

**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

LIBERTY PATENTS, LLC,

Plaintiff,

v.

BROADCOM INC., BROADCOM PTE.  
LTD., BROADCOM CORPORATION,  
FUJITSU LIMITED, FUJITSU  
SEMICONDUCTOR LIMITED,  
MEDIATEK INC., MEDIATEK USA INC.,  
QUALCOMM INC., QUALCOMM  
TECHNOLOGIES, INC., SHARP  
CORPORATION, SHARP ELECTRONICS  
CORPORATION,  
STMICROELECTRONICS N.V.,  
STMICROELECTRONICS  
INTERNATIONAL N.V., and  
STMICROELECTRONICS INC.,

Defendants.

CIVIL ACTION NO. 6:20-cv-970

ORIGINAL COMPLAINT FOR  
PATENT INFRINGEMENT

**JURY TRIAL DEMANDED**

**ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Liberty Patents, LLC (“Liberty Patents” or “Plaintiff”) files this original complaint against Defendants Broadcom Inc., Broadcom Pte. Ltd., Broadcom Corporation, Fujitsu Limited, Fujitsu Semiconductor Limited, MediaTek Inc., MediaTek USA Inc., Qualcomm Inc., Qualcomm Technologies, Inc., Sharp Corporation, Sharp Electronics Corporation, STMicroelectronics N.V., STMicroelectronics International N.V., and STMicroelectronics Inc. (collectively “Defendants”), alleging, based on its own knowledge as to itself and its own actions and based on information and belief as to all other matters, as follows:

## PARTIES

1. Liberty Patents is a limited liability company formed under the laws of the State of Texas, with its principal place of business at 2325 Oak Alley, Tyler, Texas, 75703.
2. Defendant Broadcom Inc. is a company organized and existing under the laws of Delaware. Broadcom Inc. may be served with process through its registered agent, Corporation Service Company located at 251 Little Falls Drive, Wilmington, Delaware, 19808.
3. Defendant Broadcom Pte. Ltd. is a company organized and existing under the laws of the Republic of Singapore. Broadcom Pte. Ltd. (formerly Broadcom Limited) has an office at 1 Yishun Avenue 7, 768923, Singapore. Broadcom Pte. Ltd. may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.
4. Broadcom Pte. Ltd. is a wholly owned subsidiary of Broadcom Inc. Broadcom Pte. Ltd. was formerly known as Broadcom Limited, and Broadcom Inc. is the successor to Broadcom Limited.<sup>1</sup> Broadcom Pte. Ltd. manufactures semiconductor solutions for processors, Bluetooth devices, cable modems, cellular devices, and consumer electronics.
5. Defendant Broadcom Corporation is a company organized and existing under the laws of California. Broadcom Corporation may be served with process through its registered agent, Corporation Service Company d/b/a/ CSC-Lawyers Incorporating Service Company, 211 East 7th Street, Suite 620, Austin, Texas, 78701-3218.

---

<sup>1</sup> See Broadcom Annual Report (2019) at 3, <https://investors.broadcom.com/static-files/f81d3fbb-755c-44a7-ab4d-8b5fe16633fb>.

6. Broadcom Corporation is an indirect, wholly owned subsidiary of Broadcom Inc. Broadcom Corporation describes itself as “a global leader and innovator in semiconductor solutions for wired and wireless communications,” such as SoCs and embedded software solutions.<sup>2</sup> Broadcom Corporation’s products “deliver voice, video, data, and multimedia connectivity in the home, office, and mobile environments.”<sup>3</sup>

7. The Defendants identified in paragraphs 2 through 6 above (collectively, “Broadcom”) are companies which together comprise one of the world’s largest manufacturers of integrated circuits. Broadcom is a global technology leader that designs, develops and supplies a broad range of semiconductor and infrastructure software solutions.<sup>4</sup>

8. The Broadcom Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular. Broadcom’s website states, for example, that the “term ‘Broadcom’ refers to Broadcom Inc. and/or its subsidiaries.”<sup>5</sup>

9. The Broadcom Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies.

10. Thus, the Broadcom Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

---

<sup>2</sup> See <https://docs.broadcom.com/doc/1211168571391>.

<sup>3</sup> See *id.*

<sup>4</sup> See <https://www.broadcom.com/>.

<sup>5</sup> See *id.*

11. Fujitsu Limited is a company organized under the laws of Japan. Fujitsu Limited has an office at Shiodome City Center, 1-5-2 Higashi-Shimbashi, Minato-ku, Tokyo, Japan 105-7123. Fujitsu Limited may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

12. Fujitsu Semiconductor Limited is a company organized under the laws of Japan. Fujitsu Semiconductor Limited has an office at Shin-Yokohama Chuo Building, 2-100-45 Shin-Yokohama, Kohoku-Ku, Yokohama, Kanagawa, Japan. Fujitsu Semiconductor Limited may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

13. Fujitsu Semiconductor Limited is a wholly owned subsidiary of Fujitsu Limited. Fujitsu Semiconductor Limited designs, manufactures, and sells semiconductors, including microcontrollers, ASICs, ASSPs, and power management ICs.<sup>6</sup> Fujitsu Semiconductor Limited also specializes in LSI manufacturing and provides solutions through LSI, such as FRAM (Ferroelectric RAM) and foundry services.<sup>7</sup>

14. The Defendants identified in paragraphs 11 through 13 above (collectively, “Fujitsu”) are companies which together comprise one of the largest IT services providers in the

---

<sup>6</sup> See <https://www.arm.com/company/news/2013/07/fujitsu-semiconductor-licenses-arm-biglittle-and-mali-t624-technologies-to-support-a-wide-range-of>.

<sup>7</sup> See <https://www.fujitsu.com/global/products/devices/semiconductor/>.

world. Together with its subsidiaries, the “Fujitsu Group”<sup>8</sup> is engaged in providing total solutions in the ICT field, delivering services as well as developing, manufacturing, selling, and maintaining the cutting-edge, high-performance, high-quality products and electronic devices that support these services.<sup>9</sup>

15. The Fujitsu Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular.

16. The Fujitsu Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies.

17. Thus, the Fujitsu Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

18. Defendant MediaTek Inc. is a company organized under the laws of Taiwan. MediaTek Inc. has an office at No. 1, Dusing 1st Road, Hsinchu Science Park, Hsinchu, 30078, Taiwan. MediaTek Inc. may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

---

<sup>8</sup> This terminology is used by Fujitsu for itself and its subsidiaries, which “are entities that the Group controls.” See Fujitsu Financial Selection 2020, at 3, [www.fujitsu.com/global/Images/financialsection2020-all.pdf](http://www.fujitsu.com/global/Images/financialsection2020-all.pdf).

<sup>9</sup> See <https://www.fujitsu.com/global/documents/about/ir/library/reports/Report120.pdf>.

19. Defendant MediaTek USA Inc. is a company organized and existing under the laws of Delaware. MediaTek USA Inc. may be served with process through its registered agent, CT Corporation System, at 1999 Bryan St., Suite 900, Dallas, Texas, 75201.

20. MediaTek USA Inc. is an indirect subsidiary of MediaTek Inc. MediaTek USA Inc. is involved in the research and manufacture of semiconductor products, including digital and analog imaging devices, and wireless communications products.

21. The Defendants identified in paragraphs 18 through 20 above (collectively, “MediaTek”) are companies which together comprise the world’s 4th largest global fabless semiconductor company, powering more than 1.5 billion devices a year. MediaTek products can be found in 20 percent of homes globally, and nearly one of every three mobile phones is powered by MediaTek.<sup>10</sup>

22. The MediaTek Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular.

23. The MediaTek Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies. According to MediaTek, the “[b]usiness scope of MediaTek and its affiliates include the investment, R&D, promotion, after-sale service for optical storage products, digital consumer products, wireless

---

<sup>10</sup> See <https://i.MediaTek.com/about-MediaTek>.

communication, digital TV, networking, analog, etc.,” and “MediaTek affiliates support the Company’s core business by acquiring leading technology through investments.”<sup>11</sup>

24. Thus, the MediaTek Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

25. Defendant Qualcomm Inc. is a company organized and existing under the laws of Delaware. Qualcomm Inc. may be served with process through its registered agent, Prentice-Hall Corporation System Inc., at 251 Little Falls Dr., Wilmington, Delaware, 19808.

26. Defendant Qualcomm Technologies, Inc. is a company organized and existing under the laws of Delaware. Qualcomm Technologies, Inc. may be served with process through its registered agent, Corporation Service Company, at 251 Little Falls Dr., Wilmington, Delaware, 19808.

