UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC. AND TELEFONAKTIEBOLAGET
LM ERICSSON ("Ericsson"),
Petitioner

v.

INTELLECTUAL VENTURES II LLC ("IV"),
Patent Owner

Patent 7,787,431

Title: METHODS AND APPARATUS FOR MULTI-CARRIER COMMUNICATIONS WITH VARIABLE CHANNEL BANDWIDTH

DECLARATION OF ZYGMUNT J. HAAS, PH.D. UNDER 37 C.F.R. § 1.68

I, Zygmunt Haas, do hereby declare:

1. I am making this declaration at the request of Ericsson Inc. and Telefonaktiebolaget LM Ericsson ("Ericsson") in the matter of the *Inter Partes* Review of U.S. Patent No. 7,787,431 ("the '431 patent") to Xiaodong Li, et al.

2. In the preparation of this declaration, I have studied:

(1) The '431 Patent, ERIC-1001;

(2) U.S. Patent No. 6,904,283 ("Li"), ERIC-1002;

(3) U.S. Patent No. 7,782,750 ("Yamaura"), ERIC-1003;

(4) U.S. Patent No. 7,426,175 ("Zhuang"), ERIC-1004;

(5) U.S. Patent Publication 2002/0181509 ("Mody"), ERIC-1005;

(6) S. Nobilet, et al., "Spreading Sequences for Uplink and Downlink MC-CDMA Systems: PAPR and MAI Minimization", *European Transactions on Communications*, pp. 465-473, vol. 13, no. 5, September-October 2002 ("Nobilet"), ERIC-1006;

(7) TR101146v3.0.0, "Universal Mobile Telecommunications System (UMTS); UMTS Terrestrial Radio Access (UTRA); Concept evaluation (UMTS 30.06 version 3.0.0)", December 1997 ("Beta"), ERIC-1007;

(8) B. Popovic, "Spreading Sequences for Multicarrier CDMA Systems", *IEEE Trans. Comm.*, pp. 918-926, vol. 47, no. 6, June 1999 ("Popovic"), ERIC-1008;

(9) R. van Nee and R. Prasad, *OFDM for Wireless Multimedia Communications*, Artech House, pp. 119-154, 2000, ERIC-1009.

(10) *Curriculum Vitae* of Expert, ERIC-1011.

3. In forming the opinions expressed below, I have considered:

(1) The documents listed above, and

(2) My knowledge and experience based upon my work in this area as

described below.

4. I am familiar with the technology at issue. I am also aware of the state of the art at the time the application resulting in the '431 patent was filed. The earliest priority date is May 1, 2004. Based on the technologies disclosed in the '431 patent, I believe that one of ordinary skill in the art would include someone who has a B.S. degree in Electrical Engineering, Computer Engineering, Computer Science, or equivalent training, as well as three to five years of experience in the field of digital communication systems, such as wireless cellular communication systems and networks. Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of one of ordinary skill in these technologies at and around the priority date of the '431 patent.

I. QUALIFICATIONS

5. I am a Professor and Distinguished Chair in Computer Science at the University of Texas at Dallas. I am also Professor Emeritus at the School of Electrical and Computer Engineering at Cornell University. In addition, I provide technical consulting services in intellectual property matters, during which I have written expert reports and provided deposition and trial testimony involving wireless communication technologies.

6. My academic credentials include a Bachelor of Science Degree

in Electrical Engineering, *summa cum laude*, from Technion (IIT), Israel, in 1979 and a Master of Science Degree in Electrical Engineering, *summa cum laude*, from Tel-Aviv University, Israel, in 1985. I subsequently authored the thesis titled "Packet Switching in Fiber-Optic Networks" as part of earning my Ph.D. in Electrical Engineering from Stanford University in 1988.

7. My professional background and technical qualifications are stated above and are also reflected in my *Curriculum Vitae*, which is attached as ERIC-1011. I am being compensated at a rate of $375.00 per hour, with reimbursement for actual expenses, for my work related to this Petition for *Inter Partes* Review. My compensation is not dependent on and in no way affects the substance of my statements in this Declaration.

8. I have worked or consulted for about 35 years in the field of Electrical Engineering. My primary focus has been on communication and networking systems, with an emphasis on wireless communication networks. I have authored and co-authored numerous technical papers and book chapters related to wireless communication networks. I hold eighteen patents in the fields of high-speed networking, wireless networks, and optical switching.

9. My employment history following my graduation from Stanford University began at the Network Research Department of AT&T Bell Laboratories in 1988. At AT&T Bell Laboratories, I pursued research on

wireless communications, mobility management, fast protocols, optical networks, and optical switching. During my tenure at AT&T, I also worked for the AT&T Wireless Center of Excellence, where I investigated various aspects of wireless and mobile networks.

10. Since 1995, I have been a Professor at the faculty of the School of Electrical & Computer Engineering at Cornell University. At Cornell, I headed the Wireless Networks Lab, which is an internationally recognized research group with extensive contributions in the area of wireless communication systems and networks. In 2013, I retired from Cornell with the title of Emeritus professor and joined the Computer Science Department at the University of Texas at Dallas with the title of Professor and Distinguished Chair in Computer Science. At Cornell and at the University of Texas, I have taught dozens of courses related to computer networking and wireless communications. I have also served on various committees for the benefit of the scientific community.

11. I am a member of a number of professional societies, including the Institute of Electrical and Electronic Engineers (IEEE) and the Association for Computing Machinery (ACM). In 2007, I was elevated to an IEEE Fellow. I have been responsible for organizing several workshops, and delivering numerous tutorials at major IEEE and ACM conferences. I have served as editor of several

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