UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

PARKERVISION, INC., Plaintiff, **v.** **NXP SEMICONDUCTORS N.V., NXP B.V., NXP USA, INC. D/B/A NXP SEMICONDUCTORS USA, INC.,** Defendants.	**Case No. 6:23-cv-00389-ADA** **JURY TRIAL DEMANDED**

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff ParkerVision, Inc. ("ParkerVision"), by and through its undersigned counsel, files this Amended Complaint against Defendants NXP Semiconductors N.V., NXP B.V., NXP USA, Inc. d/b/a NXP Semiconductors USA, Inc. (collectively, "NXP" or "Defendants") for patent infringement of United States Patent Nos. 7,483,686; 7,865,177; and 9,118,528 (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, Defendant NXP Semiconductors N.V. is a foreign corporation organized and existing under the laws of the Netherlands with a principal place of business located at High Tech Campus 60, 5656 AG Eindhoven, The Netherlands.

4. On information and belief, Defendant NXP B.V. is a foreign corporation organized and existing under the laws of the Netherlands with a principal place of business located at High Tech Campus 60, 5656 AG Eindhoven, The Netherlands. On information and belief, NXP B.V. is a wholly owned subsidiary of NXP Semiconductors N.V. and develops/sells semiconductor devices.

5. On information and belief, Defendant NXP USA, Inc. d/b/a NXP Semiconductors USA, Inc. is a corporation organized and existing under the laws of Delaware. NXP USA, Inc. has places of business in this judicial district, including its US Corporate Headquarters located at 6501 W. William Cannon Dr., Austin, TX 78735; and 3501 Ed Bluestein Blvd., Austin, TX 78721 (collectively, the "Austin Offices"). https://www.nxp.com/company/about-nxp/worldwide-locations/united-states:USA.

6. NXP USA, Inc. may be served with process through its registered agent, Corporation Service Company d/b/a CSC-Lawyers Incorporating Service Company at 211 East 7th Street, Suite 620, Austin, Texas, 78701-3218.

7. On information and belief, since at least March 1, 2004, NXP USA, Inc. has been registered to do business in the State of Texas under Texas Taxpayer Number 12004431826.

8. On information and belief, NXP USA, Inc. is a subsidiary of both NXP Semiconductors N.V. and NXP B.V. and engages in sales, advertising, marketing, and/or research in the United States on behalf of, and under the control of NXP. "NXP owns and operates four wafer fabrication facilities in the US, two of which are in ***Austin, Texas*** . . . . The

representative products of these fabs include microcontrollers (MCUs) and microprocessors (MPUs), power management devices, ***RF transceivers***, amplifiers and sensors." *See* https://www.nxp.com/company/about-nxp/worldwide-locations/united-states:USA.

9. NXP Semiconductors N.V, NXP B.V., and NXP USA, Inc. are companies which together comprise "a global semiconductor company and a long-standing supplier in the industry, with over 60 years of innovation and operating history." *See* https://investors.nxp.com/static-files/b8f7bcb5-5812-4709-aed4-f52d3d2a8eff at page 3. According to NXP, it provides technology solutions "in the domains of cryptography-security, high-speed interface, ***radio frequency (RF)***, mixed-signal analog-digital (mixed A/D), power management, digital signal processing and embedded system design." *Id.* NXP's "product solutions are used in a wide range of end market applications including: automotive, industrial & Internet of Things (IoT), mobile, and communication infrastructure." *Id.*

10. On information and belief, in December 2015, NXP merged with Freescale Semiconductor, Ltd. ("Freescale"). https://www.nxp.com/company/about-nxp/nxp-and-freescale-announce-40-billion-merger:NW-FREESCALE-40BILLION-MERGE; https://www.reuters.com/article/us-autos-semiconductors-nxp-semicondtrs/nxp-completes-deal-to-buy-freescale-and-create-top-auto-chipmaker-idUSKBN0TQ1IK20151207.

11. In February 2006, ParkerVision attended the 3GSM Congress conference in Barcelona, Spain. On information and belief, interested in ParkerVision's technology, Freescale representatives (Klaus Buehring (Vice President and General Manager of the Radio Products Division) and Kent Heath (Director, Cellular Operations, Radio Products Division)) met at the conference with ParkerVision. Mr. Leach kept contemporaneous notes of the meeting. At that

meeting, ParkerVision discussed its patented wireless direct down-conversion technology, which ParkerVision marketed under the name Direct-to-Data (D2D).

12. On February 20, 2006, Mr. Leach sent an email to Messrs. Buehring and Heath forwarding ParkerVision's 86-page White Paper on D2D technology, a 4-page short writeup regarding D2D technology and the presentation ParkerVision made at the meeting.

13. On January 29, 2008, Freescale filed U.S. Patent Application No. 12/021,534 (now U.S. Patent 8,045,943), which is directed to a 25% passive mixer. The technology of U.S. Patent No. 8,045,943 relates to ParkerVision's D2D technology and a ParkerVision patent is cited on the face of U.S. Patent No. 8,045,943.

