UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Petitioner

v.

COREPHOTONICS LTD.,
Patent Owner

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Case IPR2018-01140
Patent 9,402,032 B2

Case IPR2018-01146
Patent 9,568,712 B2

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**DECLARATION OF DUNCAN MOORE, Ph.D.
PURSUANT TO 37 C.F.R. §1.68**

Table of Contents

I.   Background

1.   I have been retained as a technical expert by Patent Owner Corephotonics Ltd. ("Patent Owner" or "Corephotonics") in this proceeding. Corephotonics has asked me to provide my expert opinions concerning certain technical aspects of imaging lenses and imaging lens design as they relate to the Petitioner Apple Inc.'s petitions for *inter partes* review of U.S. Patent 9,402,032 ("'032 patent") in Case No. IPR2018-01140 ("'032 IPR") and 9,568,712 ("'712 patent") in Case No, IPR2018-01146 ("'712 IPR") and the accompanying Declarations of Jose Sasian. The statements in this declaration summarize my opinions on these matters based on my over 40 years of experience in the design and development of imaging lenses for optical systems, my education, knowledge, skills, and my review and analysis of the materials referenced herein.

2.   I am being compensated for my work in this matter at the rate of $425 per hour. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the substance of my testimony.

II.   Summary of Opinions

3.   In the preparation of this declaration, I have reviewed:

- The '032 patent. '032 IPR, Ex. 1001;

- The '712 patent. '712 IPR, Ex. 1001;

- Prosecution history of the '032 patent. '032 IPR, Ex. 1002.

- Prosecution history of the '712 patent. '712 IPR, Ex. 1002.

- The Declaration of Jose Sasian submitted in the '032 IPR proceeding. '032 IPR, Ex. 1003;

- The Declaration of Jose Sasian submitted in the '712 IPR proceeding. '712 IPR, Ex. 1003;

- U.S. Patent No. 9,128,267 ("Ogino"). Ex. 1005;

- Warren J. Smith, Modern Lens Design (1992). Ex. 1006;

- U.S. Patent No. 7,918,398 to Li et al. ("Li"). Ex. 1007;

- U.S. Patent No. 7,777,972 to Chen et al. ("Chen"). Ex. 1008;

- U.S. Patent No. 8,233,224 ("Chen II"). Ex. 1009;

- Max Born et al., PRINCIPLES OF OPTICS, 6th Ed. (1980). Ex. 1010;

- Ex. 1012, identified as Jane Bareau et al., "The optics of miniature digital camera modules," SPIE Proceedings (2006) ("Bareau"). Ex. 1012;

- U.S. Patent No. 3,388,956 ("Eggert"). Ex. 1013;

- Japanese Patent Pub. No. JP2013106289 to Konno et al. Ex. 1014;

- Certified English translation of JP2013106289 ("Konno"). Ex. 1015;

- Bruce J. Walker, OPTICAL ENGINEERING FUNDAMENTALS (1995) ("Walker). Ex. 1016;

- Robert E. Fischer, Biljana Tadic-Galeb, Paul R. Yoder, OPTICAL SYSTEM DESIGN, 2nd Ed., 2008,.Ex. 2003;

- U.S. Patent No. 8,395,851 ("Tang"). Ex. 2004;

- U.S. Patent Publication No. 2011/0249346. Ex. 2005;

- U.S. Patent Publication No. 2011/0279910, Ex. 2006;

- U.S. Patent Publication No. 2011/0261470. Ex. 2007;

- Transcript of the February 15, 2019 Deposition of Dr. Jose Sasian in the '032 and '712 IPR proceedings. Ex. 2008.

4.   In forming the opinions set forth herein, I have considered:

    a. The documents listed above.

    b. My education, knowledge, skills, and experience in the design and development of imaging lenses for optical systems; and

    c. The level of skill of a person having ordinary skill in the art (POSITA) at the time of the effective filing dates of the '032 and '712 patents.

5.   It is my professional and expert opinion that Ogino does not anticipate claims 1 and 13 of the '032 patent, that it would not be obvious to combine Ogino and Chen without hindsight based on knowledge of the '032 patent's invention, disclosures and claims, and claims 14 and 15 of the '032 patent are not obvious over the combination of Ogino and Chen.

6.   It is my professional and expert opinion that Konno does not anticipate claims 1, 12-13, 15-16, and 19 of the '712 patent, that it would not have been obvious to modify Konno in view of Bareau without hindsight based on knowledge of the '712 patent's invention, disclosure and claims, and claims 6 and 14 are not obvious

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