27. Qualcomm Technologies, Inc. is a wholly owned subsidiary of Qualcomm Inc. Qualcomm Technologies, Inc. operates, along with its subsidiaries, substantially all of Qualcomm’s engineering, research and development functions, and substantially all of its products and services businesses.<sup>12</sup>

28. The Defendants identified in paragraphs 25 through 27 above (collectively, “Qualcomm”) are companies which together comprise one of the world’s largest manufacturers of integrated circuits. Qualcomm explains that it is a “global leader in the development and

---

<sup>11</sup> See MediaTek Annual Report (2019) at 94, <https://cdn-www.mediatek.com/posts/2019-MediaTek-Annual-Report.pdf>. See also <https://www.mediatek.com/corporate-social-responsibility/global-presence/global-operations>.

<sup>12</sup> See Qualcomm Inc. Annual Report – Form 10-K, at 14 (Sept. 29, 2019), <https://investor.qualcomm.com/sec-filings/annual-reports/content/0001728949-19-000072/0001728949-19-000072.pdf>. See also [www.qualcomm.com](http://www.qualcomm.com).

commercialization of foundational technologies for the wireless industry” and that its “technologies and products are used in mobile devices and other wireless products, including network equipment, broadband gateway equipment, consumer electronic devices and other connected devices.”<sup>13</sup>

29. The Qualcomm Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular. Qualcomm’s website states, for example, that “[r]eferences to ‘Qualcomm’ may mean Qualcomm Incorporated, or subsidiaries or business units within the Qualcomm corporate structure, as applicable.”<sup>14</sup>

30. The Qualcomm Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies.

31. Thus, the Qualcomm Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

32. Sharp Corporation a company organized under the laws of Japan. Sharp Corporation has an office at 1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan. Sharp Corporation may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in

---

<sup>13</sup> See Qualcomm Inc. Annual Report – Form 10-K, at 5 (Sept. 29, 2019), <https://investor.qualcomm.com/sec-filings/annual-reports/content/0001728949-19-000072/0001728949-19-000072.pdf>.

<sup>14</sup> See [www.qualcomm.com](http://www.qualcomm.com).



Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

33. Sharp Electronics Corporation is a company organized and existing under the laws of New York. Sharp Electronics Corporation may be served with process through its registered agent, CT Corporation System, at 1999 Bryan St., Suite 900, Dallas, Texas, 75201.

34. Sharp Electronics Corporation is a wholly owned subsidiary of Sharp Corporation. Sharp Electronics Corporation is a leading seller of LCDs, solar energy products (modules, inverters), home appliances (air conditioners, microwave ovens), entertainment products (TVs, Blu-ray Disc players), and business electronics (cash registers, PCs, calculators, copiers).

35. The Defendants identified in paragraphs 32 through 34 above (collectively, “Sharp”) are companies which together comprise one of the world’s largest electronics manufacturers. The Sharp Defendants are involved in the manufacturing and sales of telecommunications equipment, electric and electronic application equipment, and electronic components.<sup>15</sup>

36. The Sharp Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular.

37. The Sharp Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies.

---

<sup>15</sup> See <https://global.sharp/corporate/info/outline/>.

38. Thus, the Sharp Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

39. STMicroelectronics N.V. is a company organized under the laws of The Netherlands. STMicroelectronics N.V. has an office at WTC Schiphol Airport, Schiphol Boulevard 265, 1118 BH Schiphol, The Netherlands. STMicroelectronics N.V. may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

40. STMicroelectronics International N.V. is a company organized under the laws of The Netherlands. STMicroelectronics International N.V. has an office at 39 Chemin du Champ des Filles, 1228 Plan-Les-Ouates, Geneva, Switzerland. STMicroelectronics International N.V. may also be served with process by serving the Texas Secretary of State, 1019 Brazos Street, Austin, Texas, 78701, as its agent for service because it engages in business in Texas but has not designated or maintained a resident agent for service of process in Texas as required by statute. This action arises out of that business.

41. STMicroelectronics International N.V. is a wholly owned subsidiary of STMicroelectronics N.V. The Annual Report for the STMicroelectronics group of companies states that “[w]hile STMicroelectronics N.V. is the parent company, we conduct our global

business through STMicroelectronics International N.V. and also conduct our operations through service activities from our subsidiaries.”<sup>16</sup>

42. STMicroelectronics Inc. is a company organized and existing under the laws of Delaware. STMicroelectronics Inc. may be served with process through its registered agent, CT Corporation System, at 1999 Bryan St., Suite 900, Dallas, Texas, 75201.

43. STMicroelectronics Inc. is a subsidiary of STMicroelectronics N.V. STMicroelectronics Inc. provides manufacturing services for electronics products including semiconductors, multimedia products, power applications, and sensors.

44. The Defendants identified in paragraphs 39 through 43 above (collectively, “STMicroelectronics”) are companies which together comprise a global independent semiconductor group that designs, develops, manufactures and markets a broad range of products, including discrete and standard commodity components, application-specific integrated circuits (ASICs), full custom devices and semi-custom devices and application-specific standard products (ASSPs) for analog, digital and mixed-signal applications.<sup>17</sup> STMicroelectronics states that its “operations are also conducted through [its] various subsidiaries, which are organized and operated according to the laws of their country of incorporation, and consolidated by STMicroelectronics N.V.”<sup>18</sup>

45. The STMicroelectronics Defendants named above and their affiliates are part of the same corporate structure and distribution chain for the making, importing, offering to sell,

---

<sup>16</sup> See STMicroelectronics Annual Report (20-F) at 28 (2019), <https://investors.st.com/static-files/122c173f-920f-44d3-bdb1-431a795b97f1>.

<sup>17</sup> See STMicroelectronics Semi Annual Report at 23 (2020), <https://investors.st.com/static-files/601d353d-aa59-46b3-ad3d-2009db640a12>.

<sup>18</sup> See *id.* at 18.

selling, and using of the accused devices in the United States, including in the State of Texas generally and this judicial district in particular.

46. The STMicroelectronics Defendants named above and their affiliates share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and accused product lines and products involving related technologies.

47. Thus, the STMicroelectronics Defendants named above and their affiliates operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

48. The parties to this action are properly joined under 35 U.S.C. § 299 because the right to relief asserted against Defendants jointly and severally arises out of the same series of transactions or occurrences relating to the making and using of the same products or processes, including products using the processors and related processes based on common ARM architectures. Additionally, questions of fact common to all Defendants will arise in this action.

#### **JURISDICTION AND VENUE**

49. This is an action for infringement of a United States patent arising under 35 U.S.C. §§ 271, 281, and 284–85, among others. This Court has subject matter jurisdiction of the action under 28 U.S.C. § 1331 and § 1338(a).

50. This Court has personal jurisdiction over Defendants pursuant to due process and/or the Texas Long Arm Statute because, *inter alia*, (i) Defendants have done and continue to do business in Texas; (ii) Defendants have committed and continue to commit acts of patent infringement in the State of Texas, including making, using, offering to sell, and/or selling accused products in Texas, and/or importing accused products into Texas, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent

infringement in Texas, and/or committing a least a portion of any other infringements alleged herein in Texas, and (iii) Defendants regularly place their products within the stream of commerce—directly, through subsidiaries, or through third parties—with the expectation and knowledge that such products will be shipped to, sold, or used in Texas and elsewhere in the United States. Thus, Defendants have established minimum contacts within Texas and purposefully availed themselves of the benefits of Texas, and the exercise of personal jurisdiction over Defendants would not offend traditional notions of fair play and substantial justice. In addition, or in the alternative, this Court has personal jurisdiction over the foreign Defendants pursuant to Federal Rule of Civil Procedure 4(k)(2).

51. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) Broadcom has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, (ii) Broadcom Pte. Ltd. is a foreign entity, (iii) Broadcom Corporation is registered to do business in Texas, and (iv) Broadcom has regular and established places of business in this district, including at least at 2901 Via Fortuna Dr., Austin, Texas, 78746 and 810 Hesters Crossing Rd, Suite 175, Round Rock, Texas, 78681:

**Austin, Texas (Via Fortuna Drive)**

2901 Via Fortuna Drive  
Austin, Texas  
78746  
United States

[Get Directions](#)

**Plano**

5465 Legacy Drive  
Plano, Texas  
75024  
United States

[Get Directions](#)

**Plano, TX**

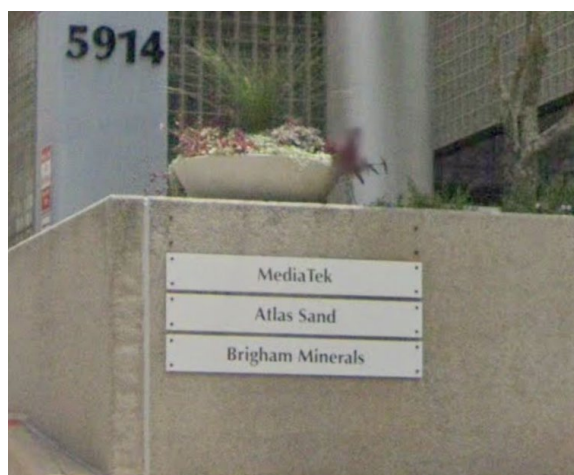
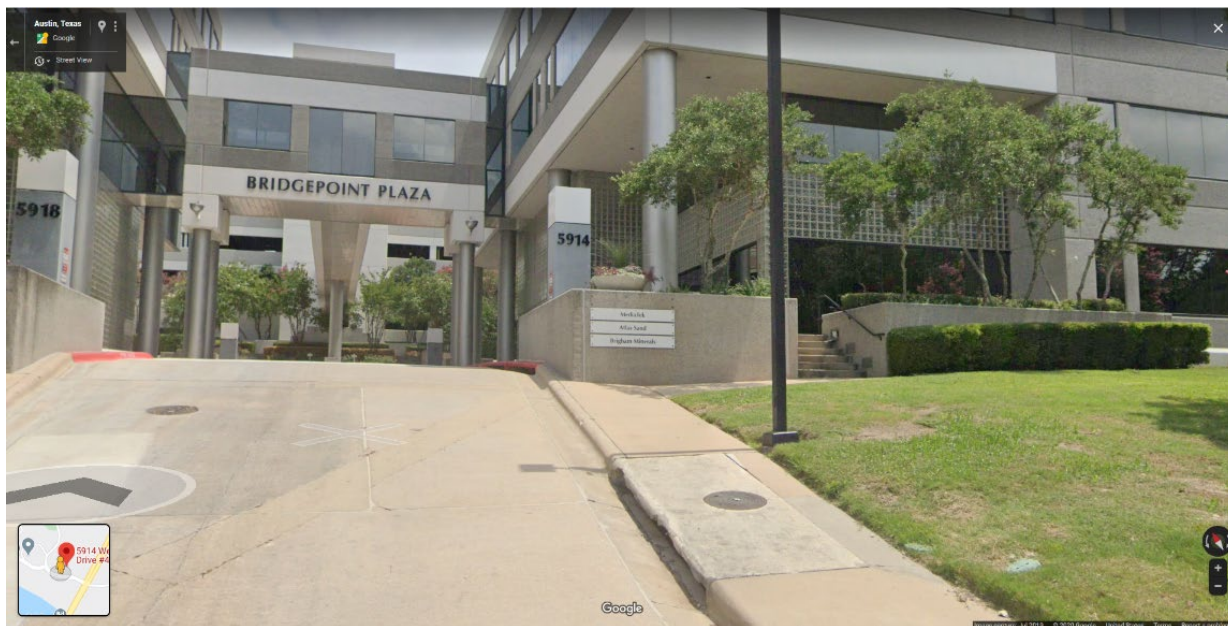
CA Technologies  
5465 Legacy Dr, Suite 700  
Plano, Texas  
75024  
United States

[Get Directions](#)

**Source:** <https://www.broadcom.com/company/contact/locations>

52. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) Fujitsu has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, and (ii) the Fujitsu Defendants are foreign entities. *See* 28 U.S.C. § 1391(c)(3) (providing that “a defendant not resident in the United States may be sued in any judicial district, and the joinder of such a defendant shall be disregarded in determining where the action may be brought with respect to other defendants”); *see also In re HTC Corp.*, 889 F.3d 1349 (Fed. Cir. 2018).

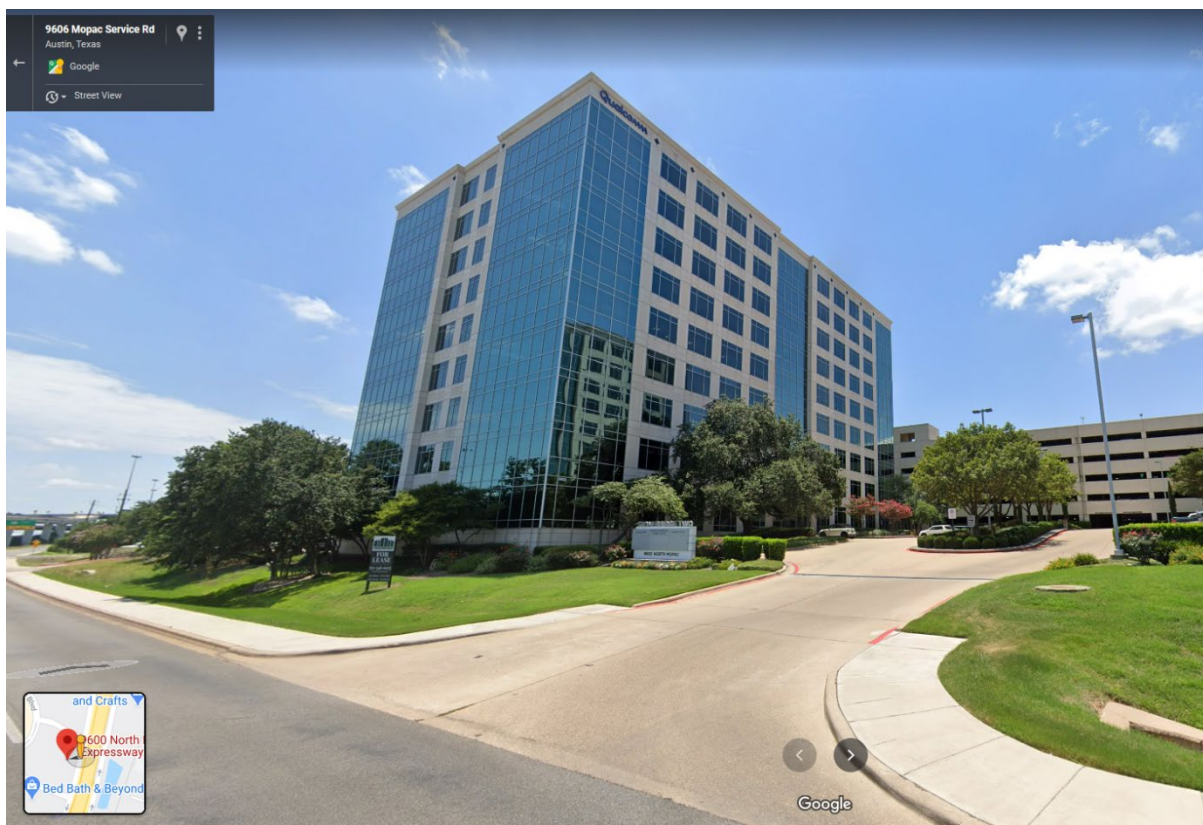
53. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) MediaTek has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, (ii) MediaTek Inc. is a foreign entity; (iii) MediaTek USA Inc. is registered to do business in Texas, and (iii) MediaTek has a regular and established place of business in this district, including at least at 5914 W. Courtyard Drive, Austin, Texas, 78730:



**Source:** <https://goo.gl/maps/4LNVGL6V5tDA2ofE9>

54. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) Qualcomm has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, and (ii) Qualcomm has a

regular and established place of business in this district, including at least at 9600 N. Mopac Expressway, Ste 900, Stonebridge Plaza II, Austin Texas, 78759:<sup>19</sup>



Source: <https://goo.gl/maps/SZPUFRJ8R1MJ8goGA>



Source: <https://goo.gl/maps/iseN8YKN4iHs34yC6>

---

<sup>19</sup> See [www.qualcomm.com/company/facilities/offices?country=USA&region=TX](http://www.qualcomm.com/company/facilities/offices?country=USA&region=TX).



55. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) Sharp has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, (ii) Sharp Corporation is a foreign entity; (iii) Sharp Electronics Corporation is registered to do business in Texas, and (iii) Sharp has a regular and established places of business in this district, including at least at 10801 N. Mopac Expressway, #370, Austin, Texas, 78759:

**Sharp Office Locations:**

**Eastern Region**

**General Sales:**

Phone: 919-466-6981

**Industrial Display Sales:**

Corey Grant

Phone: 978-764-2179

**Western Region**

**General Sales:**

Phone: 919-466-6981

**Industrial Display Sales:**

Casey Wimert

Phone: 847-258-2759

**San Jose, CA**

**General Sales:**

1701 Junction Ct, Suite 200

San Jose, CA 96112

Phone: 408-452-6400

Fax: 408-436-0924

**Austin, TX**

**General Sales:**

10801 N. Mo-Pac Express-

way Suite #370

Austin, TX 78759


Phone: 512-795-9395

Fax: 512-795-9585

**Source:** <https://www.sharpsma.com/contact>

56. Venue is proper in this district under 28 U.S.C. § 1400(b) because (i) STMicroelectronics has committed and continues to commit acts of patent infringement in this district, including making, using, offering to sell, and/or selling accused products in this district, and/or importing accused products into this district, including by Internet sales and sales via retail and wholesale stores, inducing others to commit acts of patent infringement in this district, and/or committing at least a portion of any other infringements alleged herein in this district, (ii) STMicroelectronics N.V. and STMicroelectronics International N.V. are foreign entities; (iii) STMicroelectronics Inc. is registered to do business in Texas, and (iii) ST Microelectronics has a

regular and established place of business in this district, including at least at 8501 N. Mopac Expressway, #420, Austin, Texas, 78757:

 First Alliance/Luscombe  
2837 Mercy Drive  
Fort Collins, 80526, Colorado, United States of  
America  
Phone: 970-225-6498

 FUTURE ELECTRONICS  
30851 Agoura Rd, Suite 115 Agoura Hills  
LOS ANGELES, 95661, California, United States of  
America  
Phone: +1 818 665 3957  
Fax: +1 818 735 0764  
[Website](#)

 STMicroelectronics  
8501 North Mo-Pac Expy Suite 420  
AUSTIN, 78759, Texas, United States of America  
Phone: +1 512 225 6200

Source: [https://www.st.com/content/st\\_com/en/contact-us.html](https://www.st.com/content/st_com/en/contact-us.html)

### **BACKGROUND**

57. The patent-in-suit, U.S. Patent No. 6,535,959 (“the ’959 Patent”), covers technology used in a wide array of electronic devices and applications, including computer processors for mobile and automotive industries, SoCs, graphics display controllers, LCD systems, etc. More particularly, it describes key improvements to electronic devices by more efficiently handling computer instructions for faster processing.

58. The ’959 Patent discloses a processor that includes an instruction cache. The instruction cache is a set-associative cache that comprises multiple blocks. Claim 1 of the ’959 patent is directed to a processor that generates a power reduction signal, which indicates whether the subsequent instruction to be executed resides in the same block of the instruction cache as the current instruction that is being executed. This advantageously allows, for example, the processor to read consecutive instructions (or instructions that are in the same block) quickly, without multiple additional steps. The novel system results in a processor with increased operating speed and decreased power consumption.

59. The invention described in the ’959 Patent was the result of research conducted by two inventors at Conexant Systems, Inc., which was—at the time—the world’s largest, standalone communications-IC company. Conexant, itself, was a spin-off from the

semiconductor division of the well-known and well-regarded Rockwell International Corp. Conexant was known as a leading supplier of innovative semiconductor solutions for imaging, audio, embedded modem, and video surveillance applications.<sup>20</sup> Recently, Conexant was acquired by Synaptics, the leading developer of human interface solutions for over \$300 million. Since its formation, Conexant has been an innovator in the semiconductor field (and others) with more than a thousand patents assigned to it.

60. The '959 Patent has been cited by multiple technology companies—as recently as 2017—including, Apple, ARM, Fujitsu, Hewlett-Packard, Honeywell, IBM, Intel, Panasonic (Matsushita), Oracle, Samsung, STMicroelectronics, Toshiba, and Transmeta.

## **COUNT I**

### **DIRECT INFRINGEMENT OF U.S. PATENT NO. 6,535,959**

61. On March 18, 2003, the '959 Patent was duly and legally issued by the United States Patent and Trademark Office for an invention entitled “Circuit and Method for Reducing Power Consumption in an Instruction Cache.”

62. Liberty Patents is the owner of the '959 Patent, with all substantive rights in and to that patent, including the sole and exclusive right to prosecute this action and enforce the '959 Patent against infringers, and to collect damages for all relevant times.

63. Broadcom made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its NetXtreme

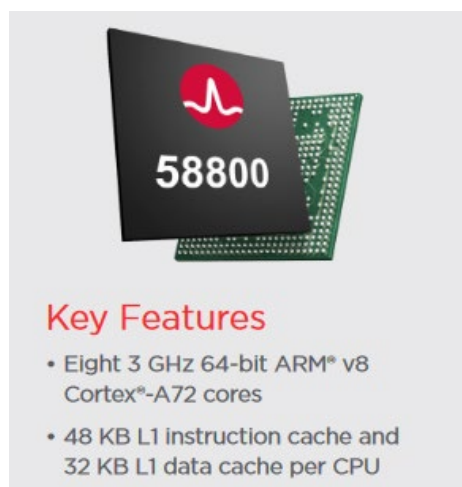
---

<sup>20</sup> See Conexant's Audio Solution Named CES Innovations 2011 Awards Honoree, BUSINESS WIRE (Nov. 9, 2010), [www.businesswire.com/news/home/20101109005618/en/Conexant%E2%80%99s-Audio-Solution-Named-CES-Innovations-2011](http://www.businesswire.com/news/home/20101109005618/en/Conexant%E2%80%99s-Audio-Solution-Named-CES-Innovations-2011).

BCM58800 family of datacenter System-on-Chip (SoC) devices and other products<sup>21</sup> that include processors with the capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):

## BCM58800

High-Performance Datacenter SoC with Integrated  
NetXtreme Ethernet Controller



**Source:** <https://docs.broadcom.com/doc/58800-PB100>

64. The Broadcom NetXtreme BCM58800 is an exemplary accused product that includes the ARM Cortex-A72 processor.

---

<sup>21</sup> See, e.g., Broadcom BCM2711, BCM5301x Series, BCM5862X Family, BCM5871X, Foxhound / BCM5333x Series, Quartz / BCM53570 Series, Trident3-X2 / BCM56275, Stingray PS225, Stingray PS410T, BCM589X Family, BCM5830X Family, BCM4707, BCM4708, BCM4709, BCM11311, BCM2835, BCM2820, BCM2763, BCM7208, BCM7218, BCM63137, BCM63139, BCM63148, BCM63158, BCM63178, BCM63138, SAS3x36R SAS Expander, SAS3x24R SAS Expander, SAS3x40 SAS Expander, SAS3x48 SAS Expander, SAS3x36 SAS Expander, SAS3x28R SAS Expander, MegaRAID SAS 9365-28i, SAS3508 Tri-Mode ROC, BCM28145, BCM28155, BCM21654, BCM21654G, BCM21663, BCM21664, BCM21664T, BCM21553, BCM28150, etc.

65. Fujitsu made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its MB86R24 “Triton-C” Graphics Display Controller and other products<sup>22</sup> that include processors with the capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):

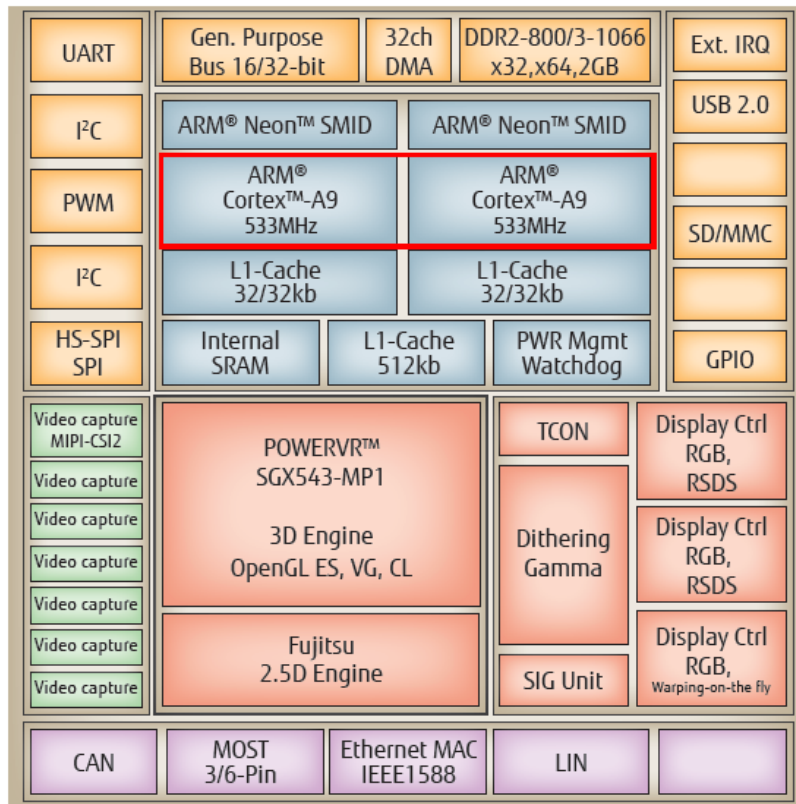
## MB86R24 “Triton-C” Graphics Display Controller Third-generation Advanced 2.5D/3D Graphics SoC



Source: [https://www.fujitsu.com/us/Images/MB86R24\\_Triton\\_FS.pdf](https://www.fujitsu.com/us/Images/MB86R24_Triton_FS.pdf)

<sup>22</sup> See, e.g., Fujitsu MB9EF126 Calypso, MB9EFx25, MB9EF226 Titan, MB86E631 Bridge IC, MB86S70, MB86R11 Emerald-L, MB86R13 Emerald-M, MB86R12 Emerald-P, MB86R24 Triton-C, MB9DF126 Atlas, MB9DF125, MB91590 “Sapphire” series, etc.

