UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,

Petitioner,

v.

FASTVDO LLC,

Patent Owner.

Patent No. 5,850,482

Inter Partes Review No. _____

DECLARATION OF ANDREW LIPPMAN

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I, Andrew Lippman, hereby declare the following:

I. INTRODUCTION

1. I have been retained by counsel for Apple Inc. ("Petitioner") as a technical expert in connection with the proceeding identified above. I submit this declaration in support of Apple Inc.'s Petition for *Inter Partes* Review of United States Patent No. 5,850,482 ("the '482 patent").

2. I am being paid at an hourly rate for my work on this matter. I have no personal or financial stake or interest in the outcome of the present proceeding.

II. QUALIFICATIONS

3. I am currently a Senior Research Scientist at the Massachusetts Institute of Technology ("MIT") and Associate Director of the MIT Media Laboratory, an approximately $50 Million per year research and teaching facility at MIT, which I helped establish in the early 1980s. I direct a special interest group called Ultimate Media, and am co-principal investigator of the Communications Futures Program, which unifies diverse research projects across MIT related to the technology, policy, and economics of communications over the Internet.

4. At MIT, I have supervised over 50 Master's and Ph.D theses in the Media Arts and Sciences program and have taught courses such as Digital Video and MIT's freshman physics seminars. Through the course of my career, I have directed and served as principal investigator of research projects supported by the

defense department (DARPA), the Office of Naval Research (ONR), The National Science Foundation (NSF), and over 50 industrial companies. I have never precisely calculated my net research volume, but it is in excess of $50 Million.

5. I received my undergraduate degree in Electrical Engineering from MIT in 1971. I received a Master of Science degree from MIT in 1978 and a Ph.D in Electrical Engineering from the École Polytechnique Fédérale de Lausanne in 1995. My thesis was on scalable video, a technique for representing visual data in a fluid and variable networking and processing environment, similar to what we call streaming today.

6. I also designed data storage schemes to embed digital data in analogue video using optical videodiscs, which were analogue video storage devices used to distribute entertainment and interactive programming in the 1980s and 1990s. My Master's student and I developed the channel coding parameters that allowed for reliable data storage on this optical medium. The results were published in Steve Yelick's thesis "Authoring of Optical Videodiscs with Digital Data" in June 1982.

7. In the early 1980s, I established a research program called "Movies of the Future," a multi-sponsor program addressing image distribution, analysis, and interaction. In 1986, I established the "Television of Tomorrow" program to research digital and scalable video processing technology. The Television of Tomorrow program initially had nine sponsors, representing the television

industry, consumer electronics industry, and a content company from North America, Asia-Pacific, and Europe, respectively. I co-authored an article called "Digital Television: A Perspective," with Arun Netravali, which reported the ideas arising from this work. "Digital Television: A Perspective" was published as the lead article in the June, 1995 IEEE proceedings.

8. I participated in the second meeting of the Motion Picture Experts Group, an ISO standards committee effort that defined the standards for storing and distributing MPEG Video. I co-wrote the paper that defined the requirements for the MPEG-2 standard with Okubo and McCann in 1995. My participation came after a presentation at the Torino Picture Coding Symposium where I presented work on asymmetric coding of video for low-rate channels.

9. I served on the editorial board of the Image Communication Journal between 1989 and 2003.

10. I am named as an inventor on six patents in the area of video and digital processing and have served on the advisory boards for technology companies in fields ranging from video conferencing to music analysis. I have authored or co-authored over 65 published papers in the fields of communications, video coding, and television, including articles in joint authorship with Bernd Girod and Edward Adelson, whose work is referenced in these proceedings. These articles address video coding, joint source/channel coding, video information

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