**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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# DECLARATION OF Michael Lebby, Ph.D.

I, Michael Lebby, Ph.D., of San Francisco, CA, declare that:

## QUALIFICATIONS AND BACKGROUND INFORMATION

1. I am currently the CEO of Oculi LLC and the CEO & Director of Lightwave Logic. Oculi LLC is my consulting company where I undertake my expert witness work. Lightwave Logic is a technology company based in Denver, Colorado that is developing optical polymers for fiber optic communications. I have testified as an expert witness and consultant in patent and intellectual property litigation as well as *inter partes* reviews and re-examination proceedings. My curriculum vitae is provided (as SEL2002).

2. I also serve as a Technical Expert/Consultant for the Photonics Unit of the European Commission. My role is to advise the European Commission in matters that are photonics technology based that have included for example: displays, fiber optic communications, sensing, medical, and biological applications.

3. I received a Bachelor of Electrical Engineering degree in 1984, a Master of Business Administration in 1985, and a Doctorate degree in 1987, all from University of Bradford in the United Kingdom. My Ph.D. thesis involved the design and fabrication of both optoelectronic and electronic semiconductor devices, and their associated characterization. In 2004, I was awarded a Doctor of Engineering degree from University of Bradford for my technical contributions to the field, with citation to "Technical Contributions to Optoelectronics."

4. As described in my curriculum vitae (attached as SEL2002), I have over 30 years of experience in the field of optoelectronics, photonics, and electronic engineering including extensive experience in the research, development, fabrication, and manufacture of semiconductor devices, organic technology, and associated packaging for optical applications such as fiber optic links, general lighting, displays, sensing, etc.

5. My career started in the late 1970s at the Ministry of Defense in UK where I spent time at their R&D facility in Malvern (RSRE – Royal Signals and Radar Establishment). I worked on semiconductor device design, fabrication, and characterization. My research work in semiconductor device design then took me to AT&T Bell Laboratories in 1985 where I pursued research in novel device designs using III-V semiconductor material systems. The devices researched became the subject of my Ph.D. thesis that was granted in 1987.

6. I moved to Motorola in 1989 to further develop my semiconductor engineering and packaging skills and became a Research and Development Manager for Motorola in the photonics division until I left the company in 1998. During my time at Motorola, I worked on many electronic and photonic technology projects that included optical interconnects, displays, LEDs, LCDs, lasers, detectors, opto-couplers, integrated circuits (analog and digital), etc., as well as the packaging and reliability of mobile prototypes. At that time, I was particularly interested in miniature displays using a number of technologies such as LEDs, lasers, LCDs, and organic LEDs. I also worked with driver and receiver based integrated circuits. I collaborated with Motorola's mobile division on new and novel display prototypes, and patented a number of new concepts that include an electronic book, electronic wallet, spectacle/eyeglass and binocular based mobile phone designs. I also patented a new semiconductor laser that had potential to be manufactured in high volume. This device was called a VCSEL (vertical cavity surface emitting laser), and is now the basis for the highest volume semiconductor laser today with its recent implementation into Apple's new iPhone Face ID system. I also initiated Motorola's work in optical interconnect (Optobus™) and was involved in the IC chip designs that this parallel interconnect module utilized. During this period, I was one of Motorola's most prolific inventors, having over 150 issued utility patents as inventor or co-inventor. Many

of the photonics prototypes were subjected to reliability and stress testing that included humidity, temperature, optical, mechanical, and electrical evaluation.

7. Between 1998 and 1999, I worked as the Director of Technology/ BD (Fiber Optics) for Tyco Electronics (previously AMP). I joined Tyco Electronics as a member of the Global Optoelectronics Division's management team. There, I was responsible for growing the optoelectronics business through external interactions that include mergers, acquisitions, strategic alliances, and technical strategic planning. Much of that work was photonics based that included designing and characterizing photonics-based modules for customer qualification specifications.

8. In 1999, I left Tyco and started employment at Intel. At Intel, I was involved heavily in photonic technology and especially those that supported silicon photonic device platforms. As a culmination of this work, I was one of Intel's founders of its silicon photonics division in the year 2000, and worked to set up a design facility in South San Jose, California. The work looked at integrating silicon FET electronics with optoelectronics onto the same silicon semiconductor wafer. I was also part of Intel Capital's optical investment team, and participated on over 30 photonics investments into photonics that included displays and liquid crystal on silicon (LCOS). Technologies invested included detectors, lasers, LEDs, LCDs, and displays.

9. In 2001, I founded a fiber optics transceiver company called Ignis Optics that developed and manufactured high speed fiber optic transceivers. Included in the design were micro-controllers as well as standard integrated circuit technology that was designed to both transmit and receive fiber optic data signals.

10. In 2005, I took up employment with a trade association called OIDA based in Washington DC. As the head of this trade association, and with photonics manufacturers that included fiber optics, display, sensing, defense, aerospace, lighting, and automotive vendors as members, I was responsible in part for industry-based technology roadmaps and implemented common industry roadmap methodologies with common features such as "Red Brick Walls" and transferred them into optoelectronics roadmaps for the industry where displays were featured.

11. In 2010, I became the General Manager and CTO of Translucent, Inc., a high-tech start-up company which developed and manufactured silicon and rare earth oxide based epitaxial semiconductor wafers. One of the key drivers at Translucent was to develop a new and novel platform for the growth of GaN and InGaN onto silicon for low cost LED as well as power FET manufacturing. Translucent pioneered the deposition of single crystal rare earth oxides such as Erbium Oxide (ErOx), Gadolinium Oxide (GdOx), Neodymium Oxide (NdOx), etc., that when grown, single crystal layers of GaN/InGaN/AlN could be grown on top of them. This allows a lattice-matched, and monolithic based wafer template to

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