IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Xiaodong Li, et al.	
U.S. Patent No.:	10,965,512	Attorney Docket No.: 18768-0206IP1
Issue Date:	March 30, 2021	
Appl. Serial No.:	17/012,813	
Filing Date:	September 4, 2020	
Title:	METHOD AND APPARATUS USING CELL-SPECIFIC AND COMMON PILOT SUBCARRIERS IN MULTI-CARRIER, MULTI CELL WIRELESS COMMUNICATION NETWORKS	

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DECLARATION OF MATTHEW C. VALENTI, Ph.D. IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,965,512

I. Engagement

1.   I have been retained by General Motors LLC, Nissan North America, Inc., Tesla, Inc., and American Honda Motor Co., Inc. ("Petitioner" or "Petitioners") to provide this declaration concerning the technical subject matter relevant to a petition for *inter partes* review of U.S. Patent No. 10,965,512 ("'512 patent").

2.   I am over 21 years of age and otherwise competent to make this Declaration. I make this Declaration based on facts and matters within my own knowledge and on information provided to me by others.

3.   Specifically, I was asked to review the declaration of Dr. Paul Min that was submitted by the Petitioner in IPR2022-01539 as Exhibit 1003 ("the Min Declaration") and form an opinion of whether I agreed with the facts, analysis, and conclusions in that declaration.

4.   My compensation in this matter is not based on the substance of my opinions or the outcome of this matter. I have no financial interest in the Petitioners.

5.   In writing this declaration, I have considered my own knowledge and experience, including my work experience in the field of mobile and wireless communication systems and my experience working with others

involved in this field, including in the design and analysis of mobile and wireless communication systems.

II.   Background and Qualifications

A.   Educational Background

6.   I received a Bachelor of Science degree in Electrical Engineering from the Virginia Polytechnic Institute & State University (Virginia Tech) in May 1992. I received a Master of Science degree in Electrical Engineering from Johns Hopkins University in May 1995 and a Ph.D. in Electrical Engineering from Virginia Tech in 1999.

B.   Professional Experience

7.   From 1992 to 1995 I served as an Electronics Engineer at the U.S. Naval Research Laboratory in Washington DC. During this time, I worked on adaptive antenna technology, including systems that performed beamforming.

8.   From 1995 to 1999, I was a Graduate Research Assistant and Instructor in the Bradley Department of Electrical and Computer Engineering at Virginia Tech. For my Ph.D. research while working as a research assistant, I conducted in-depth investigations into signal processing and error-control coding techniques specifically tailored for mobile radio systems. A key focus

of my research was on understanding the crucial role played by pilot symbols and their utilization in channel estimation processes.

9.   From 1999 to present, I have been a faculty member at West Virginia University in Morgantown, West Virginia, starting out as an Assistant Professor, being promoted to Associate Professor with tenure in 2005, and then to Professor in 2010. At WVU, I regularly teach the senior undergraduate course on Wireless Networking (CPE 462), which covers key concepts behind modern cellular networks, including orthogonal frequency division multiple access (OFDMA) and techniques for managing interference such as frequency reuse. I also teach graduate courses on Coding Theory (EE 567) and Communication Theory (EE 561).   In addition to my teaching, I run an active funded research program focused on wireless communications and signal processing.   I have advised over 50 graduate students who worked in my lab, including 10 Ph.D. students, to degree completing.

10.   I have authored numerous technical papers on various aspects of mobile and wireless communication systems that have been published in well-respected, peer-reviewed journals, such as the *IEEE Transactions on Communications*, *IEEE Transactions on Wireless Communications*, *IEEE Transactions on Vehicular Technology,* and the *International Journal on Wireless Information Networks*.

11.   A representative publication of mine is entitled "Iterative channel estimation and decoding of pilot symbol assisted turbo codes over flat-fading channels" which was published in the Sept. 2001 issue of the *IEEE Journal on Selected Area in Communications*. In this paper, I developed refined methods for performing channel estimation for wireless communication systems that use pilots and error-control codes. The paper has been cited over 390 times by other researchers who found the work useful.

12.   Taken as a whole, my academic and practical experience have given me a substantial basis upon which to evaluate the technology that is in question in the claims of the '512 Patent. Based on my experience and education, and the acceptance of my publications and professional recognition by peers in my field, I believe that I am qualified to opine as to the knowledge and level of skill of one of ordinary skill in the art at the time of the alleged invention of the '512 patent (which I further describe below) and what such a person would have understood at that time, and the state of the art during that time.

13.   A complete copy of my curriculum vitae, which includes a list of my publications and contains further details on my education, experience, publications, patents, and other qualifications to render an expert opinion, is attached as Appendix A.

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