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

REDWOOD TECHNOLOGIES, LLC,	§	
	§	
Plaintiff,	§	
	§	**JURY TRIAL DEMANDED**
v.	§	
	§	
REALTEK SEMICONDUCTOR CORPORATION,	§	**C.A. NO. 6:25-cv-111**
	§	
Defendant.	§	

PLAINTIFF'S COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Redwood Technologies, LLC ("Redwood") files this Complaint against Defendant Realtek Semiconductor Corporation (collectively, "Realtek" or "Defendant") for infringement of U.S. Patent No. 7,664,130 (the "'130 patent"), U.S. Patent No. 7,688,901 (the "'901 patent"), U.S. Patent No. 7,974,371 (the "'371 patent"), U.S. Patent No. 8,155,224 (the "'224 patent"), U.S. Patent No. 8,744,005 (the "'005 patent"), U.S. Patent No. 8,873,517 (the "'517 patent"), and U.S. Patent No. 9,628,300 (the "'300 patent"), collectively, the "Asserted Patents."

THE PARTIES

1. Redwood Technologies, LLC is a Texas limited liability company, with a principal place of business at 812 West McDermott Dr. #1038, Allen, TX 75013.

2. On information and belief, Realtek is a foreign corporation organized and existing under the laws of Taiwan with a place of business located at No. 2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan. Realtek provides Wi-Fi compliant devices. Realtek conducts business in Texas and within this District, directly or through intermediaries, including subsidiaries, distributors, affiliates, retailers, suppliers, integrators, customers, and others.

3. Defendant is engaged (including, as relevant, in the past) in making, using, selling, offering for sale, and/or importing, and/or inducing its respective subsidiaries, affiliates, distributors, suppliers, retail partners, and customers in the making, using, selling, offering for sale, and/or importing throughout the United States, including within this District, the following products accused of infringement (the "Accused Products"):

- Realtek devices that are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be and/or Realtek's mesh devices that are compliant with IEEE 802.11 as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same (collectively, "Realtek Wi-Fi compliant devices"); and
- Products comprising Realtek Wi-Fi compliant devices.

4. On information and belief, Cortina Access, Inc. ("Cortina") is a California corporation with a regular and established place of business at 2130 Gold Street, Suite 250, San Jose, CA 95002. On information and belief, Cortina is a wholly-owned and wholly-controlled subsidiary of Realtek. *See* https://www.realtek.com/images/ar/2023_Annual_Report_FINAL_.pdf at p. 107.

5. On information and belief, Ubilinx Technology, Inc. ("Ubilinx") is a California corporation with a regular and established place of business at 2841 Junction Ave., San Jose, CA 95134. On information and belief, Ubilinx is a wholly-owned and wholly-controlled subsidiary of Realtek. *See* https://www.realtek.com/images/ar/2023_Annual_Report_FINAL_.pdf at p. 107.

6. On information and belief, Realtek controls (and has controlled) Cortina and Ubilinx, as well as many other subsidiaries. On information and belief, Cortina and Ubilinx provide (and have provided) sales, distribution, testing, research, and/or development support in

the United States for its ultimate parent Realtek, which owns Cortina and Ubilinx. Cortina and Ubilinx are, and have been, agents of Realtek. At the direction and control of Realtek, its subsidiaries, including Cortina and Ubilinx, and/or other U.S.-based subsidiaries have made, used, sold, offered for sale, and/or imported and continue to make, use, sell, offer for sale, and/or import Accused Products in the United States and this District. *See* https://www.realtek.com/Article/NewsDetail?id=2255&app_id=18 ("Cortina Access's high-end gateway router and PON products have consistently passed the telecommunication specifications of various countries, and have been adopted by tier 1 carriers in the US, China, Japan, and Korea. Cortina Access products can now be paired with Realtek's recently announced 4×4 11ac Wi-Fi and IoT chip (codenamed Ameba) to provide top-notch wireless gateway solutions with high throughput and QoS for the telecommunication market, thereby fulfilling all communication requirements of smart home living", said Realtek Vice President and Spokesman, Yee-Wei Huang. "As well as the product synergy arising from this transaction, it also speaks to our commitment to our customers in the telecommunication market, and demonstrates our dedication to remaining a leader in telecommunication ICs."); https://www.ublnx.com/AboutUs.html ("Ubilinx Technology is a semiconductor design company specializing in developing highly integrated solutions for various consumer electronics applications, including broadband access, multi-media signal processing, and communication links, both wired and wireless. The company has a core team of seasoned integrated circuit designers of cumulatively more than 300 years of experience in designing cost effective high performance silicon chips over a wide range of products. The company conducts product development and research, and also provides consultation service.").

