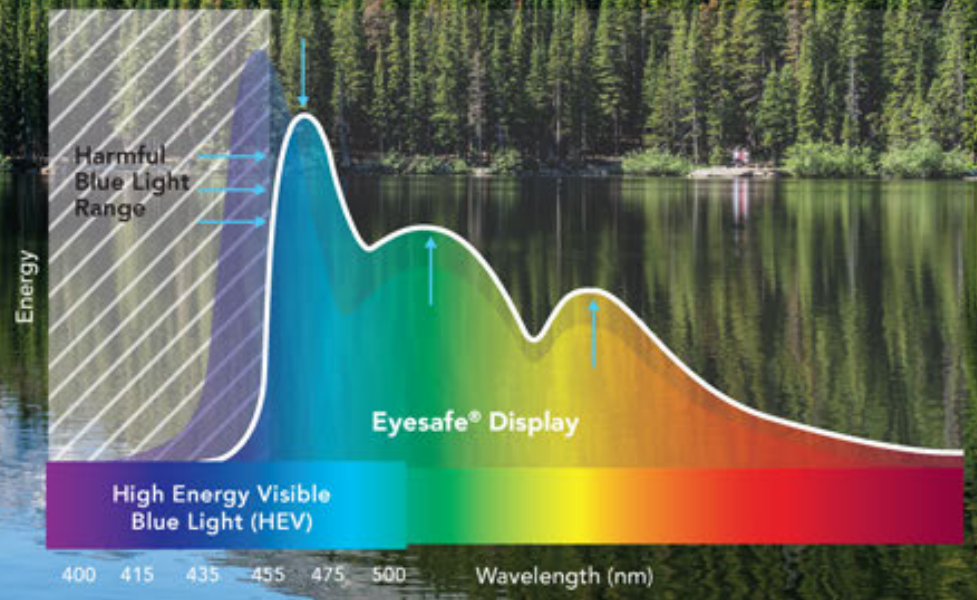
SALUS UNIVERSITY

OTHER BLUE LIGHT FILTERS



Others adjust the blue light by shifting color to warmer hues which impacts color

EYESAFE® DISPLAY



Eyesafe® Display redesigns light emission and the color filter for beautiful color with less blue light

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DISPLAY

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SCREEN PROTECTION

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JEFF RAGETH

Eyesafe Senior Board Advisor

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California Blue Light Resolution SCR73

- Unanimously passed by California Senate and Assembly designating October 10th Blue Light Awareness Day each year
- Resolution was introduced by Senator Richard Pan (a pediatrician), passed unanimously in both the Senate and Assembly, and filed with the CA Secretary of State on September 19, 2019.
- The purpose of the resolution is to encourage all Californians (and their children) to **"consider taking protective safety measures in reducing eye exposure to high-energy visible blue light."**

California Blue Light Resolution SCR73

WHEREAS, There are over 80 million electronic devices with digital screens in the State of California; and
WHEREAS, Screen time viewing with electronic devices exceeds over nine hours per day; and
WHEREAS, The increased usage of, and access to, digital devices by young children and adolescents is an acute area of concern, as ophthalmologists, optometrists, and medical researchers continue to learn more about the short-term effects of increasing and cumulative exposure to artificial blue light on the developing human eye and mental health at a young age, along with long-term potential cumulative effects on adult eye health and mental development; and
WHEREAS, The scientific community and recent studies have identified growing concerns over potential long-term eye and health impacts for all age groups from digital screen usage and cumulative blue light exposure emitted from digital devices; and
WHEREAS, Blue light has been reported to cause visual discomfort in 65 percent of Americans; and
WHEREAS, Blue light has been associated with possible harmful effects on retinal cell physiology linked to the high-energy, short wavelength in the narrow range of 415–455 nanometers; and
WHEREAS, Cumulative blue light exposure from digital devices has been shown to disrupt sleep cycles by suppressing the natural release of melatonin and has also been linked to premature aging of the retina, which could accelerate potential long-term vision problems such as age-related macular degeneration, decreased alertness, and memory and emotional regulation impacts; and
WHEREAS, Screen time can take a toll on vision health and comfort, leading to symptoms of digital eye strain and dry, irritated eyes; and
WHEREAS, Given the growing body of research around the breadth and scope of potential eye and systemic health impacts related to blue light exposure, the State of California encourages citizens, particularly children, to consider taking protective safety measures in reducing eye exposure to high-energy visible blue light; now, therefore, be it
Resolved by the Senate of the State of California, the Assembly thereof concurring, That the Legislature hereby designates October 10 of each year as Blue Light Awareness Day in California; and be it further
Resolved, That the Secretary of the Senate transmit copies of this resolution to the author for appropriate distribution.

