

CONTAINS PROTECTIVE ORDER MATERIAL

I, Atif Hashmi, hereby declare and state as follows:

I. INTRODUCTION

1. I have been retained as an expert witness for *Inter Parties* Review (“IPR”) proceedings, IPR2018-00766 and IPR2018-00767, related to two patents, U.S. Patent Nos. 7,391,791 (“the ’791 Patent”) and 8,942,252 (“the ’252 Patent”) (collectively, “the Patents”).

2. More specifically, I have been retained to review source code provided by Implicit (“the Implicit Source Code”) and to provide an opinion regarding whether that source code practices the claims of the ’791 Patent and ’252 Patent that are involved in these proceedings, namely claims 1–3, 6–9, 12, 16, 19, and 23–25 of the ’791 Patent (“the Challenged ’791 Patent claims”) and claims 1–3, 8, 11, and 17 of the ’252 Patent (“the Challenged ’252 Patent claims”).

3. For the reasons detailed in this declaration and the attachments thereto, it is my opinion that the Implicit Source Code practices the Challenged ’791 Patent claims and the challenged ’252 Patent claims.

II. BACKGROUND AND QUALIFICATIONS

4. A copy of my *Curriculum Vitae* (“CV”) is attached to this declaration as Appendix 1, which contains a detailed record of my professional qualifications, some of which I summarize below.

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5. I am an engineer and co-founder of Thalchemy Corporation, which develops complex neural network systems for efficient processing of digital data produced by electronic sensors available in modern smartphones and wearable devices. I also provide technical consulting services for intellectual property litigation. A complete list of my publications, professional activities, and honors that I have received is fully set forth in my CV.

6. I received a B.S. in Computer Engineering from Lahore University of Management Sciences in Pakistan and continued to receive an M.S. and a Ph.D. in Electrical Engineering from the University of Wisconsin – Madison. My educational training and research have been focused on processing of digital signals such as audio and video, computer networks, operating systems, and design and development of hardware circuits and software for computing systems. I have studied and developed algorithms and systems for data capturing and processing, synchronization of data obtained from different sources, computer network communication and synchronization, and have also designed systems using digital circuits.

7. Some of my relevant professional experiences include working at Intel Corporation, where I worked on both software and hardware projects related to the design and implementation of Intel's next generation graphics processing cores and data communication between these cores. I also collaborated with

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research and development teams at IBM developing complex software and hardware systems that emulate the functionality of the mammalian brain to capture and synchronously process sensory data obtained for multiple sensory modalities. This project was funded by the United States Department of Defense under the DARPA SyNAPSE program.¹ Afterwards, I co-founded a company, Thalchemy Corporation, to commercialize a software and hardware technology for smartphones and wearable devices. At Thalchemy, I designed and implemented software and hardware to obtain and synchronize data generated by sensors present in modern smartphones and wearable devices. I have also developed software and hardware to process, filter, and transmit the sensory data to remote servers for additional processing and storage. I have also developed software for servers to receive, store, and further process the transmitted data. Over the years, Thalchemy has received several grants and awards from the National Science Foundation to support research and development activities. I have developed software using many software programming languages including C, C++, Java, Python, JavaScript, Embedded C, and assembly language.

8. I have authored several research papers and articles related to computer hardware and software in peer-reviewed Computer Science and

¹ See <http://www.darpa.mil/program/systems-of-neuromorphic-adaptive-plastic-scalable-electronics>, retrieved October 2018.

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Electrical Engineering conferences and workshops, several of these publications have received best paper awards. I have also been an invited speaker at venues including academic conferences and technology companies. A complete list of my publications and invited talks is included in my CV.

9. I am a named inventor on multiple patents and patent applications for neural network software and hardware for processing sensory data. A complete list of patents and patent applications on which I am a named inventor is included in my CV.

10. I have also provided technical consulting for cases involving hardware and software patent infringement, software copyright infringement, trade secret theft, and source code quality. I have given testimony as an expert and submitted reports and declarations in which I offered opinions based on my technical analysis. As a technical consultant, I have analyzed hardware circuits and systems for audio and video streaming and decoding systems, computer networks, operating systems, neural networks, graphics display systems, and wireless and subsea communication systems. Additional details about specific cases can be found in my CV.

III. COMPENSATION

11. Quandary Peak Research is being compensated at the rate of \$325 an hour for my time consulting on this matter and \$487.50 for my time spent

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consulting on nights and weekends on this matter. My compensation does not depend on the outcome of these IPR proceedings.

IV. MATERIALS CONSIDERED

12. In developing my opinions set forth in this declaration, I have reviewed, among other materials, the '791 and '252 Patents, Provisional Application No. 60/341,574, Dr. Roman Chertov's declaration for *Inter Partes* Review of U.S. Patent No. 7,391,791 and of U.S. Patent No. 8,942,252 (Sonos Exhibit 1009 in the IPR of the '791 Patent; Sonos Exhibit 1009 in the IPR of the '252 Patent), and the Implicit Source Code. I have also reviewed the materials cited in this declaration.

V. LEGAL STANDARDS APPLIED

13. I am not an attorney and will not offer any opinions on the law.

14. I understand that for a product to practice a claim, it must meet the language of each claim limitation, as properly construed, viewed through the perspective of a person having ordinary skill in the art.

15. I also understand that terms are to be read not only in the context of the particular claim in which the term appears, but in the context of the entire patent, including the specification.

16. For the purposes of my analysis in this declaration, I applied the claim constructions that Dr. Chertov applied (Sonos Exhibit 1009 in the IPR of the '791

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