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Institute of Technology

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11  
12 UNITED STATES DISTRICT COURT  
13 CENTRAL DISTRICT OF CALIFORNIA

14  
15 The CALIFORNIA INSTITUTE OF  
TECHNOLOGY, a California  
16 corporation,

17 Plaintiff,

18 vs.

19 BROADCOM LIMITED,  
BROADCOM CORPORATION,  
20 AVAGO TECHNOLOGIES LIMITED,  
and APPLE INC.

21 Defendants.  
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CASE NO. 2:16-cv-3714

**COMPLAINT FOR PATENT  
INFRINGEMENT**

**JURY TRIAL DEMANDED**

1 Plaintiff the California Institute of Technology (“Caltech” or “Plaintiff”), by  
2 and through its undersigned counsel, complains and alleges against Broadcom  
3 Limited (“Broadcom Ltd.”), Broadcom Corporation (“Broadcom Corp.”), and  
4 Avago Technologies Limited (“Avago Technologies Ltd.”) (collectively,  
5 “Broadcom”) and Apple Inc. (“Apple”) (collectively “Defendants”) as follows:

6 **NATURE OF THE ACTION**

7 1. This is a civil action for patent infringement arising under the patent  
8 laws of the United States, 35 U.S.C. §§ 1 *et seq.*

9 2. Broadcom has infringed and continues to infringe, contributed to and  
10 continues to contribute to the infringement of, and/or actively induced and continues  
11 to induce others to infringe Caltech’s U.S. Patent No. 7,116,710, U.S. Patent No.  
12 7,421,032, U.S. Patent No. 7,916,781, and U.S. Patent No. 8,284,833 (collectively,  
13 “the Asserted Patents”). Apple has infringed and continues to infringe, contributed  
14 to and continues to contribute to the infringement of, and/or actively induced and  
15 continues to induce others to infringe the Asserted Patents. Broadcom and Apple  
16 have jointly infringed and continue to jointly infringe, jointly contributed to and  
17 continue to jointly contribute to the infringement of, and/or jointly actively induced  
18 and jointly continue to induce others to infringe the Asserted Patents.

19 3. Caltech is the legal owner by assignment of the Asserted Patents, which  
20 were duly and legally issued by the United States Patent and Trademark Office.  
21 Caltech seeks injunctive relief and monetary damages.

22 **THE PARTIES**

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

26 5. Caltech is a world-renowned science and engineering research and  
27 education institution, where extraordinary faculty and students seek answers to  
28 complex questions, discover new knowledge, lead innovation, and transform our

1 future. To date, 34 Caltech alumni and faculty have won a total of 35 Nobel Prizes.  
2 Caltech's 124-acre campus is located in Pasadena, California including 300  
3 professorial faculty and 600 research scholars. The mission of Caltech is to expand  
4 human knowledge and benefit society through research integrated with education.  
5 Caltech investigates the most challenging, fundamental problems in science and  
6 technology in a singularly collegial, interdisciplinary atmosphere, while educating  
7 outstanding students to become creative members of society. Caltech's investment  
8 in research has led Caltech to have more patent invention disclosures per faculty  
9 member than any other university in the nation and to be consistently ranked as one  
10 of the top university patent portfolios in strength and number of patents issued.

11         6. On information and belief, Broadcom Ltd. is a corporation organized  
12 under the laws of the country of Singapore with its principal places of business at  
13 1320 Ridder Park Dr., San Jose, California 95131 and 1 Yishun Avenue 7,  
14 Singapore 768923.

15         7. On information and belief, Broadcom Corp. is a California corporation  
16 with a principal place of business at 5300 California Avenue, Irvine, California  
17 92617. On information and belief, Broadcom Corp. is an indirect subsidiary of  
18 Broadcom Ltd.

19         8. On information and belief, Avago Technologies Ltd. is a corporation  
20 organized under the laws of the country of Singapore with its principal places of  
21 business at 1320 Ridder Park Dr., San Jose, California 95131 and 1 Yishun Avenue  
22 7, Singapore 768923. On information and belief, Avago Technologies Ltd. is an  
23 indirect subsidiary of Broadcom Ltd.

24         9. On information and belief, Apple Inc. is a corporation organized under  
25 the laws of the State of California, with its principal place of business at 1 Infinite  
26 Loop, Cupertino, California 95014.

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1 **JURISDICTION AND VENUE**

2 10. This Court has jurisdiction over the subject matter of this action under  
3 28 U.S.C. §§ 1331 and 1338(a).

4 11. Broadcom Ltd. is subject to this Court’s personal jurisdiction. On  
5 information and belief, Broadcom Ltd. regularly conducts business in the State of  
6 California, including in the Central District of California, and has committed acts of  
7 patent infringement and/or contributed to or induced acts of patent infringement by  
8 others in this District and elsewhere in California and the United States. As such,  
9 Broadcom Ltd. has purposefully availed itself of the privilege of conducting  
10 business within this District; has established sufficient minimum contacts with this  
11 District such that it should reasonably and fairly anticipate being haled into court in  
12 this District; has purposefully directed activities at residents of this State; and at  
13 least a portion of the patent infringement claims alleged herein arise out of or are  
14 related to one or more of the foregoing activities.

15 12. Broadcom Corp. is subject to this Court’s personal jurisdiction. On  
16 information and belief, Broadcom Corp. regularly conducts business in the State of  
17 California, including in the Central District of California, and has committed acts of  
18 patent infringement and/or contributed to or induced acts of patent infringement by  
19 others in this District and elsewhere in California and the United States. As such,  
20 Broadcom Corp. has purposefully availed itself of the privilege of conducting  
21 business within this District; has established sufficient minimum contacts with this  
22 District such that it should reasonably and fairly anticipate being haled into court in  
23 this District; has purposefully directed activities at residents of this State; and at  
24 least a portion of the patent infringement claims alleged herein arise out of or are  
25 related to one or more of the foregoing activities.

