UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TECHNICAL CONSUMER PRODUCTS, INC.,
NICOR INC., AND AMAX LIGHTING,
Petitioner,

v.

LIGHTING SCIENCE GROUP CORP.
Patent Owner

Case No.: IPR2017-01280
Patent No.: 8,967,844

Case No.: IPR2017-01285
Patent No.: 8,672,518

Case No.: IPR2017-01287
Patent No.: 8,201,968

DECLARATION OF ERIC BRETSCHNEIDER, PH.D.

Exhibit	Description
A	CV - Dr. Eric Bretschneider
B	IES Lighting Handbook Application Volume 1981, John E. Kaufman, Howard Haynes, Eds.
C	Robert E. Simmons, "Simplified formula for Estimating Natural Convection Heat Transfer Coefficient on a Flat Plate," Electronics Cooling vol. 7, No. 3, p. 12-13, August 2001
D	HLMT-PL00 Specification
E	IES Lighting Handbook Reference Volume 1984, John E. Kaufman, Jack F. Christensen, Eds.

I. INTRODUCTION

I, Eric Bretschneider, declare as follows:

1. I have been retained as an expert by Lighting Science Group Corp. ("LSG") in connection with the above-captioned lawsuit to provide my analyses and conclusions on certain technical aspects of this dispute.

2. I have personal knowledge of the matters set forth in this declaration and, if called upon to do so, would testify to such matters in court. My analyses and conclusions are based on my review of U.S. Patent Nos. 8,201,968 (the "'968 Patent"), 8,672,518 (the "'518 Patent"), and 8,967,844 (the "'844 Patent") (collectively, the "Patents at Issue"), their prosecution histories, the materials cited below, the Petitions filed by Petitioners in these IPR proceedings, any Exhibits to those Petitions, my professional experience, and my expertise in the field of light-emitting diode technology.

3. If asked to do so, I may testify regarding the contents of this declaration, and I reserve the right to use and rely on certain demonstratives to do so. I also reserve the right to amend and/or supplement this declaration should additional information or developments that may affect my opinions become available.

4. I am being compensated at my customary rate of $400 per hour for my work in connection with this case. My compensation is not dependent on the contents of this declaration, the substance of any further analyses, conclusions or testimony that I may give, or the outcome of this case.

II. PROFESSIONAL BACKGROUND

5. My qualifications for forming the conclusions set forth in this declaration are summarized here and explained in more detail in my curriculum vitae, which is attached as Exhibit A.

6. I have over 25 years of experience with lighting and LEDs, including a comprehensive background on a full range of LED production technologies, including Metal-Organic Chemical Vapor Deposition ("MOCVD") hardware/process, fabrication, LED chip and package testing and reliability, optical design, thermal management, color conversion, and SSL fixture/lamp design, integration, and reliability. Throughout the course of my career I have designed and transferred into manufacturing over 150 different LED-based lighting products.

7. I am currently the Chief Technology Officer at EB Designs & Technology. In that capacity, I am (among other things) responsible for the design of solid-state lighting technologies for clients ranging from startups to Fortune 100 companies.

8. I am also a member and current chair of the University of Florida Department of Chemical Engineering Advisory Board. I have been a Conference Chair for LED Measurement and Standards. I am also a member of a number of professional societies, including the International Society for Optics and Photonics (SPIE), Materials Research Society, and Illuminating Engineering Society (I am a member of the Science Advisory Panel as well as a member of numerous committees, most notably the IES Test Procedures Committee where I chair the Solid-State Lighting subcommittee).

9. Prior to my position at EB Designs & Technology, I served as the Director of Engineering at HeathCo, LLC. In that capacity, I was responsible for advanced technology/product development related to solid-state lighting, sensors, notifications, and control products.

10. Prior to my position as Director of Engineering at HeathCo, I was at the Elec-Tech International Co., Ltd., where I held the positions of Chief Engineer, ETi Lighting Research Institute and VP of Research and Development, ETi Solid State Lighting. In that capacity, my responsibilities included developing all technology and product roadmaps for markets in North

America, China, Europe, and Japan. I designed and developed LED based lighting products for all of these markets.

11. Between 2008 and 2011, I was at LSG, first as a product development manager, and my responsibilities included developing solid state lighting products, then as VP of Research, and my responsibilities included developing advanced LED models for product development and production control. In these roles I was involved in the design and manufacture of numerous LED-based lighting fixtures and products.

12. Between 2004 and 2008, I was at Toyoda Gosei North America, where was a sales manager, and my responsibilities included managing and developing LED die and package sales accounts form the eastern region of North America. I was also tasked with providing technical support for the entire western hemisphere. The support I provided included design of LED packages and design of lighting fixtures and products that incorporated LED packages.

13. Between 2003 and 2004, I was at Beeman Lighting, where I was Director of Solid State Lighting Engineering, and my responsibilities included leading development of solid state lighting systems and materials.

14. Between 1998 and 2003, I was at Uniroyal Optoelectronics where I held a number of positions including Team Leader for the Epitaxial Growth and Materials Characterization areas, Sr. Epi Scientist, Director of Intellectual Property, University Relations and Government Contracts. My responsibilities included MOCVD hardware modification, epitaxial process development as well as design, development and testing of new LED chip structures for both AlInGaP and GaN-based material systems. I was also responsible for providing technical support and assistance to customers on topics related to use of LED chips, design of LED packages and

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