7. According to Realtek, "[i]t is headquartered in Taiwan and it has ***sales or R&D teams in*** China, Singapore, ***the United States***, Japan, and South Korea." https://www.realtek.com/images/ar/-2021__20220518.pdf at 4 (emphasis added).

8. On information and belief, Defendant and its subsidiaries share directors, executives, and employees. For example, Yung-Fang Huang is a Director of Cortina as well as a Director and the Chief Operating Officer of Realtek. *See* https://www.realtek.com/images/ar/2023_Annual_Report_FINAL_.pdf at 11, 113. Furthermore, Kuang-Yu Yen is a Director of Cortina as well as a Director and the President of Realtek. *See id*. at 11, 113. In the role of President of Realtek, Kuang-Yu Yen "[p]lans and executes the Company's operational strategies and analysis; carries out Board of Directors' resolutions, investment assessments, PR statements, legal and patent affairs, international marketing, and information security." *Id*. at 10.

9. On information and belief Realtek controls (and has controlled) Cortina and Ubilinx. On information and belief, Realtek and other Realtek companies are, and have been, agents of Realtek. For example, Realtek, Cortina, Ubilinx and other subsidiaries report their financial information in the same document on behalf of Realtek. *See* https://www.realtek.com/images/ar/2023_Annual_Report_FINAL_.pdf.

10. On information and belief, Realtek, along with their respective foreign and U.S.-based subsidiaries, affiliates, distributors, retail partners, and customers (which act as part of a global network and supply chain of overseas sales and manufacturing subsidiaries), have operated as agents of one another and vicariously as parts of the same business group to work in concert together and enter into agreements that are nearer than arm's length to provide (and have provided) a distribution channel of infringing products within this District and the U.S. nationally.

11. Realtek operates (and has operated) in agency with its respective foreign and U.S.-based subsidiaries, affiliates, distributors, retail partners, suppliers, and customers, to provide a distribution channel of infringing products within this District and the U.S. nationally. Realtek, individually and/or between one another and their respective agents and foreign and U.S.-based subsidiaries, affiliates, distributors, retail partners, suppliers, and customers, purposefully direct (and have directed) the Accused Products into established distribution channels within this District and the U.S. nationally.

12. On information and belief, Realtek, and their respective U.S.-based subsidiaries, affiliates, distributors, retail partners, and customers (which act as part of a global network and supply chain of overseas sales and manufacturing subsidiaries), have operated as agents of one another and vicariously as parts of the same business group to work in concert together and enter into agreements that are nearer than arm's length. Realtek, and their U.S.-based subsidiaries, individually and/or in concert, conduct business (and have conducted business) in the United States, including importing, using, testing, distributing, offering to sell, and selling the Accused Products that incorporate devices, systems, and processes that infringe the Asserted Patents in Texas and this District. *See Trois v. Apple Tree Auction Center, Inc.*, 882 F.3d 485, 490 (5th Cir. 2018) ("A defendant may be subject to personal jurisdiction because of the activities of its agent within the forum state…."); *see also Cephalon, Inc. v. Watson Pharmaceuticals, Inc.*, 629 F. Supp. 2d 338, 348 (D. Del. 2009) ("The agency theory may be applied not only to parents and subsidiaries, but also to companies that are 'two arms of the same business group,' operate in concert with each other, and enter into agreements with each other that are nearer than arm's length.").