26 13. Avago Technologies Ltd. is subject to this Court’s personal  
27 jurisdiction. On information and belief, Avago Technologies Ltd. regularly  
28 conducts business in the State of California, including in the Central District of

1 California, and has committed acts of patent infringement and/or contributed to or  
2 induced acts of patent infringement by others in this District and elsewhere in  
3 California and the United States. As such, Avago Technologies Ltd. has  
4 purposefully availed itself of the privilege of conducting business within this  
5 District; has established sufficient minimum contacts with this District such that it  
6 should reasonably and fairly anticipate being haled into court in this District; has  
7 purposefully directed activities at residents of this State; and at least a portion of the  
8 patent infringement claims alleged herein arise out of or are related to one or more  
9 of the foregoing activities.

10 14. Apple Inc. is subject to this Court's personal jurisdiction. On  
11 information and belief, Apple Inc. regularly conducts business in the State of  
12 California, including in the Central District of California, and has committed acts of  
13 patent infringement and/or contributed to or induced acts of patent infringement by  
14 others in this District and elsewhere in California and the United States. As such,  
15 Apple Inc. has purposefully availed itself of the privilege of conducting business  
16 within this District; has established sufficient minimum contacts with this District  
17 such that it should reasonably and fairly anticipate being haled into court in this  
18 District; has purposefully directed activities at residents of this State; and at least a  
19 portion of the patent infringement claims alleged herein arise out of or are related to  
20 one or more of the foregoing activities.

21 15. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391  
22 and 1400 because Defendants regularly conduct business in this District, and certain  
23 of the acts complained of herein occurred in this District.

24 **CALTECH'S ASSERTED PATENTS**

25 16. On October 3, 2006, the United States Patent Office issued U.S. Patent  
26 No. 7,116,710, titled "Serial Concatenation of Interleaved Convolutional Codes  
27 Forming Turbo-Like Codes" (the "'710 patent"). A true and correct copy of the  
28 '710 patent is attached hereto as Exhibit A.



1 codes, called “irregular repeat and accumulate codes” (or “IRA codes”). The  
2 claimed methods and apparatuses generate an IRA code from information bits of a  
3 message by reordering repeated instances of those bits in a randomized but known  
4 way, and then performing logical operations on the reordered bits. These IRA codes  
5 are at least as effective at correcting errors in transmissions as prior coding  
6 techniques, such as turbo codes, but use simpler encoding and decoding circuitry  
7 and provide other technical and practical advantages, allowing for improved  
8 transmission rates and performance. Indeed, the IRA codes disclosed in the  
9 Asserted Patents enable a transmission rate close to the theoretical limit.

10 24. The Asserted Patents implement these novel IRA codes using novel  
11 encoders and decoders. The claims in the Asserted Patents describe the error  
12 correction methods in ways that enable a person of ordinary skill in the art to  
13 implement them using simple circuitry, providing improved performance over prior  
14 art encoders and decoders.

15 25. In September 2000, the Inventors of the Asserted Patents published a  
16 paper regarding their invention, titled “Irregular Repeat-Accumulate Codes” for the  
17 Second International Conference on Turbo Codes attached hereto as Exhibit E. This  
18 paper has been widely cited by experts in the industry.

19 26. The Inventors’ patents and publications describing IRA codes have  
20 been widely recognized and cited by academics and experts in the field of digital  
21 communications for their improvements over prior art error-correction codes. For  
22 example, a paper praising these IRA codes was published in August 2004 by Aline  
23 Roumy, Souad Guemghar, Giuseppe Caire, and Sergio Verdú in the IEEE  
24 Transactions on Information Theory. This paper, titled “Design Methods for  
25 Irregular Repeat-Accumulate Codes” and attached hereto as Exhibit F states:

26 IRA codes are, in fact, special subclasses of both irregular  
27 LDPCs and irregular turbo codes. . . . IRA codes are an  
28 appealing choice because the encoder is extremely simple, their  
performance is quite competitive with that of turbo codes and

1 LDPCs, and they can be decoded with a very-low-complexity  
2 iterative decoding scheme.

3 This paper also notes that, four years after publication of the Inventors' September  
4 2000 paper, the Inventors were the only ones to propose a method to design IRA  
5 codes.

### 6 **IEEE 802.11 Wi-Fi Standard**

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

11 28. The IEEE Wi-Fi standards are set forth in IEEE 802.11. The 802.11  
12 standardization process began in the 1990s and the first version of 802.11 was  
13 referred to as 802.11a. In the following years, subsequent versions of the 802.11  
14 standard were adopted.

15 29. One of the key improvements to the 802.11n version of the standard  
16 involved a "High Throughput (HT)" mode that is implemented using a specific type  
17 of LDPC (Low-Density Parity Check) code. This LDPC code used in 802.11n  
18 implements Caltech's patented IRA code technology.

19 30. This key improvement to the 802.11n version of the standard was also  
20 incorporated into the subsequent 802.11ac version of the standard. The 802.11ac  
21 version describes a "Very High Throughput (VHT)" mode that implements  
22 Caltech's patented IRA code technology.

23 31. The High Throughput and Very High Throughput modes provide  
24 significant advantages over earlier versions of the 802.11 standard. These modes  
25 allow for faster data transmissions while at the same time reducing the complexity  
26 of the encoders and decoders required to process the IRA/LDPC signals.

