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8 SPECTRA LICENSING GROUP, LLC

9
10 UNITED STATES DISTRICT COURT
11 SOUTHERN DISTRICT OF CALIFORNIA

12 SPECTRA LICENSING GROUP,
13 LLC, a California corporation,

14 Plaintiff,

15 v.

16
17 LSI CORPORATION, a Delaware
18 corporation and AVAGO
19 TECHNOLOGIES U.S., INC, a
20 Delaware corporation,

21 Defendants.

CASE NO.: 3:16-cv-00899-DMS-MDD

**AMENDED COMPLAINT FOR
PATENT INFRINGEMENT**

JURY TRIAL DEMANDED

1 This is an action for patent infringement in which Plaintiff SPECTRA
2 LICENSING GROUP, LLC (“SPECTRA” or “Plaintiff”) makes the following
3 allegations against Defendants LSI CORPORATION (“LSI”) and AVAGO
4 TECHNOLOGIES U.S., INC (“AVAGO”) (collectively, “Defendants”) as follows:

5 **THE PARTIES AND THEIR OWNERSHIP**

6 1. Plaintiff SPECTRA is a limited liability company organized under the
7 laws of the State of California with a principal place of business at 2907 Shelter
8 Island Drive, Suite 105-279, San Diego, California 92106.

9 2. Upon information and belief, Defendant LSI is a corporation organized
10 under the laws of the state of Delaware, with offices located at 1320 Ridder Park
11 Drive, San Jose, California 95131. LSI is registered with the California Secretary of
12 State under entity number C1590746.

13 3. Upon information and belief, AVAGO is a corporation organized under
14 the laws of the state of Delaware, with offices located at 1320 Ridder Park Drive, San
15 Jose, California 95131. AVAGO is registered with the California Secretary of State
16 under entity number C2800429.

17 4. Although not a party to this action, upon information and belief,
18 Defendant BROADCOM is a Singapore Corporation with co-headquarters at 1320
19 Ridder Park Drive, San Jose, California 95131 and 1 Yishun Avenue 7, Singapore.
20 BROADCOM was previously known as Avago Technologies Limited.

21 5. Upon information and belief, Defendant LSI was acquired by Avago
22 Technologies, Ltd. in 2013 and has been a wholly owned subsidiary of BROADCOM
23 since 2015.

24 6. Upon information and belief, AVAGO is a wholly owned subsidiary of
25 BROADCOM.

26 7. Upon information and belief, BROADCOM and Avago Technologies,
27 Ltd. are holding companies that do not engage in any sales use, or product
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1 development activities, particularly with regard to read channel devices for use in
2 hard-disk drives.

3 **JURISDICTION AND VENUE**

4 8. This is an action for patent infringement arising under the patent laws
5 of the United States, 35 U.S.C. §1, *et seq.*, including 35 U.S.C. § 271. This Court has
6 subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

7 9. This Court has personal jurisdiction over Defendants at least because
8 Defendants are present within or have ongoing and systematic contacts with the
9 United States, the State of California, and the Southern District of California.
10 Defendants have purposefully and regularly availed themselves of the privileges of
11 conducting business in the State of California and in the Southern District of
12 California and expected or reasonably should have expected their acts to have
13 consequence in the State of California and within this judicial District. Plaintiff's
14 causes of action arise directly from Defendants' business contacts and other activities
15 in the State of California and in the Southern District of California. Defendants have
16 committed acts of patent infringement in this District, and have harmed SPECTRA
17 in this District, by, among other things, using, selling, offering for sale, and/or
18 importing infringing products and/or services into this District.

19 10. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391 and
20 1400(b) as Defendants are doing substantial business in this judicial District and
21 therefore may be found in this district, and/or a substantial part of the events giving
22 rise to the claim alleged herein occurred within this District.

23 **PATENT-IN-SUIT**

24 11. SPECTRA owns, by assignment, all right, title, and interest in U.S.
25 Patent No. 6,108,388 ("the '388 patent" or the "Patent-in-Suit").

26 12. The '388 patent, entitled "Iterative-Structure Digital Signal Reception
27 Device, and Module and Method Therefor" was duly and legally issued by the United
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1 States Patent and Trademark Office on August 22, 2000 naming Catherine Douillard,
2 *et al.*, as inventors after a full and fair examination. The '388 patent has a priority
3 date of at least February 7, 1995. The '388 patent was originally assigned to "France
4 Telecom; Telediffusion de France, both of Paris, France".¹ A true and correct copy
5 of the '388 patent (including the Certificate of Correction) is attached hereto as
6 Exhibit A.

7 13. The Patent-in-Suit is/was valid and enforceable at least until February
8 6, 2016.

9 14. SPECTRA is in compliance with the marking requirements under 35
10 U.S.C. § 287 in that it has no duty to mark or to give notice in lieu thereof because it
11 has no products to mark.

12 **BACKGROUND**

13 **The Invention of Turbo Equalization and Iterative Detection.**

14 15. During the early 1990s, French researchers (including the named
15 inventors of the '388 patent) made groundbreaking advances in the area of iterative
16 signal processing. These advances included the development of iteratively decodable
17 codes such as "Turbo Codes" as well as the development of a signal processing
18 technique called "turbo equalization." Turbo equalization may also be referred to as
19 "iterative detection," "iterative coding," or "iterative reception."

