

**UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION**

PARKERVISION, INC.,

Plaintiff,

v.

REALTEK SEMICONDUCTOR CORP.,

Defendant.

Case No. 6:22-cv-01162-ADA

JURY TRIAL DEMANDED

AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff ParkerVision, Inc. (“ParkerVision”), by and through its undersigned counsel, files this Amended Complaint against Defendant Realtek Semiconductor Corp. (“Realtek” or “Defendant”) for patent infringement of United States Patent Nos. 6,049,706; 6,266,518; 7,292,835; and 8,660,513 (the “patents-in-suit”) and alleges as follows:

NATURE OF THE ACTION

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

PARTIES

2. Plaintiff ParkerVision is a Florida corporation with its principal place of business at 4446-1A Hendricks Avenue, Suite 354, Jacksonville, Florida 32207.

3. On information and belief, Realtek is a foreign corporation organized and existing under the laws of Taiwan with a place of business located at No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan.

4. According to Realtek, “Realtek Semiconductor Corporation is a world-leading IC provider that designs and develops a wide range of IC products for connected media, communications network, computer peripheral, and multimedia applications.”

<https://www.realtek.com/en/press-room/news-releases/item/realtek-to-announce-full-range-of-communications-network-multimedia-and-consumer-electronics-solutions-at-2022-ces>.

Operations Overview

I. Business Overview

1. Business Scope

(1) Realtek’s Main Business Areas

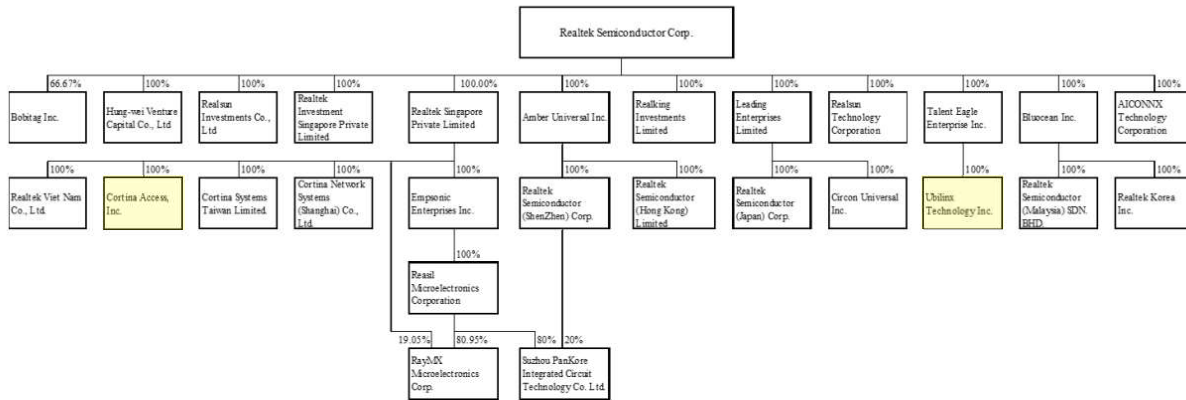
- i. Research, development, production, manufacturing, and the sale of various types of integrated circuits
- ii. Software and hardware application design, testing, repairs, and technical consultations for various types of integrated circuits
- iii. Research, development, and the sale of various types of silicon intellectual property
- iv. Adjunct trade and sales that relate to Realtek’s core businesses

https://www.realtek.com/images/ar/-2021__20220518.pdf at page 69.

5. Moreover, according to Realtek, “Realtek Semiconductor Corporation . . . was incorporated on October 21, 1987, and debuted on the Taiwan Stock Exchange in October 1998. It is headquartered in Taiwan and it *has sales or R&D teams in* China, Singapore, the *United States*, Japan, and South Korea.” https://www.realtek.com/images/ar/-2021__20220518.pdf at page 4.

6. In Realtek’s 2021 Annual Report, Realtek lists wholly-owned affiliates that are registered in the United States, specifically, Cortina Access, Inc. and Ubilinx Technology Inc.

Company Name	Date of Incorporation	Place of Registration	Paid-in Capital	Main Business Activities
Cortina Access, Inc.	2015.04	United States	US\$16,892	R&D and information services
Ubilinx Technology Inc.	2016.08	United States	US\$60,000,000	R&D and information services



https://www.realtek.com/images/ar/-2021_20220518.pdf at pages 107-108.

7. On information and belief, Realtek has designed, manufactured, and/or sold Realtek Wi-Fi/802.11/Bluetooth chips (“Wi-Fi chips”) in the United States and that are found in products sold in the United States. https://www.realtek.com/images/ar/-2021_20220518.pdf at pages 70, 84; https://www.realtek.com/images/ar/-_.pdf at pages 67, 70, 79-80.