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1 decoders and infringe the Asserted Patents include, but are not limited to, the  
2 following: iPhone SE, iPhone 6S, iPhone 6S Plus, iPhone 6, iPhone 6 Plus, iPhone  
3 5C, iPhone 5S, iPhone 5, iPad Air, iPad Air 2, iPad Pro, iPad Mini 4, iPad Mini 3,  
4 iPad Mini 2, MacBookAir, Apple Watch and the products listed in Appendix 1  
5 (“Apple Accused Products”).

6 39. Apple has manufactured, used, imported, offered for sale, and/or sold  
7 products that incorporate IRA/LDPC encoders and/or decoders and infringe the  
8 Asserted Patents since approximately 2012. For example, Apple announced the  
9 release of the iPhone 5 in September 2012 in a press release titled: “Thinnest,  
10 Lightest iPhone Ever Features All-New Aluminum Design, Stunning 4-Inch Retina  
11 Display, A6 Chip & Ultrafast Wireless.” On information and belief, the iPhone 5  
12 incorporates a Broadcom BCM 4334 chip that is compliant with 802.11n and uses  
13 IRA/LDPC codes.

#### 14 **Broadcom’s Relationship With Apple**

15 40. Apple is one of Broadcom’s largest customers. In 2012, 2013 and  
16 2014, sales to Apple represented 14.6%, 13.3% and 14.0% of Broadcom Corp.’s net  
17 revenue, respectively. (Broadcom Corporation 2014 Form 10-K). During this  
18 timeframe, Broadcom’s Wi-Fi products that incorporate IRA/LDPC encoders and  
19 decoders and infringe the Asserted Patents were incorporated into Apple’s key  
20 products including iPhones, iPads, and Mac computers. On information and belief,  
21 sales from these Apple products generated hundreds of billions of dollars in  
22 revenue.

23 41. On information and belief, Broadcom markets, offers to sell, and sells  
24 its products to Apple in the United States and has secured numerous Apple design  
25 wins for its Wi-Fi products in the United States. Broadcom’s Wi-Fi design wins for  
26 Apple products include design wins for iPhones, iPads, Mac computers, and the  
27 Apple Watch.

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1           47. Notwithstanding Broadcom's actual notice of infringement, Broadcom  
2 continues to sell the Broadcom Accused Products, directly and/or through  
3 intermediaries, to others such as Apple that make, use, sell, offer for sale, or import  
4 into the United States the Broadcom Accused Products or other products  
5 incorporating the Broadcom Accused Products with knowledge of or willful  
6 blindness to the fact that its actions will induce others, including but not limited to  
7 its customers, partners, and/or end users, to directly infringe the '710 patent.  
8 Broadcom induces others including Apple to infringe the '710 patent in violation of  
9 35 U.S.C. § 271(b) by encouraging and facilitating others to perform actions that  
10 Broadcom knows to be acts of infringement of the '710 patent with intent that those  
11 performing the acts infringe the '710 patent. Upon information and belief,  
12 Broadcom, directly and/or through intermediaries, advertises and distributes the  
13 Broadcom Accused Products, publishes instruction materials, specifications and  
14 promotional literature describing the operation of the Broadcom Accused Products,  
15 offers technical assistance, training, and/or consulting services regarding the  
16 Broadcom Accused Products to their customers, partners, and/or end users. At least  
17 consumers, partners, and/or end users of these Broadcom Accused Products then  
18 directly infringe the '710 patent by making, using, selling, offering for sale, and/or  
19 importing into the United States, without authority, the Broadcom Accused Products  
20 or products incorporating the Broadcom Accused Products.

21           48. Notwithstanding Apple's actual notice of infringement, Apple  
22 continues to sell the Apple Accused Products, directly and/or through  
23 intermediaries, to others that make, use, sell, offer for sale, or import into the United  
24 States the Apple Accused Products with knowledge of or willful blindness to the  
25 fact that its actions will induce others, including but not limited to its customers,  
26 partners, and/or end users, to directly infringe the '710 patent. Apple induces others  
27 including its customers to infringe the '710 patent in violation of 35 U.S.C. § 271(b)  
28 by encouraging and facilitating others to perform actions that Apple knows to be

1 acts of infringement of the '710 patent with intent that those performing the acts  
2 infringe the '710 patent. Upon information and belief, Apple, directly and/or  
3 through intermediaries, advertises and distributes the Apple Accused Products,  
4 publishes instruction materials, specifications and promotional literature describing  
5 the operation of the Apple Accused Products, offers technical assistance, training,  
6 and/or consulting services regarding the Apple Accused Products to their customers,  
7 partners, and/or end users. At least consumers, partners, and/or end users of these  
8 Apple Accused Products then directly infringe the '710 patent by making, using,  
9 selling, offering for sale, and/or importing into the United States, without authority,  
10 the Apple Accused Products.

11 49. Upon information and belief, Broadcom knows that the Broadcom  
12 Accused Products are especially made or especially adapted for use in the  
13 infringement of the '710 patent. The infringing components of these products are  
14 not staple articles or commodities of commerce suitable for substantial non-  
15 infringing use, and the infringing components of these products are a material part  
16 of the invention of the '710 patent. Accordingly, in violation of 35 U.S.C. § 271(c),  
17 Broadcom is also contributing, directly and/or through intermediaries, to the direct  
18 infringement of the '710 patent by at least the customers such as Apple, partners,  
19 and/or end users of these Broadcom Accused Products. The customers such as  
20 Apple, partners, and/or end users of these Broadcom Accused Products directly  
21 infringe the '710 patent by making, using, selling, offering for sale, and/or importing  
22 into the United States, without authority, the Broadcom Accused Products or  
23 products incorporating the Broadcom Accused Products.

