Exhibit 1238

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

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

PLAINTIFF SIGHTSOUND TECHNOLOGIES, LLC'S, EXPERT REPORT
OF JOHN SNELL

Confidential Information
Subject to Protective Order

April 22, 2012
Date

John Snell

I. **Introduction**

1. This report gives the opinions, and their underlying bases and reasons, about which I may testify at trial on behalf of SightSound Technologies, LLC ("SightSound"). This report further includes information regarding CONF [redacted] This report also includes information regarding the advantages of the invention in the patents-in-suit over the prior art. In addition to these opinions and their underlying reasoning and bases, I reserve the right to respond to assertions made by Defendant's expert witnesses or fact witnesses and to testify in rebuttal to evidence that Apple may present during trial.

2. I have been retained by the plaintiff SightSound Technologies, LLC ("SightSound"), to serve as an expert in this case. I expect to testify at trial regarding the matters set forth in this report if asked about these matters by the Court or the parties' attorneys.

3. I am an engineer, and reside and work in San Geronimo, California. I specialize in the design and analysis of microelectronics, software, and systems for recording, playing, synthesis, processing and transferring of electronic media over electronic networks. I have over four decades of experience in electronics engineering, computer science, signal processing mathematics, and the engineering of audio, video and music. I have researched, designed, developed and analyzed the microelectronics and software of numerous digital music and video systems.

4. I studied at Carnegie-Mellon University from 1967–74. My interdisciplinary graduate work through the electrical engineering department at Carnegie-Mellon University was performed with a grant from the National Science Foundation. I earned my Bachelor of Science

degree in Electrical Engineering and my Bachelor of Arts degree in Cybernetics (an interdisciplinary program, combining coursework in computer science, signal processing mathematics, physics, music analysis and composition, psychology and physiology of perception as well as audio, video and electrical engineering) at Carnegie-Mellon University. I wrote my first computer program in 1968 on a mainframe computer at Carnegie-Mellon University, where I took courses in programming, including data structures and software design for real-time systems. I have programmed computers and media processing digital systems at all levels, from high-level code down to assembly language and microcode (including binary, octal and hexadecimal for debugging systems).

5. I worked on the development of a large multiprocessing system and a graphics display processor, as well as analog-to-digital and digital-to-analog audio converters in the Engineering Lab of the Artificial Intelligence Lab at Carnegie-Mellon University in the early 1970s. I co-designed the microelectronics and software of a real-time microwave (wireless) signal analyzer in the mid-1970s.

6. I am the founder (1976) and original editor of the COMPUTER MUSIC JOURNAL,[1] an academic publication of international research on the application of computer science, signal processing mathematics, electronics, software, physics, acoustics and psychology of perception to the composition, recording, editing, and processing of music. Publication of several books[2] resulted from the articles I collected and edited.

7. I also did research in digital audio and music processing at Stanford University from 1977–1980 at the Center for Computer Research in Music and Acoustics (CCRMA). I

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[1] COMPUTER MUSIC JOURNAL, MIT Press.

[2] Revised articles from the COMPUTER MUSIC JOURNAL with new articles edited by John Snell, John Strawn and Curtis Roads were published in 3 books: FOUNDATIONS OF COMPUTER MUSIC (MIT PRESS 1985), DIGITAL AUDIO ENGINEERING (Kaufmann 1985), and DIGITAL AUDIO SIGNAL PROCESSING (Kaufmann 1985).

worked on the development of the third generation of the CCRMA mainframe computer for editing, signal processing, and playing digital music files, and our computer was connected to the ARPANET.

8. I was a design engineer from 1980–86 at Lucasfilm Ltd., where we designed and developed the microelectronics and software of graphics-based multiprocessor supercomputers for recording, processing, synthesis, editing and transferring of digital music, voices, Foley, and sound effects. In addition to design of the programmable digital mixing console and solid state memory system of our Digital Audio Signal Processor (a.k.a. ASP and SoundDroid), I contributed to the architecture[3] and use of higher-speed circuitry (change from noisy, slower TTL to faster, less noise-prone, ECL supercomputer integrated circuitry[4]) for real-time operation. Our ASP/SoundDroid system included static and dynamic random access semiconductor memory (RAM) as well as disk drives for storing digital audio. This multiprocessor system was designed so that multiple channels of digital audio could be transmitted over a private Ethernet (ASPnet) between the disk drives connected to the memory systems of the processors. Our Trio project was designed for editing digital audio and video with optical video disks.