13. On information and belief, employees of Cortina are agents and employees of Realtek. Employees of Realtek and/or Cortina test and use Defendant's Accused Products in the United States. *See, e.g.*, https://www.realtek.com/Article/NewsDetail?id=2255&app_id=18 ("Cortina Access's high-end gateway router and PON products have consistently passed the telecommunication specifications of various countries, and have been adopted by tier 1 carriers in the US, China, Japan, and Korea. Cortina Access products can now be paired with Realtek's recently announced 4×4 11ac Wi-Fi and IoT chip (codenamed Ameba) to provide top-notch wireless gateway solutions with high throughput and QoS for the telecommunication market, thereby fulfilling all communication requirements of smart home living", said Realtek Vice President and Spokesman, Yee-Wei Huang. "As well as the product synergy arising from this transaction, it also speaks to our commitment to our customers in the telecommunication market, and demonstrates our dedication to remaining a leader in telecommunication ICs."); https://www.cortina-access.com/index.php/company-overview/career/senior-system-applications-engineer (job listing for a Senior Systems Applications Engineer in California to test 802.11 Wi-Fi functionality by using 802.11 Wi-Fi compliant devices).

14. Through offers to sell, sales, imports, distributions, and other related agreements to transfer ownership of Defendant's Accused Products by and/or to affiliates, distributors, subsidiaries, suppliers, retail partners, customers, and/or agents, Defendant is operating in (and have operated in) and maintaining (and maintained) a significant business presence in the U.S. and/or through their U.S. subsidiaries or agents, Defendant does business in the U.S., the state of Texas, and in this District.

15. Realtek and their subsidiaries share the same management, common ownership, advertising platforms, facilities, distribution chains and platforms, and infringing product lines and

products involving related technologies. On information and belief, Defendant operates as a single business entity and/or in concert with its affiliates, distributors, subsidiaries, suppliers, retail partners, customers, and/or agents to manufacture, sell, offer to sell, import, market, advertise, and/or otherwise promote the Accused Products in the United States, including in the State of Texas generally and this District in particular.

16. Realtek, as a single enterprise of multiple operating subsidiaries acting in consort with one another, has a common Board of Directors. The collective set of Realtek entities, including Defendant, is managed, in consort, by a common management team to direct the manufacture, distribution, importation, use, and sale of Realtek products, including the Accused Products, in the United States and worldwide.

17. Prior to the filing of the Complaint, Redwood sent a letter via FedEx on November 2, 2021 to Realtek, where Redwood attempted to engage Realtek in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Realtek refused delivery of Redwood's letter. Redwood sent a follow-up letter via FedEx on December 8, 2021 to Realtek, where Redwood again attempted to engage Realtek in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Realtek also refused deliver of Redwood's follow-up letter. On May 22, 2022, Redwood sent another letter via FedEx to Realtek, where Redwood again attempted to engage Realtek in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. Realtek again refused delivery of Redwood's letter dated May 22, 2022.

18. Prior to the filing of the Complaint, Redwood sent several emails to different Realtek employees, where Redwood again attempted to engage Realtek in licensing discussions

related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation. On May 12, 2022, Redwood sent an email to Sherry Chen of Realtek that attached the 2021 notice letter, a 2022 notice letter, and access to Redwood's data room for the infringement charts of the Asserted Patents. On September 15, 2023, Redwood sent an email to Alfred Kuo of Realtek that attached the 2021 notice letters. On July 19, 2024, Redwood sent an email to Gina Hung of Realtek that attached the 2021 notice letters. Realtek refused to respond to any of Redwood's emails attempting to engage Realtek in licensing discussions related to the Asserted Patents for reasonable and non-discriminatory terms for a license to be taken in the absence of litigation.

19. Indeed, Realtek has known about each of the Asserted Patents since at least May 12, 2022, September 15, 2023, and July 19, 2024 when Realtek received the email notices of its infringement of the Asserted Patents.

20. To date, Realtek has not responded to any of Redwood's attempts to license the Asserted Patents for reasonable and non-discriminatory terms. Redwood's RAND obligations to the IEEE are fulfilled because Realtek refused to engage in any licensing dialogue.