24 50. Upon information and belief, Apple knows that the Apple Accused  
25 Products are especially made or especially adapted for use in the infringement of the  
26 '710 patent. The infringing components of these products are not staple articles or  
27 commodities of commerce suitable for substantial non-infringing use, and the  
28 infringing components of these products are a material part of the invention of the

1 '710 patent. Accordingly, in violation of 35 U.S.C. § 271(c), Apple is also  
2 contributing, directly and/or through intermediaries, to the direct infringement of the  
3 '710 patent by at least the customers, partners, and/or end users of these Apple  
4 Accused Products. The customers, partners, and/or end users of these Apple  
5 Accused Products directly infringe the '710 patent by making, using, selling,  
6 offering for sale, and/or importing into the United States, without authority, the  
7 Apple Accused Products.

8 51. As but one example of Broadcom's contributory and/or induced  
9 infringement, Broadcom explicitly encourages customers such as Apple to use, sell,  
10 offer for sale and/or import into the United States products that infringe the '710  
11 patent by incorporating Broadcom Accused Products. For example, Broadcom's  
12 website advertises that the BCM 4350 product implements the 802.11ac standard  
13 and highlights its use of "low-density parity check codes (LDPC)." On information  
14 and belief, through materials such as these, Broadcom actively encourages  
15 customers such as Apple, partners, and/or end users to infringe the '710 patent  
16 through at least the use, sale, offer for sale and importation of products that  
17 incorporate the Broadcom Accused Products into the United States knowing those  
18 acts to be infringement of the '710 patent with intent that those performing the acts  
19 infringe the '710 patent.

20 52. As but one example of Apple's contributory and/or induced  
21 infringement, Apple explicitly encourages its customers to infringe the '710 patent  
22 by using the Apple Accused Products. For example, Apple's website advertises that  
23 the iPhone 6, implements the 802.11n and 802.11ac standard. On information and  
24 belief, through materials such as these, Apple actively encourages customers,  
25 partners, and/or end user to infringe the '710 patent through at least the use of Apple  
26 Accused Products incorporating Broadcom Accused Products such as the iPhone 6,  
27 knowing those acts to be infringement of the '710 patent with intent that those  
28 performing the acts infringe the '710 patent.



1 products that incorporate IRA/LDPC encoders and/or decoders. Broadcom has  
2 infringed and is currently infringing literally and/or under the doctrine of  
3 equivalents.

4 61. In violation of 35 U.S.C. § 271, Apple has infringed and is currently  
5 infringing, directly and/or through intermediaries, the '032 patent by making, using,  
6 selling, offering for sale, and/or importing into the United States, without authority,  
7 products that practice at least claims 1-8 and 10-22 of the '032 patent. These  
8 products include the Apple Accused Products and any other products that  
9 incorporate IRA/LDPC encoders and/or decoders. Apple has infringed and is  
10 currently infringing literally and/or under the doctrine of equivalents.

11 62. On information and belief, Broadcom and Apple have had actual  
12 knowledge of their infringement of the '032 patent since no later than the filing date  
13 of this Complaint.

14 63. Notwithstanding Broadcom's actual notice of infringement, Broadcom  
15 continues to sell the Broadcom Accused Products, directly and/or through  
16 intermediaries, to others such as Apple that make, use, sell, offer for sale, or import  
17 into the United States the Broadcom Accused Products or other products  
18 incorporating the Broadcom Accused Products with knowledge of or willful  
19 blindness to the fact that its actions will induce others, including but not limited to  
20 its customers, partners, and/or end users, to directly infringe the '032 patent.  
21 Broadcom induces others including Apple to infringe the '032 patent in violation of  
22 35 U.S.C. § 271(b) by encouraging and facilitating others to perform actions that  
23 Broadcom knows to be acts of infringement of the '032 patent with intent that those  
24 performing the acts infringe the '032 patent. Upon information and belief,  
25 Broadcom, directly and/or through intermediaries, advertises and distributes the  
26 Broadcom Accused Products, publishes instruction materials, specifications and  
27 promotional literature describing the operation of the Broadcom Accused Products,  
28 offers technical assistance, training, and/or consulting services regarding the

1 Broadcom Accused Products to their customers, partners, and/or end users. At least  
2 consumers, partners, and/or end users of these Broadcom Accused Products then  
3 directly infringe the '032 patent by making, using, selling, offering for sale, and/or  
4 importing into the United States, without authority, the Broadcom Accused Products  
5 or products incorporating the Broadcom Accused Products.

6 64. Notwithstanding Apple's actual notice of infringement, Apple  
7 continues to sell the Apple Accused Products, directly and/or through  
8 intermediaries, to others that make, use, sell, offer for sale, or import into the United  
9 States the Apple Accused Products with knowledge of or willful blindness to the  
10 fact that its actions will induce others, including but not limited to its customers,  
11 partners, and/or end users, to directly infringe the '032 patent. Apple induces others  
12 including its customers to infringe the '032 patent in violation of 35 U.S.C. § 271(b)  
13 by encouraging and facilitating others to perform actions that Apple knows to be  
14 acts of infringement of the '032 patent with intent that those performing the acts  
15 infringe the '032 patent. Upon information and belief, Apple, directly and/or  
16 through intermediaries, advertises and distributes the Apple Accused Products,  
17 publishes instruction materials, specifications and promotional literature describing  
18 the operation of the Apple Accused Products, offers technical assistance, training,  
19 and/or consulting services regarding the Apple Accused Products to their customers,  
20 partners, and/or end users. At least consumers, partners, and/or end users of these  
21 Apple Accused Products then directly infringe the '032 patent by making, using,  
22 selling, offering for sale, and/or importing into the United States, without authority,  
23 the Apple Accused Products.

