UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

PARKERVISION, INC., **Plaintiff,** **v.** **TCL INDUSTRIES HOLDINGS CO., LTD., TCL ELECTRONICS HOLDINGS LTD., SHENZHEN TCL NEW TECHNOLOGY CO., LTD., TCL KING ELECTRICAL APPLIANCES (HUIZHOU) CO., LTD., TCL MOKA INT'L LTD., and TCL MOKA MANUFACTURING S.A. DE C.V.,** **Defendants.**	**Case No. 6:20-cv-00945** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff ParkerVision, Inc. ("ParkerVision"), by and through its undersigned counsel, files this Complaint against Defendants TCL Industries Holdings Co., Ltd., TCL Electronics Holding Ltd. (f/k/a TCL Multimedia Technology Holdings Ltd.), Shenzhen TCL New Technology Co., Ltd., TCL King Electrical Appliances (Huizhou) Co., Ltd., TCL Moka Int'l Ltd., and TCL Moka Manufacturing S.A. de C.V. (collectively, "TCL" or "Defendants") for patent infringement of United States Patent Nos. 6,049,706; 6,266,518; 6,580,902; 7,110,444; 7,292,835; 8,588,725; 8,660,513; 9,118,528; 9,246,736 and 9,444,673 (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 9446 Philips Highway, Jacksonville, Florida 32256.

3. Defendant TCL Industries Holdings Co., Ltd. ("TCL Industries") is a Chinese corporation with a principal place of business located at 22/F, TCL Technology Building, 17 Huifeng 3rd Road, Huizhou, Guangdong, 516000 P.R. China.

4. Defendant TCL Electronics Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings Ltd.) ("TCL Electronics") is a limited liability company incorporated in the Cayman Islands with a registered address at P.O. Box 309, Ugland House, Grand Cayman, KY1-1104, Cayman Islands. TCL Electronics has a principal place of business at 7/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Sha Tin, New Territories, Hong Kong.

5. Defendant Shenzhen TCL New Technology Co., Ltd. ("TCL New Technology") is a foreign corporation duly organized under the laws of the People's Republic of China with a principal place of business located at 9/F, Building D4, TCL International E City, No. 1001, Zhongshan Park Road, Nanshan District, Shenzhen, Guangdong, 518067 P.R. China.

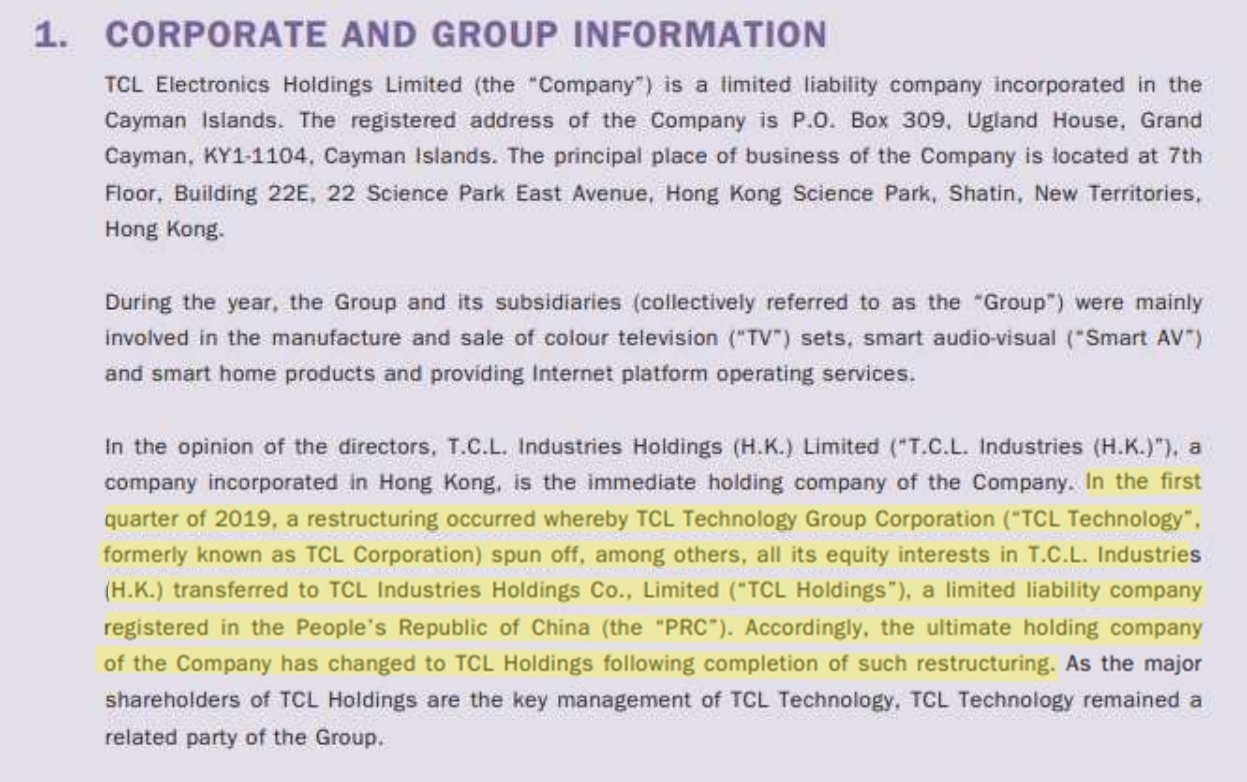
6. Defendant TCL King Electrical Appliances (Huizhou) Co., Ltd. ("TCL King") is a foreign corporation duly organized under the laws of the People's Republic

of China with a principal place of business located at No. 78 Zhongkai Development Zone, Huizhou, 516006 P.R. China.

7. Defendant TCL Moka Int'l Ltd. ("TCL Moka") is a foreign corporation duly organized under the laws of Hong Kong with a principal place of business located at 7/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Sha Tin, New Territories, Hong Kong.

8. Defendant TCL Moka Manufacturing, S.A. de C.V. ("TCL Moka Manufacturing") is a Mexican corporation with a principal place of business located at Camino Vecinal 2472, colonia, Canon del Padre, Tijuana Baja California.

9. On information and belief, TCL Industries is a holding company and the ultimate corporate parent of Defendants TCL Electronics, TCL New Technology, TCL King, TCL Moka, and TCL Moka Manufacturing. *See* TCL Electronics Holding Limited Annual Report 2019 (available at https://doc.irasia.com/listco/hk/tclelectronics/annual/2019/ar2019.pdf) (Exhibit 1).