8. On information and belief, Realtek sells Wi-Fi chips to its customers knowing those chips will be incorporated into products imported and/or sold in the United States.

9. For example, on information and belief, Realtek provides its customers with Wi-Fi chips for televisions to be sold in the United States.

In the consumer market, the TV market generally moves with the epidemic and market fluctuations. High-end TVs maintain high-spec Wi-Fi, but require cost support. Customers with low-end specifications are faced with low gross profit that cannot cover the cost of sales, and are forced to adjust the specifications to Wi-Fi 4 1x1 single Wi-Fi. In order to simultaneously defend against market competition and enhance customers' hitherto low-end TV specifications, Realtek guides customers to move to a 1x1 combo or 2x2 with better cost-performance specifications, and upgrade W-Fi 4 1x1+BT from single-band to dual-band. In 2021, due to the limited supply of Wi-Fi 5 in the Chinese market, the set-top box was downgraded to models without Wi-Fi. However, the Chinese operator market is expected to start introducing Wi-Fi 6 models in the third quarter of 2022. Major telecom operators have added Wi-Fi 6 models to their set-top box tenders, and are expected to gradually upgrade the specifications of existing tenders.

https://www.realtek.com/images/ar/-2021_20220518.pdf at page 78.

10. Realtek Wi-Fi chips are found in televisions sold in the United States including by TCL and LG.

11. For example, the Realtek RTL8812BU is found in TCL television model no. 43S425.





12. On information and belief, Realtek's RTL8812BU chip is found in other TCL televisions sold in the United States including, without limitation, the television models shown below.

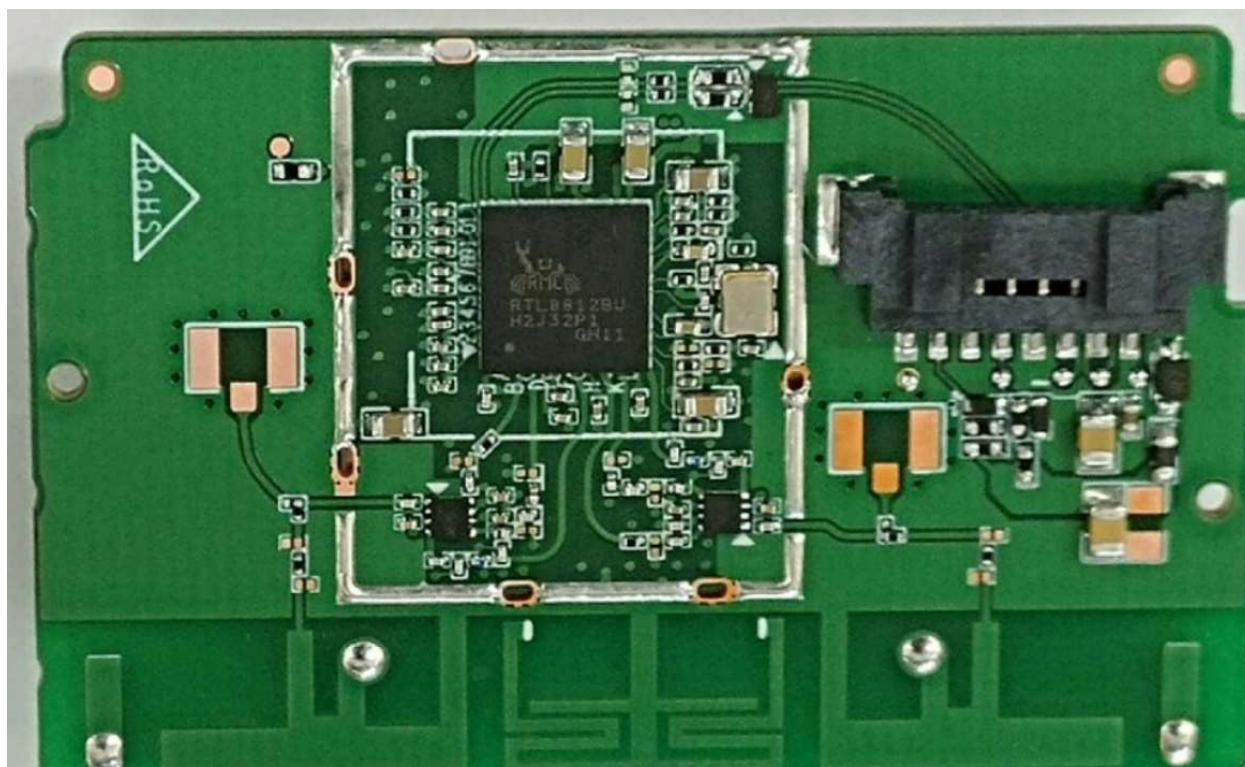
TV Model No.	FCC ID
65S427	W8U65S427
43S423	W8U43S423
55S426	W8U55S426
75Q825	W8U75Q825
65R625	W8U65R625
55S427	W8U55S427
55R625	W8U55R625
43S525	W8U43S525
65S525	W8U65S525
55S525	W8U55S525
55S423	W8U55S423
43S421	W8U43S421
50S525	W8U50S525
50S423	W8U50S423
65S423	W8U65S423
75S425	W8U75S425
75R615	W8U75R615
32S301	W8U32S301
55S421	W8U55S421
32S325	W8U32S325

