UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

The CALIFORNIA INSTITUTE OF TECHNOLOGY, Plaintiff, v. DELL TECHNOLOGIES INC. and DELL INC., Defendants.	§ § § § § § § § §	**Civil Action No.: 6:20-cv-1042** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff the California Institute of Technology ("Caltech" or "Plaintiff"), by and through its undersigned counsel, complains and alleges against Dell Technologies Inc. and Dell Inc. (collectively "Dell" or "Defendants") as follows:

NATURE OF THE ACTION

1. This is a civil action for infringement of U.S. Patent No. 7,116,710, U.S. Patent No. 7,421,032, and U.S. Patent No. 7,916,781 (collectively, "the Asserted Patents") arising under the patent laws of the United States, 35 U.S.C. §§ 1 et seq.

2. Earlier this year, a jury found that Apple Inc.'s ("Apple's") and Broadcom Limited's ("Broadcom's") Wi-Fi products infringed the Asserted Patents and awarded Caltech over $1.1 billion in damages. *Caltech v. Broadcom Limited, et al.*, No. 16-cv-3714-GW, Dkt. No. 2114 (C.D. Cal. Jan. 29, 2020). As in the case against Apple and Broadcom, Caltech seeks a reasonable royalty from Dell as compensation for its infringement of the Asserted Patents.

THE PARTIES

3. Caltech is a non-profit private university organized under the laws of the State of California, with its principal place of business at 1200 East California Boulevard, Pasadena, California 91125.

4. Caltech is a world-renowned science and engineering research and education institution, where extraordinary faculty and students seek answers to complex questions, discover new knowledge, lead innovation, and transform our future. To date, 40 Caltech alumni and faculty have won a total of 41 Nobel Prizes. The mission of Caltech is to expand human knowledge and benefit society through research integrated with education. Caltech investigates the most challenging, fundamental problems in science and technology in a singularly collegial, interdisciplinary atmosphere, while educating outstanding students to become creative members of society. Caltech's investment in research has led Caltech to have more inventions disclosed and patents granted per faculty member than any other university in the nation, and to be consistently ranked as one of the top university patent portfolios in strength and number of patents issued.

5. On information and belief, defendant Dell Technologies Inc. is a Delaware corporation with its principal place of business at One Dell Way, Round Rock, Texas 78682.

6. On information and belief, defendant Dell Inc. is a Delaware corporation with its principal place of business at One Dell Way, Round Rock, Texas 78682. Dell. Inc. has additional offices at 1404 Park Center Dr., Austin, Texas, 701 E. Parmer Lane, Bldg. PS2, Austin, Texas, 12500 Tech Ridge Road, Austin, Texas, 9715 Burnet Road, Austin, Texas, and 4309 Emma Browning Avenue, Austin, Texas.

JURISDICTION AND VENUE

7. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

8. This Court has personal jurisdiction over Dell pursuant to due process and/or the Texas Long Arm Statute because Dell has committed and continues to commit acts of patent infringement, including acts giving rise to this action, within the State of Texas and this District, and because Dell recruits Texas residents, directly or through an intermediary located in this state, for employment inside or outside this state. The Court's exercise of jurisdiction over Dell would not offend traditional notions of fair play and substantial justice because Dell has established minimum contacts with the forum.

9. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400 because a substantial part of the events or omissions giving rise to the claims occurred in this District, and Dell has committed acts of infringement and has a regular and established place of business in this District.

10. Dell has committed acts of infringement in this District, directly and/or through intermediaries, by, among other things, making, using, offering to sell, selling, and/or importing products and/or services that infringe the Asserted Patents, as alleged herein.

11. Dell has a regular and established places of business in this District including a shared corporate office at One Dell Way, Round Rock, Texas 78682. Dell is also registered to do business in Texas.

CALTECH'S ASSERTED PATENTS

12. On October 3, 2006, the United States Patent Office issued U.S. Patent No. 7,116,710, titled "Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes" (the "'710 patent"). A true and correct copy of the '710 patent is attached hereto as Exhibit A.

13. On September 2, 2008, the United States Patent Office issued U.S. Patent No. 7,421,032, titled "Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes" (the "'032 patent"). A true and correct copy of the '032 patent is attached hereto as Exhibit B. The '032 patent is a continuation of the application that led to the '710 patent.