20 16. The technological advance provided by turbo equalization, which was
21 made possible by France Telecom in collaboration with ENST de Bretagne (an elite
22 French information technology and telecommunications research school), led to huge
23 performance gains in systems that experience substantial inter-symbol interference
24 (ISI) such as the hard disk drive data storage market.

25 17. At its most basic, "turbo equalization" is an advanced signal processing
26 technique for "cleaning-up" errors introduced by ISI during transmission or storage.

27
28 ¹ France Telecom is now known as "Orange S.A."

1 In the context of high capacity hard disk drives (“HDDs”), ISI occurs because the
2 data bits (symbols) are packed so closely together that they interfere with one another.
3 This may cause cross-talk between the data symbols stored on the disk making it
4 difficult to recover the original information.

5 18. Turbo equalization was first described publicly in a paper entitled: C.
6 Douillard, *et al.*, “Iterative correction of inter-symbol interference: Turbo
7 Equalization,” *Eur. Trans. Communications*, vol. 6, pp. 507-11, Oct. 1995 (the
8 “Douillard Paper”). (Attached hereto as Exhibit B.)

9 19. The Douillard Paper has been widely acknowledged as the first paper to
10 propose turbo equalization.

11 20. For example, the Douillard Paper was acknowledged as the first
12 proposal of turbo equalization in a paper entitled “The Turbo Principle: Tutorial
13 Introduction and State of the Art,” Hagenauer, 1997 (the “Hagenauer Paper”).
14 (Attached hereto as Exhibit C.)

15 21. The Douillard Paper was also acknowledged as the first paper to propose
16 turbo equalization in “Turbo Equalization: Principles and New Results,” Michael
17 Tuchler, Ralf Koetter and Andrew Singer, 2002 (the “Tuchler Paper”). (Attached
18 hereto as Exhibit D.)

19 22. The Douillard Paper was once again acknowledged as the original
20 proposal for turbo equalization in “Comparative Study of Turbo Equalization
21 Schemes Using Convolutional, Convolutional Turbo, and Block-Turbo Codes.” B.L.
22 Yeap, *et al.*, 2002 at Bates E-2, lines 1-2 (the “Yeap Paper”). (Attached hereto as
23 Exhibit E.)

24 23. The Douillard Paper was also incorporated by reference in U.S. Patent
25 No. 8,291,299 (“the ’299 patent”), assigned to LSI, as a source of information about
26 turbo-equalization. (Attached hereto as Exhibit F; *see* col. 7, lines 11-15.) The ’299
27 patent from LSI is entitled “Turbo-Equalization Methods for Iterative Decoders.”
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1 The '299 patent lists LSI employees Zongwang Li, Shaohua Yang, Yang Han, Hao
2 Zhong, Yuan Xing Lee, and Weijun Tan as inventors and it also incorporates the
3 Yeap Paper by reference in its entirety. (*Id.* at lines 15-20.)

4 **Aspects of Iterative Detection are Claimed in the '388 Patent.**

5 24. The ENST research activity reflected in the Douillard Paper also led to
6 the issuance of the '388 patent, the first of many more related to turbo equalization
7 and iterative detection. The '388 patent was assigned to France Telecom, and then
8 later to Plaintiff.

9 25. Various aspects of the practice of turbo equalization and/or iterative
10 detection as described in the Douillard Paper, especially as implemented by
11 Defendants in the context of devices for use in hard disk drives, infringed the '388
12 patent.

13 26. Via the use of Defendants' iterative read channel devices, including the
14 design, development, demonstration, sampling, evaluation, configuration, testing,
15 optimization, and qualification thereof, one or more Defendants infringed the '388
16 patent under 35 U.S.C § 271.

17 **LSI Knew that Iterative Detection was First Disclosed in the Douillard Paper**
18 **and Associated with France Telecom's Research.**

19 27. Upon information and belief Defendants were aware and have been
20 aware of France Telecom's work in the arena of iterative coding and iterative
21 detection, and have knowledge that directly connects the discovery of turbo
22 equalization to France Telecom's research activities. This is demonstrated by, among
23 other things, the '299 patent referencing the Douillard Paper and the Yeap Paper, the
24 latter of which acknowledges the former as the origin of turbo equalization.

25 28. Upon information and belief, Defendants were aware of the '388 patent
26 prior to the initiation of this lawsuit.

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1 **The LSI TrueStore RC5100/5200 as Exemplary Accused Product.**

2 29. LSI published a description and diagram of the read channel processing
3 capabilities of its TrueStore 5100/5200 series read channel device family in a
4 document entitled “TrueStore® RC5100/5200 Series Spyder Read Channel Product
5 Specification” dated February 2013, (the “TrueStore 5x00 Specification”). (Selected
6 pages of which are attached hereto as Exhibit G.)

7 30. The TrueStore 5x00 Specification was prepared for LSI customer
8 Seagate Technology, a hard disk drive manufacturer with operational headquarters
9 in Cupertino, California.

10 31. Based on information and belief, the TrueStore 5x00 Specification is an
11 accurate depiction of the LSI TrueStore 5100/5200 series read channel device family
12 (collectively, the “TrueStore 5x00 Series”).

