UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FUJITSU NETWORK COMMUNICATIONS, INC.
Petitioner

v.

CAPELLA PHOTONICS, INC.
Patent Owner

Case IPR2015-00727
Patent RE42,678 E

DECLARATION OF DR. ALEXANDER V. SERGIENKO IN SUPPORT OF THE PATENT OWNER RESPONSE

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I, Dr. Alexander V. Sergienko, declare as follows:

I. INTRODUCTION

1. My name is Alexander V. Sergienko. Capella Photonics, Inc. has retained me as an expert witness. I have been asked to provide my expert opinion on the validity of claims 1-4, 9, 10, 13, 17, 19-23, 27, 29, 44-46, 53 and 61-65 of U.S. Patent No. RE42,678 to Wilde et al. ("'678 patent").

2. I am being compensated for my work at a rate of $400 per hour. My compensation is not contingent upon and in no way affects the substance of my testimony.

II. QUALIFICATIONS

3. I have a Ph.D. in Physics from Moscow State University in 1987 and a Master of Science Degree in Physics from Moscow State University in 1981.

4. I am currently a full professor at Boston University where I hold joint appointments in the Photonics Center, the Department of Electrical and Computer Engineering, and the Department of Physics. My expertise and research interests include optics, photonics, quantum physics, laser physics, nonlinear optics, and precise optical measurement in telecommunication and optical engineering.

5. I have experience and familiarity with the technical areas involved in this case. With over 30 years of research experience in the field of optics, I have

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studied and worked with optical components such as those at issue in this case. For example, during my tenure as a Director of the Quantum Communication and Measurement Laboratory at the Boston University Photonics Center, I developed quantum optical technologies for high-resolution evaluation of optical device parameters (*e.g.*, fibers, switches, and amplifiers). With this research I have evaluated the differences in wavelength selective switches produced by commercial vendors. I have thus studied switching technologies such as microelectromechanical ("MEMS") mirrors, liquid crystal ("LC"), combined MEMS+LC, and liquid crystal on silicon ("LCOS").

6. For more than a decade, my focus has been on high-resolution measurement of polarization mode dispersion ("PMD") in modern wavelength selective switches operating in 40 Gb/s and 100 Gb/c telecommunication reconfigurable optical add-drop multiplexer networks. I have worked to develop measurement technologies that are based on the use of quantum properties of light and enable measurement of PMD in discrete telecommunication devices, fibers, and switches with a superior resolution of < 1fs. For details on my research regarding high-resolution measurement of PMD, see, *e.g.*, Fraine, D.S. Simon, O. Minaeva, R. Egorov, and A.V. Sergienko, *Precise Evaluation of Polarization Mode Dispersion by Separation of Even- and Odd-Order Effects in Quantum*

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