The high-performance MB86R24 “Triton-C” combines the latest ARM® Cortex™-A9 dual CPU core with state-of-the-art, embedded 2.5D and 3D graphics cores. This third-generation application processor is the first device in Fujitsu’s new “Blueline” family of high-performance GDCs.



"Triton-C" is a "right-sized" SoC featuring a unique blend of special-purpose functional blocks combined with a high-powered, standards-based GPU.

Source: [https://www.fujitsu.com/us/Images/MB86R24\\_Triton\\_FS.pdf](https://www.fujitsu.com/us/Images/MB86R24_Triton_FS.pdf)

66. The Fujitsu MB86R24 “Triton-C” Graphics Display Controller is an exemplary accused product that includes the ARM Cortex-A9 processor.

67. MediaTek made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its MediaTek Helio X27

(MT6797X) and other products<sup>23</sup> that include processors with the capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):

## MediaTek Helio X27

**Premium clocked tri-cluster, deca-core 64-bit WorldMode LTE platform**



Source: <https://www.mediatek.com/products/smartphones/mt6797x-helio-x27>;

<https://www.infohub24.com/2020/03/17/mediatek-mt6797x-helo-x27-mobile-platform/>

MediaTek Helio X27 (MT6797X) provides three processor clusters, each designed to more efficiently handle different types of workloads. The premium MediaTek Helio X27 features a maximized clock frequency across all three clusters, with an unequalled maximum of 2.6GHz on the powerful ARM Cortex-A72 cluster.

<sup>23</sup> See, e.g., MediaTek Helio X27 (MT6797X), Helio X25 (MT6797T), Helio X23 (MT6797D), Helio X20 (MT6797), Autus I20 (MT2712), Autus T10 (MT2635), MT5396, MT5398, MT5505, MT5561, MT5580, MT5582, MT5592, MT5596, MT6280, MT6513, MT6515, MT6517, MT6517T, MT6573, MT6575, MT6575M, MT6577, MT6577T, MT6795, MT8135, MT8135V, MT8173, MT8176, MT8317, MT8317T, MT8377, MT8580, MT8693, MT8735B, MT8735D, etc.

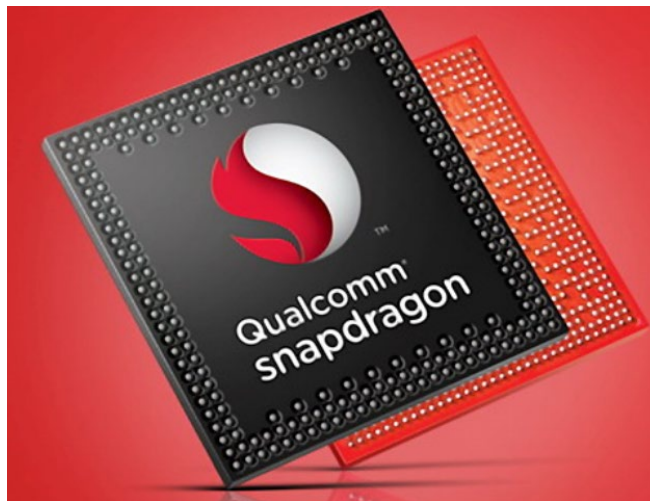
**Source:** <https://www.mediatek.com/products/smartphones/mt6797x-helio-x27>

68. The MediaTek Helio X27 (MT6797X) platform is an exemplary accused product that includes the ARM Cortex-A72 processor.

69. Qualcomm made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its Snapdragon 652 mobile platform and other products<sup>24</sup> that include processors with the capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):



### Snapdragon 652 Mobile Platform



---

<sup>24</sup> See, e.g., Qualcomm APQ8094, Atlas VI, CSRPrima II, CSRS3681, CSRS3682, Quatro 5300, Quatro 5500, Snapdragon 650, Snapdragon 652, Snapdragon 653, Snapdragon 808, Snapdragon 810, etc.



**Source:** <https://www.qualcomm.com/products/snapdragon-652-mobile-platform>;  
<https://www.notebookcheck.net/Qualcomm-Snapdragon-652-MSM8976-SoC-Benchmarks-and-Specs.169861.0.html>

## Features

---

- 4K video capture and playback
- 64-bit quad ARM Cortex-A72 CPU and quad Cortex-A53 CPU
- Integrated X8 LTE
  - LTE Advanced Carrier Aggregation up to 2x20 MHz in the downlink and uplink
  - Cat 7 with support for peak speeds of 300 Mbps download/100 Mbps upload

**Source:** <https://www.qualcomm.com/products/snapdragon-652-mobile-platform>

70. The Qualcomm Snapdragon 652 Mobile Platform is an exemplary accused product that includes the ARM Cortex-A72 processor.

71. Sharp made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its PN-HM851 LCD Monitor and other products<sup>25</sup> that include processors with the capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):

---

<sup>25</sup> See, e.g., Sharp A1, Aquos Compact SH-02H, Aquos Famiredo, Aquos Mini SH-M03, Aquos Pad SH-05G, Aquos Serie SHV32, Aquos Xx, Aquos Zeta SH-01H, Aquos Zeta SH-03G, SH631W, Z2, Z3, etc.

**PN-HM851 / PN-HM751 /  
PN-HM651**

LCD MONITOR

Spectacular 4K Panel Delivers  
24/7 Professional Signage



**Source:** [http://global.sharp/products/professional-monitors/products/pn-hm851\\_hm751\\_hm651/index.html](http://global.sharp/products/professional-monitors/products/pn-hm851_hm751_hm651/index.html)

Android™	OS	Android 7.1
	CPU	Hexa Core [Arm Cortex-A72 processor (dual core) + Arm Cortex-A53 processor (quad core)]
	Memory	4 GB
	Storage	32 GB
	External Interface	LAN port (10Base-T/100Base-TX/1000Base-T), microSD card slot (microSD/microSDHC/microSDXC*4) × 1, USB port (3.0-compliant) × 2, USB port (2.0-compliant) × 1
	Wireless LAN	Compliant with IEEE802.11ac/n/a/g/b
	Bluetooth	Compliant with version 4.1 (A2DP/AVRCP/GATT/GAP/HID/HOGP)

**Source:** [http://global.sharp/products/professional-monitors/products/pn-hm851\\_hm751\\_hm651/specifications.html](http://global.sharp/products/professional-monitors/products/pn-hm851_hm751_hm651/specifications.html)

72. The Sharp PN-HM851 LCD Monitor is an exemplary accused product that includes the ARM Cortex-A72 processor.

73. STMicroelectronics made, had made, used, imported, provided, supplied, distributed, sold, and/or offered for sale products and/or systems including, for example, its SPEAr1310 Embedded Microprocessor and other products<sup>26</sup> that include processors with the

<sup>26</sup> See, e.g., STMicroelectronics Accordo2 Family - STA1080, Accordo2 Family - STA1085, Accordo2 Family - STA1090, Accordo2 Family - STA1095, Nova A9500, Nova A9540,

capability to ignore reading the tag field when a sequential instruction is to be loaded (processors such as the ARM Cortex-A72, Cortex-A57, Cortex-A15, Cortex-A9, Cortex-R5, Cortex-R4, ARM11, etc.) (“accused products”):



**SPEAr1310**

---

Dual-core Cortex A9 embedded MPU for communications

---



**Source:** [http://www.ebvnews.ru/doc12/Flyer\\_SPEAr1310.pdf](http://www.ebvnews.ru/doc12/Flyer_SPEAr1310.pdf);

[http://www.ebvnews.ru/doc12/Flyer\\_SPEAr1310.pdf](http://www.ebvnews.ru/doc12/Flyer_SPEAr1310.pdf).

ST's SPEAr1300 series, based on dual ARM<sup>®</sup> Cortex<sup>™</sup>-A9 cores, offers the dual core energy-conscious performance needed by increasing numbers of demanding applications that require concurrent processing or video streaming. The SPEAr1300 series offers high level performance and multi-core flexibility, together with great power efficiency. The Cortex<sup>™</sup>-A9 core is the industry standard for a wide range of market applications from mobile handsets through to high-performance consumer and enterprise products.