24 65. Upon information and belief, Broadcom knows that the Broadcom  
25 Accused Products are especially made or especially adapted for use in the  
26 infringement of the '032 patent. The infringing components of these products are  
27 not staple articles or commodities of commerce suitable for substantial non-  
28 infringing use, and the infringing components of these products are a material part

1 of the invention of the '032 patent. Accordingly, in violation of 35 U.S.C. § 271(c),  
2 Broadcom is also contributing, directly and/or through intermediaries, to the direct  
3 infringement of the '032 patent by at least the customers such as Apple, partners,  
4 and/or end users of these Broadcom Accused Products. The customers such as  
5 Apple, partners, and/or end users of these Broadcom Accused Products directly  
6 infringe the '032 patent by making, using, selling, offering for sale, and/or importing  
7 into the United States, without authority, the Broadcom Accused Products or  
8 products incorporating the Broadcom Accused Products.

9       66. Upon information and belief, Apple knows that the Apple Accused  
10 Products are especially made or especially adapted for use in the infringement of the  
11 '032 patent. The infringing components of these products are not staple articles or  
12 commodities of commerce suitable for substantial non-infringing use, and the  
13 infringing components of these products are a material part of the invention of the  
14 '032 patent. Accordingly, in violation of 35 U.S.C. § 271(c), Apple is also  
15 contributing, directly and/or through intermediaries, to the direct infringement of the  
16 '032 patent by at least the customers, partners, and/or end users of these Apple  
17 Accused Products. The customers, partners, and/or end users of these Apple  
18 Accused Products directly infringe the '032 patent by making, using, selling,  
19 offering for sale, and/or importing into the United States, without authority, the  
20 Apple Accused Products.

21       67. As but one example of Broadcom's contributory and/or induced  
22 infringement, Broadcom explicitly encourages customers such as Apple to use, sell,  
23 offer for sale and/or import into the United States products that infringe the '032  
24 patent by incorporating Broadcom Accused Products. For example, Broadcom's  
25 website advertises that the BCM 4350 product implements the 802.11ac standard  
26 and highlights its use of "low-density parity check codes (LDPC)." On information  
27 and belief, through materials such as these, Broadcom actively encourages  
28 customers such as Apple, partners, and/or end users to infringe the '032 patent

1 through at least the use, sale, offer for sale and importation of products that  
2 incorporate the Broadcom Accused Products into the United States knowing those  
3 acts to be infringement of the '032 patent with intent that those performing the acts  
4 infringe the '032 patent.

5 68. As but one example of Apple's contributory and/or induced  
6 infringement, Apple explicitly encourages its customers to infringe the '032 patent  
7 by using the Apple Accused Products. For example, Apple's website advertises that  
8 the iPhone 6, implements the 802.11n and 802.11ac standard. On information and  
9 belief, through materials such as these, Apple actively encourages customers,  
10 partners, and/or end user to infringe the '032 patent through at least the use of Apple  
11 Accused Products incorporating Broadcom Accused Products such as the iPhone 6,  
12 knowing those acts to be infringement of the '032 patent with intent that those  
13 performing the acts infringe the '032 patent.

14 69. Broadcom is not licensed or otherwise authorized to practice the claims  
15 of the '032 patent.

16 70. Apple is not licensed or otherwise authorized to practice the claims of  
17 the '032 patent.

18 71. By reason of Broadcom's and Apple's individual and joint  
19 infringement, Caltech has suffered, and will continue to suffer, substantial damages.

20 72. Caltech is entitled to recover from Broadcom and Apple the damages  
21 sustained as a result of their wrongful acts in an amount subject to proof at trial.

22 73. Broadcom's and Apple's continuing acts of infringement are  
23 irreparably harming and causing damage to Caltech, for which Caltech has no  
24 adequate remedy at law, and will continue to suffer such irreparable injury unless  
25 Broadcom's and Apple's continuing acts of infringement are enjoined by the Court.  
26 The hardships that an injunction would impose are less than those faced by Caltech  
27 should an injunction not issue. The public interest would be served by issuance of  
28

1 an injunction. Thus, Caltech is entitled to a preliminary and a permanent injunction  
2 against further infringement.

3 74. Broadcom's and Apple's infringement of the '032 patent is exceptional  
4 and entitles Caltech to attorneys' fees and costs incurred in prosecuting this action  
5 under 35 U.S.C. § 285.

6 **COUNT III**

7 **Infringement of the '781 Patent**

8 75. Caltech re-alleges and incorporates by reference the allegations of the  
9 preceding paragraphs of this Complaint as if fully set forth herein.

10 76. In violation of 35 U.S.C. § 271, Broadcom has infringed and is  
11 currently infringing, directly and/or through intermediaries, the '781 patent by  
12 making, using, selling, offering for sale, and/or importing into the United States,  
13 without authority, products that practice at least claims 3-19 and 21-22 of the '781  
14 patent. These products include the Broadcom Accused Products, and any other  
15 products that incorporate IRA/LDPC encoders and/or decoders. Broadcom has  
16 infringed and is currently infringing literally and/or under the doctrine of  
17 equivalents.

18 77. In violation of 35 U.S.C. § 271, Apple has infringed and is currently  
19 infringing, directly and/or through intermediaries, the '781 patent by making, using,  
20 selling, offering for sale, and/or importing into the United States, without authority,  
21 products that practice at least claims 3-19 and 21-22 of the '781 patent. These  
22 products include the Apple Accused Products and any other products that  
23 incorporate IRA/LDPC encoders and/or decoders. Apple has infringed and is  
24 currently infringing literally and/or under the doctrine of equivalents.

25 78. On information and belief, Broadcom and Apple have had actual  
26 knowledge of their infringement of the '781 patent since no later than the filing date  
27 of this Complaint.