14. On information and belief, NXP designs, develops, manufactures, and/or ships integrated circuits/wireless chips to be sold in the United States. On information and belief, NXP USA designs, develops, manufactures, sells, advertises, and markets integrated circuits/wireless chips on behalf of, and under the control of NXP.

15. NXP Semiconductors N.V, NXP B.V., and NXP USA, Inc. share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and infringing product lines and products involving related technologies. According to NXP, "NXP has one reportable segment representing the entity as a whole, which reflects the way in which our chief operating decision maker executes operating decisions, allocates resources, and manages the growth and profitability of the Company." https://investors.nxp.com/static-files/b8f7bcb5-5812-4709-aed4-f52d3d2a8eff at page 3.

16. On information and belief, NXP Semiconductors N.V, NXP B.V., and NXP USA, Inc. are operated as a single business entity and/or in concert with each other to manufacture, sell, offer to sell, import, market, advertise, and/or otherwise promote the infringing products

(receiver and/or transceiver integrated circuits (e.g., chips for use in wireless devices)) in the United States, including in the State of Texas generally and this judicial district in particular. On information and belief, the Defendants share directors, executives and/or employees.

17. On information and belief, NXP Semiconductors N.V. controls the business decisions of its affiliates including, but not limited to, NXP B.V., and NXP USA, Inc.

18. Thus, on information and belief, NXP Semiconductors N.V, NXP B.V., and NXP USA, Inc. operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

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. NXP 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 NXP because NXP 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 NXP because, *inter alia*, NXP, on information and belief, (1) has substantial, continuous, and systematic business contacts in this judicial district, (2) owns, manages, and/or operates facilities in this States and this judicial district; (3) enjoys substantial income from its operations in this State and this judicial district; (4) employs Texas residents in this State and this judicial district; and (5) solicits business and markets infringing produces in this State and this judicial district.

22. NXP has purposefully availed itself of the laws of, and 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. NXP Semiconductors N.V, NXP B.V., and NXP USA, Inc. are part of the same corporate structure and distribution chain for the making, importing, offering to sell, selling, and/or using of the infringing products in the United States, including in the State of Texas generally and this judicial district in particular.

24. This Court has personal jurisdiction over NXP because NXP (directly and/or through its subsidiaries, affiliates, or intermediaries) has committed and continue 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, NXP (directly and/or through its subsidiaries, affiliates, or intermediaries) manufactures, uses, sells, offers for sale, imports, advertises, and/or otherwise promotes infringing products (receiver 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, NXP part nos. TEF510x series,[1] IW620 series, IW416 series, 88W9098 series, 88W9097 series, 88W9068 series, 88W9064 series, 88W8997 series, 88W8987 series, 88W8977 series, 88W8897 series, 88W8887 series, 88W8801 series, 88W8787 series, 88W8786 series, 88W8766 series, 88W8764 series, 88W8688 series, 88Q9098 series, 88MW3xx series (collectively, "NXP Chips").

[1] On information and belief, the TEF5100 was sold and/or offered for sale at least on or before March 2018. *See, e.g.,* https://fcc.report/FCC-ID/2AEIFUMPZ2-M01/3838141.pdf.

25. On information and belief, NXP (directly and/or through its subsidiaries, affiliates, or intermediaries) owns, operates, or controls facilities that include offices and fabrication facilities in Austin, Texas where infringing products are designed, developed, manufactured, tested, used, marketed, imported, exported, offered for sale, and/or sold into a stream of commerce that includes this judicial district. *See* https://www.nxp.com/company/about-nxp/worldwide-locations/united-states:USA.

26. On information and belief, NXP maintains its Austin Offices as a regular and established place of business. On information and belief, NXP employs over 1800 employees in the Austin area. *See* https://www.linkedin.com/company/nxp-semiconductors/people/.

27. On information and belief, NXP has hundreds of H-1B labor condition applications for people employed in Austin, Texas. https://h1bsalary.online/?searchtext=NXP%20USA%20INC&job_title=&worksite_city=AUSTIN&state_name=TX&year=. Employees holding an H-1B visa are employed in a specialty occupation that requires "theoretical and practical application of a body of highly specialized knowledge . . . and attainment of a bachelor's or higher degree in the specific specialty." *See generally* 8 U.S.C. § 1184. As such, NXP employees in Austin, Texas are highly specialized and important to the operation of NXP.

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

29. Venue is proper in this judicial district under to 28 U.S.C. §1400(b) at least because NXP USA, Inc. is registered to do business in the State of Texas, maintains a regular

and established place of business within this judicial district, and has committed acts of infringement in this judicial district.

30. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b)-(d) and/or 1400(b) at least because NXP Semiconductors N.V and NXP B.V. are foreign corporations subject to personal jurisdiction in this judicial district and have committed acts of infringement within this judicial district giving rise to this action.

31. Alternatively, the Court has personal jurisdiction over NXP Semiconductors N.V and NXP B.V. under Federal Rule of Civil Procedure 4(k)(2). This cause of action arises under federal law, NXP Semiconductors N.V and NXP B.V. are not subject to general jurisdiction in any one state, and the exercise of jurisdiction is consistent with the United States Constitution.