13 32. Section 14.1 of the TrueStore 5x00 Specification is entitled “Iterative
14 Decoding Overview” and the first three paragraphs read as follows:

15 Iterative decoding consists of both global and local iterations. A global
16 iteration is defined as one pass through a soft-input/soft-output detector
17 followed by multiple passes, or local iterations, through a soft-
input/soft-output LDPC decoder.

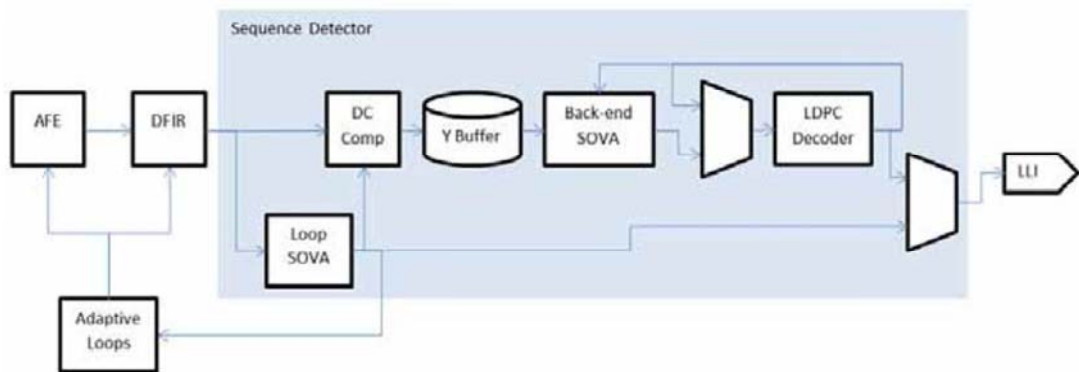
18 A soft-input/soft-output detector, commonly referred to as a SOVA,
19 combines equalized ADC samples acquired during the initial physical
20 read operation with probability information generated by the LDPC
21 decoder in prior global iterations. Using these two data streams, the
22 SOVA generates soft decisions in the form of log-likelihood ratios
23 (LLRs), which express the probability that a given bit is a 0 or a 1.
Subsequently the LDPC decoder uses the LLRs calculated by the SOVA
to calculate new probabilities based on knowledge of the LDPC parity
equations.

24 In the first global iteration while decoding a given sector, soft
25 information from the LDPC decoder is not yet available, so the SOVA
26 relies purely on equalized output samples from the read channel digital
finite impulse response (DFIR) filter, commonly referred to as *Y*
27 *samples*. As iterative decoding progresses, the SOVA and LDPC
28 decoder continue to pass information back and forth until a solution

1 which satisfies all LDPC parity equations is found, and the sector is said
 2 to converge. Once a sector has converged, the iterative decoder
 3 transmits the recovered data to the controller. (Exhibit G at Bates G-4,
 emphasis added.)

4 33. Figure 139 of the TrueStore 5x00 Specification (*Id.*) provides a flow
 5 diagram of the iterative decoding performed by the sequence detector (reproduced in
 6 full below).

7 **Figure 139 Sequence Detector Data Flow Diagram**



14 34. An LDPC code is a low-density parity check code. An LDPC code is
 15 constructed from many interconnected single parity check (SPC) codes.

16 **Infringement Analysis of the TrueStore 5x00 Series**

17 35. Claim 9 of the '388 patent, with miniscule reference letters added to
 18 designate different parts of the claim, reads as follows (in light of the Certificate of
 19 Correction):

20 *9. Method for the reception of signals formed by a series of digital*
 21 *symbols corresponding to the convolutive encoding of items of source*
 22 *digital data comprising the following steps:*

23 *[a] supplying with received symbols R_i ; and*

24 *[b] performing for each received symbol R_i at least two*
 iterations of the following steps:

25 *[c] correcting inter-symbol interference affecting received*
 26 *symbols R_i , by means of an item of correction information Z_i ,*
 27 *said correction information Z_i except Z_1 (first iteration), being*
 28 *computed by a computing step of the previous iteration, and the*

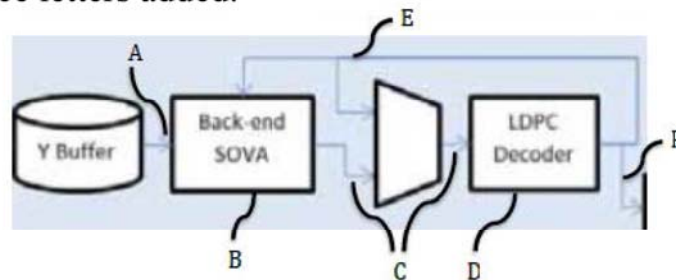
1 *delivery of corresponding estimated symbols $A_{i,1}$ with weighted*
 2 *value;*

3 *[d] decoding said estimated symbols $A_{i,1}$ with weighted value*
 4 *entailing operations symmetrical to said convolutive encoding,*
 5 *and the delivery of decoded symbols $A_{i,2}$ with weighted value;*

6 *[e] computing said correction information Z_i from at least one*
 7 *of said estimated symbols $A_{i,1}$ and at least one of said decoded*
 8 *symbols $A_{i,2}$; and*

9 *[f] delivering said correction information Z_i to the step of*
 10 *correcting inter-symbol interference of the following iteration.*

11 36. Attached hereto as Exhibit H (and included immediately below) is the
 12 “Iterative Decoder” portion of the TrueStore 5x00 Series core as depicted in Figure
 13 139 of the TrueStore 5x00 Specification (Exhibit G at Bates G-4), shown with
 14 majuscule reference letters added.