**Source:** <https://www.st.com/en/microcontrollers-microprocessors/spear-arm-cortex-a9-microprocessors.html>

74. The STMicroelectronics SPEAr1310 Embedded Microprocessor is an exemplary accused product that includes the ARM Cortex-A9 processor.

---

NovaThor (L8540, L8580, L9540, U8500, U9500), SPEAr1300 series, STiD337, STiH412, STiH416, STiH418, etc.

75. By doing so, Defendants have directly infringed (literally and/or under the doctrine of equivalents) at least Claim 1 of the '959 Patent. Defendants' infringement in this regard is ongoing.

76. The ARM Cortex-A72 and the ARM Cortex-A9 are exemplary processors that infringe the '959 Patent.

77. For example, the ARM Cortex-A72 and the ARM Cortex-A9 in the accused products are processors that include an instruction cache. The instruction cache includes multiple cache lines or blocks.

### Features

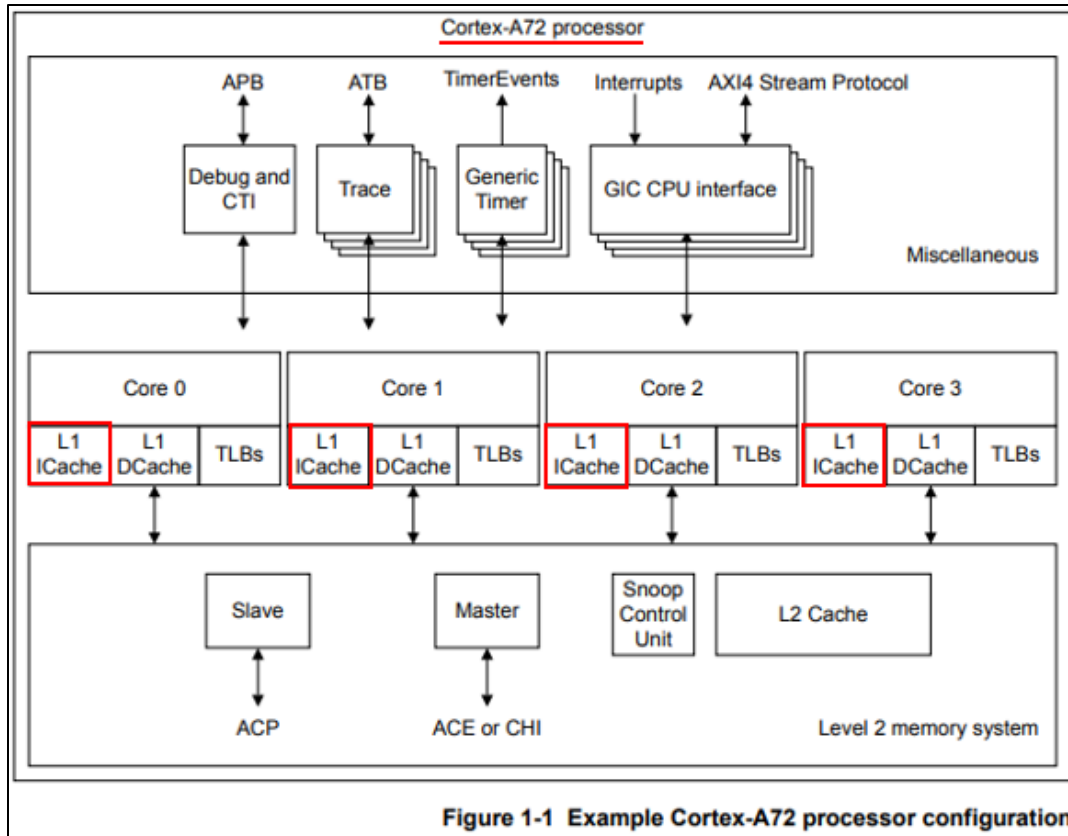
The Cortex-A72 processor includes the following features:

- Full implementation of the ARMv8-A architecture profile. See *1.2 Compliance* on page 1-15.
- Superscalar, variable-length, out-of-order pipeline.
- Dynamic branch prediction with *Branch Target Buffer (BTB)* and *Global History Buffer (GHB)* RAMs, a return stack, and an indirect predictor.
- 48-entry fully-associative L1 instruction *Translation Lookaside Buffer (TLB)* with native support for 4KB, 64KB, and 1MB page sizes.
- 32-entry fully-associative L1 data TLB with native support for 4KB, 64KB, and 1MB page sizes.
- 4-way set-associative unified 1024-entry *Level 2 (L2)* TLB in each processor.
- Fixed 48K L1 instruction cache and 32K L1 data cache.
- Shared L2 cache of 512KB, 1MB, 2MB or 4MB configurable size.

### Source:

[https://static.docs.arm.com/100095/0002/cortex\\_a72\\_mpcore\\_trm\\_100095\\_0002\\_03\\_en.pdf](https://static.docs.arm.com/100095/0002/cortex_a72_mpcore_trm_100095_0002_03_en.pdf)

(Page 17).



Source:

[https://static.docs.arm.com/100095/0002/cortex\\_a72\\_mpcore\\_trm\\_100095\\_0002\\_03\\_en.pdf](https://static.docs.arm.com/100095/0002/cortex_a72_mpcore_trm_100095_0002_03_en.pdf)

(Page 14).

### Instruction fetch

The instruction fetch unit fetches instructions from L1 instruction cache and delivers up to three instructions per cycle to the instruction decode unit. It supports dynamic and static branch prediction.

The instruction fetch unit includes:

- L1 instruction cache that is a 48KB 3-way set-associative cache with a 64-byte cache line and optional dual-bit parity protection per 32 bits in the Data RAM and 36 bits in the Tag RAM.
- 48-entry fully-associative L1 instruction *Translation Lookaside Buffer* (TLB) with native support for 4KB, 64KB, and 1MB page sizes.
- 2-level dynamic predictor with *Branch Target Buffer* (BTB) for fast target generation.
- Static branch predictor.
- Indirect predictor.
- Return stack.

**Source:**

[https://static.docs.arm.com/100095/0002/cortex\\_a72\\_mpcore\\_trm\\_100095\\_0002\\_03\\_en.pdf](https://static.docs.arm.com/100095/0002/cortex_a72_mpcore_trm_100095_0002_03_en.pdf)

(Page 26).

### 1.1 About the Cortex-A9 processor

The Cortex-A9 processor is a high-performance, low-power, ARM macrocell with an L1 cache subsystem that provides full virtual memory capabilities. The Cortex-A9 processor implements the ARMv7-A architecture and runs 32-bit ARM instructions, 16-bit and 32-bit Thumb instructions, and 8-bit Java bytecodes in Jazelle state.

**Source:** [https://static.docs.arm.com/ddi0388/i/DDI0388I\\_cortex\\_a9\\_r4p1\\_trm.pdf](https://static.docs.arm.com/ddi0388/i/DDI0388I_cortex_a9_r4p1_trm.pdf) (Page 13)

### 1.6 Configurable options

Table 1-1 shows the configurable options for the Cortex-A9 processor.

**Table 1-1 Configurable options for the Cortex-A9 processor**

<b>Feature</b>	<b>Range of options</b>
<u>Instruction cache size</u>	16KB, 32KB, or 64KB
Data cache size	16KB, 32KB, or 64KB
TLB entries	64, 128, 256 or 512 entries
BTAC entries	512, 1024, 2048 or 4096 entries

**Source:** [https://static.docs.arm.com/ddi0388/i/DDI0388I\\_cortex\\_a9\\_r4p1\\_trm.pdf](https://static.docs.arm.com/ddi0388/i/DDI0388I_cortex_a9_r4p1_trm.pdf) (Page 19)

### 11.1 Cache terminology

In a von Neumann architecture, a single cache is used for instruction and data (a unified cache). A modified Harvard architecture has separate instruction and data buses and therefore there are two caches, an instruction cache (I-cache) and a data cache (D-cache). In the ARMv8 processors, there are distinct instruction and data L1 caches backed by a unified L2 cache.

The cache is required to hold an address, some data and some status information.

The following is a brief summary of some of the terms used and a diagram illustrating the fundamental structure of a cache:

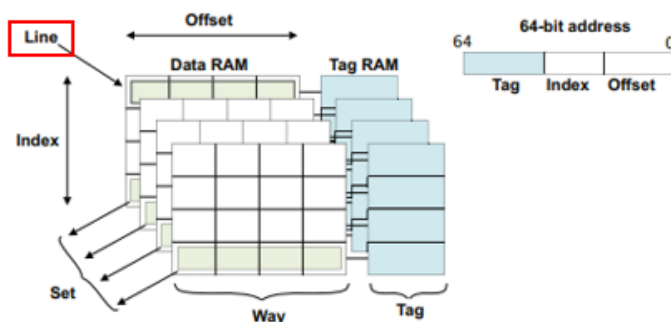


Figure 11-2 Cache terminology

- The tag is the part of a memory address stored within the cache that identifies the main memory address associated with a line of data.