21. Furthermore, as a member of the relevant standards-setting bodies, on information and belief, Realtek is on notice of standard essential patents issued to other members of the standards bodies.

22. Realtek's past and continuing making, using, selling, offering for sale, and/or importing, and/or inducing subsidiaries, affiliates, retail partners, distributors, manufacturers of end user devices, customers, and other third parties in the making, using, selling, offering for sale, and/or importing the Accused Products throughout the United States i) willfully infringe each of

the Asserted Patents and ii) impermissibly take the significant benefits of Redwood's patented technologies without fair compensation to Redwood.

23. Realtek (individually and/or in concert with its subsidiaries, agents, affiliates, retail partners, distributors, manufacturers of end user devices, and/or customers) is engaged in making, using, testing, selling, offering for sale, and/or importing, and/or induces subsidiaries, affiliates, retail partners, distributors, manufacturers of end user devices, customers, and other third parties in the making, using, selling, offering for sale, and/or importing throughout the United States, including within this District, the Accused Products, such as Wi-Fi compliant components as well as routers, laptops, computers, TVs, automotives, IoT devices and other products that include Realtek's Wi-Fi compliant components, accused of infringement.

24. On information and belief, Realtek and its subsidiaries operate as a unitary business venture and are jointly and severally liable for the acts of patent infringement alleged herein.

25. Through offers to sell, sales, imports, distributions, and other related agreements to transfer ownership of Defendant's Accused Products by and/or to affiliates, distributors, subsidiaries, suppliers, business partners, retail partners, customers, and/or agents, Defendant is operating in (and has operated in) and maintaining (and maintained) a significant business presence in the U.S. and/or through its U.S. subsidiaries or agents, Defendant has done (and does) business in the U.S., the state of Texas, and in the Western District of Texas.

JURISDICTION AND VENUE

26. Plaintiff incorporates paragraphs 1 through 25 herein by reference.

27. This action arises under the patent laws of the United States, namely 35 U.S.C. §§ 271, 281, and 284-285, among others.

28. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

29. Venue is proper for Defendant in this District pursuant to 28 U.S.C. §§ 1391(c). Defendant is a foreign entity and may be sued in any judicial district under 28 U.S.C. § 1391(c)(3).

30. This Court has general and specific personal jurisdiction over the Defendant pursuant to due process and/or the Texas Long Arm Statute because, inter alia, (i) the Defendant has done and continue to do business in Texas and/or (ii) the Defendant has, directly and through intermediaries, distributers, agents, and/or others committed and continues to commit acts of patent infringement in the State of Texas, including making, using, offering to sell, and/or selling Accused Products in Texas, and/or importing Accused Products into Texas, including by Internet sales and/or sales via business partners, retail and wholesale stores, inducing others to commit acts of patent infringement in Texas, and/or committing at least a portion of any other infringements alleged herein. Defendant has placed, and is continuing to place, infringing products into the stream of commerce, via established distribution channels, with the knowledge and/or understanding that such products are sold in Texas, including in this District. Defendant has derived substantial revenues from its infringing acts occurring within Texas and within this District. Defendant has substantial business in this State and District (including, as relevant, in the past), including: (A) conducting at least part of its infringing activities alleged herein; and (B) regularly doing or soliciting business, engaging in other persistent conduct, and/or deriving substantial revenue from infringing goods offered for sale, sold, and/or imported, and services provided to Texas residents vicariously through and/or in concert with its respective alter egos, intermediaries, agents, distributors, importers, customers, subsidiaries, and/or consumers.

31. On information and belief, Defendant sells its Accused Products (e.g., 802.11 Wi-Fi compliant components) to its customers knowing those accused components will be incorporated into products imported, offered for sale, sold, and/or used in the United States. Indeed, downstream Accused Products (e.g., TVs, laptops, routers, etc.) incorporating Defendant's Accused Products are on sale and have been sold by retailers, such as Walmart and Amazon, in the United States, the state of Texas, and this District. *See, e.g., Parkervision, Inc. v. Realtek Semiconductor Corp.*, No. 6:23-CV-00374- ADA, Dkt. No. 31 (W.D. Tex. Nov. 1, 2023) at ¶¶ 25-26; *Bandspeed, LLC v. Realtek Semiconductor Corporation*, No. 1:20-CV-00765-LY, Dkt. No. 22 (W.D. Tex. Mar. 13, 2022) at ¶¶ 23-26.