14. On March 29, 2011, the United States Patent Office issued U.S. Patent No. 7,916,781, titled "Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes" (the "'781 patent"). A true and correct copy of the '781 patent is attached hereto as Exhibit C. The '781 patent is a continuation of the application that led to the '032 patent, which is a continuation of the application that led to the '710 patent.

15. The Asserted Patents identify Hui Jin, Aamod Khandekar, and Robert J. McEliece as the inventors (the "Inventors").

16. Caltech is the owner of all right, title, and interest in and to each of the Asserted Patents with full and exclusive right to bring suit to enforce the Asserted Patents, including the right

to recover for past damages and/or royalties prior to the expiration of the Asserted Patents on August 18, 2020.

17. The Asserted Patents are valid and enforceable.

BACKGROUND

Caltech's IRA Code Patents

18. The Asserted Patents disclose a seminal improvement to coding systems and methods. The Asserted Patents introduce a new type of error correction codes, called "irregular repeat and accumulate codes" (or "IRA codes"). The claimed methods and apparatuses are directed to encoders and decoders. The claimed encoders generate an IRA codeword from message or information bits reordering irregularly repeated instances of those bits in a randomized but known way and performing other logical operations such as summing and accumulating bits. The claimed decoders facilitate recovery of the message or information bits from the codewords even when the codewords have been corrupted by noise such as the noise that is experienced when transmitting a codeword over a wireless communications channel. These IRA codes are at least as effective at correcting errors in transmissions as prior coding techniques, such as turbo codes, but use simpler encoding and decoding circuitry and provide other technical and practical advantages, allowing for improved transmission rates and performance. Indeed, the IRA codes disclosed in the Asserted Patents enable a transmission rate close to the theoretical limit.

19. The Asserted Patents implement these novel IRA codes using novel encoders and decoders. The claims in the Asserted Patents enable a person of ordinary skill in the art to implement IRA codes using simple circuitry, providing improved performance over prior art encoders and decoders.

20. In September 2000, the Inventors of the Asserted Patents published a paper regarding their invention, titled "Irregular Repeat-Accumulate Codes" for the Second International Conference on Turbo Codes attached hereto as Exhibit D. This paper has been widely cited by experts in the field.

21. The Inventors' patents and publications describing IRA codes have been widely recognized and cited by academics and experts in the field of digital communications for their

improvements over prior art error-correction codes. For example, a paper praising these IRA codes was published in August 2004 by Aline Roumy, Souad Guemghar, Giuseppe Caire, and Sergio Verdú in the IEEE Transactions on Information Theory. This paper, titled "Design Methods for Irregular Repeat-Accumulate Codes," and attached hereto as Exhibit E, states:

> IRA codes are, in fact, special subclasses of both irregular LDPCs and irregular turbo codes. . . . IRA codes are an appealing choice because the encoder is extremely simple, their performance is quite competitive with that of turbo codes and LDPCs, and they can be decoded with a very-low-complexity iterative decoding scheme.

This paper also notes that, four years after publication of the Inventors' September 2000 paper, the Inventors were the only ones to propose a method to design IRA codes.

IEEE 802.11 Wi-Fi Standard

22. The Institute of Electrical and Electronics Engineers ("IEEE") has developed standards for wireless communications over local area networks (also referred to as "Wi-Fi"). Wi-Fi usage is widespread in modern electronic products, including smartphones, laptops, routers, televisions, cameras, cars and other devices that have wireless connections.

23. The IEEE standard upon which Wi-Fi is based is IEEE 802.11. The 802.11 standardization process began in the 1990s and the first version of 802.11 was referred to as IEEE 802.11-1997. In the following years, subsequent versions of the 802.11 standard were adopted.

24. One of the key improvements to the 802.11n version of the standard involved a "High Throughput (HT)" mode that is implemented using specific LDPC (Low-Density Parity Check) error correction codes. The same LDPC error correction codes introduced in the 802.11n version of the standard are also implemented in the subsequent 802.11ac version (finalized by IEEE in 2013 and basis for Wi-Fi 5) and 802.11ax version (nearing finalization and basis for Wi-Fi 6) of the standard. The LDPC codes specified by the 802.11n, 802.11ac, and 802.11ax standards may be implemented using Caltech's patented IRA/LDPC encoders and decoder technology.

Caltech's Case Against Apple and Broadcom

25. In May 2016, Caltech filed a patent infringement action against Apple and Broadcom in the Central District of California involving the Asserted Patents. On January 29,

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