PARKERVISION

32. 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.

33. 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.

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

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

36. 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.

37. ParkerVision's innovations did not stop there. ParkerVision went on to develop additional RF direct down-conversion technologies, RF direct 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.

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

39. 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. 7,483,686

40. On January 27, 2009, the United States Patent and Trademark Office duly and legally issued United States Patent No. 7,483,686 ("the '686 patent") entitled "Universal Platform Module and Methods and Apparatuses Relating Thereto Enabled by Universal Frequency Translation Technology" to inventor David F. Sorrells et al.

41. The '686 patent is presumed valid under 35 U.S.C. § 282.

42. ParkerVision owns all rights, title, and interest in the '686 patent.

United States Patent No. 7,865,177

43. On January 4, 2011, the United States Patent and Trademark Office duly and legally issued United States Patent No. 7,865,177 ("the '177 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.

44. The '177 patent is presumed valid under 35 U.S.C. § 282.

45. ParkerVision owns all rights, title, and interest in the '177 patent.

United States Patent No. 9,118,528

46. 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.

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

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

CLAIMS FOR RELIEF

COUNT I - Infringement of United States Patent No. 7,483,686

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

50. NXP directly infringes (literally and/or under the doctrine of equivalents) the '686 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 11 of the '686 patent.

51. On information and belief, NXP products that infringe at least claim 11 of the '686 patent include, but are not limited to, the NXP Chips and any other NXP product that is capable of performing simultaneous multi-platform operations as claimed in the '686 patent. On information and belief, NXP uses the NXP Chips at least by testing or demonstrating (or having others do so on its behalf) the NXP Chips in the United States.

52. On information and belief, NXP Chips including, without limitation, the NXP TEF5100, IW620, IW416, 88W9098, 88W9097, 88W9068, 88W9064, 88W8997, 88W8987, 88W8977, 88W8897, 88W8887, 88W8787, 88W8786, 88W8766, 88W8764, 88W8688, 88Q9098, 88MW320, 88MW322 (collectively, "Multi-platform NXP Chips") perform simultaneous multi-platform operations (e.g., Wi-Fi and Bluetooth operations). NXP infringes each step of claim 11 because the Multi-platform NXP Chips automatically, and without user modification, perform each of the claimed steps.

53. On information and belief, each Multi-platform NXP Chip meets wireless telecommunication standards including, but not limited to, IEEE 802.11a, 802.11b, 802.11g, 802.11n, 802.11ac, and Bluetooth. *See, e.g.,* https://www.nxp.com/products/wireless-connectivity/wi-fi-plus-bluetooth-plus-802-15-4/2-4-5-ghz-dual-band-1x1-wi-fi-4-802-11n-plus-

bluetooth-5-2-solution:IW416; https://www.nxp.com/products/wireless/wi-fi-plus-bluetooth-plus-802-15-4/2-4-5-ghz-dual-band-1x1-wi-fi-4-802-11n-plus-bluetooth-5-2-solution:88W8977.

54. On information and belief, each Multi-platform NXP Chip controls at least one multi-platform module (e.g., a module having a plurality of receiver and transmitter paths, which handle multiple communication protocols (e.g., Wi-Fi, Bluetooth)) to communicate with at least one of a plurality of communication links (e.g. wireless or Bluetooth links) using a control module (e.g., a module having hardware, firmware/software, or a combination thereof for controlling receiving, transmitting, and/or processing of signals of two or more communication protocols/links) having a plurality of standard/protocol sub-modules (e.g., modules each having hardware, firmware/software, or a combination thereof for controlling receiving, transmitting, and/or processing of signals associated with a particular communication protocol/link).

55. On information and belief, the at least one multi-platform module includes a plurality of transceivers (e.g., a plurality of receiver and transmitter paths, where each transceiver includes at least one receiver path and one transmitter path) each having at least one frequency translation module (e.g., a module having components used in the process of down-converting an RF signal from a higher frequency to a lower frequency).

56. On information and belief, the at least one frequency translation module comprises a switch (e.g., one or more transistors) configured to operate according to an energy transfer signal (e.g., a local oscillator (LO) signal), and to sub-sample and transfer energy from a first electromagnetic (EM) signal (e.g., high frequency RF signal). On information and belief, each NXP Chip sub-samples the first EM signal by a transistor(s) turning ON and OFF as controlled by a e.g., 25% duty cycle LO signal. The sub-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 EM signal.

57. On information and belief, the at least one frequency translation module comprises a storage module (e.g., one or more capacitors) coupled to the switch (e.g., one or more transistors) and configured to store the transferred energy (e.g., as current passes through the switch).

58. On information and belief, a second EM signal (e.g., a baseband signal) is generated from the stored energy (e.g., when a capacitor(s) discharge(s) to a load), the second EM signal having a frequency different (a lower frequency) from the first EM signal (e.g., high frequency RF signal).