28

1           79. Notwithstanding Broadcom's actual notice of infringement, Broadcom  
2 continues to sell the Broadcom Accused Products, directly and/or through  
3 intermediaries, to others such as Apple that make, use, sell, offer for sale, or import  
4 into the United States the Broadcom Accused Products or other products  
5 incorporating the Broadcom Accused Products with knowledge of or willful  
6 blindness to the fact that its actions will induce others, including but not limited to  
7 its customers, partners, and/or end users, to directly infringe the '781 patent.  
8 Broadcom induces others including Apple to infringe the '781 patent in violation of  
9 35 U.S.C. § 271(b) by encouraging and facilitating others to perform actions that  
10 Broadcom knows to be acts of infringement of the '781 patent with intent that those  
11 performing the acts infringe the '781 patent. Upon information and belief,  
12 Broadcom, directly and/or through intermediaries, advertises and distributes the  
13 Broadcom Accused Products, publishes instruction materials, specifications and  
14 promotional literature describing the operation of the Broadcom Accused Products,  
15 offers technical assistance, training, and/or consulting services regarding the  
16 Broadcom Accused Products to their customers, partners, and/or end users. At least  
17 consumers, partners, and/or end users of these Broadcom Accused Products then  
18 directly infringe the '781 patent by making, using, selling, offering for sale, and/or  
19 importing into the United States, without authority, the Broadcom Accused Products  
20 or products incorporating the Broadcom Accused Products.

21           80. Notwithstanding Apple's actual notice of infringement, Apple  
22 continues to sell the Apple Accused Products, directly and/or through  
23 intermediaries, to others that make, use, sell, offer for sale, or import into the United  
24 States the Apple Accused Products with knowledge of or willful blindness to the  
25 fact that its actions will induce others, including but not limited to its customers,  
26 partners, and/or end users, to directly infringe the '781 patent. Apple induces others  
27 including its customers to infringe the '781 patent in violation of 35 U.S.C. § 271(b)  
28 by encouraging and facilitating others to perform actions that Apple knows to be

1 acts of infringement of the '781 patent with intent that those performing the acts  
2 infringe the '781 patent. Upon information and belief, Apple, directly and/or  
3 through intermediaries, advertises and distributes the Apple Accused Products,  
4 publishes instruction materials, specifications and promotional literature describing  
5 the operation of the Apple Accused Products, offers technical assistance, training,  
6 and/or consulting services regarding the Apple Accused Products to their customers,  
7 partners, and/or end users. At least consumers, partners, and/or end users of these  
8 Apple Accused Products then directly infringe the '781 patent by making, using,  
9 selling, offering for sale, and/or importing into the United States, without authority,  
10 the Apple Accused Products.

11 81. Upon information and belief, Broadcom knows that the Broadcom  
12 Accused Products are especially made or especially adapted for use in the  
13 infringement of the '781 patent. The infringing components of these products are  
14 not staple articles or commodities of commerce suitable for substantial non-  
15 infringing use, and the infringing components of these products are a material part  
16 of the invention of the '781 patent. Accordingly, in violation of 35 U.S.C. § 271(c),  
17 Broadcom is also contributing, directly and/or through intermediaries, to the direct  
18 infringement of the '781 patent by at least the customers such as Apple, partners,  
19 and/or end users of these Broadcom Accused Products. The customers such as  
20 Apple, partners, and/or end users of these Broadcom Accused Products directly  
21 infringe the '781 patent by making, using, selling, offering for sale, and/or importing  
22 into the United States, without authority, the Broadcom Accused Products or  
23 products incorporating the Broadcom Accused Products.

24 82. Upon information and belief, Apple knows that the Apple Accused  
25 Products are especially made or especially adapted for use in the infringement of the  
26 '781 patent. The infringing components of these products are not staple articles or  
27 commodities of commerce suitable for substantial non-infringing use, and the  
28 infringing components of these products are a material part of the invention of the

1 '781 patent. Accordingly, in violation of 35 U.S.C. § 271(c), Apple is also  
2 contributing, directly and/or through intermediaries, to the direct infringement of the  
3 '781 patent by at least the customers, partners, and/or end users of these Apple  
4 Accused Products. The customers, partners, and/or end users of these Apple  
5 Accused Products directly infringe the '781 patent by making, using, selling,  
6 offering for sale, and/or importing into the United States, without authority, the  
7 Apple Accused Products.

8 83. As but one example of Broadcom's contributory and/or induced  
9 infringement, Broadcom explicitly encourages customers such as Apple to use, sell,  
10 offer for sale and/or import into the United States products that infringe the '781  
11 patent by incorporating Broadcom Accused Products. For example, Broadcom's  
12 website advertises that the BCM 4350 product implements the 802.11ac standard  
13 and highlights its use of "low-density parity check codes (LDPC)." On information  
14 and belief, through materials such as these, Broadcom actively encourages  
15 customers such as Apple, partners, and/or end users to infringe the '781 patent  
16 through at least the use, sale, offer for sale and importation of products that  
17 incorporate the Broadcom Accused Products into the United States knowing those  
18 acts to be infringement of the '781 patent with intent that those performing the acts  
19 infringe the '781 patent.

20 84. As but one example of Apple's contributory and/or induced  
21 infringement, Apple explicitly encourages its customers to infringe the '781 patent  
22 by using the Apple Accused Products. For example, Apple's website advertises that  
23 the iPhone 6, implements the 802.11n and 802.11ac standard. On information and  
24 belief, through materials such as these, Apple actively encourages customers,  
25 partners, and/or end user to infringe the '781 patent through at least the use of Apple  
26 Accused Products incorporating Broadcom Accused Products such as the iPhone 6,  
27 knowing those acts to be infringement of the '781 patent with intent that those  
28 performing the acts infringe the '781 patent.

1 85. Broadcom is not licensed or otherwise authorized to practice the claims  
2 of the '781 patent.

3 86. Apple is not licensed or otherwise authorized to practice the claims of  
4 the '781 patent.

