

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC., GOOGLE INC., and MOTOROLA MOBILITY LLC,

Petitioners,

v.

Arendi S.A.R.L.,

Patent Owner.

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Case No. IPR2014-00208

Patent No. 7,917,843

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DECLARATION OF JOHN V. LEVY, Ph.D.

I, John V. Levy, make this declaration in connection with the proceeding identified above.

### Qualifications

1. I am the sole proprietor of John Levy Consulting, a consulting firm that specializes in consulting on managing development of high tech products, including computers and software. I have a Bachelor of Engineering Physics degree from Cornell University, a Master of Science degree in Electrical Engineering from California Institute of Technology, and a Ph.D. in Computer Science from Stanford University.

2. From 1965 to 1966 at Caltech, my field of study was information processing systems. My coursework included systems programming, including the construction of compilers and assemblers. From 1966 to 1972, during my graduate study at Stanford, my field of study was computer architecture and operating systems. My coursework included computer systems design, programming and operating systems. During my employment at Stanford Linear Accelerator Center while I was a graduate student at Stanford University, I was a programmer and I participated in the design and implementation of a real-time operating system for use in data acquisition, storage and display. My Ph.D. thesis research related to computer systems organization and programming of multi-processor computers. I developed and measured the performance of several parallel programs on a

simulated 16-processor system. I also studied file systems, disk and tape storage subsystems, and input/output.

3. I have been an employee and a consultant for over thirty years in the computer systems, software and storage industry. After earning my doctorate from Stanford University in Computer Science, I worked as an engineer at a number of leading companies in the computer industry, including Digital Equipment Corporation, Tandem Computer, Inc., Apple Computer, Inc., and Quantum Corporation.

4. From 1972 to 1974 at Digital Equipment Corporation I supervised the development of an input/output channel for high-speed mass storage (disk, drum and tape), and its implementation for 7 different peripheral units and 3 different computer systems. From 1974 to 1975 I was project engineer leading the development of a new computer system. From 1975 to 1976, I supervised an operating system development group. During this time, I reviewed design changes and bug reports and fixes for two operating systems. While working for Digital Equipment Corporation, I wrote a long-term strategic plan for input/output buses and controllers and operating systems, including the conversion of most I/O buses to serial implementations. I am the author of a chapter on computer bus design in the book *Computer Engineering*, published in 1978 by Digital Press.

5. From 1977 to 1979 I was employed at Tandem Computer, Inc., where I worked on design of future multiprocessor systems. I also worked on problems related to distributed (networked) systems including rollback and recovery of distributed databases.

6. From 1979 to 1982 I was employed at Apple Computer, Inc., where I worked on the design of a new computer system, the Lisa, which was a precursor to the Macintosh. I also supervised hardware and software engineers in the development of a new local area network.

7. In 1980-81 I taught an upper-division course at San Francisco State University titled "Input/Output Architecture" which dealt with design of I/O channels, controllers, storage devices and their associated software.

8. From 1982 to 1992 I consulted for a variety of client companies, including Apple Computer, Quantum Corporation and Ricoh Co., Ltd., on project management and product development. Consulting work for Quantum included working as a temporary supervisor of a firmware development team for a new hard disk drive. During this time I co-authored a paper, cited in my CV attached as Exhibit A, on the design of a file system for write-once optical disk drives, related to work I did for client Ricoh.

9. From 1993 to 1998 I was employed at Quantum Corporation, a manufacturer of hard disk drives, where I formed and managed a new group called

Systems Engineering. While in this role I managed, among others, software and systems engineers who developed hard disk input/output drivers for personal computers and disk drive performance analysis and simulation software. While at Quantum, I also led the definition and implementation of high-speed improvements of the ATA disk interface standard, called Ultra-ATA/33 and /66, which also led to improvements in the SCSI interface standard. I was also involved in the design of file systems for hard disks, data compression schemes for disk data, and Ethernet-connected disk drives. I was Quantum's representative to the Audio/Video Working Group of the 1394 (FireWire) Trade Association, a Consumer Electronics industry standards group, and participated in Quantum's work in designing disks that could record and play back video and audio streams without needing an intervening computer system.

10. My qualifications for forming the opinions set forth in this report are listed in this section and in Exhibit A attached, which is my curriculum vitae. Exhibit A also includes a list of my publications.

11. I am a named inventor on seven United States patents, including several related to input/output buses and storage subsystems. I have been disclosed as an expert in over 50 cases and have testified at trial and in depositions. A list of my testimony is attached hereto as Exhibit B. I also have served as a technical advisor to two United States District Court Judges.

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