59. On information and belief, each Multi-platform NXP Chip operates a first transceiver (e.g., at least one receiver path and one transmitter path) in conformance with a first protocol/standard combination (e.g., Wi-Fi protocol/standard) using a first standard/protocol sub-module (e.g., a sub-module controlling Wi-Fi communications).

60. On information and belief, each Multi-platform NXP Chip operates a second transceiver (e.g., at least one receiver path and one transmitter path) in conformance with a second protocol/standard combination (e.g., Bluetooth protocol/standard) using a second standard/protocol sub-module (e.g., a sub-module controlling Bluetooth communications).

61. On information and belief, the configuration and operation of the Multi-platform NXP Chips are described in various publications by NXP and Marvell[2]. *See, e.g.,* H. Zarei, "An

[2] On information and belief, in December 2019, NXP USA, Inc. acquired Marvell Technology Group Ltd.'s ("Marvell") Wi-Fi Connectivity Business unit, Bluetooth technology portfolio and related assets. https://investors.nxp.com/node/19761/html; https://www.sec.gov/ix?doc=/Archives/edgar/data/0001058057/000105805720000014/mrvl-20200201.htm.

Analysis Of Voltage-Driven Passive-Mixer Based SAW-Less Transmitters," *Proceedings of Papers 5th European Conference on Circuits and Systems for Communications* (ECCSC), Belgrade, Serbia, 2010, pp. 177-180; S. Tadjpour et al., "A Multi-Band Rel9 WCDMA/HSDPA/TDD LTE and FDD LTE Transceiver with Envelope Tracking," *ESSCIRC 2014 - 40th European Solid State Circuits Conference* (ESSCIRC), Venice Lido, Italy, 2014, pp. 383-386; R. Winoto et al., "A 2×2 WLAN and Bluetooth Combo SoC in 28nm CMOS with On-Chip WLAN Digital Power Amplifier, Integrated 2G/BT SP3T Switch And BT Pulling Cancelation," *2016 IEEE International Solid-State Circuits Conference* (ISSCC), San Francisco, CA, USA, 2016, pp. 170-171; M. Ramella et al., "A SAW-Less 2.4-GHz Receiver Front-End with 2.4-mA Battery Current for SoC Coexistence," in *IEEE Journal of Solid-State Circuits*," vol. 52, no. 9, pp. 2292-2305, Sept. 2017; J. van Sinderen et al., "Wideband UHF ISM-Band Transceiver Supporting Multichannel Reception and DSSS Modulation," *2013 IEEE International Solid-State Circuits Conference Digest of Technical Paper*s, San Francisco, CA, USA, 2013, pp. 454-455; X. He and H. Kundur, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with Translational Loop for Input Matching" *2011 IEEE International Solid-State Circuits Conference*, San Francisco, CA, USA, 2011, pp. 372-374; and U.S. Patent No. 8,045,943.

62. On information and belief, the multiple references listed above show examples of shared architectures used across multiple NXP/Marvell IC designs or designs that were supported by NXP/Marvell. These materials are consistent with NXP/Marvell reusing a common architecture between IC chip designs.

63. On information and belief, the structure, function, and operation of the Multi-platform NXP Chips are substantially similar to one another with respect to '686 patent.

64. On information and belief, the configuration and operation of the Multi-platform NXP Chips are described in various publications by NXP including, without limitation, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with Translational Loop for Input Matching" by X. He and H. Kundur, 2011 IEEE International Solid-State Circuits Conference, San Francisco, CA, USA, 2011, pp. 372-374 (hereinafter referred to as 2011 IEEE paper).

65. For example, as shown in Figure 21.5.2 of the 2011 IEEE paper (below), a single receiver path includes the following exemplary circuit components: input signal (red arrow), LO signal (orange arrow), switch (transistor(s), shown in the purple box), storage module(s) (capacitor(s), green boxes), and low impedance load (resistor(s), shown in the yellow box).