9. I designed several real-time multiprocessing systems for processing digital media signals over the last few decades[5 and 6] and wrote a book,[7] which detailed my design of numerous

[3] Contributions to the architecture included replacement of the traditional single-bus with a dual-bus for faster processing (since most calculations involve dual-operands), touch-sensitive, interactive graphics screen technology for ease of editing, and use of a hinged paging design for easy troubleshooting access to signals.

[4] Emitter-coupled-logic (ECL) was a faster and cleaner method of electronics design than TTL. Electronic circuitry known as transistor-transistor technology (TTL) was commonly used for digital design in the 1970s and 1980s. Schottky TTL sometimes failed due to its electrical noise and reflections over lines connecting TTL chips. From troubleshooting experience with the noise generated by, and line reflections of, Schottky TTL in developing large digital systems in the 1970s, I realized the need for a faster and more reliable supercomputer technology. Speed was an essential ingredient for real-time processing of media during this period. However, I designed portions of our less speed-critical user interface with more energy-efficient CMOS (complimentary metal-oxide-semiconductor) integrated circuitry, which became the dominant technology for microprocessors.

[5] John M. Snell, *Expandable Interactive Real-time Multiprocessor DSP*, PROCEEDINGS OF THE IEEE ASSP WORKSHOP ON APPLICATIONS OF SIGNAL PROCESSING TO AUDIO AND ACOUSTICS (IEEE Press 1989).

architectures for processing audio and video. In 1989, I was invited to give an international presentation on real-time software design issues in programming multiprocessor systems,[8] which was subsequently published by the Audio Engineering Society. In the 1990s, I worked on the design of a supercomputer chip and software for personal home computers, which enabled simultaneous processing of multiple streams of media. This integrated circuit with its software was designed to receive, decode and process digital video, digital audio and graphics while implementing modem connection to the Internet. These systems were designed with static and dynamic RAM (Random Access Memory) as well as non-volatile digital storage.

10. Over the last decade, I worked on the design of a multiprocessing supercomputer system which allowed customers to select their own movies and music over the Internet and have them transmitted from solid state memory to their home over the higher-fidelity cable TV and satellite dish (wireless) networks, including thousands of channels of high-fidelity digital audio and high-definition digital video. I also worked on the design/analysis of smartphone applications involving digital media. I have used the Internet and its predecessor, the ARPANET, since 1972[9] for my research and development work in digital media. I have given lectures and engineering presentations at international conferences, research centers and universities.[10]

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[6] John Snell, *Professional Real-time Signal Processor for Synthesis, Sampling, Mixing & Recording*, PROCEEDINGS OF THE 83RD CONVENTION OF THE AUDIO ENGINEERING SOCIETY (Audio Engineering Society 1987).

[7] John M. Snell, MULTIPROCESSOR ARCHITECTURES & DESIGN TECHNIQUES FOR MEDIA SIGNAL PROCESSING & SYNTHESIS 1991–1995 (Timbre Engineering 1995).

[8] John M. Snell, *Multiprocessor DSP Architectures & Implications for Software*, AUDIO IN DIGITAL TIMES (Audio Engineering Society 1990).

[9] For example, my first transmission of digital files of music instrument designs with scores to play them was from Carnegie-Mellon University to Stanford University in the early 1970s over the ARPAnet. This was years ahead of the less expressive MIDI standard.

[10] I have given lectures and engineering presentations at Audio Engineering Society international conferences, International Computer Music Conferences, Institute of Electrical and Electronics Engineers (IEEE) International Conference on Signal Processing Applications and Technology, Stanford University, Institut de Recherche et Coordination Acoustique/Musique (IRCAM, Paris), University of California, Microprocessor Forum, Eastman

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