49S325	W8U49S325
43S325	W8U43S325
40S325	W8U40S325
32S327	W8U32S327
32S425	W8U43S425
50S425	W8U50S425
49S425	W8U49S425
32S321	W8U32S321
65S425	W8U65S425
55S425	W8U55S425
49S403	W8U49S403
65S401	W8U65S401
43S403	W8U43S403
55S401	W8U55S401
65S517	W8U65S517
55S517	W8U55S517
65R613	W8U65R613
55R613	W8U55R613
49S517	W8U49S517
43S517	W8U43S517
75C807	W8U75C807
49S303	W8U49S303
43S303	W8U43S303
40S303	W8U40S303
28S303	W8U28S303
32S303	W8U32S303
55C807	W8U55C807
65C807	W8U65C807

13. On information and belief, the LG model LGSWFAC81 wireless module, which is identified by the FCC ID number BEJLGSWFAC81, includes Realtek's RTL8812BU chip.

Arcadyan Technology		
Reg. Date : 2017.09.01	SPECIFICATION	
Rev. No. : 1.0	MODEL NAME: LGSWFAC81	
<p>1. Electrical Specifications</p> <p>1. Features</p> <p>LGSWFAC81 is the small size and low power module for IEEE 802.11ac wireless LAN.</p> <p>LGSWFAC81 is based on Realtek RTL8812BU solution.</p> <ul style="list-style-type: none"> ▪ IEEE 802.11 a/b/g/n/ac Dual Band WLAN infrastructure 		

<https://fccid.io/BEJLGSWFAC81/Users-Manual/Users-Manual-3587629>.



<https://fccid.io/BEJLGSWFAC81/Internal-Photos/Internal-Photos-3585492>.

14. On information and belief, the following LG television models contain the LGSWFAC81 module and Realtek's RTL8812BU chip: 43UM6900PUA, 49UM6900PUA, 55UM6900PUA, 65UM6900PUA, 43UM6950DUB, 49UM6950DUB, 55UM6950DUB,

60UM6900PUA, 60UM6950DUB, 65UM6950DUB, 55UM6910PUC, 49LK5700PUA, 49LK5700BUA, 43LK5700PUA, 43LK5700BUA, 32LK610PUA.

15. On information and belief, at CES 2020 and 2022 in Las Vegas, Nevada, Realtek exhibited, demonstrated, and used a number of products containing Realtek Wi-Fi chips. <https://www.realtek.com/en/press-room/news-releases/item/realtek-to-demonstrate-full-range-of-connectivity-multimedia-and-consumer-electronics-solutions-at-2020-ces>; <https://www.realtek.com/en/press-room/news-releases/item/realtek-to-announce-full-range-of-communications-network-multimedia-and-consumer-electronics-solutions-at-2022-ces>. On information and belief, Realtek (or those acting on its behalf) sold, offered for sale and imported these products into the United States.

16. On information and belief, Realtek sells and/or offers to sell Wi-Fi chips to United States customers (e.g., HP Inc.) for incorporating into devices e.g. laptop computers. *See, e.g.,* <https://fccid.io/B94RTL>; <https://support.hp.com/us-en/document/c06624389>.

17. On information and belief, Realtek provides technical support for United States customers to incorporate Realtek Wi-Fi chips into devices.

18. On information and belief, Realtek sells, offers to sell, provides, exports and/or transfers in and to the United States Realtek Wi-Fi chips to its wholly-owned affiliates Cortina Access, Inc. and Ubilinx Technology Inc.