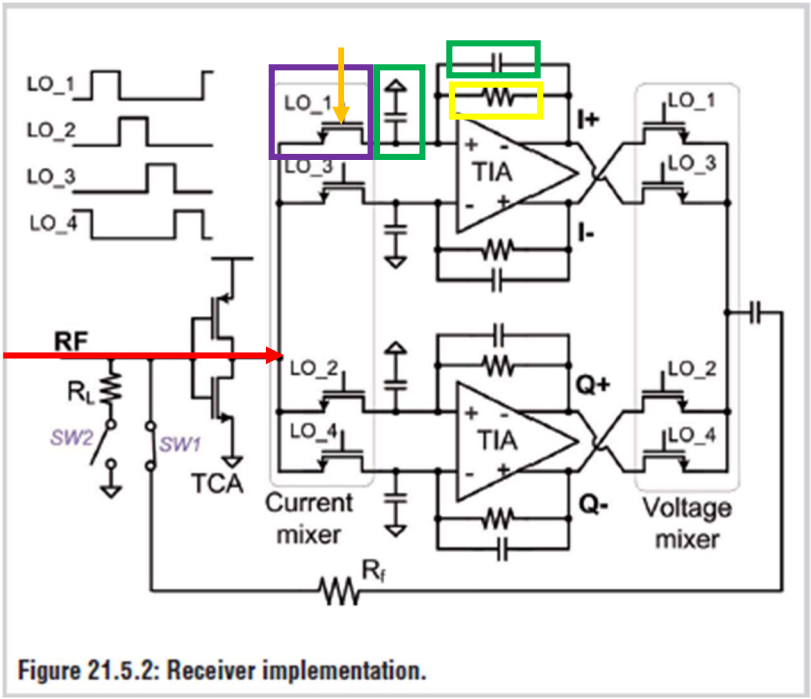
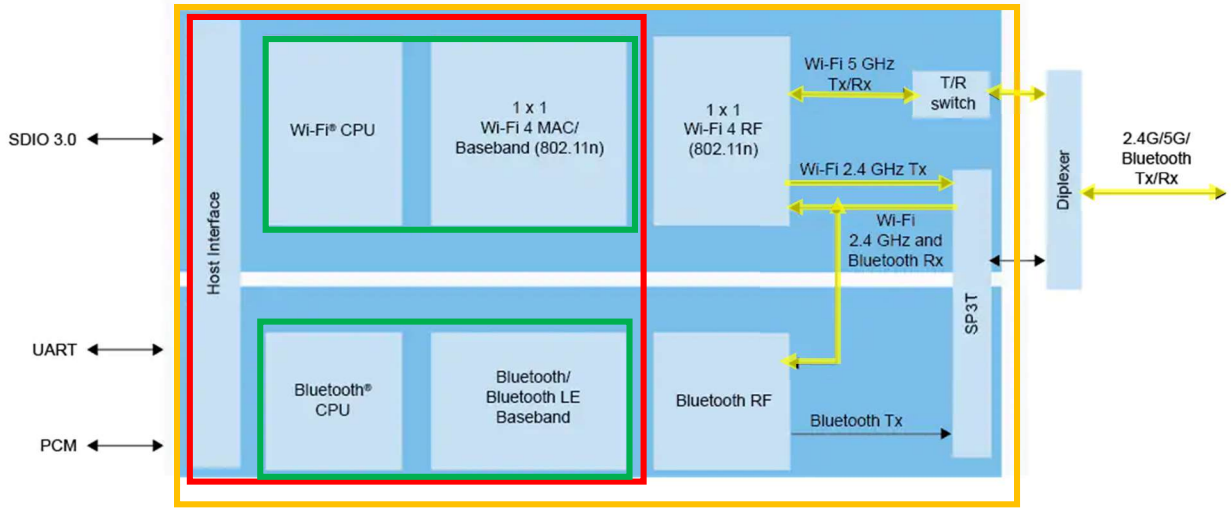


Figure 21.5.2: Receiver implementation.

66. On information and belief, each Multi-platform NXP Chip includes at least four receiver paths and the frequency down-converter (and subsequent circuitry) of each receiver path has the same/substantially the same architecture, is connected in the same/substantially the same manner, and functions in the same/substantially the same way.

67. On information and belief, NXP's 88W8977 is an exemplary product that infringes at least claim 11 of the '686 patent. As shown in the block diagram below, the 88W8977 includes the following exemplary circuit components: a multi-platform module (represented by the orange box), a plurality of communication links (represented by the yellow arrows), a control module (represented by the red box), standard/protocol sub-modules (represented by the green boxes).



https://www.nxp.com/products/wireless/wi-fi-plus-bluetooth-plus-802-15-4/2-4-5-ghz-dual-band-1x1-wi-fi-4-802-11n-plus-bluetooth-5-2-solution:88W8977. Like the 88W8977 chip, on information and belief, each of the Multi-platform NXP Chips includes the exemplary circuit components above and the same or similar chip architecture as the 88W8977 chip, and infringes at least clam 11 of the '686 patent.

68. ParkerVision has been damaged by the direct infringement of NXP 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. 7,865,177

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

70. NXP directly infringes (literally and/or under the doctrine of equivalents) the '177 patent by making, using, selling, offering for sale, and/or importing in/into the United States products covered by at least claim 14 of the '177 patent. NXP infringes each step of claim 14 because the NXP Chips automatically, and without user modification, perform each of the claimed steps.

71. On information and belief, NXP products that infringe at least claim 14 of the '177 patent include, but are not limited to, the NXP Chips,[3] and any other NXP product that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the '177 patent. On information and belief, NXP uses the NXP Chips at least by testing or demonstrating (or having others do so on its behalf) the NXP Chips in the United States.

72. On information and belief, each NXP Chip performs a method for down-converting an electromagnetic signal (e.g., high frequency RF signal). The method is performed on the receiver side of each NXP Chip.