15 37. Upon information and belief, the input arrow (A) to the back-end SOVA
 16 is indicative of the step of (a) “supplying with received symbols R_i .”

17 38. Upon information and belief, the use of the term “global iterations” in
 18 Section 14.1 of the TrueStore 5x00 Specification is indicative of the step of (b)
 19 “performing for each receive symbol R_i at least two iterations.” A “global iteration”
 20 is defined in the first paragraph of section 14.1 of the TrueStore 5x00 Specification
 21 as “one pass through a [SISO] detector followed by multiple passes ... through a
 22 [SISO] LDPC decoder.”

23 39. The use of at least two iterations is further demonstrated by the
 24 following description from the third paragraph of section 14.1 (as provided above)
 25 where each “pass” of information is an iteration: “As iterative decoding progresses,
 26 the SOVA and LDPC decoder continue to pass information back and forth until a
 27
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1 solution which satisfies all LDPC parity equations is found, and the sector is said to
2 converge.” (Emphasis added.)

3 40. Upon information and belief, the back-end SOVA (B) is indicative of
4 performing the step (c) of “correcting for inter-symbol interference.”

5 41. Upon information and belief, the statement that the “soft-input/soft-
6 output detector, commonly referred to as a SOVA, combines equalized ADC samples
7 acquired during the initial physical read operation with probability information”
8 (from Section 14.1 of the TrueStore 5x00 Specification) is indicative of correcting
9 “by means of an item of correction information” as set forth in step (c). (Emphasis
10 added.)

11 42. Upon information and belief, the sideways pointing arrows (C) are
12 indicative of the “delivery of decoded symbols with weighted value” as set forth in
13 step (c). This is further indicated by the statement “[s]ubsequently the LDPC decoder
14 uses the LLRs calculated by the SOVA” as set forth in Section 14.1 of the TrueStore
15 5x00 Specification. (Emphasis added.)

16 43. Upon information and belief, LDPC Decoder (D) is indicative of
17 performing the step of (d) “decoding said estimated symbols” and “delivering
18 estimated symbols with weighted value,” which takes place during the “local
19 iterations.”

20 44. Upon information and belief, LDPC Decoder (D) further performs the
21 step (e) of “computing correction information from at least one of said estimated
22 symbols and at least one of said decoded symbols,” which also takes place during the
23 “local iterations.”

24 45. Upon information and belief, arrow (E) is indicative of the step (f) of
25 “delivering said correction information to the step of correcting inter-symbol
26 interference of the following iteration.”
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1 46. Upon information and belief, the decoding performed by LDPC
2 Decoder (D) entails operations symmetrical to said convolutional encoding due to
3 the decoding of the single parity check codes that make up an LDPC code.

4 **The TrueStore Product Line.**

5 47. There are other TrueStore Product Specifications similar to that
6 provided in Exhibit G, including LSI's publication entitled "TrueStore
7 RC9500/RC9501 Read Chanel General Information Product Specification" (the
8 "TrueStore 950x Specification.") (Excerpts attached hereto as Exhibit I.)

9 48. The TrueStore 950x Specification describes a sequence detector as an
10 "iterative decoding device" that is similar to that provided in the TrueStore 5x00
11 Specification. (Exhibit I at Bates I-5, *et seq.*)

12 49. The TrueStore 950x Specification is dated January 2010 and labeled as
13 an "Advance Copy, version 0.25." (*Id.* at I-2.)

14 50. The TrueStore 950x Specification lists a version history spanning from
15 April 2009 to January 2010. (*Id.* at I-3.)

16 51. On or around Oct. 5, 2010, LSI issued a press release announcing the
17 introduction of the "TrueStore SC9500, a 40-nanometer application specific product
18 ... for the notebook and desktop hard disk drive (HDD) market segments." (The
19 "SC9500 Press Release," attached as Exhibit J.)

20 52. The SC9500 Press Release states at p. J-2:

21 Now sampling to HDD manufactures, the SC9500 is the first LSI™
22 standard product SoC including integrated LSI hard disk controller, low-
23 density parity check (LDPC) read channel and serial PHY integrated
circuits.

24 [...]

25 [t]he SC9500 integrates the TrueStore RC9500 read channel which
26 utilizes next-generation LDPC iterative decoding technology to deliver
27 significant improvement in signal-to-noise ratio (SNR).

28 [...]

1 The LSI TrueStore SC9500 will be demonstrated at the LSI
2 Accelerating Innovation Conference and Technology Showcase ...
3 taking place October 5-7, 2010, at the Crowne Plaza Hotel in Milpitas,
Calif. (Emphasis Added.)