JURISDICTION AND VENUE

19. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a) because the action arises under the patent laws of the United States, 35 U.S.C. §§ 1 *et seq.*

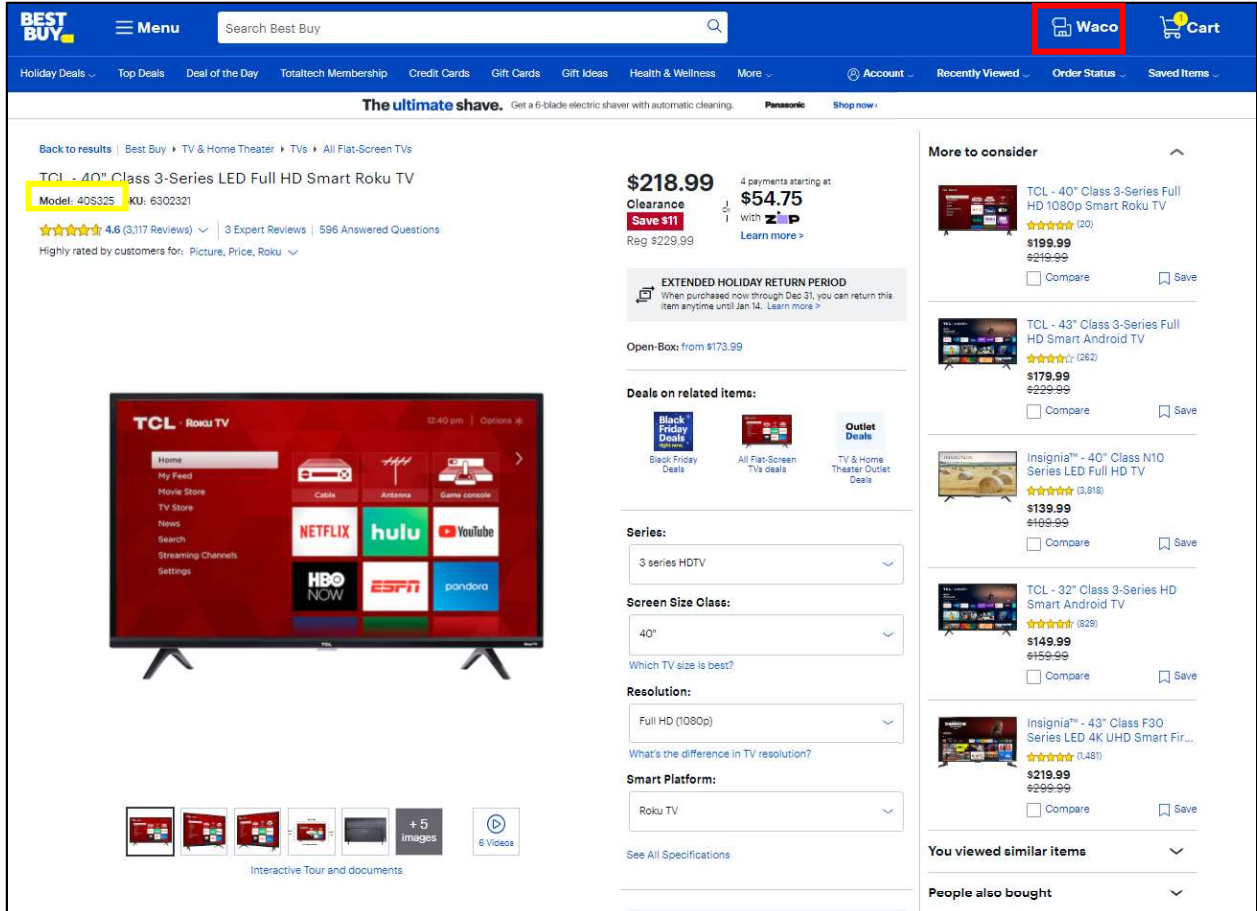
20. Realtek is subject to this Court's personal jurisdiction in accordance with due process and/or the Texas Long-Arm Statute. *See* Tex. Civ. Prac. & Rem. Code §§ 17.041 *et seq.*

21. This Court has personal jurisdiction over Realtek because Realtek has sufficient minimum contacts with this forum as a result of business conducted within the State of Texas and this judicial district. In particular, this Court has personal jurisdiction over Realtek because, *inter alia*, Realtek, on information and belief, has substantial, continuous, and systematic business contacts in this judicial district, and derives substantial revenue from goods provided to individuals in this judicial district.

22. Realtek has purposefully availed itself of the privileges of conducting business within this judicial district, has established sufficient minimum contacts with this judicial district such that it should reasonably and fairly anticipate being hauled into court in this judicial district, has purposefully directed activities at residents of this judicial district, and at least a portion of the patent infringement claims alleged in this Complaint arise out of or are related to one or more of the foregoing activities.

23. This Court has personal jurisdiction over Realtek because Realtek (directly and/or through its subsidiaries, affiliates, intermediaries, or customers) has committed and continues to commit acts of infringement in this judicial district in violation of at least 35 U.S.C. § 271(a). In particular, on information and belief, Realtek (directly and/or through its subsidiaries, affiliates, intermediaries, or customers) uses, sells, offers for sale, imports, advertises, and/or otherwise promotes infringing products (receiver, transmitter, and/or transceiver integrated circuits (e.g., chips for use in wireless devices)) in the United States, the State of Texas, and this judicial district. The infringing products include, without limitation, the Realtek RTL8812BU ("Realtek Chips").