1. CORPORATE AND GROUP INFORMATION

TCL Electronics Holdings Limited (the "Company") is a limited liability company incorporated in the Cayman Islands. The registered address of the Company is P.O. Box 309, Ugland House, Grand Cayman, KY1-1104, Cayman Islands. The principal place of business of the Company is located at 7th Floor, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, New Territories, Hong Kong.

During the year, the Group and its subsidiaries (collectively referred to as the "Group") were mainly involved in the manufacture and sale of colour television ("TV") sets, smart audio-visual ("Smart AV") and smart home products and providing Internet platform operating services.

In the opinion of the directors, T.C.L. Industries Holdings (H.K.) Limited ("T.C.L. Industries (H.K.)"), a company incorporated in Hong Kong, is the immediate holding company of the Company. In the first quarter of 2019, a restructuring occurred whereby TCL Technology Group Corporation ("TCL Technology", formerly known as TCL Corporation) spun off, among others, all its equity interests in T.C.L. Industries (H.K.) transferred to TCL Industries Holdings Co., Limited ("TCL Holdings"), a limited liability company registered in the People's Republic of China (the "PRC"). Accordingly, the ultimate holding company of the Company has changed to TCL Holdings following completion of such restructuring. As the major shareholders of TCL Holdings are the key management of TCL Technology, TCL Technology remained a related party of the Group.

Ex. 1 at p. 134

10. On information and belief, TCL Electronics is a parent of TCL's television business group, comprising subsidiaries that manufacture, market, offer for sale, and sell television products, including the accused infringing products, in the United States, the State of Texas, and this judicial district. *See, e.g.*, http://electronics.tcl.com/en/about/overview.php ("[TCL Electronics] is one of the leading players in the global TV industry, and is engaged in the research and development, manufacturing and distribution of consumer electronic products."). TCL New Technology is a "principal subsidiary" of TCL Electronics with "principal activities" of "[m]anufacture and sale of TV products." *See* Ex. 1 at p. 135. TCL King is a

"principal subsidiary" of TCL Electronics with "principal activities" of "[m]anufacture and sale of TV products and trading of components." *See id.* at p. 136. TCL Moka Manufacturing is a "principal subsidiary" of TCL Electronics with "principal activities" of "manufacture and sale of TV products." *See id.* at p. 137. TCL Moka is a "principal subsidiary" of TCL Electronics and, on information and belief, is similarly involved in the manufacture, sale, and trading of TCL television products and components. *See id.* at p. 138.

11. On information and belief, Defendants comprise a "vertically integrated industrial chain," and thus act in concert to design, manufacture, sell, offer for sale, import, distribute, advertise, and/or otherwise promote the accused infringing products in the United States, the State of Texas, and this judicial district. *See, e.g.,* Ex. 1; TCL Electronics Holding Limited Interim Report 2020 (available at https://doc.irasia.com/listco/hk/tclelectronics/interim/2020/intrep.pdf) (Exhibit 2) ("Benefitting from its leading positions in integrated supply chain, global channels, production capacity layout, hardware, software and content, TCL Electronics, as the brand driving force of the entire TCL display industry chain and a user-centric company, managed to expand its market share amid negative trend…").

12. In 2019, TCL Electronics also entered into a number of "connected transactions" with TCL Industries in furtherance of its mutual business interests and goals, including, but not limited to, (i) a Master Rental (2019-2021) Agreement; (ii) a Master Sale and Purchase (2019-2021) Agreement; and (iii) a Master Services (2019-2021) Agreement. *See* Ex. 1 at p. 109-110.

13. On information and belief, Defendants are operated as a single business entity and/or in concert with each other to sell, offer to sell, import, market, advertise, and/or otherwise promote TCL TVs, including the accused infringement products, in the United States, the State of Texas and this judicial district. On information and belief, the Defendants share directors, executives and/or employees. For example, Mr. Li Dongsheng is an Executive Director of TCL Electronics and a Director of TCL Industries. Ex. 1 at p. 36. Mr. Wang Cheng is the CEO and an Executive Director of TCL Electronics and the CEO of TCL Industries. *Id*. at p. 37.

14. On information and belief, TCL Industries controls the business decisions of TCL Electronics and its subsidiaries including, but not limited to, TCL New Technology, TCL King, TCL Moka, and TCL Moka Manufacturing.

JURISDICTION AND VENUE

15. 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.

16. TCL 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*.

17. This Court has personal jurisdiction over TCL because TCL 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 TCL because, *inter alia*, TCL, 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.

18. TCL 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.

19. This Court has personal jurisdiction over TCL because TCL (directly and/or through its subsidiaries, affiliates, or intermediaries) 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, TCL uses, sells, offers for sale, imports, markets, advertises, and/or otherwise promotes the accused infringing products in the United States, the State of Texas, and this judicial district.

20. TCL Electronics' 2020 interim financial report ("2020 interim financial report") discusses the shipment of TCL TVs in the North American markets, which includes the United States, and market share of TCL TVs in the North American markets, which includes the United States. Ex. 2 at p. 4, 7. On information and belief, sales of TCL TVs in the United States make up a majority of TCL's revenue from the North American markets.

21. The 2020 interim financial report discusses the rise in logistics costs in North American markets, which includes the United States, on information and belief,