4 53. Based on information and belief, at least the following LSI products
5 perform iterative detection and infringe the '388 patent and (along with their
6 prototypes and other test devices) constitute the "Accused Products":

- 7 • LSI TrueStore RC9500-series read channel device family, including
8 without limitation model numbers RC9500 and RC9501;
- 9 • LSI TrueStore SC9500-series read channel device family;
- 10 • LSI TrueStore RC5x00-series read channel device family, including
11 without limitation model numbers RC5100, RC5101, and RC5200;
- 12 • LSI part numbers B5501, B5502, B5503, B5504, and B5505; and
- 13 • LSI part number B6400, B64002, B6500, and B6650.

14 54. Based on information and belief, Defendant LSI used the TrueStore
15 SC9500 device in the U.S. during demonstrations, and these demonstrations were
16 part of an effort to sell and market the SC9500. The same is true for the other Accused
17 Products.

18 55. Products containing the Accused Products are sold to consumers in the
19 Southern District of California.

20 **Iterative Detection was a Critical Feature Supporting Defendants'**

21 **Read Channel Success.**

22 56. Around 2010, at least, LSI announced it was sampling read channel
23 devices incorporating iterative detection.

24 57. LSI's read channel devices for hard disk drives incorporating iterative
25 detection (a.k.a. turbo equalization) employ signal processing techniques first
26 proposed in the Douillard Paper and claimed in the '388 patent.

27 58. LSI would soon successfully develop, market, and sell read channel
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1 devices with iterative detection to several hard disk drive manufacturers to
2 incorporate into consumer and enterprise hard disk drives.

3 59. The on-going development and sales by LSI of read channel devices that
4 incorporated iterative detection increased LSI's market share for read channel
5 application-specific integrated circuits (ASICs) – especially in the area of hard disk
6 drive technology.

7 **Read Channel Product Sales Cycle.**

8 60. Based on information and belief, one or more of the Accused Products
9 underwent an extensive development and sales cycle that involved substantial U.S.-
10 based use of the Accused Products both at Defendants' U.S. facilities and at the U.S.-
11 based facilities of Defendants' customer(s). During a sales cycle, LSI demonstrates
12 the operation of the Accused Products to potential customers including
13 demonstration at U.S.-based industry trade shows.

14 61. LSI further provided evaluation chips for prospective customers (hard
15 disk drive manufacturers) to put through a process of performance and functionality
16 validation. The evaluation is typically followed by a customization process whereby
17 LSI further uses the Accused Products to perform customization based on the
18 customer's requirements. Subsequently, the prospective customer may go through
19 another round of validation with input and help from LSI including further use of one
20 or more of the Accused Products prior to integrating the chips into their products
21 (hard disk drives).

22 62. The infringing uses of the Accused Products, or their prototypes, by LSI
23 during the sales cycle led to numerous design wins. These design wins resulted in
24 orders of millions, tens of millions, or hundreds of millions of units, and associated
25 revenue and profit, and therefore those design wins were highly valuable sales.

26 63. But for this infringing activity (including the infringing use) by LSI,
27 such design wins would not have been achieved, and LSI would not have maintained
28

1 or increased their market share in the hard disk drive market and would not have
2 reaped the profits that go along therewith.

3 64. LSI performed infringing activity extensively in the U.S. during the
4 sales cycle of its highly-valuable read/write channel products.

5 65. Multiple lines of the Accused Products (product lines) each went
6 through a sales cycle while being developed, offered, and sold by LSI.

7 66. The infringing activity was performed extensively, continuously, and
8 repeatedly at LSI's U.S. location(s) from at least the time period of 2010 to the
9 current date.

10 **AVAGO'S USE AND SALE OF ACCUSED PRODUCTS**

11 67. Upon information and belief, BROADCOM (as Avago Technologies,
12 Ltd. at the time) acquired LSI around 2013.

13 68. After BROADCOM acquired LSI and beginning March 8, 2015,
14 AVAGO handled the U.S. sale and distribution of LSI-label products. *See*
15 Declaration of Terasa Perkins, Associate General Counsel for AVAGO filed on June
16 13, 2016 in the case of *Godo Kaisha IP Bridge 1 v. Broadcom Ltd. et al.*, 2:16-cv-
17 134 (E.D. Tex.) and attached hereto as Exhibit K, ¶ 36, FN1.

18 69. Further, after the acquisition of LSI by BROADCOM, some of LSI's
19 "responsibilities and businesses have been folded into the responsibilities and
20 business" of AVAGO. Exhibit K, ¶38.

21 70. Upon information and belief, the responsibilities and businesses
22 transferred from LSI to AVAGO described in ¶ 69 included the development and
23 sales of Accused Products. Such sales activities includes AVAGO's participation in
24 the Sales Cycle (described *supra*) and involves AVAGO repeatedly performing all
25 of the steps of the '388 patent within the United States and California.

26 71. As part of the reallocation of business responsibilities between the
27 different subsidiaries of BROADCOM, AVAGO assumed the ownership (including
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1 sales and development) as a successor in interest for the TrueStore branded read
2 channel devices. Since the BROADCOM acquisition, AVAGO committed multiple
3 distinct acts of infringing the '388 patent which caused damage to SPECTRA and
4 that cannot be attributed to LSI.