24. Customers can purchase TCL televisions containing Realtek Chips at brick-and-mortar stores located in this judicial district. For example, and as illustrated below, customers can order TCL televisions, including the TCL TV Model No. 40S325 (which includes the RTL8812BU) (indicated by the yellow box (below)), for in-store pickup at the Best Buy in Waco, Texas (indicated by the red box (below)).



[https://www.bestbuy.com/site/tcl-40-class-3-series-led-full-hd-smart-roku-tv/6302321.p?skuId=6302321.](https://www.bestbuy.com/site/tcl-40-class-3-series-led-full-hd-smart-roku-tv/6302321.p?skuId=6302321)

The screenshot displays the Best Buy website interface. On the left, there is a sidebar with filters for Price (ranging from \$100 to \$3000 and up), Condition (New and Open-Box), and Current Deals. The main content area shows three TCL Roku TV models. The first model is a 75-inch Class 4-Series 4K UHD HDR Smart Roku TV priced at \$629.99. The second model is a 40-inch Class 3-Series LED Full HD Smart Roku TV priced at \$218.99, with a red box highlighting its pickup information: 'Get it in 5 days' and 'Pickup: Order now for pickup on Thu, Nov 10 at Waco'. The third model is a 75-inch Class 5-Series QLED 4K UHD Smart Google TV priced at \$799.99. A Marantz advertisement is also visible in the sidebar.

https://www.bestbuy.com/site/searchpage.jsp?_dyncharset=UTF-8&browsedCategory=pcmcat1526935930973&cp=2&id=pcat17071&iht=n&ks=960&list=y&sc=Global&st=pcmcat1526935930973_categoryid%24abcat0101001&type=page&usc=All%20Categories

25. On information and belief, Realtek has known of and has had notice of the patents-in-suit and ParkerVision’s accused infringement of Realtek Chips since at least as early as October 12, 2020 when ParkerVision filed suit against TCL in *ParkerVision v. TCL Industries Holdings Co., Ltd., et al.*, 6:20-cv-00945 (ADA).

26. On information and belief, Realtek knew or should have known that its chips would be incorporated into products (such as the televisions identified above) that would be

used, sold, offered for sale, and/or imported in the United States, the State of Texas, and this judicial district. Realtek intended that its products be sold in the United States and affirmatively directed its products to the United States market including, without limitation, through its customers and distributors. *See, e.g.*, <https://www.realtek.com/en/contact-us-en/cu-3-en-2/category/42-12-en-3>.

27. On information and belief, Realtek targets the United States market and has purposefully availed itself of doing business in the United States. On information and belief, Realtek conducts business with U.S. companies for the purpose of incorporating its products into products sold in the United States, has sought authorization from the FCC to sell its products in the United States (including, without limitation, the Realtek Chips – see <https://fccid.io/TX2>), and has presented products for sale and distribution in the United States at the Consumer Electronics Show in Nevada.

28. This case is related to at least the following cases before this Court and involves common patents and products: *ParkerVision, Inc. v. TCL Industries Holdings Co., Ltd., et al.*, 6:20-CV-00945, and *ParkerVision, Inc. v. LG Electronics, Inc.* 6:21-CV-00520 (W.D. Tex).

29. Realtek has been involved in a number of litigations in this judicial district including against Bandspeed, LLC; Rock Creek Networks, LLC; and Future Link Systems, LLC.

30. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b)-(d) and/or 1400(b) at least because Realtek is a foreign corporation subject to personal jurisdiction in this judicial district and has committed acts of infringement within this judicial district giving rise to this action.

PARKERVISION

31. In 1989, Jeff Parker and David Sorrells started ParkerVision in Jacksonville, Florida. Through the mid-1990s, ParkerVision focused on developing commercial video cameras, e.g., for television broadcasts. The cameras used radio frequency (RF) technology to automatically track the camera's subject.

32. When developing consumer video cameras, however, ParkerVision, encountered a problem – the power and battery requirements for RF communications made a cost effective, consumer-sized product impractical. So, Mr. Sorrells and ParkerVision's engineering team began researching ways to solve this problem.

33. At the time, a decade's-old RF technology called super-heterodyne dominated the consumer products industry. But this technology was not without its own problems – the circuitry was large and required significant power.

34. From 1995 through 1998, ParkerVision engineers developed an innovative method of RF direct conversion by a process of sampling a RF carrier signal and transferring energy to create a down-converted baseband signal.

35. After creating prototype chips and conducting tests, ParkerVision soon realized that its technology led to improved RF receiver performance, lower power consumption, reduced size and integration benefits. In other words, RF receivers could be built smaller, cheaper and with greater improved performance.