73. On information and belief, each NXP Chip receives an input signal (e.g., high frequency RF signal) at a first and second matched filtering/correlating module. Each matched filtering/correlating module is linear time-variant circuitry that samples a modulated RF carrier signal at an aliasing rate. On information and belief, sampling is performed using a switch (e.g., one or more transistors), which turns ON and OFF. The switch has an independent control input

[3] *See, e.g.,* TEF510x series, IW620 series, IW416 series, 88W9098 series, 88W9097 series, 88W9068 series, 88W9064 series, 88W8997 series, 88W8987 series, 88W8977 series, 88W8897 series, 88W8887 series, 88W8801 series, 88W8787 series, 88W8786 series, 88W8766 series, 88W8764 series, 88W8688 series, 88Q9098 series, 88MW3xx series.

that is driven by a control signal (e.g., LO signal). On information and belief, the control signal has non-negligible, periodic apertures (e.g., periods of time when the transistor(s) is ON/receives a e.g., 25% duty cycle LO signal). On information and belief, non-negligible amounts of energy from the RF signal are accumulated (e.g., in one or more capacitors in each matched filtering/correlating module) and transferred to a low impedance load (e.g., one or more resistors) during an aperture period (e.g., when the switch is closed (ON)). Each NXP Chip meets wireless telecommunication standards including, but not limited to, IEEE 802.11a, 802.11b, 802.11g, 802.11n, 802.11p, and ARIB STD-T55/STD-T75. *See, e.g.,* https://www.nxp.com/products/wireless/dsrc-safety-modem/v2x-rf-transceiver:TEF5100. On information and belief, the capacitor(s) discharge(s) energy through the low impedance load between aperture periods (e.g., when the switch is open (OFF)). In this way, real power from the RF signal is transferred to the low impedance load and produces a down-converted signal with enhanced signal-to-noise power ratio.

74. On information and belief, each NXP Chip down-converts the input signal at the first matched filtering/correlating according to a first control signal (e.g., a first LO signal) and outputs a first down-converted signal (e.g., a first baseband signal).

75. On information and belief, each NXP Chip down-converts the input signal at the second matched filtering/correlating according to a second control signal (e.g., a second LO signal) and outputs a second down-converted signal (e.g., a second baseband signal).

76. On information and belief, a differential amplifier circuit in each NXP Chip combines the second down-converted signal (e.g., second baseband signal) and the first down-converted signal (e.g., first baseband signal) to output a first channel down-converted signal.

77. On information and belief, the configuration and operation of the NXP Chips are described in various publications by NXP and Marvell[4]. *See, e.g.,* H. Zarei, "An Analysis Of Voltage-Driven Passive-Mixer Based SAW-Less Transmitters," *Proceedings of Papers 5th European Conference on Circuits and Systems for Communications* (ECCSC), Belgrade, Serbia, 2010, pp. 177-180; S. Tadjpour et al., "A Multi-Band Rel9 WCDMA/HSDPA/TDD LTE and FDD LTE Transceiver with Envelope Tracking," *ESSCIRC 2014 - 40th European Solid State Circuits Conference* (ESSCIRC), Venice Lido, Italy, 2014, pp. 383-386; R. Winoto et al., "A 2×2 WLAN and Bluetooth Combo SoC in 28nm CMOS with On-Chip WLAN Digital Power Amplifier, Integrated 2G/BT SP3T Switch And BT Pulling Cancelation," *2016 IEEE International Solid-State Circuits Conference* (ISSCC), San Francisco, CA, USA, 2016, pp. 170-171; M. Ramella et al., "A SAW-Less 2.4-GHz Receiver Front-End with 2.4-mA Battery Current for SoC Coexistence," in *IEEE Journal of Solid-State Circuits*," vol. 52, no. 9, pp. 2292-2305, Sept. 2017; J. van Sinderen et al., "Wideband UHF ISM-Band Transceiver Supporting Multichannel Reception and DSSS Modulation," *2013 IEEE International Solid-State Circuits Conference Digest of Technical Paper*s, San Francisco, CA, USA, 2013, pp. 454-455; X. He and H. Kundur, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with Translational Loop for Input Matching" *2011 IEEE International Solid-State Circuits Conference*, San Francisco, CA, USA, 2011, pp. 372-374; and U.S. Patent No. 8,045,943.

78. On information and belief, the multiple references listed above show examples of shared architectures used across multiple NXP/Marvell IC designs or designs that were

[4] On information and belief, in December 2019, NXP USA, Inc. acquired Marvell Technology Group Ltd.'s ("Marvell") Wi-Fi Connectivity Business unit, Bluetooth technology portfolio and related assets. https://investors.nxp.com/node/19761/html; https://www.sec.gov/ix?doc=/Archives/edgar/data/0001058057/000105805720000014/mrvl-20200201.htm.

supported by NXP/Marvell. These materials are consistent with NXP/Marvell reusing a common architecture between IC chip designs in and among the NXP Chips.

79. On information and belief, the structure, function, and operation of the NXP Chips are substantially similar to one another with respect to '177 patent.

80. On information and belief, the configuration and operation of the NXP Chips are described in various publications by NXP including, without limitation, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with Translational Loop for Input Matching" by X. He and H. Kundur, 2011 IEEE International Solid-State Circuits Conference, San Francisco, CA, USA, 2011, pp. 372-374 (hereinafter referred to as 2011 IEEE paper).