5 72. This assumption of ownership of the TrueStore read channel product
6 line is demonstrated by, among other things, Exhibit L, the corporate web page for
7 AVAGO, which states that “Avago offers TrueStore® systems-on-a chip (SOC’s)
8 that integrate read channels, hard disk controllers, PHY’s and DDR memory
9 interfaces on one single chip.”

10 73. Additionally, AVAGO developed read channel devices sold outside the
11 TrueStore® brand (together with TrueStore® devices, the “AVAGO Read Channel
12 Devices”).

13 74. The allegations of ¶ 73 are supported by Exhibit M, an AVAGO October
14 22, 2015 press release announcing an industry-first demonstration (and therefore
15 infringing use) by AVAGO of a multi-reader hard-disk drive read channel in silicon.

16 75. The AVAGO Read Channel Devices are included in SPECTRA’s
17 definition of Accused Products.

18 76. Exhibit N is a true and accurate copy of AVAGO Employee Mr. Wise
19 Shin’s LinkedIn profile (The “Shin Profile”), which lists his work history as an
20 Employee of LSI and later shifting/moving to AVAGO.

21 77. Upon information and belief, Mr. Wise Shin is currently an employee
22 of Marvell Semiconductor, a competitor of Defendant AVAGO, and has been since
23 October 2015. Exhibit N.

24 78. The Shin Profile describes Mr. Shin having been employed by
25 Defendant AVAGO from January 2012 to June 2015. While at Avago, Mr. Shin
26 described his major achievements of placing the “Hilo SOC (Spyder channel) in mass
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1 production,” which involved substantial use and testing of the Spyder channel.
2 Exhibit N.

3 79. Additionally, Mr. Shins stated achievements while at AVAGO included
4 a design win for the “Read channel for enterprise SOC- RC5110.” Exhibit N.

5 80. The RC5110 is a TrueStore brand read channel device that uses the
6 Sypder Read Channel and is an Accused Product.

7 81. The Spyder Read Channel is the read channel used in the TrueStore
8 RC50xx Product line as described above.

9 82. Other achievements Mr. Shin stated he achieved while at AVAGO
10 include the “Read channel for 3.5 [inch] SOC – RC9700 with 60M\$ revenue per
11 year.” Exhibit N.

12 83. The RC9700 is also a TrueStore read channel product and is an Accused
13 Product..

14 84. “Western Digital Corporation in Irvine” is a major customer of
15 AVAGO. *See* Exhibit N.

16 85. Mr. Shin’s responsibilities at AVAGO included performing bench test
17 and measurement with Drivetap for new channel and system technologies as well
18 programming python scripts for Channel and preamp optimization. Mr. Shin
19 performed specific channel performance measurements and data gathering required
20 by the customer. Finally, Mr. Shin assisted AVAGO customers in understanding and
21 using AVAGO storage devices such as preamp and read channel in the customers’
22 products. *See* Exhibit N.

23 86. All the above-mentioned read channel associated activity by AVAGO
24 employee Wise Shin (done at the direction of Wise Shin’s employer, AVAGO)
25 demonstrates continued and ongoing use of Accused Products including the RC5110
26 and the Spyder Read Channel and therefore continued and ongoing infringement of
27 the ‘388 patent by AVAGO.
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1 87. Based on information and belief, including the Shin Profile, while
2 employed by defendant AVAGO, Mr. Shin provided sales support for major
3 customers Western Digital Corporation in Irvine and HGST (Hitachi Global Storage
4 Technology) in Irvine. This sales support included substantial use of Accused
5 Products including TrueStore read channel devices incorporating Spyder Read
6 Channel technology such as the RC5110.

7 88. Based on information and belief, Defendant AVAGO demonstrated one
8 or more AVAGO Read Channel Devices, including the Spyder Read Channel based
9 TrueStore RC5110, at U.S. based locations of one or more customers as part of a
10 Sales Cycle.

11 89. But for that infringing use of an AVAGO Read Channel Device
12 Defendant AVAGO would not have made sales and would have lost substantial
13 market share and revenue in the hard-disk drive read channel device market.

14 90. Based on information and belief, Defendant AVAGO used one or more
15 read channel devices incorporating iterative detection at a major customer's location
16 in Irvine, California, as well as at its own Irvine, California based facilities by, among
17 others, AVAGO employee Wise Shin who was based in Irvine, California.

18 91. This infringing use included the performing of specific channel
19 performance measurements and data gathering as requested by a major customer as
20 part of the Sales Cycle.

21 92. Defendant AVAGO then improved, optimized, and customized the read
22 channel device (including implementing appropriate features) and this led to design
23 wins that resulted in huge revenues and profits for Defendant AVAGO.

24 93. Based on information and belief, Defendant AVAGO demonstrated one
25 or more AVAGO Read Channel Devices at U.S. based location as part of a Sales
26 Cycle.

27
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1 94. But for that infringing use of an AVAGO Read Channel Device
2 Defendant AVAGO would not have made Sales and would have lost substantial
3 market share and revenue in the hard-disk drive read channel device market.

4 95. Upon information and belief, Exhibit O is a true and accurate copy of
5 the LinkedIn profile of AVAGO employee Mr. Shaohua Yang (The “Yang Profile”)
6 downloaded on June 24, 2016.