32. On information and belief, Defendant's Accused Products are incorporated into Asus downstream products that are offered for sale, sold, imported, and/or used in the United States and this District. *See, e.g.*, https://www.asus.com/supportonly/f1502za/helpdesk_download/.

33. On information and belief, Defendant's Accused Products are also incorporated into Lenovo downstream products that are offered for sale, sold, imported, and/or used in the United States and this District. *See, e.g.*, https://support.lenovo.com/us/en/downloads/ds104538-realtek-wifi-driver-for-windows-10-32-bit-64-bit-desktop.

34. Defendant has employees in the United States, including Defendant's employees that work in the United States at Cortina and Ubilinx.

35. In addition, Defendant is aware that the Accused Products are shipped to, and used in, the United States given that they obtain authorization from the U.S. Federal Communications Commission ("FCC") for the Accused Products so that that the Accused Products comply with the laws and regulations of the United States. *See, e.g.*, https://fccid.io/TX2.

36. Also, given the Defendant's history as a supplier of the Accused Products to known manufacturers of Wi-Fi devices in the United States market, Defendant has knowledge that such manufacturers (*e.g.*, Asus, Lenovo, etc.) have substantial operations in the United States, as well as substantial market share in the United States market for Wi-Fi devices. Defendant is well-aware that the Accused Products are destined for the United States and Texas (e.g., via Realtek and other manufacturers' supply chains, distributers, retailers, etc.). Indeed, the U.S. market for the Accused Products is substantial.

37. This Court has personal jurisdiction over Defendant, directly or through agents, intermediaries, distributors, importers, business partners, customers, subsidiaries, and/or consumers. Through direction and control (including, as relevant, in the past) of such subsidiaries, affiliates, business partners, distributors, retail partners, agents, and/or customers, Defendant has committed acts of direct and/or indirect patent infringement within Texas, and elsewhere within the United States, giving rise to this action and/or have established minimum contacts with Texas such that personal jurisdiction over Defendant would not offend traditional notions of fair play and substantial justice. Upon information and belief, Defendant compensate its U.S.-based subsidiaries and/or agents for their sales and/or technical support services in the United States. As such, Defendant has a direct financial interest in its U.S.-based subsidiaries and/or agents, and/or partners, distributers, or customers, and vice versa.

38. Personal jurisdiction is proper because Defendant has committed acts of infringement in this District. This Court has personal jurisdiction over Defendant because, inter alia, this action arises from activities Defendant purposefully directed towards the State of Texas and this District.

39. Exercising personal jurisdiction over Defendant in this District would not be unreasonable given Defendant's contacts in this District, the interest in this District of resolving disputes related to products sold herein, and the harm that would occur to Plaintiff who resides in this District.

40. In addition, Defendant has knowingly induced infringement within this District by advertising, marketing, offering for sale and/or selling devices pre-loaded with infringing functionality within this District, to consumers, customers, manufacturers, distributors, resellers, partners, end users, and providing instructions, user manuals, advertising, and/or marketing materials which facilitate, direct or encourage the use of infringing functionality with knowledge thereof.

41. For example, Defendant's website advertises the type of components and Accused Products that are infringing in this case. Indeed, Defendant provides technical support directed specifically to its customers in the United States, including customers that purchased and/or used the Accused Products in the United States. *See* https://www.realtek.com/Article/Index?menu_id=850.

42. Personal jurisdiction also exists specifically over Defendant because Defendant, directly or through affiliates, subsidiaries, business partners, agents, and/or intermediaries, transact business (or have transacted business) in this State or purposefully directed business at this State by making, importing, offering to sell, selling, and/or having sold infringing products within this State and District or purposefully directed at this State or District.