36. ParkerVision's innovations did not stop there. ParkerVision went on to develop additional RF down-conversion technologies, RF up-conversion technologies and other related direct-conversion technologies. ParkerVision also developed complementary wireless communications technologies that involved interactions, processes, and controls between the baseband processor and the transceiver, which improved and enhanced the operation of

transceivers that incorporate ParkerVision's down-converter and up-converter technologies. To date, ParkerVision has been granted over 200 patents related to its innovations, including the patents-in-suit.

37. ParkerVision's technology helped make today's wireless devices, such as televisions, a reality by enabling RF chips used in these devices to be smaller, cheaper, and more efficient, and with higher performance.

38. ParkerVision sold products. To the extent ParkerVision products needed to be marked with a ParkerVision patent number, ParkerVision marked those products in compliance with 35 U.S.C. § 287.

THE ASSERTED PATENTS

United States Patent No. 6,049,706

39. On April 11, 2000, the United States Patent and Trademark Office duly and legally issued United States Patent No. 6,049,706 ("the '706 patent") entitled "Integrated Frequency Translation and Selectivity" to inventor Robert W. Cook et al.

40. The '706 patent is presumed valid under 35 U.S.C. § 282.

41. ParkerVision owns all rights, title, and interest in the '706 patent.

United States Patent No. 6,266,518

42. On July 24, 2001, the United States Patent and Trademark Office duly and legally issued United States Patent No. 6,266,518 ("the '518 patent") entitled "Method and System for Down-Converting Electromagnetic Signals by Sampling and Integrating Over Apertures" to inventor David F. Sorrells et al.

43. The '518 patent is presumed valid under 35 U.S.C. § 282.

44. ParkerVision owns all rights, title, and interest in the '518 patent.

United States Patent No. 7,292,835

45. On November 6, 2007, the United States Patent and Trademark Office duly and legally issued United States Patent No. 7,292,835 (“the ’835 patent”) entitled “Wireless and Wired Cable Modem Applications of Universal Frequency Translation Technology” to inventor David F. Sorrells et al.

46. The ’835 patent is presumed valid under 35 U.S.C. § 282.

47. ParkerVision owns all rights, title, and interest in the ’835 patent.

United States Patent No. 8,660,513

48. On February 25, 2014, the United States Patent and Trademark Office duly and legally issued United States Patent No. 8,660,513 (“the ’513 patent”) entitled “Method and System for Down-Converting an Electromagnetic Signal, and Transforms for Same, and Aperture Relationships” to inventor David F. Sorrells et al.

49. The ’513 patent is presumed valid under 35 U.S.C. § 282.

50. ParkerVision owns all rights, title, and interest in the ’513 patent.

CLAIMS FOR RELIEF

COUNT I - Infringement of United States Patent No. 6,049,706

51. The allegations set forth above are re-alleged and incorporated by reference as if they were set forth fully here.

52. Realtek directly infringes (literally and/or under the doctrine of equivalents) the ’706 patent by using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 19 of the ’706 patent. Realtek infringes each step of claim 19 because the Realtek Chips automatically, and without user modification, perform each of the claimed steps.

53. On information and belief, Realtek products that infringe by at least claim 19 of the '706 patent include, but are not limited to, the Realtek Chips and any other Realtek device that is capable of filtering and down-converting an input signal as claimed in the '706 patent. On information and belief, Realtek uses the Realtek Chips at least by demonstrating and testing (or having others on its behalf demonstrate and test, including without limitation HP Inc. and other U.S. customers, as well as Cortina Access, Inc. and Ubilinx Technology Inc.) the Realtek Chips in the United States.

54. On information and belief, each Realtek Chip performs a method of filtering and down-converting an input signal (e.g., a radio frequency (RF) signal at a transmission frequency). The method is performed on the receiver side of each Realtek Chip.

55. On information and belief, each Realtek Chips filters and down-converts an input signal in an integrated manner using a switch (e.g., one or more transistor(s)), capacitor(s), and low impedance load (e.g., one or more resistors). On information and belief, a down-converted signal (e.g., a baseband signal) is formed from energy from a transistor(s) when the transistor(s) is ON and energy from a capacitor(s) when the transistor(s) is OFF.

56. On information and belief, each Realtek Chip tunes at least one of the filtering operation and down-converting operation (e.g., the Realtek Chip selects components/adjusts component values).

57. On information and belief, a transistor(s) in each Realtek Chip under-samples (e.g., at a sample rate below the Nyquist rate) the input signal according to a control signal (e.g., local oscillator (LO) signal). The frequency of the control signal is equal to a frequency of the input signal plus or minus a frequency of a down-converted image, divided by n , where n represents a harmonic or sub-harmonic of the input signal.