7 96. Upon information and belief, Mr. Yang is an employee of Defendant
8 AVAGO. *See* Exhibit O, p. 1.

9 97. Mr. Yang worked on the LSI read channel products Mamba, McLaren,
10 and Spyder.

11 98. Mr. Yang was shifted from being an LSI employee to an AVAGO
12 employee around May 2014, and Mr. Yang has the “same job as in LSI” at AVAGO.
13 *See Id.*

14 99. Mr. Yang’s design teams “have delivered majority of the IP in
15 Avago/LSI read channel products and achieved multiple-billion dollar design wins.”
16 *Id.*

17 100. Upon information and belief, the development of AVAGO read channel
18 products by Mr. Yang and his design teams involved substantial infringing use of the
19 Accused Products and their prototypes at AVAGO’s U.S. locations.

20 101. By performing the “same job” at AVAGO as LSI, Mr. Yang was
21 involved in a Sales Cycle and associated infringing use of the Accused Products at
22 AVAGO.

23 102. AVAGO Read Channel Devices incorporate the same (or substantially
24 similar) read channel technology as that used and developed by LSI and described
25 *supra*. For example, at least one of the AVAGO Read Channel Devices incorporate
26 the “Spyder Read Channel” (as shown in Exhibit G and analyzed for infringement of
27 the ‘388 patent above).
28

1 103. Upon information and belief, including statements from the Yang
2 Profile, AVAGO began its own read channel product development and sales during
3 a time period estimated to be from 2013 to 2015.

4 104. The TrueStore Product line is now listed as product on AVAGO's
5 website. *See* Exhibit L.

6 105. LSI no longer has its own separate website or other detectable presence
7 in the marketplace.

8 106. Upon information and belief, many of the key employees associated
9 with the TrueStore product line have been moved from Defendant LSI to Defendant
10 AVAGO, as exemplified by the change in employment of Wise Shin and Shaohua
11 Yang.

12 107. Additionally, key assets such as LSI patents have been transferred from
13 LSI to other entities including assignment of LSI patent 8,291,299 (provided at
14 Exhibit F) to Bank of America, N.A. as collateral on Feb 11, 2016.

15 108. Defendant AVAGO is the successor to the TrueStore product line and
16 has gained substantial income from the prior sales of TrueStore products and has
17 substantial assets as a large volume seller of read channel devices and semiconductors
18 that give it the ability to assume Defendant LSI's risk-spreading role.

19 109. Additionally, Defendant AVAGO has benefited from the good-will
20 associated with the TrueStore product line and brand, including substantial income
21 therefrom, and enjoys the continued operation of the business as evidenced by,
22 among other things, the prominent display of the TrueStore product line on
23 Defendant AVAGO's corporate website.

24 110. AVAGO has used one or more Spyder read channel based devices at
25 Western Digital Corporation's Irvine facility as part of a Sales Cycle for that device.
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1 111. The AVAGO Read Channel Devices were developed and supported by
2 some of the same engineering personnel used by LSI for the TrueStore product line
3 and used the same or similar technology.

4 112. The normal use, including demonstration, of AVAGO Read Channel
5 Devices by AVAGO personnel infringed the '388 patent.

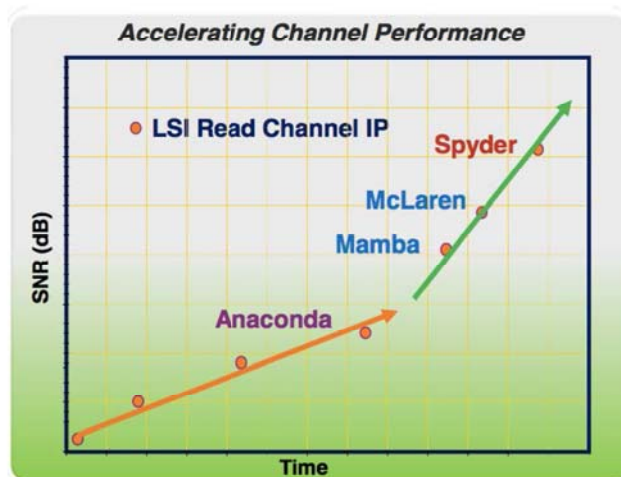
6 113. AVAGO does not merely sell Accused Products. Rather AVAGO
7 repeatedly performed the required steps of the '388 patent and therefore directly
8 infringed '388 patent.

9 114. Based on information and belief, AVAGO engaged in the Sales Cycle
10 activity described above in ¶¶ 60 *et seq.* with regard to AVAGO Read Channel
11 Devices. During this Sales Cycle AVAGO conducted substantial infringing use of at
12 least one AVAGO Read Channel Device. This infringing use led to highly-lucrative
13 design wins that resulted in huge revenue and profits for Defendant AVAGO.

14 115. Upon information and belief, Exhibit P is a true and accurate copy of
15 the presentations made by LSI on “LSI Corporation Analyst Day 2010” on March
16 17, 2010 (the “Analyst Day Presentation”).

17 116. On page 51, of the Analyst Day Presentation is a graph entitled
18 “Accelerating Channel Performance.” The Executive Vice President and General
19 Manager of LSI Semiconductor Solutions at that time, Jeff Richardson, accurately
20 illustrated the critical performance benefits that were expected from the iterative
21 detection based read channels Mamba, McLaren, and Spyder. This graph is also
22 included immediately below.