43. To the extent Defendant is not subject to jurisdiction in any state's court of general jurisdiction, exercising jurisdiction over Defendant in this State and this District would be

consistent with due process and this State's long-arm statute and under national contacts in light of the facts alleged in this Complaint.

44. In addition, Defendant, directly or through affiliates, subsidiaries, agents, and/or intermediaries, have placed infringing products into the stream of commerce knowing they would be sold and used in Texas, and economically benefit from the retail sale of infringing products in this State, including in this District.

45. Defendant has advertised its infringing products to customers in Texas and this District through its website.

46. On information and belief, Defendant controls (or has controlled) or otherwise direct (or directed) and authorizes (or authorized) all activities of its U.S.-based (or foreign-based with the knowledge that the Accused Products are directed to the United States and this District) agents and/or subsidiaries. Such directed and authorized activities include the U.S.-based (and/or foreign-based) subsidiaries' and/or agents having used, offered for sale, sold, and/or imported the Accused Products, their components, processes, and/or products containing the same that incorporated the fundamental technologies and claims of the Asserted Patents. Defendant's U.S.-based (and/or foreign-based) subsidiaries and/or agents were authorized to import, distribute, sell, use, or offer for sale the Accused Products on behalf of Defendant. For example, Defendant researched, designed, developed, and manufactured the Accused Products, and then directed its U.S.-based (and/or foreign-based) subsidiaries, distributers, business partners agents, and/or others to import, distribute, offer for sale, use, and sell the Accused Products in the United States. *See, e.g., United States v. Hui Hsiung*, 778 F.3d 738, 743 (9th Cir. 2015) (finding that the sale of infringing products to third parties rather than for direct import into the U.S. did not "place [defendants'] conduct beyond the reach of United States law [or] escape culpability under the

rubric of extraterritoriality"). Thus, Defendant conducted infringing activities, and Defendant's U.S.-based (and foreign-based) subsidiaries and/or distributers and/or agents and/or business partners conducted infringing activities on behalf of Defendant.

47. On information and belief, Defendant's' U.S.-based (and/or foreign-based) subsidiaries' and/or agents' presence (including in the past) in the United States gave Defendant substantially the same business advantages that it would have enjoyed if Defendant conducted its business through its own offices or paid agents. Defendant's U.S.-based (and/or foreign-based) subsidiaries and/or distributers and/or agents were authorized to import, distribute, sell, and offer for sale Defendant's products, including the Accused Products, as well as their components and processes related to the same, on behalf of Defendant. For example, Defendant's U.S.-based (and/or foreign-based) subsidiaries and/or agents operated within Defendant's global network and supply chain of sales. In the U.S., including within the Western District of Texas, the Accused Products, as well as their components and processes related to the same, were imported, distributed, offered for sale, and/or sold.

48. Via Defendant's alter egos, agents, business partners, intermediaries, distributors, importers, customers, subsidiaries, and/or consumers that maintained a business presence, operating in, and/or residing in the U.S., Defendant's products, including products and processes accused of infringing the Asserted Patents, are or have been widely distributed and sold in Texas including within this District. *See Litecubes, LLC v. Northern Light Products, Inc.*, 523 F.3d 1353, 1369-70 (Fed. Cir. 2008) ("[T]he sale [for purposes of § 271] occurred at the location of the buyer."); *see also Semcon IP Inc. v. Kyocera Corp.*, No. 2:18-cv-00197-JRG, 2019 WL 1979930, at *3 (E.D. Tex. May 3, 2019) (denying accused infringer's motion to dismiss because plaintiff

sufficiently plead that purchases of infringing products outside of the United States for importation into and sales to customers in the U.S. may constitute an offer to sell under § 271(a)).

49. On information and belief, Defendant has placed infringing products and/or products that practiced infringing processes into the stream of commerce via established distribution channels comprising at least its subsidiaries, business partners, affiliates, distributors, and/or agents or customers, with the knowledge and/or intent that those products were imported, used, offered for sale, and sold in the United States and Texas, including in this District. As a result, Defendant has, vicariously through and/or in concert with alter egos, agents, intermediaries, distributors, affiliates, importers, customers, subsidiaries, and/or consumers, placed the Accused Products into the stream of commerce via established distribution channels with the knowledge and/or intent that those products were sold and continue to be sold in the United States and Texas, including in this District.