5 87. By reason of Broadcom's and Apple's individual and joint  
6 infringement, Caltech has suffered, and will continue to suffer, substantial damages.

7 88. Caltech is entitled to recover from Broadcom and Apple the damages  
8 sustained as a result of their wrongful acts in an amount subject to proof at trial.

9 89. Broadcom's and Apple's continuing acts of infringement are  
10 irreparably harming and causing damage to Caltech, for which Caltech has no  
11 adequate remedy at law, and will continue to suffer such irreparable injury unless  
12 Broadcom's and Apple's continuing acts of infringement are enjoined by the Court.  
13 The hardships that an injunction would impose are less than those faced by Caltech  
14 should an injunction not issue. The public interest would be served by issuance of  
15 an injunction. Thus, Caltech is entitled to a preliminary and a permanent injunction  
16 against further infringement.

17 90. Broadcom's and Apple's infringement of the '781 patent is  
18 exceptional and entitles Caltech to attorneys' fees and costs incurred in prosecuting  
19 this action under 35 U.S.C. § 285.

20 **COUNT IV**

21 **Infringement of the '833 Patent**

22 91. Caltech re-alleges and incorporates by reference the allegations of the  
23 preceding paragraphs of this Complaint as if fully set forth herein.

24 92. In violation of 35 U.S.C. § 271, Broadcom has infringed and is  
25 currently infringing, directly and/or through intermediaries, the '833 patent by  
26 making, using, selling, offering for sale, and/or importing into the United States,  
27 without authority, products that practice at least claims 1-4, 6-11, and 13-14 of the  
28 '833 patent. These products include the Broadcom Accused Products, and any other

1 products that incorporate IRA/LDPC encoders and/or decoders. Broadcom has  
2 infringed and is currently infringing literally and/or under the doctrine of  
3 equivalents.

4 93. In violation of 35 U.S.C. § 271, Apple has infringed and is currently  
5 infringing, directly and/or through intermediaries, the '833 patent by making, using,  
6 selling, offering for sale, and/or importing into the United States, without authority,  
7 products that practice at least claims 1-4, 6-11, and 13-14 of the '833 patent. These  
8 products include the Apple Accused Products and any other products that  
9 incorporate IRA/LDPC encoders and/or decoders. Apple has infringed and is  
10 currently infringing literally and/or under the doctrine of equivalents.

11 94. On information and belief, Broadcom and Apple have had actual  
12 knowledge of their infringement of the '833 patent since no later than the filing date  
13 of this Complaint.

14 95. Notwithstanding Broadcom's actual notice of infringement, Broadcom  
15 continues to sell the Broadcom Accused Products, directly and/or through  
16 intermediaries, to others such as Apple that make, use, sell, offer for sale, or import  
17 into the United States the Broadcom Accused Products or other products  
18 incorporating the Broadcom Accused Products with knowledge of or willful  
19 blindness to the fact that its actions will induce others, including but not limited to  
20 its customers, partners, and/or end users, to directly infringe the '833 patent.  
21 Broadcom induces others including Apple to infringe the '833 patent in violation of  
22 35 U.S.C. § 271(b) by encouraging and facilitating others to perform actions that  
23 Broadcom knows to be acts of infringement of the '833 patent with intent that those  
24 performing the acts infringe the '833 patent. Upon information and belief,  
25 Broadcom, directly and/or through intermediaries, advertises and distributes the  
26 Broadcom Accused Products, publishes instruction materials, specifications and  
27 promotional literature describing the operation of the Broadcom Accused Products,  
28 offers technical assistance, training, and/or consulting services regarding the

1 Broadcom Accused Products to their customers, partners, and/or end users. At least  
2 consumers, partners, and/or end users of these Broadcom Accused Products then  
3 directly infringe the '833 patent by making, using, selling, offering for sale, and/or  
4 importing into the United States, without authority, the Broadcom Accused Products  
5 or products incorporating the Broadcom Accused Products.

6 96. Notwithstanding Apple's actual notice of infringement, Apple  
7 continues to sell the Apple Accused Products, directly and/or through  
8 intermediaries, to others that make, use, sell, offer for sale, or import into the United  
9 States the Apple Accused Products with knowledge of or willful blindness to the  
10 fact that its actions will induce others, including but not limited to its customers,  
11 partners, and/or end users, to directly infringe the '833 patent. Apple induces others  
12 including its customers to infringe the '833 patent in violation of 35 U.S.C. § 271(b)  
13 by encouraging and facilitating others to perform actions that Apple knows to be  
14 acts of infringement of the '833 patent with intent that those performing the acts  
15 infringe the '833 patent. Upon information and belief, Apple, directly and/or  
16 through intermediaries, advertises and distributes the Apple Accused Products,  
17 publishes instruction materials, specifications and promotional literature describing  
18 the operation of the Apple Accused Products, offers technical assistance, training,  
19 and/or consulting services regarding the Apple Accused Products to their customers,  
20 partners, and/or end users. At least consumers, partners, and/or end users of these  
21 Apple Accused Products then directly infringe the '833 patent by making, using,  
22 selling, offering for sale, and/or importing into the United States, without authority,  
23 the Apple Accused Products.

24 97. Upon information and belief, Broadcom knows that the Broadcom  
25 Accused Products are especially made or especially adapted for use in the  
26 infringement of the '833 patent. The infringing components of these products are  
27 not staple articles or commodities of commerce suitable for substantial non-  
28 infringing use, and the infringing components of these products are a material part

1 of the invention of the '833 patent. Accordingly, in violation of 35 U.S.C. § 271(c),  
2 Broadcom is also contributing, directly and/or through intermediaries, to the direct  
3 infringement of the '833 patent by at least the customers such as Apple, partners,  
4 and/or end users of these Broadcom Accused Products. The customers such as  
5 Apple, partners, and/or end users of these Broadcom Accused Products directly  
6 infringe the '833 patent by making, using, selling, offering for sale, and/or importing  
7 into the United States, without authority, the Broadcom Accused Products or  
8 products incorporating the Broadcom Accused Products.

