UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON, INC. &
TELEFONAKTIEBOLAGET LM ERICSSON
Petitioners

v.

INTELLECTUAL VENTURES II LLC
Patent Owner

Case IPR2014-01185
U.S. Patent No. 7,269,127

DECLARATION OF DIRK HARTOGS, PH.D.

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I. Introduction

I, Dr. Dirk Hartogs, declare as follows:

1. I understand that in response to a Petition submitted by Ericsson, Inc. and Telefonaktiebolaget LM Ericsson ("Petitioners"), an *inter partes* review of claims 1–10 and 17 of U.S. Patent No. 7,269,127 (Ex. 1001, "the '127 patent") was instituted by the Patent Trial and Appeal Board ("Board") on January 28, 2015.

2. I have been retained on behalf of Patent Owner Intellectual Ventures II LLC ("Patent Owner") to provide expert opinions in connection with this *inter partes* review. Specifically, I have been asked to provide my opinion relating to an inquiry into the patentability of claims 1–10 and 17 of the '127 patent relative to various combinations of Schmidl, Arslan, Kim, and Heiskala.

II. Qualifications

3. I have been involved in communications technologies, including cellular, 802.11, wireless, networking, modulation, radio propagation, digital signal processing, and statistics for over 20 years.

4. My academic background in electrical engineering provides a technical foundation for work in digital communications. I received a Bachelor of Arts degree in Mathematics and Physics from Dartmouth College in 1968. I then attended Stanford University, where I received a Master of Science in 1971 and a Doctor of Philosophy in 1975, both in Electrical Engineering.

5. While pursuing my Ph.D., I worked part-time for Probe Systems, and then full-time from 1975 to 1979 as a Senior Engineering Specialist. In this position, I was responsible for technical impact and management of defense programs (including ARPA) requiring innovative signal processing techniques (SIGINT, ELINT). I analyzed sophisticated communications methods and developed effective DSP techniques for complex radio signals, including spread spectrum and low probability of intercept.

6. In 1979 I was Vice President of a startup company called Spatial Incorporated, where I was responsible for engineering and manufacturing management. Our best-of-class products were based on complex ultra-linear amplifier technology. In 1981 I became Staff to Vice President, Engineering for Litton Applied Technology. At Litton, I was responsible for the direction of the independent research effort supporting development of integrated computer/receiver platforms for the Defense Department. In 1983, I transitioned to Telebit Corporation, where I served as Director of Development. At Telebit, I supervised fifteen development engineers in software and hardware modem design and development. I led a rapid and successful digital signal processing effort (over fifty thousand lines of code on Texas Instruments 320 DSP) that resulted in numerous Product of the Year awards. I also contributed as an individual developer of a unique modulation technology (now referred to as OFDM), allowing Telebit to become a market leader against

established competitors in less than two years. During my time at Telebit, I also obtained four key patents on orthogonal frequency division multiplexing (OFDM), each of which has been cited over 100 times by later patents. These inventions are now incorporated in wireless (both cellular and Wi-Fi), DSL, and most digital broadcast standards.

7. From 1990 to 1996, I was Director, Systems Architecture/WAN Technology at Canon Research. At Canon, I directed the digital telecommunications development efforts and was responsible for the analysis, architecture, and implementation of emerging technologies, including ISDN and telecommunications networking. I managed engineering teams with engineers at multiple levels, including several with Ph.D.s. I participated as a board member of California ISDN Users Group and testified before the California Public Utilities Commission.

8. Since 1995 I have worked as a technologist supporting major intellectual property disputes arising from patent disputes, standards groups, and trade secret issues both in the United States and abroad. Technologies that I have consulted on include the IEEE 802.11 wireless standard, cellular technology, GPS, ISDN, digital modulation, DSL, OFDM, error correction, digital signal processing, spread spectrum, and packet systems.

9. My Curriculum Vitae is attached as Ex. 2010, which contains further details on my education, experience, publications, and other qualifications to ren-

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