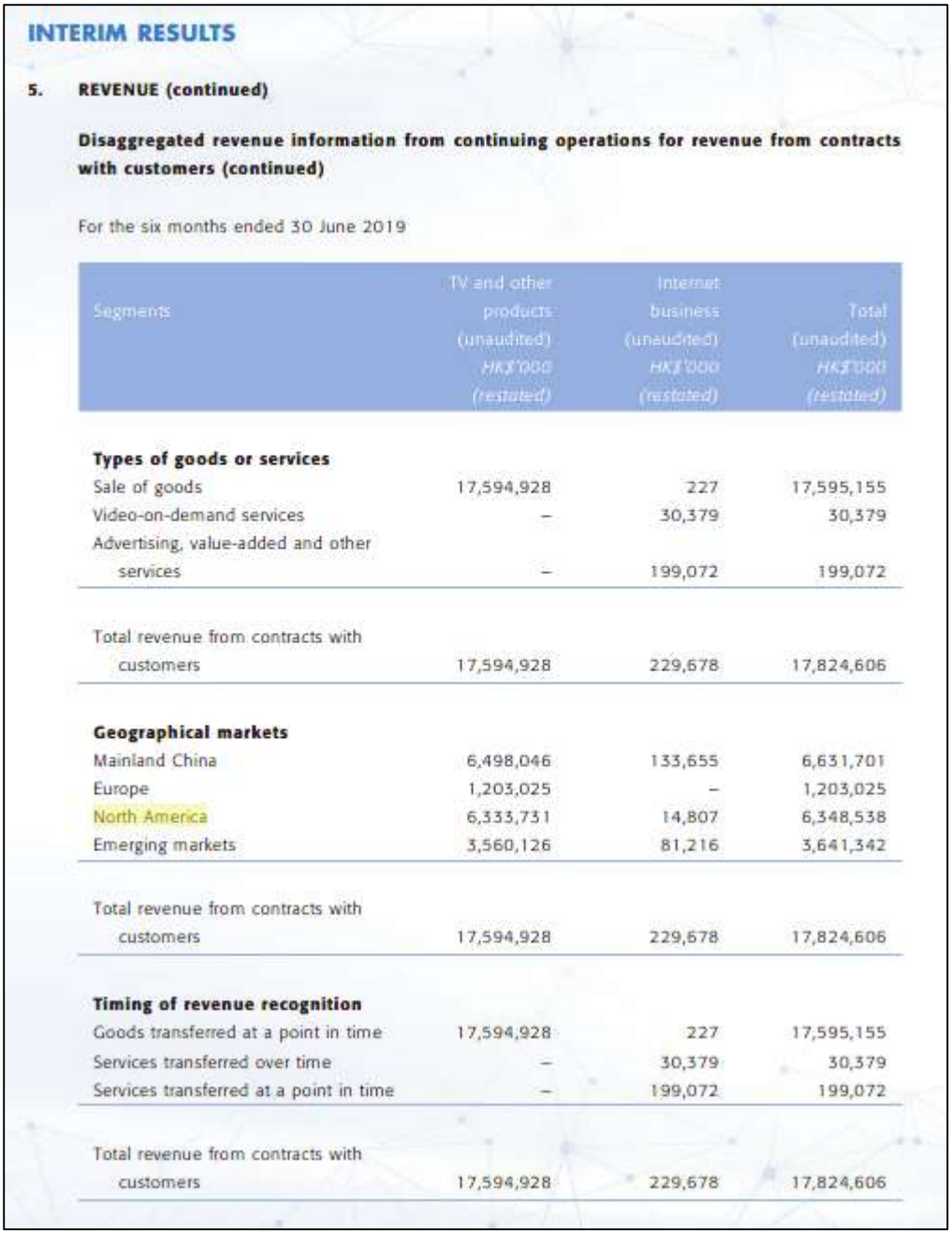
related to TCL TVs. Id. at 16. With regard to TCL TVs, the 2020 interim financial report discusses that business in North America with low gross profit (low expenses) grew fast in the second quarter 2020. Id. at 23. The 2020 interim financial report discusses the sales volume of TCL TVs in North America, which includes the United States, for the first quarters of 2018, 2019 and 2020. *Id*. at 30.

22. The 2020 interim financial report reports revenue from the North American market, which includes the United States, for TCL TVs in 2019 and 2020. *Id*. at pp. 51-52. On information and belief, this revenue includes revenue from the sales of the accused infringing products.

Disaggregated revenue information from continuing operations for revenue from contracts with customers

For the six months ended 30 June 2020

Segments	TV and other products (unaudited) HK$'000	Internet business (unaudited) HK$'000	Total (unaudited) HK$'000
Types of goods or services			
Sale of goods	16,756,021	25,670	16,781,691
Video-on-demand services	–	130,336	130,336
Advertising, value-added and other services	–	365,052	365,052
Total revenue from contracts with customers	16,756,021	521,058	17,277,079
Geographical markets			
Mainland China	5,412,667	396,574	5,809,241
Europe	1,462,955	–	1,462,955
North America	5,381,025	8,837	5,389,862
Emerging markets	4,499,374	115,647	4,615,021
Total revenue from contracts with customers	16,756,021	521,058	17,277,079
Timing of revenue recognition			
Goods transferred at a point in time	16,756,021	25,670	16,781,691
Services transferred over time	–	130,336	130,336
Services transferred at a point in time	–	365,052	365,052
Total revenue from contracts with customers	16,756,021	521,058	17,277,079



INTERIM RESULTS

5. REVENUE (continued)

Disaggregated revenue information from continuing operations for revenue from contracts with customers (continued)

For the six months ended 30 June 2019

Segments	TV and other products (unaudited) HK$'000 (restated)	Internet business (unaudited) HK$'000 (restated)	Total (unaudited) HK$'000 (restated)
Types of goods or services			
Sale of goods	17,594,928	227	17,595,155
Video-on-demand services	–	30,379	30,379
Advertising, value-added and other services	–	199,072	199,072
Total revenue from contracts with customers	17,594,928	229,678	17,824,606
Geographical markets			
Mainland China	6,498,046	133,655	6,631,701
Europe	1,203,025	–	1,203,025
North America	6,333,731	14,807	6,348,538
Emerging markets	3,560,126	81,216	3,641,342
Total revenue from contracts with customers	17,594,928	229,678	17,824,606
Timing of revenue recognition			
Goods transferred at a point in time	17,594,928	227	17,595,155
Services transferred over time	–	30,379	30,379
Services transferred at a point in time	–	199,072	199,072
Total revenue from contracts with customers	17,594,928	229,678	17,824,606

23. TCL Electronics' 2019 annual financial report ("2019 financial report") discusses market share of TCL TVs in the North American markets, which include the United States. Ex. 1 at p. 13. The 2019 financial report discusses sales volume in North America, which includes the United States, and production capacity being sufficient to

meet shipment demand in the North American markets, which include the United States. *Id*. at pp. 20, 22.

24. The 2019 financial report reports revenue from the North American market, which includes the United States, for TCL TVs in 2018 and 2019. *Id*. at pp. 189-190. On information and belief, this revenue includes revenue from the sales of the accused infringing products.