9 98. Upon information and belief, Apple knows that the Apple Accused  
10 Products are especially made or especially adapted for use in the infringement of the  
11 '833 patent. The infringing components of these products are not staple articles or  
12 commodities of commerce suitable for substantial non-infringing use, and the  
13 infringing components of these products are a material part of the invention of the  
14 '833 patent. Accordingly, in violation of 35 U.S.C. § 271(c), Apple is also  
15 contributing, directly and/or through intermediaries, to the direct infringement of the  
16 '833 patent by at least the customers, partners, and/or end users of these Apple  
17 Accused Products. The customers, partners, and/or end users of these Apple  
18 Accused Products directly infringe the '833 patent by making, using, selling,  
19 offering for sale, and/or importing into the United States, without authority, the  
20 Apple Accused Products.

21 99. As but one example of Broadcom's contributory and/or induced  
22 infringement, Broadcom explicitly encourages customers such as Apple to use, sell,  
23 offer for sale and/or import into the United States products that infringe the '833  
24 patent by incorporating Broadcom Accused Products. For example, Broadcom's  
25 website advertises that the BCM 4350 product implements the 802.11ac standard  
26 and highlights its use of "low-density parity check codes (LDPC)." On information  
27 and belief, through materials such as these, Broadcom actively encourages  
28 customers such as Apple, partners, and/or end users to infringe the '833 patent

1 through at least the use, sale, offer for sale and importation of products that  
2 incorporate the Broadcom Accused Products into the United States knowing those  
3 acts to be infringement of the '833 patent with intent that those performing the acts  
4 infringe the '833 patent.

5 100. As but one example of Apple's contributory and/or induced  
6 infringement, Apple explicitly encourages its customers to infringe the '833 patent  
7 by using the Apple Accused Products. For example, Apple's website advertises that  
8 the iPhone 6, implements the 802.11n and 802.11ac standard. On information and  
9 belief, through materials such as these, Apple actively encourages customers,  
10 partners, and/or end user to infringe the '833 patent through at least the use of Apple  
11 Accused Products incorporating Broadcom Accused Products such as the iPhone 6,  
12 knowing those acts to be infringement of the '833 patent with intent that those  
13 performing the acts infringe the '833 patent.

14 101. Broadcom is not licensed or otherwise authorized to practice the claims  
15 of the '833 patent.

16 102. Apple is not licensed or otherwise authorized to practice the claims of  
17 the '833 patent.

18 103. By reason of Broadcom's and Apple's individual and joint  
19 infringement, Caltech has suffered, and will continue to suffer, substantial damages.

20 104. Caltech is entitled to recover from Broadcom and Apple the damages  
21 sustained as a result of their wrongful acts in an amount subject to proof at trial.

22 105. Broadcom's and Apple's continuing acts of infringement are  
23 irreparably harming and causing damage to Caltech, for which Caltech has no  
24 adequate remedy at law, and will continue to suffer such irreparable injury unless  
25 Broadcom's and Apple's continuing acts of infringement are enjoined by the Court.  
26 The hardships that an injunction would impose are less than those faced by Caltech  
27 should an injunction not issue. The public interest would be served by issuance of  
28

1 an injunction. Thus, Caltech is entitled to a preliminary and a permanent injunction  
2 against further infringement.

3 106. Broadcom's and Apple's infringement of the '833 patent is  
4 exceptional and entitles Caltech to attorneys' fees and costs incurred in prosecuting  
5 this action under 35 U.S.C. § 285.

6 **PRAYER FOR RELIEF**

7 WHEREFORE, Plaintiff respectfully prays for the following relief:

8 (a) A judgment that Defendants have infringed each and every one of the  
9 Asserted Patents;

10 (b) A preliminary and permanent injunction against Defendants, their  
11 respective officers, agents, servants, employees, attorneys, parent and subsidiary  
12 corporations, assigns and successors in interest, and those persons in active concert  
13 or participation with them, enjoining them from infringement, inducement of  
14 infringement, and contributory infringement of each and every one of the Asserted  
15 Patents, including but not limited to an injunction against making, using, selling,  
16 and/or offering for sale within the United States, and/or importing into the United  
17 States, any products, methods, equipment and/or services that infringe the Asserted  
18 Patents;

19 (c) Damages adequate to compensate Caltech for Defendants' infringement  
20 of the Asserted Patents pursuant to 35 U.S.C. § 284;

21 (d) Prejudgment interest;

22 (e) Post-judgment interest;

23 (f) A declaration that this Action is exceptional pursuant to 35 U.S.C.  
24 § 285, and an award to Caltech of its attorneys' fees, costs and expenses incurred in  
25 connection with this Action; and

26 (h) Such other relief as the Court deems just and equitable.  
27  
28

1 DATED: May 26, 2016

Respectfully submitted,

2  
3 QUINN EMANUEL URQUHART &  
SULLIVAN, LLP

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5  
6 By /s/ James R. Asperger  
James R. Asperger  
7 *Attorneys for Plaintiff California Institute*  
8 *of Technology*

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**DEMAND FOR JURY TRIAL**

Pursuant to Rule 38 of the Federal Rules of Civil Procedure and Local Rule 38-1 of this Court, Plaintiff hereby demands a trial by jury as to all issues so triable.

DATED: May 26, 2016

Respectfully submitted,

QUINN EMANUEL URQUHART &  
SULLIVAN, LLP

By /s/ James R. Asperger  
James R. Asperger  
*Attorneys for Plaintiff California Institute  
of Technology*