81. For example, as shown in Figure 21.5.2 of the 2011 IEEE paper (below), a single receiver path includes the following exemplary circuit components: input signal (red arrow), LO signal (orange arrow), switch (transistor(s), shown in the purple box), storage module(s) (capacitor(s), green boxes), low impedance load (resistor(s), shown in the yellow box), and differential amplifier circuit (shown in the blue box).

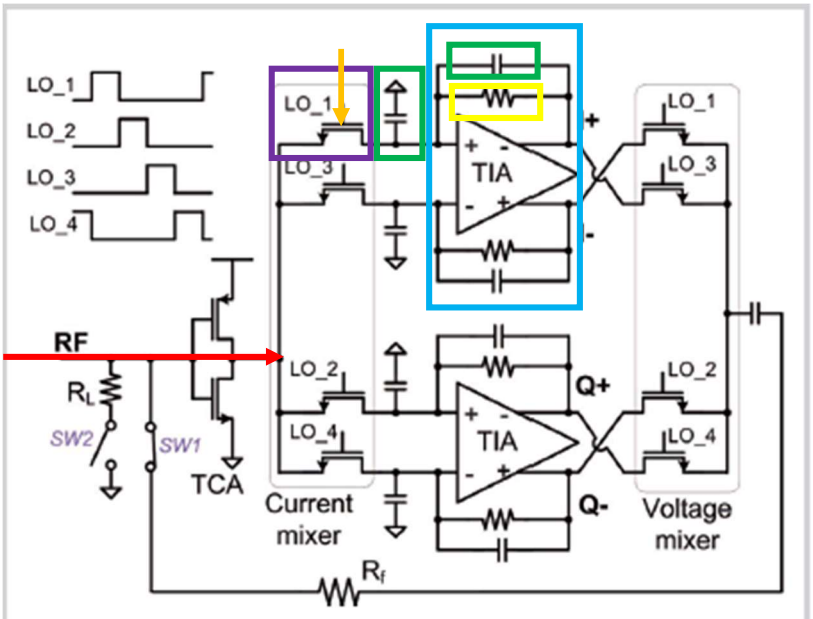


Figure 21.5.2: Receiver implementation.

82. On information and belief, each NXP Chip includes at least four receiver paths and the frequency down-converter (and subsequent circuitry) of each receiver path has the same/substantially the same architecture, is connected in the same/substantially the same manner, and functions in the same/substantially the same way, and infringes at least claim 14 of the ’177 patent.

83. ParkerVision has been damaged by the direct infringement of NXP 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. 9,118,528

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

85. NXP 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.

86. On information and belief, NXP products that infringe at least claim 1 of the ’528 patent include, but are not limited to, the NXP Chips and any other NXP product that is capable of down-converting a higher-frequency signal to a lower-frequency signal as claimed in the ’528 patent. On information and belief, NXP uses the NXP Chips at least by testing or demonstrating (or having others do so on its behalf) the NXP Chips in the United States.

87. On information and belief, each NXP Chip is/includes a system for frequency down-converting a modulated carrier signal (e.g., high frequency RF signal) to a baseband signal. Each NXP Chip includes a first switch (e.g., one or more transistors) coupled to a first control signal (e.g., an 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 the first switch during the sampling aperture of the first control signal. Each NXP Chip meets wireless telecommunication standards including, but not limited to, IEEE 802.11a, 802.11b, 802.11g, 802.11n, 802.11p, and ARIB STD-T55/STD-T75. *See, e.g.,* https://www.nxp.com/products/wireless/dsrc-safety-modem/v2x-rf-transceiver:TEF5100

88. On information and belief, each NXP 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 the modulated carrier signal.

89. On information and belief, each NXP Chip includes a second switch (e.g., one or more transistors) coupled to a second control signal (e.g., an 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 the second switch during the sampling aperture of the second control signal.

90. On information and belief, each NXP 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 the modulated carrier signal.

91. On information and belief, the portions of transferred energy from each of the first and second switch are integrated over time to accumulate the portions of transferred energy from which the down-converted in-phase baseband signal portion and the down-converted inverted in-phase baseband signal portion are derived.

