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Filed on behalf of Intel Corporation
By: David L. Cavanaugh, Reg. No. 36,476
John V. Hobgood, Reg. No. 61,540
Benjamin S. Fernandez, Reg. No. 55,172
Wilmer Cutler Pickering Hale and Dorr LLP
1875 Pennsylvania Ave., NW
Washington, DC 20006
Tel: (202) 663-6000
Email: David.Cavanaugh@wilmerhale.com
John.Hobgood@wilmerhale.com
Ben.Fernandez@wilmerhale.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION Petitioner

v.

QUALCOMM INCORPORATED Patent Owner

Case IPR2019-00047

DECLARATION OF PATRICK FAY, Ph.D. U.S. PATENT NO. 9,154,356 CLAIMS 1, 7, 8, 10, 11, 17, and 18

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U.S. Patent No. 9,154,356 Claims 1, 7, 8, 10, 11, 17, and 18

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U.S. Patent No. 9,154,356 Claims 1, 7-8, 10-11, 17-18

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I. INTRODUCTION

1. My name is Patrick Fay.

2. I am a Professor with tenure in the Department of Electrical Engineering at the University of Notre Dame. I earned a Bachelor of Science in Electrical Engineering from the University of Notre Dame in 1991, a Master of Science in Electrical Engineering from the University of Illinois at Urbana-Champaign in 1993, and a Doctorate (Ph.D.) degree in Electrical Engineering from the University of Illinois at Urbana-Champaign in 1996.

3. I have approximately 22 years of experience in the field of electrical engineering, with particular experience in the field of RF transceivers, RF front ends, and related components. I have been the Director of the Notre Dame Nanofabrication Facility since 2003 and established the High-Speed Circuits and Devices Laboratory at Notre Dame in 1998.

4. For example, I have worked and published extensively on highfrequency devices suitable for use in low noise amplifiers, mixers, and oscillators, all of which are fundamental components of RF receivers and RF front ends. I have also published on compact models needed to design circuits with these devices, as well as benchmarking studies comparing these technologies to current approaches. 5. I have taught graduate and undergraduate level courses at the University of Illinois and at Notre Dame in electrical engineering, semiconductor devices, circuit design, and microwave circuit design. I regularly teach courses in analog circuit design. I developed and teach a course on RF and Microwave Circuits for Wireless Communications that combines classwork as well as laboratory measurements and design, with a focus on RF receivers. For these efforts, I was awarded the College of Engineering's Outstanding Teacher Award in 2015.

6. I have authored or co-authored more than 150 peer-reviewed technical publications, more than 160 conference presentations, and have 9 U.S. patents, with others pending, in the areas of inter-chip communication, semiconductor devices for low-power applications, and semiconductor devices for high-frequency applications. My resume includes a sample list of these publications.

7. I was named fellow of the Institute of Electrical and Electronics Engineer (IEEE) in 2016, which is the highest grade of membership conferred by the IEEE Board of Directors on an individual member.

 In my time as a faculty member at Notre Dame, I have received grants to support research in device technologies suitable for high-performance RF applications. This work has been supported by the Office of Naval Research (ONR), the Defense Advanced Research Projects Agency (DARPA), the National

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