On November 6, 2018, the leading international provider of third-party testing, inspection and certification services, TÜV Rheinland Group (hereinafter TÜV Rheinland), attended the first China International Import Expo (CIIE). At Booth 1A1-007 in the Service Trade Zone, TÜV Rheinland and Healthe jointly released the Chinese and English versions of the "White Paper of Blue Light Management for the Display Industry and Health Impacts" (hereinafter referred to as the "White Paper"). This refers to the blue light filtration technology for electronic product display screens which TÜV Rheinland and Healthe gave priority to after they launched a new standard for Blue Light Filtration Certification of Digital Device Accessory Screen Protection this September. The paper provides manufacturers with perspectives on hazardous high-energy blue light management of electronic devices as well as a health guide for users.

Jay Yang, Vice President of TÜV Rheinland Greater China Electrical, and Jeffrey Rageth, Senior Advisor of Healthe, unveiled the main contents of the White Paper. Yang said: "Today, people spend more time on electronic devices and electronic displays, which has resulted in widespread attention being paid to the long-term effects of blue light on the eyes and human health. TÜV Rheinland and Healthe
have jointly released this White Paper based on research and survey results, seeking to provide instruction and guidance for the electronic display industry. It aims to help manufacturers improve the user experience while guiding users to correctly understand the blue light hazards.

The White Paper contains five chapters: Human Vision, Lighting and Display Technology Development; Health and Safety Concerns; Display Industry Blue Light Solutions and Electronic Industry Display Options; Low Blue Light Standard Development Progress; and Health Guide for Users. In the first two parts, TÜV Rheinland briefly describes the development of display technology and provides comparisons between the human vision system and light perception, artificial lighting, and natural lighting, pointing out the harmful effects of blue light and its potential damage to human health. The third part introduces three blue light solutions from the display industry pertaining to hardware, software, and protective optical films. The fourth part analyzes the problems existing with these current blue light solutions, and highlights TÜV Rheinland's existing testing and certification for low blue light standards as well as the outlook for the next generation of standards. In the fifth section, safety and health recommendations are made in regard to eye strain.

In 2014, TÜV Rheinland took the lead in introducing low-blue-light testing and certification requirements into the display industry, and has developed two methods to continuously guide the industry in improving management for harmful blue light. In September 2018, TÜV Rheinland and Healthe collaborated to develop the world's first blue light filtration standard, the Retina Protection Factor. This standard applies to optical films, anti-blue-light glasses, and other display products that reduce harmful blue light. It summarizes the methods for scientific testing and evaluation of anti-blue-light, and guides consumers in choosing high-quality anti-blue-light film or anti-blue-light glasses.
There are thousands of anti-blue-light film or anti-blue-light glasses available for various display products on the market, but most of the anti-blue-light film is not as good as claimed in publicity on existing LED-backlit displays and OLED displays. Some films with strong anti-blue-light effect negatively affect normal use of a display through severe brightness degradation and color shift problems, though harmful blue light is reduced. To this end, Healthe has developed new Eyesafe technology and cooperated with world brands including ZAGG to bring high-quality blue light filtration to the display industry. At the CIIE booth, TÜV Rheinland presented gifts made with this blue filter membrane to let visitors experience the new membrane technology.

**Support of product development for teenagers’ eye care**

During the CIIE, TÜV Rheinland issued a low blue light certificate for the Interactive Touch Display of Hisense Commercial Display Company (hereinafter referred to as Hisense). TÜV Rheinland’s Jay Yang and Hill Lin, General Manager of the Planning and R&D Department at Hisense Commercial Display Company, attended this ceremony.

Yang said: "As a leader in the electronic display industry, Hisense has many achievements in the field of protecting the eye from blue light. In the future, TÜV Rheinland will persist in supporting Hisense to constantly explore and develop higher quality anti-blue-light products, and protect users’ health in the field of anti-blue-light with its advanced technology and rich experience in testing and certification."

Hisense’s self-developed Interactive Touch Display, featuring interactive all-in-one touch, is the first in the education industry to receive low-blue-light standard
certification from TÜV Rheinland. Its rating is RG0 (no hazard) in photobiological safety, reaching the low-blue-light level of 2PfG 2383-06.16. Reducing the blue light and unifying the color temperature adjustment in the eye protection mode, it can effectively reduce damage to the eyes caused by viewing a display over a long period. This product is widely used in the multimedia teaching field (especially in the K12 system, from kindergarten through high school), protecting the health of teenagers’ eyes while ensuring the optimal effect of multimedia teaching.

As the world's leading provider of technical services, TÜV Rheinland is committed to ensuring human safety and health in all aspects of life. Since 2014, TÜV Rheinland has awarded more than 750 low blue light certificates for various display products, ranging from displays, tablets, smart phones, and notebooks to all-in-ones. At present, TÜV Rheinland's low blue light standard is widely recognized as the basic standard for displaying product health and performance certification by most mainstream display brands, including Dell, Hewlett-Packard, Lenovo, BenQ, Samsung, etc. TÜV Rheinland also plans to establish a global low-blue-light committee to develop blue-light management standards to boost the development and production of low-blue-light eye-protection products, and to protect the eye health of users, especially teenagers.

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TÜV Rheinland is a global leader in independent inspection services, founded nearly 150 years ago. The group maintains a worldwide presence of more than 20,000
people; annual turnover is EUR 2 billion. The independent experts stand for quality and safety for people, technology and the environment in nearly all aspects of life. TÜV Rheinland inspects technical equipment, products and services, oversees projects, and helps to shape processes and information security for companies. Its experts train people in a wide range of careers and industries. To this end, TÜV Rheinland employs a global network of approved labs, testing and education centers. Since 2006, TÜV Rheinland has been a member of the United Nations Global Compact to promote sustainability and combat corruption.

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