92. On information and belief, each NXP Chip includes 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.

93. On information and belief, the configuration and operation of the NXP Chips are described in various publications by NXP and Marvell[5]. *See, e.g.,* H. Zarei, "An Analysis Of Voltage-Driven Passive-Mixer Based SAW-Less Transmitters," *Proceedings of Papers 5th European Conference on Circuits and Systems for Communications* (ECCSC), Belgrade, Serbia, 2010, pp. 177-180; S. Tadjpour et al., "A Multi-Band Rel9 WCDMA/HSDPA/TDD LTE and FDD LTE Transceiver with Envelope Tracking," *ESSCIRC 2014 - 40th European Solid State Circuits Conference* (ESSCIRC), Venice Lido, Italy, 2014, pp. 383-386; R. Winoto et al., "A 2×2 WLAN and Bluetooth Combo SoC in 28nm CMOS with On-Chip WLAN Digital Power Amplifier, Integrated 2G/BT SP3T Switch And BT Pulling Cancelation," *2016 IEEE International Solid-State Circuits Conference* (ISSCC), San Francisco, CA, USA, 2016, pp. 170-171; M. Ramella et al., "A SAW-Less 2.4-GHz Receiver Front-End with 2.4-mA Battery Current for SoC Coexistence," in *IEEE Journal of Solid-State Circuits*," vol. 52, no. 9, pp. 2292-2305, Sept. 2017; J. van Sinderen et al., "Wideband UHF ISM-Band Transceiver Supporting Multichannel Reception and DSSS Modulation," *2013 IEEE International Solid-State Circuits Conference Digest of Technical Paper*s, San Francisco, CA, USA, 2013, pp. 454-455; X. He and H. Kundur, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with

[5] On information and belief, in December 2019, NXP USA, Inc. acquired Marvell Technology Group Ltd.'s ("Marvell") Wi-Fi Connectivity Business unit, Bluetooth technology portfolio and related assets. https://investors.nxp.com/node/19761/html; https://www.sec.gov/ix?doc=/Archives/edgar/data/0001058057/000105805720000014/mrvl-20200201.htm.

Translational Loop for Input Matching" *2011 IEEE International Solid-State Circuits Conference*, San Francisco, CA, USA, 2011, pp. 372-374; and U.S. Patent No. 8,045,943.

94. On information and belief, the multiple references listed above show examples of shared architectures used across multiple NXP/Marvell IC designs or designs that were supported by NXP/Marvell. These materials are consistent with NXP/Marvell reusing a common architecture between IC chip designs in and among the NXP Chips.

95. On information and belief, the structure, function, and operation of the NXP Chips are substantially similar to one another with respect to '528 patent.

96. On information and belief, the configuration and operation of the NXP Chips are described in various publications by NXP including, without limitation, "A Compact SAW-less Multiband WCDMA/GPS Receiver Front-End with Translational Loop for Input Matching" by X. He and H. Kundur, 2011 IEEE International Solid-State Circuits Conference, San Francisco, CA, USA, 2011, pp. 372-374 (hereinafter referred to as 2011 IEEE paper).

97. For example, as shown in Figure 21.5.2 of the 2011 IEEE paper (below), a single receiver path includes the following exemplary circuit components: input signal (red arrow), LO signal (orange arrow), switch (transistor(s), shown in the purple box), storage module(s) (capacitor(s), green boxes), low impedance load (resistor(s), shown in the yellow box), and differential amplifier circuit (shown in the blue box).

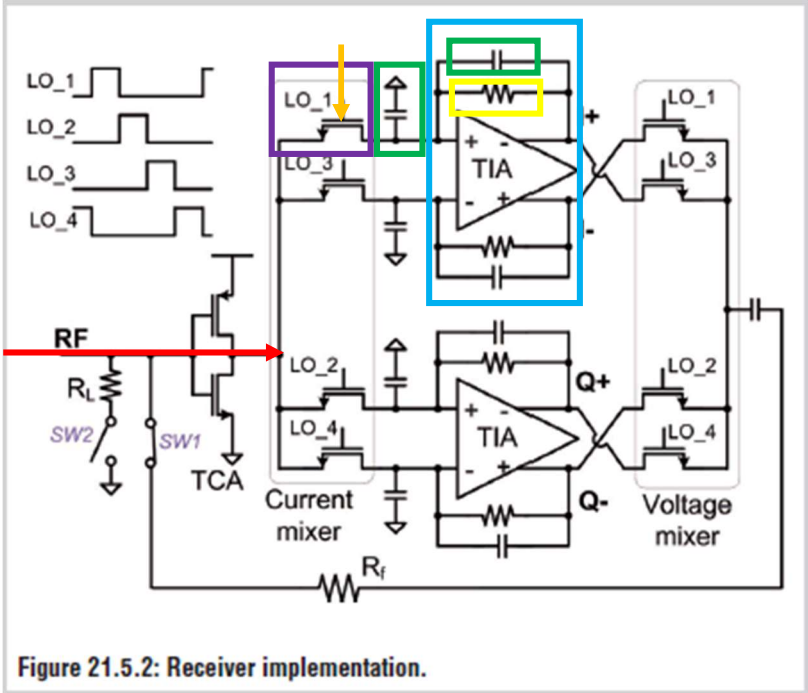


Figure 21.5.2: Receiver implementation.

98. On information and belief, each NXP Chip includes at least four receiver paths and the frequency down-converter (and subsequent circuitry) of each receiver path has the same/substantially the same architecture, is connected in the same/substantially the same manner, and functions in the same/substantially the same way, and infringes at least claim 1 of the '528 patent.

99. ParkerVision has been damaged by the direct infringement of NXP 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 NXP as follows:

a. finding that NXP 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: September 8, 2023

THE MORT LAW FIRM, PLLC

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#Not admitted in Virginia
**Pro hac vice to be filed*