6. TURNOVER, OTHER REVENUE AND GAINS (CONTINUED)

Revenue from contracts with customers

(i) Disaggregated revenue information

For the year ended 31 December 2019

Segments	TV and other products HK$'000	Internet business HK$'000	Total HK$'000
Type of goods or services			
Sale of goods	46,364,963	28,696	46,393,659
Video-on-demand services	–	121,030	121,030
Advertising, value-added and other services	–	476,450	476,450
Total revenue from contracts with customers	46,364,963	626,176	46,991,139
Geographical markets			
Mainland China	17,627,030	416,136	18,043,166
Europe	2,826,222	–	2,826,222
North America	10,973,204	37,838	11,011,042
Emerging Markets	7,706,011	172,202	7,878,213
Others	7,232,496	–	7,232,496
Total revenue from contracts with customers	46,364,963	626,176	46,991,139
Timing of revenue recognition			
Goods transferred at a point in time	46,364,963	28,696	46,393,659
Services transferred over time	–	121,030	121,030
Services transferred at a point in time	–	476,450	476,450
Total revenue from contracts with customers	46,364,963	626,176	46,991,139

6. TURNOVER, OTHER REVENUE AND GAINS (CONTINUED)

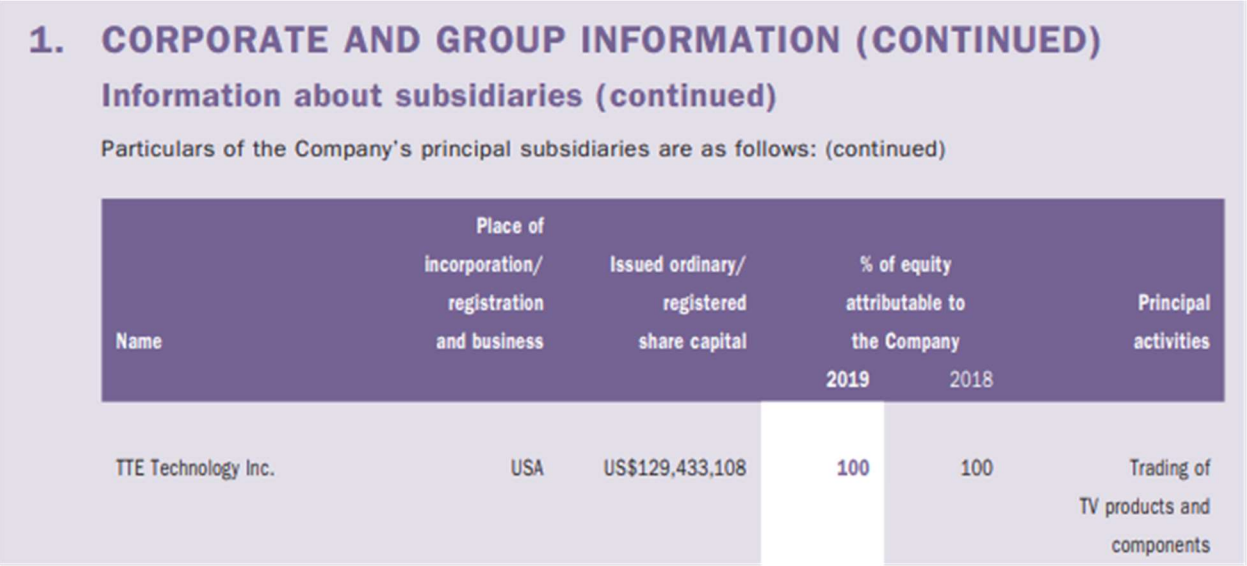
Revenue from contracts with customers (continued)

(i) Disaggregated revenue information (continued)

For the year ended 31 December 2018

Segments	TV and other products HK$'000
Type of goods	
Sale of goods	45,581,970
Total revenue from contracts with customers	45,581,970
Geographical markets	
Mainland China	18,920,054
Europe	2,059,384
North America	10,232,343
Emerging Markets	6,172,501
Others	8,197,688
Total revenue from contracts with customers	45,581,970
Timing of revenue recognition	
Goods transferred at a point in time	45,581,970
Total revenue from contracts with customers	45,581,970

25. On information and belief, TTE Technology, Inc. (d/b/a TCL North America and TCL USA) ("TCL USA") is the exclusive distributor of TCL TVs, including the accused infringing products, in the United States, the State of Texas, and this judicial district. On information and belief, TCL USA is a wholly owned subsidiary of TCL Electronics. *See* Ex. 1 at p. 137.



1. CORPORATE AND GROUP INFORMATION (CONTINUED)

Information about subsidiaries (continued)

Particulars of the Company's principal subsidiaries are as follows: (continued)

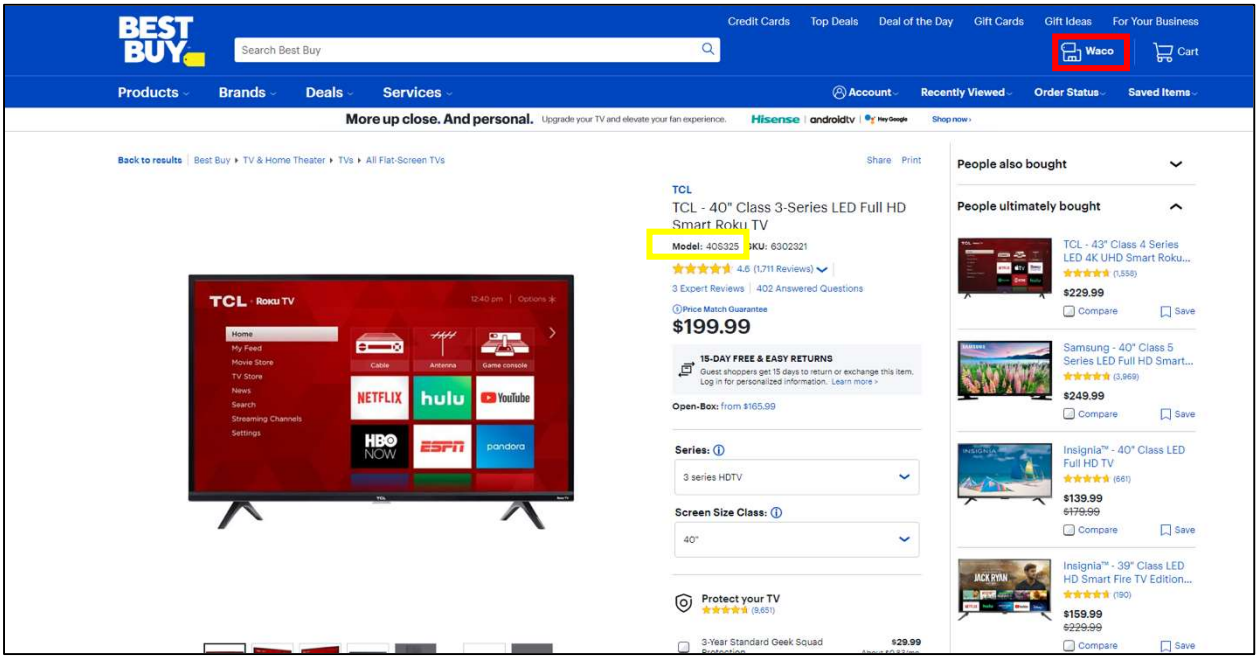
Name	Place of incorporation/ registration and business	Issued ordinary/ registered share capital	% of equity attributable to the Company 2019	% of equity attributable to the Company 2018	Principal activities
TTE Technology Inc.	USA	US$129,433,108	100	100	Trading of TV products and components

Ex. 1 at p. 137

26. On information and belief, TCL (directly and/or through its subsidiaries, affiliates, or intermediaries – including TCL USA) places the accused infringing products into the stream of commerce knowing they will be sold and used in the State of Texas and this judicial district. TCL televisions, for example, can be purchased through retailers throughout the State of Texas and in this judicial district including, without limitation, Best Buy, Target, Walmart, and Costco.