Source:

[https://static.docs.arm.com/den0024/a/DEN0024A\\_v8\\_architecture\\_PG.pdf?\\_ga=2.17157625.1756166971.1588761056-4692096.1569325365](https://static.docs.arm.com/den0024/a/DEN0024A_v8_architecture_PG.pdf?_ga=2.17157625.1756166971.1588761056-4692096.1569325365) (Page 145).

- It would be inefficient to hold one word of data for each tag address, so several locations are typically grouped together under the same tag. This logical block is commonly known as a cache line, and refers to the smallest loadable unit of a cache, a block of contiguous words from main memory. A cache line is said to be valid when it contains cached data or instructions, and invalid when it does not.

Source:

[https://static.docs.arm.com/den0024/a/DEN0024A\\_v8\\_architecture\\_PG.pdf?\\_ga=2.17157625.1756166971.1588761056-4692096.1569325365](https://static.docs.arm.com/den0024/a/DEN0024A_v8_architecture_PG.pdf?_ga=2.17157625.1756166971.1588761056-4692096.1569325365) (Page 145).

<b>Cache set</b>	<u>A cache set is a group of cache lines (or blocks). A set contains all the ways that can be addressed with the same index. The number of cache sets is always a power of two.</u>  <i>See also</i> Cache terminology diagram on the last page of this glossary.
<b>Cache way</b>	A group of cache lines (or blocks). It is 2 to the power of the number of index bits in size.  <i>See also</i> Cache terminology diagram on the last page of this glossary.

**Source:**

[http://infocenter.arm.com/help/topic/com.arm.doc.ddi0301h/DDI0301H\\_arm1176jzfs\\_r0p7\\_trm.pdf](http://infocenter.arm.com/help/topic/com.arm.doc.ddi0301h/DDI0301H_arm1176jzfs_r0p7_trm.pdf) (Page 746).

78. The ARM Cortex-A72 and the ARM Cortex-A9 processors include a circuit that is configured to generate a power reduction signal. The power reduction signal indicates if a subsequent instruction to be fetched is in a same block (of a plurality of blocks) as a previous instruction fetched from the instruction cache.

79. For example, the ARM Cortex-A72 and the ARM Cortex-A9 support a power reduction method that is operational when an instruction is being accessed from the instruction cache. The instruction cache includes multiple cache lines or blocks, and each cache line or block is associated with a tag value. These tag values are stored in the tag RAM. The cache also includes data RAM for storing the instructions.

80. If a sequential (or subsequent) instruction to be read from the instruction cache is in the same cache line or block as the previous instruction, only the data RAM of the cache is accessed for the instruction, and the tag RAM is *not* accessed because the sequential instruction resides in the same cache line or block.

81. Accordingly, both the ARM Cortex-A72 and the ARM Cortex-A9 include a circuit that sends a signal (“power reduction signal”) if a sequential instruction to be accessed from the instruction cache is identified as being in the same cache line or block.



## L1 instruction memory system

The instruction cache can source up to 128 bits per fetch depending on alignment.

Sequential cache read operations reduce the number of full cache reads. This has the benefit of reducing power consumption. If a cache read is sequential to the previous cache read, and the read is within the same cache line, only the data RAM way that was previously read is accessed.

### Source:

[https://static.docs.arm.com/100095/0002/cortex\\_a72\\_mpcore\\_trm\\_100095\\_0002\\_03\\_en.pdf](https://static.docs.arm.com/100095/0002/cortex_a72_mpcore_trm_100095_0002_03_en.pdf)

(Page 287).

## Cache features

The Cortex-A9 processor has separate instruction and data caches. The caches have the following features:

- Each cache can be disabled independently. See *System Control Register* on page 4-25.
- Both caches are 4-way set-associative.
- The cache line length is eight words.
- On a cache miss, critical word first filling of the cache is performed.
- You can configure the instruction and data caches independently during implementation to sizes of 16KB, 32KB, or 64KB.
- To reduce power consumption, the number of full cache reads is reduced by taking advantage of the sequential nature of many cache operations. If a cache read is sequential to the previous cache read, and the read is within the same cache line, only the data RAM set that was previously read is accessed.

Source: [https://static.docs.arm.com/ddi0388/i/DDI0388I\\_cortex\\_a9\\_r4p1\\_trm.pdf](https://static.docs.arm.com/ddi0388/i/DDI0388I_cortex_a9_r4p1_trm.pdf) (Page 113)

## 11.1 Cache terminology

In a von Neumann architecture, a single cache is used for instruction and data (a unified cache). A modified Harvard architecture has separate instruction and data buses and therefore there are two caches, an instruction cache (I-cache) and a data cache (D-cache). In the ARMv8 processors, there are distinct instruction and data L1 caches backed by a unified L2 cache.

The cache is required to hold an address, some data and some status information.

The following is a brief summary of some of the terms used and a diagram illustrating the fundamental structure of a cache:

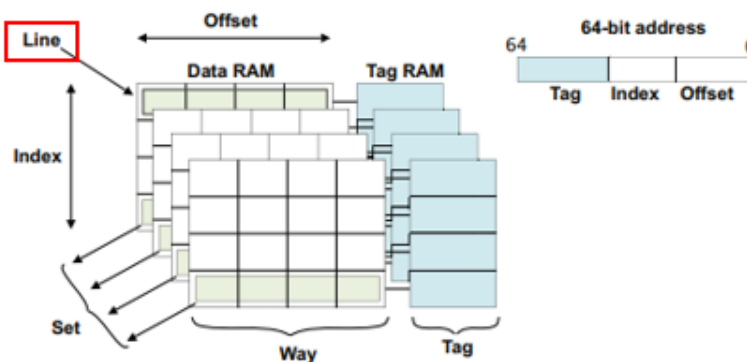


Figure 11-2 Cache terminology

- The tag is the part of a memory address stored within the cache that identifies the main memory address associated with a line of data.

Source:

[https://static.docs.arm.com/den0024/a/DEN0024A\\_v8\\_architecture\\_PG.pdf?\\_ga=2.17157625.1756166971.1588761056-4692096.1569325365](https://static.docs.arm.com/den0024/a/DEN0024A_v8_architecture_PG.pdf?_ga=2.17157625.1756166971.1588761056-4692096.1569325365) (Page 145).

## **Instruction fetch**

The instruction fetch unit fetches instructions from L1 instruction cache and delivers up to three instructions per cycle to the instruction decode unit. It supports dynamic and static branch prediction.

The instruction fetch unit includes:

- L1 instruction cache that is a 48KB 3-way set-associative cache with a 64-byte cache line and optional dual-bit parity protection per 32 bits in the Data RAM and 36 bits in the Tag RAM.
- 48-entry fully-associative L1 instruction *Translation Lookaside Buffer* (TLB) with native support for 4KB, 64KB, and 1MB page sizes.
- 2-level dynamic predictor with *Branch Target Buffer* (BTB) for fast target generation.
- Static branch predictor.
- Indirect predictor.
- Return stack.

**Source:**

[https://static.docs.arm.com/100095/0002/cortex\\_a72\\_mpcore\\_trm\\_100095\\_0002\\_03\\_en.pdf](https://static.docs.arm.com/100095/0002/cortex_a72_mpcore_trm_100095_0002_03_en.pdf)

(Page 26).

• It would be inefficient to hold one word of data for each tag address, so several locations are typically grouped together under the same tag. This logical block is commonly known as a cache line, and refers to the smallest loadable unit of a cache, a block of contiguous words from main memory. A cache line is said to be valid when it contains cached data or instructions, and invalid when it does not.

**Source:**

[https://static.docs.arm.com/den0024/a/DEN0024A\\_v8\\_architecture\\_PG.pdf?\\_ga=2.17157625.1756166971.1588761056-4692096.1569325365](https://static.docs.arm.com/den0024/a/DEN0024A_v8_architecture_PG.pdf?_ga=2.17157625.1756166971.1588761056-4692096.1569325365) (Page 145).

82. Defendants have had knowledge of the '959 Patent at least as of the date when they were notified of the filing of this action.

83. In addition, Fujitsu has had knowledge of the '959 Patent at least as of November 28, 2003, when it was cited by the examiner in an office action during prosecution of U.S. Patent No. 6,760,810, which was initially assigned to Fujitsu Limited and later to Fujitsu Semiconductor Limited. The examiner rejected every pending claim in the application as anticipated by the '959 Patent. Fujitsu employees, Yasuhiro Yamazaki, Taizoh Satoh, Hiroyuki Utsumi, and Hitoshi Yoda—who were named as inventors of U.S. Patent No. 6,760,810—and others involved in the prosecution of the patent have had knowledge of the '959 Patent well before this suit was filed.