58. ParkerVision has been damaged by the direct infringement of Realtek and is suffering and will continue to suffer irreparable harm and damages as a result of this infringement.

COUNT II – Infringement of United States Patent No. 6,266,518

59. The allegations set forth above are re-alleged and incorporated by reference as if they were set forth fully here.

60. Realtek directly infringes (literally and/or under the doctrine of equivalents) the '518 patent by using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 27 of the '518 patent. Realtek infringes each step of claim 27 because the Realtek Chips automatically, and without user modification, performed each of the claimed steps.

61. On information and belief, Realtek products that infringe at least claim 27 of the '518 patent include, but are not limited to, the Realtek Chips, and any other Realtek device that is capable of down-converting a carrier signal to a baseband signal as claimed in the '518 patent. On information and belief, Realtek uses the Realtek Chips at least by demonstrating and testing (or having others on its behalf demonstrate and test, including without limitation HP Inc. and other U.S. customers, as well as Cortina Access, Inc. and Ubilinx Technology Inc.) the Realtek Chips in the United States.

62. On information and belief, the Realtek Chips perform a method of down-converting a carrier signal (e.g., an RF signal at a transmission frequency) to a baseband signal. The method is performed on the receiver side of each Realtek Chip.

63. On information and belief, each Realtek Chip receives a carrier signal that includes at least one of amplitude variations, phase variations, or frequency variations at a

frequency lower than a carrier frequency of the carrier signal (e.g., a modulated carrier signal, such as a quadrature amplitude modulation (QAM) signal). The carrier signal includes a baseband signal that has been imparted on the carrier signal.

64. On information and belief, each Realtek Chip samples the carrier signal by a transistor(s) turning ON and OFF. The sampling occurs over aperture periods (e.g., periods of time when the transistor(s) is ON/receives an LO signal) to transfer energy from the carrier signal at an aliasing rate, which is determined according to a frequency of the carrier signal divided by N, wherein N indicates a harmonic or sub-harmonic of the carrier signal.

65. On information and belief, a capacitor(s) in each Realtek Chip integrates energy from a transistor(s) over the aperture periods (e.g., when the transistor(s) is ON).

66. On information and belief, each Realtek Chip generates a baseband signal including from the integrated energy that comes from a capacitor(s) when the transistor(s) is OFF.

67. On information and belief, a capacitor(s) in each Realtek Chip transfers energy to a load (e.g., one or more resistors) during an off-time (e.g., when the transistor(s) is OFF).

68. ParkerVision has been damaged by the direct infringement of Realtek and is suffering and will continue to suffer irreparable harm and damages as a result of this infringement.

COUNT III - Infringement of United States Patent No. 7,292,835

69. The allegations set forth above are re-alleged and incorporated by reference as if they were set forth fully here.

70. Realtek directly infringes (literally and/or under the doctrine of equivalents) the '835 patent by using, selling, offering for sale, and/or importing in/into the United States products covered by at least claims 1 and 17 of the '835 patent.

71. On information and belief, Realtek products that infringe one or more claims of the '835 patent include the Realtek Chips and any other Realtek device used e.g., in televisions (“Realtek TV Chips”) that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '835 patent. On information and belief, Realtek uses the Realtek Chips at least by demonstrating and testing (or having others on its behalf demonstrate and test, including without limitation HP Inc. and other U.S. customers, as well as Cortina Access, Inc. and Ubilinx Technology Inc.) the Realtek Chips in the United States.

72. The Realtek TV Chips used in televisions enable users to watch live TV and on demand programming from their cable service providers over a wireless network. For example, some of the Realtek TV Chips provide wireless connectivity for televisions, such as TCL and LG televisions. The Realtek TV Chips are configured to function/capable of functioning as wireless cable modems. For example, the Realtek TV Chips provide a wireless connection to cable services.

73. On information and belief, each Realtek TV Chip is/includes a cable modem (e.g., wireless modem for communicating with a cable television network) for down-converting an electromagnetic signal (e.g., a high frequency RF signal), having complex modulations (e.g., QAM), to a lower frequency signal. The electromagnetic signal is transmitted by a wireless method to the cable modem.

74. Each Realtek TV Chip has (a) an oscillator (e.g., LO) to generate an in-phase oscillating signal (e.g., in-phase LO signal), (b) a phase shifter (e.g., a flip-flop) to receive the in-

phase oscillating signal and to create a quadrature-phase oscillating signal (e.g., quadrature-phase LO signal), (c) a first frequency down-conversion module (e.g., a first module that includes at least one switch and at least one capacitor) to receive the electromagnetic signal and the in-phase oscillating signal and (d) a second frequency down-conversion module (e.g., a second module that includes at least one switch and at least one capacitor) to receive the electromagnetic signal and the quadrature-phase oscillating signal.