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STANLEY LIU

TÜV Rheinland Group

Technical Competence Center Director

Milestone to reduce blue light

From 1st industrial try to TÜV Low Blue Light Certification…

- **New solution for anti-blue light film (10 Valid Certificates)**

1st try in Android Mobile Phones APP

- Year 2013
- Declared blue light reduce by linearly reducing luminance in %
- Significant change in CCT

TÜV LBL Certification Method 1

- Year 2014
- Ratio Blue light to luminance level less than 20%
- Blue to Green Ratio less than 2

TÜV LBL Certification Method 2

- Year 2016
- The ratio of light in the range from 415nm - 455nm compared to 400nm – 500nm shall be less than 50%.
- CCT shall be 5500-7000K

TÜV Retina Protection Factor

- Year 2018
- Luminance reduction ratio
- Hazardous blue light reduction ratio
- Change of CCT

- **994 Valid Certificates**
- **Industrial referred solution**
- **Consumer purchase guide for health**

TÜV Certification for Accessory Film—Retina Protection Factor

Applicable to accessory optical film and display product module that has the function to reduce hazardous blue light.

RPF Classification Rules：

Classification Requirement	RPF Level	Luminance reduction	Change of CCT
RPF15	15	≤20%	≤250K
RPF20	20	≤20%	≤350K
RPF30	30	≤20%	≤500K

TÜV Rheinland is Now Certifying Eyesafe Display Requirements

BLUE LIGHT SUMMIT 2019

- Announcing new industry mark representing health and safety for manufacturers
- Representing efficacy in protection from blue light and color quality
- Identifies achievements of Eyesafe Standard health requirements

Eyesafe Standard Validation Service

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TÜV AK Certificate + test report based on Eyesafe standard

EYESAFE CERTIFICATE	
TÜV CERTIFICATION MODEL • TÜV Test Mark certificate + Test report • Based on Eyesafe requirements • Sample: 1 • Document: Eyesafe document • Lead time: 2-3 weeks	

Eyesafe Certification by TÜV Rheinland

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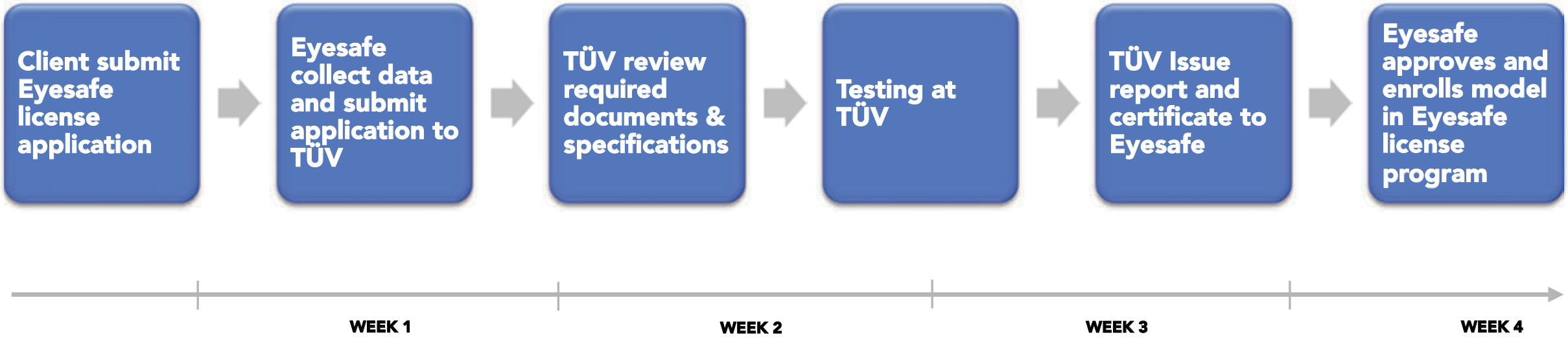
- TÜV will receive the panel and validate achievement of requirements to the Eyesafe Standard



NOTE: Requires commercial agreement with Eyesafe and participation in the Eyesafe Program

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NEXT STEPS

1. Submit Blue Light Health Issues & Research Questions to Vision Health Advisory Board
2. Get the Handbook in English or Chinese from Eyesafe and TÜV Rheinland
3. Submit Questions on Standards, Certification and Solutions
4. Meet with Eyesafe and TÜV Rheinland at CIIE
5. Review materials at Bluelightsummit.com

- Contact TUV Rheinland: **Stanley.Liu@tuv.com**
- Contact Eyesafe: **Justin@eyesafe.com**