Exhibit 1021

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA

SIGHTSOUND TECHNOLOGIES, LLC,	
Plaintiff,	Civil Action No. 2:11-cv-01292-DWA
v.	Honorable Judge Donetta W. Ambrose
APPLE, INC.,	
Defendant.	

DECLARATION OF J.D. TYGAR, PH.D.

INTRODUCTION AND BACKGROUND

1. My name is Justin Douglas Tygar. I am a tenured, full Professor at the University of California, Berkeley, with a joint appointment in the Department of Electrical Engineering and Computer Science (Computer Science Division) and the School of Information. Prior to joining UC Berkeley in 1998, I was a tenured faculty member in the Computer Science Department at Carnegie Mellon University.

2. I am an expert in software engineering, computer security, and cryptography. I have taught courses in software engineering and computer security, at the undergraduate, master's, and Ph.D. level at both UC Berkeley and Carnegie Mellon University.

3. I have also co-written three books that address networking technology and security for networking technology, and one of those books has been translated into Japanese. I have helped design the DETER networking testbed supported by the U.S. National Science Foundation and the U.S. Department of Homeland Security that is a widely used framework for testing networking. Further, I led the team that designed the SWOON overlay network used to test mobile networking in that environment.

4. Among my awards are the National Science Foundation Presidential Young Investigator Award and the Kyoto Fellowship.

5. I was the co-inventor of a major electronic commerce payment system called NetBill which has been patented, implemented, and licensed to a commercial company CyberCash. I am the UC Berkeley lead of the U.S. National Science Foundation Science and Technology Center TRUST, which studies issues associated with networking and security. The U.S. State Department chose my project at UC Berkeley to examine the security and networking issues, including load-balancing issues, for communications protocols and software to support

Internet freedom and allow users to bypass national firewalls in countries such as China, Iran, and Syria. I am also associated with the Intel Science and Technology Center SCRUB, which focuses on issues related to networking and security. I helped design the security standards for the US Postal Service's Information Based Indicia Program (cryptographic postal indicia).

6. Appendix A contains a list of court cases for which I have provided testimony at trial or at deposition since January 1, 2007. Appendix B contains my curriculum vitae (including a full publication list for the last ten years).

7. Counsel for SightSound Technologies LLC ("SightSound") requested that I provide expert analysis pertinent to claim construction issues in the case *SightSound Technologies, LLC v. Apple, Inc.*, Civ. Action No. 2:11-cv-01292-DWA, in the United States District Court for the Western District of Pennsylvania. I am charging $500/hour for work performed (limited to a maximum charge of $5000/day). My compensation is in no way dependent on the outcome of the case.

8. In preparing to submit this Declaration, I have read the following materials: U.S. Patent No. 5,191,573 (the "'573 Patent"), U.S. Patent No. 5,675,734 (the "'734 Patent"), and U.S. Patent No. 5,966,440 (the "'440 Patent") (collectively, the "Hair Patents"); the parties' Joint Disputed Claim Terms Chart (Aug. 8, 2012); and other materials cited herein.

ANALYSIS OF CLAIM TERMS

9. My analysis of claim construction issues is intended to address two main issues. First, I address what a person of ordinary skill in the art would have understood the Hair Patents and the pertinent claim terms to have disclosed in 1988. For present purposes, a "person of ordinary skill in the art" is a one with an undergraduate degree in computer science or electrical engineering or an equivalent level of knowledge and ability from working in the industry for an

appropriate number of years. This person would have been familiar with then existing means for storage of digital information and transmission of digital information across telecommunications lines. Second, I address whether Apple's proposed constructions of certain terms are consistent with the understanding of one of ordinary skill in the art.

10. This declaration does not set forth all of my opinions regarding the Hair Patents or the claim terms thereof, but instead provides analysis of the issues that appear most germane based on the claim constructions proposed by Apple in the parties' Joint Disputed Claim Terms Chart. I reserve the right to amend, clarify, or expand upon the analysis and opinions set forth in this Declaration, and to respond to and rebut issues raised Apple in the course of claim construction briefing and during this litigation.

Digital audio signal[s]

11. Apple proposes that the term "digital audio signal[s]" be construed as "digital data playable as an audible sound wave."

12. Based on my review of the Hair Patents and my knowledge of computer languages and digital music, it is my belief that one skilled in the art would not have interpreted "digital audio signals" as including computer instructions to generate sound. All digital data can be converted into an audible sound wave. Therefore, Apple's construction would have the Hair Patents cover all data stored in digital form, and not just the sound recordings Mr. Hair referenced in his Patents.

13. Apple's proposed construction would cover all forms of instruction-based computer systems that are intended to represent musical instruments. The main system for accomplishing this in 1988 was the Musical Instrument Digital Interface ("MIDI"). At a conceptual level, MIDI is a series of instructions, like digital sheet music, which directs a

computer-based device to generate and play sounds from a stored database or catalog. MIDI instructions are typically entered by typing them on a computer keyboard; this is the digital equivalent of a composer writing out a score in long-hand form. MIDI instructions may then be played on a computer's sound card or via another output device, such as a synthesizer. It obviates the need for musicians to play instruments in order to test or demonstrate a composition. In this way, MIDI resembles a modem, sophisticated player piano roll. However, like a player piano, MIDI has limitations. This system can play back its catalog of "instruments" (including synthesizers) but cannot effectively represent human vocals. In addition, the quality of MIDI-generated sound depends on the quality of the synthesizer that MIDI directs. MIDI is a useful tool for musicians, but it would not be used (in 1988 or today) as a medium for CD-quality re-creation of an artist's performance, nor would it be seen by artists or consumers as a genuine, stand-alone substitute for studio- or performance-quality sound.[1]

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[1] The process for digitizing audio signals (*i.e.*, music) was well known in 1988 following the advent of the CD nearly a decade earlier. Digitization begins with the use of a microphone to convert the original sound waves from a performance (such as a song) into an analog electrical signal. This analog electrical signal is then "sampled" or measured very frequently (for example, in CD-quality digital audio, at 44,100 Hz (*i.e.*, 44,100 samples per second). The measured values of the amplitude (height) of the sound wave and audio frequencies present in the sample are converted to l's and O's. These measurements assign discrete amplitude levels to the sounds. This necessarily entails a minor loss of data because sound waves exist in the real world as continuously variable amplitudes. One can visualize the difference as that between a continuous sine-curve and a series of very small steps going up and down. Nevertheless, the differences in the discreet amplitude measurements are so minute that the loss of data is not detectible to human ears.

After the binary data is captured from a recording, it is then mixed with other signals (for example, two recordings made at different times might be combined or sampled), mastered (adjusted for sound quality—a sophisticated analog of adjusting the "bass" and "treble" on a home stereo system), and then assembled into a digital audio file that could be recorded onto the CD.

Playback of digital music involves basically reversing the process, with the l's and 0's being read from the CD by a laser and used by a digital audio player to generate analog electric signals that can be fed to speakers.

Because the original sound waves were converted into l's and 0's at a very high frequency, and the amplitude levels are very close to the original, sound waves generated by the speakers

(Footnote Cont'd on Following Page)

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