84. In addition, STMicroelectronics has had knowledge of the '959 Patent well before the filing of this lawsuit because the '959 Patent was cited by the examiner during prosecution of U.S. Patent No. 6,772,355, which was assigned to STMicroelectronics Inc. STMicroelectronics employees, Mark Homewood and Anthony Jarvis—who were named as inventors on U.S. Patent

No. 6,772,355—and others involved in the prosecution of the patent have had knowledge of the '959 Patent at least before August 3, 2004, the issue date of U.S. Patent No. 6,772,355.

85. Liberty Patents has been damaged as a result of the infringing conduct by Defendants alleged above. Thus, Defendants are liable to Liberty Patents in an amount that adequately compensates it for such infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

86. Liberty Patents and/or its predecessors-in-interest have satisfied all statutory obligations required to collect pre-filing damages for the full period allowed by law for infringement of the '959 Patent.

**ADDITIONAL ALLEGATIONS REGARDING INFRINGEMENT**

87. Defendants have also indirectly infringed the '959 Patent by inducing others to directly infringe the '959 Patent. Defendants have induced the end-users, Defendants' customers, to directly infringe (literally and/or under the doctrine of equivalents) the '959 Patent by using the accused products.

88. Defendants took active steps, directly and/or through contractual relationships with others, with the specific intent to cause them to use the accused products in a manner that infringes one or more claims of the patent-in-suit, including, for example, claim 1 of the '959 Patent.

89. Such steps by Defendants included, among other things, advising or directing customers and end-users to use the accused products in an infringing manner; advertising and promoting the use of the accused products in an infringing manner; and/or distributing instructions that guide users to use the accused products in an infringing manner.

90. Defendants performed these steps, which constitute induced infringement, with the knowledge of the '959 Patent and with the knowledge that the induced acts constitute infringement.

91. Defendants were and are aware that the normal and customary use of the accused products by Defendants' customers would infringe the '959 Patent. Defendants' inducement is ongoing.

92. Defendants have also induced their affiliates, or third-party manufacturers, shippers, distributors, retailers, or other persons acting on their or their affiliates' behalf, to directly infringe (literally and/or under the doctrine of equivalents) the '959 Patent by importing, selling or offering to sell the accused products.

93. Defendants have a significant role in placing the accused products in the stream of commerce with the expectation and knowledge that they will be purchased by consumers in Texas and elsewhere in the United States.

94. Defendants purposefully direct or control the making of accused products and their shipment to the United States, using established distribution channels, for sale in Texas and elsewhere within the United States.

95. Defendants purposefully direct or control the sale of the accused products into established United States distribution channels, including sales to nationwide retailers. Defendants' established United States distribution channels include one or more United States based affiliates.

96. Defendants purposefully direct or control the sale of the accused products online and in nationwide retailers, including for sale in Texas and elsewhere in the United States, and expect and intend that the accused products will be so sold.

97. Defendants purposefully place the accused products—whether by themselves or through subsidiaries, affiliates, or third parties—into an international supply chain, knowing that the accused products will be sold in the United States, including Texas. Therefore, Defendants also facilitate the sale of the accused products in Texas.

98. Defendants took active steps, directly and/or through contractual relationships with others, with the specific intent to cause such persons to import, sell, or offer to sell the accused products in a manner that infringes one or more claims of the '959 Patent, including, for example, claim 1 of the '959 Patent.

99. Such steps by Defendants included, among other things, making or selling the accused products outside of the United States for importation into or sale in the United States, or knowing that such importation or sale would occur; and directing, facilitating, or influencing their affiliates, or third-party manufacturers, shippers, distributors, retailers, or other persons acting on their or their affiliates' behalf, to import, sell, or offer to sell the accused products in an infringing manner.

100. Defendants performed these steps, which constitute induced infringement, with the knowledge of the '959 Patent and with the knowledge that the induced acts would constitute infringement.

101. Defendants performed such steps in order to profit from the eventual sale of the accused products in the United States.

102. Defendants' inducement is ongoing.

103. Defendants have also indirectly infringed by contributing to the infringement of the '959 Patent. Defendants have contributed to the direct infringement of the '959 Patent by the end-user of the accused products.

104. The accused products have special features that are specially designed to be used in an infringing way and that have no substantial uses other than ones that infringe the '959 Patent, including, for example, claim 1 of the '959 Patent.

105. The special features include, for example, executing computer instructions in an instruction cache used in a manner that infringes the '959 Patent.

106. These special features constitute a material part of the invention of one or more of the claims of the '959 Patent and are not staple articles of commerce suitable for substantial non-infringing use.

107. Defendants' contributory infringement is ongoing.

108. Defendants have had actual knowledge of the '959 Patent at least as of the date when they were notified of the filing of this action. Since at least that time, Defendants have known the scope of the claims of the '959 Patent, the products that practice the '959 Patent, and that Liberty Patents is the owner of the '959 Patent.

109. By the time of trial, Defendants will have known and intended (since receiving such notice) that their continued actions would infringe and actively induce and contribute to the infringement of one or more claims of the '959 Patent.

110. Furthermore, Defendants have a policy or practice of not reviewing the patents of others (including instructing their employees to not review the patents of others), and thus have been willfully blind of Liberty Patents' patent rights. *See, e.g.*, M. Lemley, "Ignoring Patents," 2008 Mich. St. L. Rev. 19 (2008).

111. Defendants' actions are at least objectively reckless as to the risk of infringing valid patents, and this objective risk was either known or should have been known by Defendants. Defendants have knowledge of the '959 Patent.

112. Defendants' customers have infringed the '959 Patent. Defendants have encouraged their customers' infringement.

113. Defendants' direct and indirect infringement of the '959 Patent has been, and/or continues to be willful, intentional, deliberate, and/or in conscious disregard of Liberty Patents' rights under the patent-in-suit.

114. Liberty Patents has been damaged as a result of Defendants' infringing conduct alleged above. Thus, Defendants are liable to Liberty Patents in an amount that adequately compensates it for such infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

**JURY DEMAND**

Liberty Patents hereby requests a trial by jury on all issues so triable by right.

**PRAYER FOR RELIEF**

Liberty Patents requests that the Court find in its favor and against Defendants, and that the Court grant Liberty Patents the following relief:

- a. Judgment that one or more claims of the '959 Patent have been infringed, either literally and/or under the doctrine of equivalents, by Defendants and/or all others acting in concert therewith;
- b. A permanent injunction enjoining Defendants and their officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all others acting in concert therewith from infringement of the '959 Patent; or, in the alternative, an award of a reasonable ongoing royalty for future infringement of the '959 Patent by such entities;
- c. Judgment that Defendants account for and pay to Liberty Patents all damages to and costs incurred by Liberty Patents because of Defendants' infringing activities and other



conduct complained of herein, including an award of all increased damages to which Liberty Patents is entitled under 35 U.S.C. § 284;

d. That Liberty Patents be granted pre-judgment and post-judgment interest on the damages caused by Defendants' infringing activities and other conduct complained of herein;

e. That this Court declare this an exceptional case and award Liberty Patents its reasonable attorney's fees and costs in accordance with 35 U.S.C. § 285; and

f. That Liberty Patents be granted such other and further relief as the Court may deem just and proper under the circumstances.

Dated: October 16, 2020

Respectfully submitted,

/s/ Zachariah S. Harrington

Matthew J. Antonelli

Texas Bar No. 24068432

matt@ahtlawfirm.com

Zachariah S. Harrington

Texas Bar No. 24057886

zac@ahtlawfirm.com

Larry D. Thompson, Jr.

Texas Bar No. 24051428

larry@ahtlawfirm.com

Christopher Ryan Pinckney

Texas Bar No. 24067819

ryan@ahtlawfirm.com

Rehan M. Safiullah

Texas Bar No. 24066017

rehan@ahtlawfirm.com

ANTONELLI, HARRINGTON

& THOMPSON LLP

4306 Yoakum Blvd., Ste. 450

Houston, TX 77006

(713) 581-3000

Stafford Davis

State Bar No. 24054605

sdavis@stafforddavisfirm.com

Catherine Bartles  
Texas Bar No. 24104849  
cbartles@stafforddavisfirm.com  
THE STAFFORD DAVIS FIRM  
815 South Broadway Avenue  
Tyler, Texas 75701  
(903) 593-7000  
(903) 705-7369 fax

*Attorneys for Liberty Patents, LLC*