27. On information and belief, TCL maintains control over websites accessible to residents of the State of Texas and this judicial district, through which TCL promotes and facilitates sales of the accused infringing products. For example, the website https://www.tclusa.com directs consumers in the United States, including those in the State of Texas and this judicial district, to purchase TCL infringing television systems from online stores, such as Amazon.

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



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

29. Moreover, TCL has availed itself of the legal protections of the State of Texas in multiple lawsuits. For example, in *Canon, Inc. v. TCL Electronics Holdings Ltd. f/k/a/ TCL Multimedia Technology Holdings, Ltd.*, 2-18-cv-00546 (E.D. Tex.), TCL Electronics, TCL New Technology, and TCL King were dismissed with prejudice, through an Order of the Court granting a joint motion to dismiss. In so filing a joint motion and thereafter obtaining the Order of dismissal with prejudice, TCL – through

TCL Electronics, TCL New Technology, and TCL King – purposefully availed itself to the protections, powers and resources of this State. Attached hereto as Exhibit 3 is a true and correct copy of the Order.

30. TCL also availed itself of the legal protections of this State in *American Patents LLC v. TCL Corp.*, et al., 4:18-cv-767 (E.D. Tex.), where TCL King filed counterclaims against American Patents LLC. In so doing, TCL – through TCL King – purposefully availed itself to the protections, powers, and resources of this State. Attached hereto as Exhibit 4 is a true and correct copy of TCL King's Answer to and Counterclaims against American Patents LLC, filed on March 7, 2019.

31. TCL also availed itself of the legal protections of this State in *Nichia Corporation v. TCL Multimedia Technology Holdings*, Ltd., 2:16-cv-1452-JRG (E.D. Tex.). TCL Electronics (using its former name, TCL Multimedia Technology Holdings, Ltd.) was dismissed, with prejudice, through an Order of the Court granting an agreed stipulation of dismissal. In so filing an agreed stipulation of dismissal and thereafter obtaining the order of dismissal with prejudice, TCL – through TCL Electronics Holding Ltd. – purposefully availed itself to the protections, powers, and resources of this State. Attached hereto as Exhibit 5 is a true and correct copy of the Order Granting Agreed Stipulation of Dismissal.

32. TCL also availed itself of the legal protections of this State in *Personalized Media Communications, LLC, v. TCL Corp. et al.*, 2:17-cv-443-JRG (E.D. Tex.), where TCL Electronics (using its former name, TCL Multimedia Technology Holdings, Ltd.) filed counterclaims against Personalized Media Communications, LLC. In so doing, TCL –

through TCL Electronics – purposefully availed itself to the protections, powers, and resources of this State. Attached hereto as Exhibit 6 is a true and correct copy of TCL Electronics' Answer to and Counterclaims against Personalized Media Communications, LLC, filed on December 4, 2017.

33. Venue is proper for all Defendants in this judicial district pursuant to 28 U.S.C. §§ 1391(c) and/or 1400(b), and *Brunette Mach. Works, Ltd. v. Kockum Indus., Inc.*, 406 U.S. 706 (1972). There is no clearly more convenient venue.

BACKGROUND

34. 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.

35. 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. Sorrels and ParkerVision's engineering team began researching ways to solve this problem.

36. 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 circuity was large and required significant power.

37. 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.

38. 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.

39. 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.

40. 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.

TCL

41. TLC is a Chinese multinational electronics company headquartered in Huizhou, Guangdong Province, China. On information and belief, since at least 2014, TCL (or those acting on its behalf) has made, used, sold, offered for sale and/or imported televisions ("TCL Products") in/into the United States. https://www.tclusa.com/about-us/press-releases/tcl-celebrates-five-years; https://www.tclusa.com/products.

42. TCL Products can be purchased through retailers throughout the United States including, without limitation, Best Buy, Target, Walmart, Costco, BJ Wholesale, B&H and PC Richards & Sons.

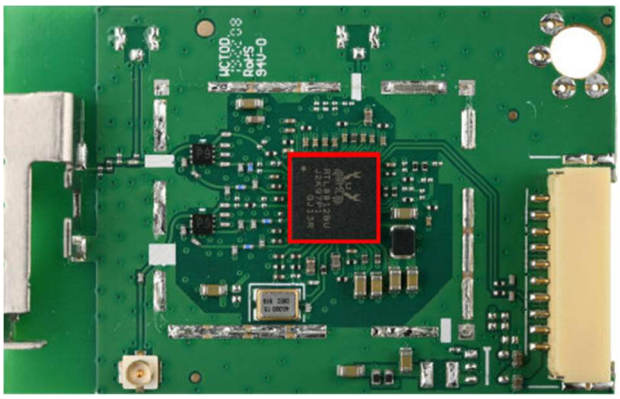
43. On information and belief, as of 2019, TCL was the second largest brand of smart televisions in the United States. https://www.tclusa.com/about-us/press-releases/tcl-celebrates-five-years.

44. TCL Products include modules (e.g., WCOHR2601) containing Wi-Fi chips including, without limitation, Realtek RT8812BU (each a "TCL Chip"; collectively, the "TCL Chips"). TCL Chips provide wireless connectivity for TCL Products.

45. Below are images from a TCL television model no. 43S425 purchased from Best Buy.


TCL
Model: 43S425
Manufactured in China
Rating: 120V~ 60Hz 85W
DOLBY AUDIO
58-43F8MT-0HD1B
TCL North America
1668 Compton Ave, Corona, CA 92881, USA
CAUTION/ATTENTION
FCC ID: W8U43S425
Contains FCC ID: 2AC23-WC0HR2601
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
c ETL us
Intertek
3092540
CONFORMS TO UL STD. 60065
CERTIFIED TO CSA STD. C22.2 NO. 60065
HDMI


MADE IN CHINA
WC0HR2601
MAC: D813995299E0
SN: 190531233001
FCC ID:2AC23-WC0HR2601
IC:12290A-WC0HR2601
07-RT8812-MA2G
GSD



TCL Products include, without limitation, the televisions set forth 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

THE ASSERTED PATENTS

United States Patent No. 6,049,706

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

47. The ’706 patent is presumed valid under 35 U.S.C. § 282.

48. ParkerVision owns all rights, title, and interest in the ’706 patent.

United States Patent No. 6,266,518

49. 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.