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117. The performance benefits (increase in SNR (dB)) is attributable in significant part to the turbo equalization technology described in the Douillard Paper (Exhibit B) and the '388 Patent.

118. Seagate Technology ("Seagate") is an Ireland corporation with operational headquarters in Cupertino, California. Seagate is a hard disk drive manufacturer and a buyer and user of LSI read channel devices incorporating iterative detection including one or more of the Accused Products.

119. Seagate is a buyer and user of Avago Read Channel Devices incorporating iterative detection including one or more of the Accused Products.

120. Western Digital is a California corporation with operational headquarters in Irvine, California. Western Digital is a hard disk drive manufacturer and a buyer and user of Avago Read Channel Devices incorporating iterative detection including one or more of the Accused Products.

121. Western Digital is a buyer and user of Avago Read Channel Devices incorporating iterative detection including one or more of the Accused Products.

122. Defendant AVAGO used one or more TrueStore read channel devices at Western Digital's Irvine facility.

123. Defendant AVAGO used one or more TrueStore read channel devices at Hitachi Global Storage Technology's (HGST's) Irvine facility.

1 124. One or more Defendants used a B5501 read channel device, or prototype
2 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
3 for that device.

4 125. One or more Defendants used a B5501 read channel device, or prototype
5 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
6 for that device.

7 126. One or more Defendants used a B5502 read channel device, or prototype
8 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
9 for that device.

10 127. One or more Defendants used a B5503 read channel device, or prototype
11 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
12 for that device.

13 128. One or more Defendants used a B5504 read channel device, or prototype
14 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
15 for that device.

16 129. One or more Defendants used a B6400 read channel device, or prototype
17 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
18 for that device.

19 130. One or more Defendants used a B6500 read channel device, or prototype
20 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
21 for that device.

22 131. One or more Defendants used a B6650 read channel device, or prototype
23 thereof, one or more times at a Seagate U.S.-based facility as part of the sales cycle
24 for that device.

25 132. Defendants infringed the '388 patent in violation of 35 U.S.C. § 271 by
26 making, using, selling or offering for sale, and/or importing into the United States
27

28

1 without authority, either directly or via its agents or intermediaries, one or more of
2 the Accused Products

3 133. SPECTRA has been damaged by the foregoing acts of infringement of
4 its patent by the Defendants.

5 **COUNT I**

6 **INFRINGEMENT OF THE '388 PATENT (Against LSI and AVAGO)**

7 134. SPECTRA incorporates paragraphs 1 through 133 by reference as if
8 fully stated herein.

9 135. LSI directly infringed literally and/or under the doctrine of equivalents,
10 at least claim 9 of the '388 patent at least during the period prior to the expiration of
11 the patent.

12 136. LSI directly infringed, either literally and/or under the doctrine of
13 equivalents, in violation of 35 U.S.C. § 271(a), by making, using, selling, offering
14 for sale, and/or importing in or into the United States, without authority, products
15 that infringe at least claim 9 of the '388 patent, including but not limited to the
16 Accused Products at least during the period prior to the expiration of the patent.

17 137. AVAGO directly infringed literally and/or under the doctrine of
18 equivalents, at least claim 9 of the '388 patent at least during the period prior to the
19 expiration of the patent.

20 138. AVAGO directly infringed, either literally and/or under the doctrine of
21 equivalents, in violation of 35 U.S.C. § 271(a), by making, using, selling, offering
22 for sale, and/or importing in or into the United States, without authority, products
23 that infringe at least claim 9 of the '388 patent, including but not limited to the
24 Accused Products (including the Avago Read Channel Devices) at least during the
25 period prior to the expiration of the patent.

1 139. As a direct and proximate result of the acts of patent infringement by
2 Defendants, SPECTRA has been damaged and continues to be damaged in an amount
3 not presently known.

4 **PRAYER FOR RELIEF**

5 SPECTRA respectfully requests that judgment be entered in its favor and
6 against Defendants, and that the Court award the following relief to SPECTRA:

7 A. A judgment in favor of SPECTRA that Defendants have directly
8 infringed the Patent-in-Suit;

9 B. A judgment and order that Defendants account for and pay all damages
10 necessary to adequately compensate SPECTRA for infringement of the Patent-in-
11 Suit, but in no event less than a reasonable royalty;

12 C. A judgment and order finding that this is an exceptional case within the
13 meaning of 35 U.S.C. § 285 and awarding SPECTRA its reasonable attorneys' fees
14 against Defendants;

15 D. A judgment and order requiring Defendants to provide an accounting
16 and to pay supplemental damages to SPECTRA, including without limitation, pre-
17 judgment and post-judgment interest; and

18 E. Any and all other relief to which SPECTRA may be entitled.

19 **JURY DEMAND**

20 SPECTRA hereby respectfully demands trial by jury of all issues so triable.
21

22 Respectfully submitted,

23 Dated: July 5, 2016

GAZDZINSKI & ASSOCIATES, PC

/s/ Adam S. Garson

By: Adam Garson

Attorneys for Plaintiff

Email: adam.garson@gazpat.com