

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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Intel Corporation  
Petitioner

v.

Qualcomm Incorporated  
Patent Owner

U.S. Patent No. 8,698,558  
Claims 1-9

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Case IPR2018-01153

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**DECLARATION OF ALYSSA APSEL, PH.D.  
ON BEHALF OF PETITIONER**

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I, Alyssa Apsel, declare as follows:

## **I. BACKGROUND**

1. I am currently a professor of electrical and computer engineering at Cornell University in Ithaca, New York, and a visiting professor at Imperial College in London, England.

2. I have also been the Chief Technology Officer for AlphaWave IP Corporation, a multinational private equity-backed company that provides high-end analog silicon IP related to high-end Multi Standard SerDes (MSS) and Multi Standard Radio (MSR) solutions for a wide range of markets.

3. My qualifications are stated more fully in my curriculum vitae, which is attached as Appendix A. I briefly summarize my education, work experience, and other qualifications below.

4. I received a Bachelor of Science degree in Electrical Engineering from Swarthmore College in 1995. I then earned a Master of Science degree in Electrical Engineering from the California Institute of Technology in 1996. I received my Ph.D. in Electrical Engineering from the Johns Hopkins University in 2002, where the focus of my program was electrical and computer engineering. My doctoral studies included analog and mixed signal circuit design for optoelectronic and highspeed communication systems. My dissertation, titled “Optoelectronic Receivers in Silicon on Sapphire CMOS: Architecture and Design

for Efficient Parallel Interconnects,” included the study of integrated interface circuits for high-speed chip-to-chip communications.

5. By 2000, I had completed all of my coursework at Johns Hopkins, including approximately 2-3 years of graduate courses in circuits and devices, passed the Ph.D. Comprehensive Exam (required to advance in the Ph.D. program and equivalent of a Master Degree), completed significant independent research on optical receiver circuits in CMOS, and published six conference papers.

6. By 2002, I had completed my Ph.D. at Johns Hopkins, published 3 journal papers, 10 conference papers, and had 5 years of experience in wireless communications that included working at the Army Research Laboratory.

7. I was a consultant for Intel Research from January 2009 to June 2009. In that role, I developed process invariant calibration blocks for high speed I/O circuits. These circuits were designed to monitor and maintain good operating conditions, despite imperfections and flaws in the manufacturing process, of the high-speed receivers and transmitters that enable computers to send and receive data over long wires.

8. From June 2008 to October 2015, I was an Associate Professor of Electrical and Computer Engineering at Cornell University. During that time, I worked on research regarding low-power radio design and networking, systems and circuit co-design for efficient low power networks, design in presence of

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