50. The ’518 patent is presumed valid under 35 U.S.C. § 282.

51. ParkerVision owns all rights, title, and interest in the ’518 patent.

United States Patent No. 6,580,902

52. On June 17, 2003, the United States Patent and Trademark Office duly and legally issued United States Patent No. 6,580,902 (“the ’902 patent”) entitled “Frequency Translation Using Optimized Switch Structures” to inventor David F. Sorrells et al.

53. The ’902 patent is presumed valid under 35 U.S.C. § 282.

54. ParkerVision owns all rights, title, and interest in the ’902 patent.

United States Patent No. 7,110,444

55. On September 19, 2006, the United States Patent and Trademark Office duly and legally issued United States Patent No. 7,110,444 (“the ’444 patent”) entitled “Wireless Local Area Network (WLAN) Using Universal Frequency Translation Technology Including Multi-Phase Embodiments and Circuit Implementations” to inventor David F. Sorrells et al.

56. The ’444 patent is presumed valid under 35 U.S.C. § 282.

57. ParkerVision owns all rights, title, and interest in the '444 patent.

United States Patent No. 7,292,835

58. 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.

59. The '835 patent is presumed valid under 35 U.S.C. § 282.

60. ParkerVision owns all rights, title, and interest in the '835 patent.

United States Patent No. 8,588,725

61. On November 19, 2013, the United States Patent and Trademark Office duly and legally issued United States Patent No. 8,588,725 ("the '725 patent") entitled "Apparatus, System, and Method For Down Converting and Up-Converting Electromagnetic Signals" to inventor David F. Sorrells et al.

62. The '725 patent is presumed valid under 35 U.S.C. § 282.

63. ParkerVision owns all rights, title, and interest in the '725 patent.

United States Patent No. 8,660,513

64. 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.

65. The '513 patent is presumed valid under 35 U.S.C. § 282.

66. ParkerVision owns all rights, title, and interest in the '513 patent.

United States Patent No. 9,118,528

67. On August 25, 2015, the United States Patent and Trademark Office duly and legally issued United States Patent No. 9,118,528 ("the '528 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.

68. The '528 patent is presumed valid under 35 U.S.C. § 282.

69. ParkerVision owns all rights, title, and interest in the '528 patent.

United States Patent No. 9,246,736

70. On January 26, 2016, the United States Patent and Trademark Office duly and legally issued United States Patent No. 9,246,736 ("the '736 patent") entitled "Method and System for Down-Converting an Electromagnetic Signal" to inventor David F. Sorrells et al.

71. The '736 patent is presumed valid under 35 U.S.C. § 282.

72. ParkerVision owns all rights, title, and interest in the '736 patent.

United States Patent No. 9,444,673

73. On September 13, 2016, the United States Patent and Trademark Office duly and legally issued United States Patent No. 9,444,673 ("the '673 patent") entitled "Methods and Systems for Down-Converting a Signal Using a Complementary Transistor Structure" to inventor David F. Sorrells et al.

74. The '673 patent is presumed valid under 35 U.S.C. § 282.

75. ParkerVision owns all rights, title, and interest in the '673 patent.

CLAIMS FOR RELIEF

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

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

77. TCL directly infringes (literally and/or under the doctrine of equivalents) the '706 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '706 patent.

78. TCL products that infringe one or more claims of the '706 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of filtering and down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '706 patent.

79. Each TCL Chip is/includes an apparatus for filtering and down-converting (e.g., a higher frequency RF signal to a lower frequency signal). Each TCL Chip includes a frequency translator, comprising a down-convert and delay module (e.g., module including one or more switches, capacitors, and resistors) to under-sample an input signal (e.g., high frequency RF signal) to produce an input sample of a down-converted image of said input signal, and to delay said input sample.

80. Each TCL Chip also includes a filter, comprising at least a portion of said down-convert and delay module, at least one delay module (e.g., module having one or more capacitors) to delay instances of an output signal, and an adder (e.g., feedback capacitor of an operational amplifier) to combine at least said delayed input sample

with at least one of said delayed instances of said output signal to generate an instance of said output signal.

81. The down-convert and delay module under-samples (e.g., at a sample rate below the Nyquist rate) said input signal according to a control signal (e.g., local oscillator (LO) signal), wherein a frequency of said control signal is equal to a frequency of said input signal plus or minus a frequency of said down-converted image, divided by n, where n represents a harmonic or sub-harmonic of said input signal.

82. ParkerVision has been damaged by the direct infringement of TCL 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

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

84. TCL directly infringes (literally and/or under the doctrine of equivalents) the '518 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 67 of the '518 patent.

85. TCL products that infringe one or more claims of the '518 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '518 patent.

86. Each TCL Chip is/includes an apparatus for down-converting a carrier signal (e.g., high frequency RF signal) to a lower frequency signal (e.g., baseband

signal). Each TCL Chip has a universal frequency down-converter (UFD), including a switch (e.g., transistor(s)), an integrator (e.g., feedback capacitor of an operational amplifier) coupled to the switch, a pulse generator (e.g., LO and/or LO circuitry) coupled to the switch; and a reactive structure (e.g., filter(s) having variable resistor-capacitor networks) coupled to the UFD.

87. The pulse generator (e.g., LO and/or LO circuitry) outputs pulses (e.g., pulses of an LO control signal) to the switch at an aliasing rate that is determined according to a frequency of the carrier signal +/− a frequency of the lower frequency signal) divided by N.

88. The pulses have apertures (e.g., 25% duty cycle) and cause the switch to close and sample the carrier signal (e.g., high frequency RF signal). During an aperture of the LO control signal, the switch closes and energy from the carrier signal is transferred through the switch. Between each aperture of the LO control signal, the switch remains open, thereby preventing the flow of energy through the switch. Successive pulses of the LO control signal, therefore, recursively close/open the switch. The recursive closing/opening of the switch samples the carrier signal.

89. Each TCL Chip is/includes an apparatus wherein energy is transferred from the carrier signal (e.g., high frequency RF signal) and integrated using the integrator (e.g., feedback capacitor of an operational amplifier) during apertures of the pulses. The switch periodically opens and closes according to the LO control signal. During an aperture of the LO control signal, for example, the switch closes and energy from the carrier signal is directed to a feedback capacitor of an operational amplifier.

The closing of the switch, therefore, results in the feedback capacitor acquiring energy during apertures of the LO control signal.

