UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

RED.COM, LLC,
Patent Owner.

Case No. IPR2019-01065
Patent No. 9,245,314

DECLARATION OF THOMAS GRAEME NATTRESS IN SUPPORT OF PATENT OWNER RED.COM, LLC PRELIMINARY RESPONSE

RED.COM Ex. 2001
Apple v. RED.COM

I, Thomas Graeme Nattress, declare and state as follows:

I. INTRODUCTION

1. I am a lead camera systems architect at RED.COM ("RED"), the assignee of U.S. Patent Nos. 9,230,299 ("the '299 patent") and 9,245,314 (the '314 patent). I am also a listed inventor on the '299 and '314 patents, and an inventor on over twenty-five additional issued patents assigned to RED. I am submitting this declaration in connection with Patent Owner Preliminary Responses to IPR2019-010164 and IPR2019-01065, filed by Petitioner Apple Inc., relating to the '299 and '314 patents, respectively.

2. I executed a previous declaration, which was submitted on January 31, 2014, in connection with a reexamination proceeding on U.S. Patent No. 8,174,560 (the "'560 patent"), assigned to RED and for which I am a named inventor (the "2014 declaration"). A copy of my 2014 declaration can be found at pages 312-345 in Petitioner's Ex. 1002 in IPR2019-01064. I understand that Petitioner's Ex. 1002 in IPR2019-01064 is a copy of the prosecution history of the '299 patent. A true and correct copy of my 2014 declaration is also attached hereto as **Exhibit 2024** for use and reference in IPR2019-01065, as my 2014 declaration does not appear in Ex. 1002 ('314 patent prosecution history) in IPR2019-01065.

3. A detailed summary of my biography and credentials can be found in my 2014 declaration at paragraphs 1-6.

4. In my 2014 declaration, I testified regarding the inventions claimed in the ’560 patent. In particular, paragraphs 10-28 in my 2014 declaration describe the state of the art at the time of the filing of the ’560 patent, and the deficiencies in technology and conventional thinking that were overcome by the inventions claimed in the ’560 patent. Those paragraphs relate to the April 11, 2007 time frame, which is the earliest filing date to which the ’560 patent claims priority. The ’299 and ’314 patents claim priority to the ’560 patent, and to the same April 11, 2007 provisional application as the ’560 patent. Thus, paragraphs 10-28 in my 2014 declaration refer to the deficiencies in technology and conventional thinking that were overcome by the inventions in claimed in the ’299 and ’314 patents.

II. REDUCTION TO PRACTICE OF THE RED ONE MOTION PICTURE CAMERAS

5. I first met Mr. Jim Jannard in December of 2005. At that meeting, we discussed his desire to create the first ever digital motion picture camera that could record compressed digital motion video at cinema quality levels, including 4K. I was intrigued by the possibilities, because combining the ease and flexibility post-production of digital video while maintaining cinema-quality frame rate and resolution would be a game-changer in the world of movie making. But I also knew that digital compression was highly disfavored in the movie camera industry

due to its resulting artifacts and lower resolution, which were unacceptable for big-screen cinema viewing.

6. To solve this problem, one key area I researched was the use of an image sensor with a Bayer-pattern filter. This was one of several unconventional avenues we explored at RED. At the time, such sensors were associated with lower-quality consumer-grade video cameras and derided as incapable of providing cinema-quality video due to artifact and resolution issues. In contrast, the industry consensus held that cinema quality cameras would need to utilize three sensors, with a prism to split red, green and blue light to each sensor. However, we believed that the benefits of a Bayer-pattern image sensor could be optimized if the image data remained in raw, mosaiced format for compression. We believed that such a data workflow could allow the raw digital files to operate as a digital negative, and would provide all of the post-production flexibility of being able to manipulate the original raw data.

Developing REDCODE for the RED ONE Cameras

7. Immediately following my December 2005 meeting with Mr. Jannard, I began working on the design of RED's first commercial digital motion picture camera that would become known as the RED ONE. This work would last all throughout 2006 and into 2007 when we commercially launched the RED ONE

video camera. My title on the RED ONE project was Problem Solver, and it remains my title to this day.

8. As I explained in paragraphs 13-21 of my 2014 declaration, the typical flowchart for prior art video image data capture and processing involved demosaicing video data captured by a Bayer-pattern sensor prior to compressing that data for storage. Paragraphs 22-28 of my 2014 declaration explain how we rejected that conventional thinking by implementing known compression techniques, such as JPEG 2000, in such a way as to operate on non-demosaiced Bayer-pattern image data, a type of image data these techniques were not designed to work on.

9. Accordingly, my work on the RED ONE camera was based on a video image processing pipeline that did not include a conventional demosaicing step prior to compression. Rather, the data flow upon which I based my research and design work for the RED ONE camera generally operated along the following four-step sequence for processing and compressing raw Bayer-pattern video image data: First, raw image data was collected by the image sensor, which was a Mysterium CMOS image sensor chip with a Bayer-pattern pixel filter, *i.e.*, a sensor chip that detected only one data value for each of the green, red and blue pixel locations. The raw mosaiced data was outputted by the image sensor at a resolution of at least 2K and at least 23 frames per second. Second, the raw Bayer-

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