75. On information and belief, the first frequency down-conversion module includes a first frequency translation module (e.g., a module having one or more switches) and a first storage module (e.g., a module having one or more capacitors). The first frequency translation module samples the electromagnetic signal at a rate (e.g., LO rate with a 25% duty cycle) that is a function of the in-phase oscillating signal, thereby creating a first sampled signal.

76. The second frequency down-conversion module includes a second frequency translation module (e.g., a module having one or more switches) and a second storage module (e.g., a module having one or more capacitors). The second frequency translation module samples the electromagnetic signal at a rate (e.g., LO rate with a 25% duty cycle) that is a function of the quadrature-phase oscillating signal, thereby creating a second sampled signal.

77. ParkerVision has been damaged by the direct infringement of Realtek and is suffering and will continue to suffer irreparable harm and damages as a result of this infringement.

COUNT IV - Infringement of United States Patent No. 8,660,513

78. The allegations set forth above are re-alleged and incorporated by reference as if they were set forth fully here.

79. Realtek directly infringes (literally and/or under the doctrine of equivalents) the '513 patent by using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 19 of the '513 patent.

80. On information and belief, Realtek products that infringe one or more claims of the '513 patent include, but are not limited to, the Realtek Chips, and any other Realtek device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '513 patent. On information and belief, Realtek uses the Realtek Chips at least by demonstrating and testing (or having others on its behalf demonstrate and test, including without limitation HP Inc. and other U.S. customers, as well as Cortina Access, Inc. and Ubilinx Technology Inc.) the Realtek Chips in the United States.

81. On information and belief, each Realtek Chip is/includes a system for frequency down-converting a modulated carrier signal (e.g., high frequency RF signal) to a lower frequency signal. Each Realtek Chip has (a) a first switch (e.g., one or more transistors), (b) a first control signal (e.g., LO signal) which comprises a sampling aperture (e.g., 25% duty cycle) with a specified frequency, and (c) a first energy storage element (e.g., one or more capacitors) that down-converts the modulated carrier signal according to the first control signal and outputs a down-converted in-phase signal portion of the modulated carrier signal.

82. On information and belief, each Realtek Chip has (a) a second switch (e.g., one or more transistors), (b) a second control signal (e.g., LO signal) which comprises a sampling aperture (e.g., 25% duty cycle) with a specified frequency, and (c) a second energy storage element (e.g., one or more capacitors) that down-converts the modulated carrier signal (e.g., high frequency RF signal) according to the second control signal and outputs a down-converted inverted in-phase signal portion of the modulated carrier signal.

83. On information and belief, each Realtek Chip has a first differential amplifier circuit that combines the down-converted in-phase signal portion with the inverted in-phase signal portion and outputs a first channel down-converted differential in-phase signal.

84. On information and belief, each Realtek Chip has (a) a third switch (e.g., one or more transistors), (b) a third control signal (e.g., LO signal) which comprises a sampling aperture (e.g., 25% duty cycle) with a specified frequency, and (c) a third energy storage element (e.g., one or more capacitors) that down-converts the modulated carrier signal (e.g., high frequency RF signal) according to the third control signal and outputs a down-converted quadrature-phase signal portion of the modulated carrier signal.

85. On information and belief, each Realtek Chip has (a) a fourth switch (e.g., one or more transistors), (b) a fourth aperture signal (e.g., LO signal), and (c) a fourth energy storage element (e.g., one or more capacitors) that down-converts the modulated carrier signal (e.g., high frequency RF signal) according to the fourth control signal and outputs a down-converted inverted quadrature-phase signal portion of the modulated carrier signal.

86. On information and belief, each Realtek Chip has a second differential amplifier circuit that combines the down-converted quadrature-phase signal portion with the inverted quadrature-phase signal portion and outputs a second channel down-converted differential quadrature-phase signal.

87. ParkerVision has been damaged by the direct infringement of Realtek and is suffering and will continue to suffer irreparable harm and damages as a result of this infringement.

JURY DEMANDED

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, ParkerVision hereby requests a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, ParkerVision respectfully requests that the Court enter judgment in its favor and against Realtek as follows:

- a. finding that Realtek directly infringes one or more claims of each of the patents-in-suit;
- b. awarding ParkerVision damages under 35 U.S.C. § 284, or otherwise permitted by law, including supplemental damages for any continued post-verdict infringement;
- c. awarding ParkerVision pre-judgment and post-judgment interest on the damages award and costs;
- d. awarding cost of this action (including all disbursements) and attorney fees pursuant to 35 U.S.C. § 285, or as otherwise permitted by the law; and
- e. awarding such other costs and further relief that the Court determines to be just and equitable.

Dated: May 25, 2023

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