90. Each TCL Chip is/includes an apparatus wherein the lower frequency signal (e.g., baseband signal) is generated from the transferred energy.

91. Each TCL Chip is/includes an apparatus wherein the energy is transferred to a load (e.g., passive and/or active filter(s)) during an off-time (e.g., when the switch is open). Between each aperture of the LO control signal, the switch remains open and energy is discharged from the feedback capacitor into a subsequent load, such as subsequent passive and/or active filters.

92. ParkerVision has been damaged by the direct infringement of TCL, 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. 6,580,902

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

94. TCL directly infringes (literally and/or under the doctrine of equivalents) the '902 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '902 patent.

95. TCL products that infringe one or more claims of the '902 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '902 patent.

96. Each TCL Chip is/includes a circuit for down-converting an electromagnetic signal (e.g., high frequency RF signal) to a lower frequency signal. Each TCL Chip includes an energy transfer module having a switch module (e.g., module with one or more switches) and an energy storage module (e.g., module with one or more capacitors). The energy transfer module of the TCL Chip samples the electromagnetic signal at an energy transfer rate (e.g., LO rate with a 25% duty cycle), according to an energy transfer signal (e.g., LO signal), to obtain sampled energy. The sampled energy is stored by said energy storage module (e.g., module with one or more capacitors).

97. Each TCL Chip is/includes a circuit wherein a down-converted signal (e.g., baseband signal) is generated from the sampled energy. The recursive closing/opening of the switching module samples the carrier signal according to the energy transfer signal. During an aperture of the energy transfer signal, for example, the switch module closes and energy from the electromagnetic signal is directed to the energy storage module. Between apertures of the energy transfer signal, the switch module remains open, preventing the flow of energy through the switch module and consequently discharging energy stored in storage module. The down-converted signal (e.g., baseband signal) is generated from the sampled energy, e.g., transferred to the storage module during apertures of the energy transfer signal and discharged between apertures.

98. The energy transfer module of each TCL Chip has transistors coupled together. The transistors have a common first port, a common second port, and a

common control port. The electromagnetic signal is accepted at the common first port and the sampled energy is present at the common second port.

99. The common control port accepts the energy transfer signal, which has a control frequency that is substantially equal to said energy transfer rate.

100. Each of the transistors of the TCL Chip has a drain, a source, and a gate. The common first port couples together drains of the transistors, the common second port couples together sources of the transistors, and the common control port couples together gates of the transistors.

101. ParkerVision has been damaged by the direct infringement of TCL 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. 7,110,444

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

103. TCL directly infringes (literally and/or under the doctrine of equivalents) the '444 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 2 of the '444 patent.

104. TCL products that infringe one or more claims of the '444 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '444 patent.

105. Each TCL Chip is/includes a wireless modem apparatus (e.g., a modulation/demodulation device providing bi-directional, over-the-air data transmission) having a receiver for frequency down-converting an input signal (e.g., high frequency RF signal). The receiver for frequency down-converting an input signal includes a first frequency down-conversion module to down-convert the input signal, wherein said first frequency down-conversion module down-converts said input signal according to a first control signal (e.g., LO signal) and outputs a first down-converted signal (e.g., baseband signal); a second frequency down-conversion module to down-convert said input signal, wherein said second frequency down-conversion module down-converts said input signal according to a second control signal (e.g., LO signal) and outputs a second down-converted signal (e.g., baseband signal); and a subtractor module (e.g., module with differential amplifier) that subtracts said second down-converted signal from said first down-converted signal and outputs a down-converted signal.

106. The first frequency down-conversion module under-samples (e.g., at a sample rate below the Nyquist rate) the input signal according to the first control signal, and the second frequency down-conversion module under-samples (e.g., at a sample rate below the Nyquist rate) the input signal according to said second control signal.

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

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

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

109. TCL directly infringes the '835 patent by making, 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.

110. TCL products that infringe one or more claims of the '835 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '835 patent.

111. TCL Products enable users to watch live TV and on demand programming from their cable service providers over a wireless network. https://support.tclusa.com/televisions-setup-configurations/258975-how-to-connect-your-tcl-roku-tv-to-the-internet; https://www.tclusa.com/top-tv-apps. TCL Chips are configured to function/capable of functioning as wireless cable modems. For example, TCL Chips provide a wireless connection to cable services.

112. Each TCL 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.

113. Each TCL 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.

114. 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 with a 25% duty cycle) that is a function of the in-phase oscillating signal, thereby creating a first sampled signal.

115. 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.

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

COUNT VI - Infringement of United States Patent No. 8,588,725

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

118. TCL directly infringes (literally and/or under the doctrine of equivalents) the '725 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '725 patent.

119. TCL products that infringe one or more claims of the '725 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '725 patent.

120. Each TCL Chip is/includes an apparatus for down-converting an electromagnetic signal (e.g., high frequency RF signal) to a lower frequency signal. Each TCL Chip has an aliasing module comprising a switching device (e.g., one or more transistors) and a storage module (e.g., module having one or more capacitors). The aliasing module receives as an input an RF information signal and provides as an output a down-converted signal. The switching device of the aliasing module receives as an input a control signal (e.g., LO signal) that controls a charging and discharging cycle of the storage module by controlling the switching device so that a portion of energy is transferred from the RF information signal to the storage module during a

charging part of the cycle and a portion of the transferred energy is discharged during a discharging part of the cycle.

121. As an example, the switching device samples the RF information signal according to an LO control signal. In particular, the switching device periodically opens and closes to control the current flow of RF information signal in the circuit. The time period for which switching device is open/closed is determined by the LO control signal. During an aperture of the LO control signal, for example, the switching device closes and energy from RF information signal is directed to the storage module. Between each aperture of the LO control signal, the switching device remains open, preventing the flow of energy through the switch and consequently discharging energy stored in the storage module. The sampling, charging, and discharging process provides the down-converted signal as an output of the aliasing module.

122. The control signal operates at an aliasing rate (e.g., LO rate with a 25% duty cycle) selected so that energy of the RF information signal is sampled and applied to the storage module at a frequency that is equal to or less than twice the frequency of the RF information signal. The storage module generates the down-converted signal from the alternate charging and discharging applied to the storage module using the control signal.

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

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

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

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

126. TCL products that infringe one or more claims of the '513 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '513 patent.

127. Each TCL Chip is/includes a system for frequency down-converting a modulated carrier signal (e.g., a high frequency RF signal) to a lower frequency signal. Each TCL Chip has (a) a first switch (e.g., transistor), (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.

128. Each TCL Chip has (a) a second switch (e.g., transistor), (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 according to the

second control signal and outputs a down-converted inverted in-phase signal portion of the modulated carrier signal.

129. Each TCL 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.

130. Each TCL Chip has (a) a third switch (e.g., transistor), (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 according to the third control signal and outputs a down-converted quadrature-phase signal portion of the modulated carrier signal.

131. Each TCL Chip has (a) a fourth switch (e.g., transistor), (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 according to the fourth control signal and outputs a down-converted inverted quadrature-phase signal portion of the modulated carrier signal.

132. Each TCL 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.

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

COUNT VIII – Infringement of United States Patent No. 9,118,528

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

135. TCL directly infringes (literally and/or under the doctrine of equivalents) the '528 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '528 patent.

136. TCL products that infringe one or more claims of the '528 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '528 patent.

137. Each TCL Chip is/includes a system for frequency down-converting a modulated carrier signal (e.g., high frequency RF signal) to a baseband signal. Each TCL Chip includes a first switch (e.g., transistor) coupled to a first control signal (e.g., LO signal) which comprises a sampling aperture (e.g., 25% duty cycle) with a specified frequency, wherein the first switch is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal (e.g., high frequency RF signal) as an output of said first switch during the sampling aperture of the first control signal.

138. Each TCL Chip includes a first energy storage element (e.g., one or more capacitors) that stores the transferred energy from the modulated carrier signal and outputs a down-converted in-phase baseband signal portion of said modulated carrier signal.

139. Each TCL Chip includes a second switch (e.g., transistor) coupled to a second control signal (e.g., LO signal) which comprises a sampling aperture (e.g., 25% duty cycle) with a specified frequency, wherein the second switch is on and a portion of energy that is distinguishable from noise is transferred from the modulated carrier signal (e.g., high frequency RF signal) as an output of said second switch during the sampling aperture of the second control signal.

140. Each TCL Chip includes a second energy storage element (e.g., one or more capacitors) that stores the transferred energy from the modulated carrier signal and outputs a down-converted inverted in-phase baseband signal portion of said modulated carrier signal.

141. The portions of transferred energy from each of the first and second switch are integrated over time to accumulate said portions of transferred energy from which said down-converted in-phase baseband signal portion and said down-converted inverted in-phase baseband signal portion are derived.

142. Each TCL Chip includes a first differential amplifier circuit that combines said down-converted in-phase baseband signal portion with said down-converted inverted in-phase baseband signal portion and outputs a first channel down-converted differential in-phase baseband signal.

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

COUNT IX - Infringement of United States Patent No. 9,246,736

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

145. TCL directly infringes (literally and/or under the doctrine of equivalents) the '736 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '736 patent.

146. TCL products that infringe one or more claims of the '736 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '736 patent.

147. Each TCL Chip is/includes a system for frequency down-converting a modulated carrier signal (e.g., high frequency RF signal) to a demodulated baseband signal. Each TCL Chip has a first switch (e.g., transistor) coupled to a first control signal (e.g., LO signal) which comprises a first sampling aperture (e.g., 25% duty cycle) with a specified frequency, wherein the first switch is on during the first sampling aperture and wherein the first switch is off outside the first sampling aperture.

148. Each TCL Chip has a first energy storage element (e.g., one or more capacitors), coupled to said first switch, that outputs a down-converted in-phase baseband signal portion of the modulated carrier signal.

149. Each TCL Chip has a second switch (e.g., transistor) coupled to a second control signal (e.g., LO signal) which comprises a second sampling aperture (25% duty cycle) with a specified frequency, wherein the second switch is on during the second sampling aperture and wherein the first switch is off outside the second sampling aperture.

150. Each TCL Chip has a second energy storage element (e.g., one or more capacitors), coupled to the second switch, that outputs a down-converted inverted in-phase baseband signal portion of the modulated carrier signal.

151. The first and second control signals each control a charging and discharging cycle of their respective energy storage element so that for each switch a portion of energy from the modulated carrier signal is transferred to the respective energy storage element when the respective switch is on during the charging cycle, and a portion of previously transferred energy is discharged during the discharging cycle for each respective switch when the respective switch is off.

152. For each respective energy storage element, the energy discharged during any given discharge cycle is not completely discharged, with the remaining undischarged energy from the given discharge cycle becoming an initial condition for a next charging cycle that begins immediately following the given discharge cycle.

153. The down-converted in-phase baseband signal portion is derived from energy accumulated at the first energy storage element during both the charging and the discharging cycles for the first energy storage element. The down-converted inverted in-phase baseband signal portion is derived from energy accumulated at the

second energy storage element during both the charging and the discharging cycles for the second energy storage element.

154. Each TCL Chip has a first differential amplifier circuit that combines the down-converted in-phase baseband signal portion with the down-converted inverted in-phase baseband signal portion and outputs a first channel down-converted differential in-phase baseband signal.

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

COUNT X - Infringement of United States Patent No. 9,444,673

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

157. TCL directly infringes (literally and/or under the doctrine of equivalents) the '673 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 1 of the '673 patent.

158. TCL products that infringe one or more claims of the '673 patent include, but are not limited to, the TCL Products and any other TCL device that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '673 patent.

159. Each TCL Chip is/includes an apparatus for down-converting an input modulated carrier signal (e.g., high frequency RF signal) to a demodulated baseband

signal, wherein the modulated carrier signal has an amplitude variation, a phase variation, a frequency variation, or a combination thereof.

160. Each TCL Chip has a frequency down-conversion module that has a switch (e.g., transistor), a capacitor coupled to said switch, and a pulse generator (e.g., LO) coupled to the switch. The pulse generator outputs pulses to the switch at a rate (e.g., LO rate with a 25% duty cycle) that is a function of a frequency of the modulated carrier signal and a frequency of the demodulated baseband signal determined according to: (the frequency of the modulated carrier signal +/− a frequency of the demodulated baseband signal) divided by N, where N is any integer including 1.

161. The pulses have apertures and the pulses cause the switch to open outside of the apertures and cause the switch to close and sample the modulated carrier signal during the apertures by transferring energy from the modulated carrier signal and accumulating the transferred energy in the capacitor each time the switch is closed.

162. Some of the previously accumulated energy is discharged from the capacitor into load circuitry (e.g., a resistor and/or differential amplifier) each time said switch is open. The demodulated baseband signal is generated from (a) the accumulating of the energy transferred to the capacitor each time the switch is closed and (b) the discharging of the some of the previously accumulated energy into the load circuitry each time the switch is opened.

163. ParkerVision has been damaged by the direct infringement of TCL, 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 TCL as follows:

a. finding that TCL 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: October 12, 2020

THE MORT LAW FIRM, PLLC

/s/Raymond W. Mort, III

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