50. The minimum contacts test is satisfied because Defendant delivers its Accused Products (e.g., Wi-Fi compliant devices) into the stream of commerce with the expectation that they will be purchased by consumers in Texas. *Beverly Hills Fan Co. v. Royal Sovereign Corp.*, 21 F.3d 1558, 1566 (Fed. Cir. 1994) (quoting *World-Wide Volkswagen Corp. v. Woodson*, 100 S. Ct. 559 (1980)). For example, and on information and belief (and as provided for herein), Defendant imports, and/or has imported and/or shipped infringing Accused Products into the United States through and with its supply chain partners, distributors, and/or customers (including, but not limited to, Asus and Lenovo). Defendant supplies its Accused Products (e.g., Wi-Fi compliant devices) to customers knowing that its accused products will be incorporated into accused downstream Wi-Fi compliant products (e.g., TVs, laptops, routers) that are offered for sale, sold, imported, and/or used by Asus, Lenovo, Walmart, and/or Amazon in the United States

and this District. The Accused Products were (and are) directed to this District and were (and are) available for purchase in this District via retailers, such as Asus, Lenovo, Walmart, and Amazon. The lengthy and complex distribution chain does not insulate Defendant from suit in Texas.

51. Defendant intentionally placed its Accused Products in a distribution chain flowing from Asia to the United States, Texas, and this District. For example, Defendant intentionally places its Accused Products in a distribution or supply chain knowing that such Accused Products ultimately arrive in the United States market and this District through, at least, laptops, TVs, and/or routers manufactured by its customers, such as Asus and Lenovo. Defendant, through its sales of Wi-Fi compliant devices for application in downstream Wi-Fi devices knew (or should have reasonably known) the likely destination of the products, where Defendant's conduct and connections with Texas and this District were such that Defendant should have reasonably anticipated being brought to court in this District.

52. Indeed, Defendant sought authorization from the FCC so that its Accused Products were authorized for operation at approved frequencies so that the Accused Products would be authorized for sale within the United States. Defendant's activities with the FCC further evidence that Defendant knew or should have known that its products were destined for the United States and this District.

53. Moreover, Defendant is the assignee of a substantial number of United States patents and patent applications, including use of U.S. patent counsel to procure such patents in their name. Thus, Defendant sought out the United States market, evidenced by seeking patent protection in the United States.

54. Realtek has substantial contacts with the U.S. based on its substantial contacts with standards bodies. Realtek is a member of the IEEE 802.11 standards group and does business with

the IEEE. https://www.ieee802.org/11/members.html. The IEEE has corporate headquarters in New York and its operation centers in New Jersey. Furthermore, Realtek does business with the Wi-Fi Alliance, which is located in Austin, Texas and this District. Realtek has certified over 100 products through the Wi-Fi Alliance, including certain of its Accused Products.

55. Also by way of example, and on information and belief, Defendant has (and have had) U.S. based (and/or foreign-based) employees that work in connection with the Accused Products, including, but not limited to, employees who research, design, sell, import, and/or test the Accused Products in the United States. On information and belief, John Coffey is a Realtek employee who serves as a voting member of the IEEE 802.11 working group on behalf of Realtek. *See* https://www.ieee802.org/11/members.html. On information and belief, John Coffey resides and works in San Francisco in the United States. *See, e.g.*, https://patentimages.storage.googleapis.com/fc/63/82/2082106ec279a5/US11152963.pdf at 1.

56. Moreover, Realtek is an annual participant in the Consumer Electronics Show ("CES") held annually in Las Vegas. Realtek has imported, presented, demonstrated, offered for sale, and used certain Accused Products in the United States at the CES each year since at least 2017. *See, e.g.*, https://www.realtek.com/Article/NewsDetail?id=4244&app_id=18.

57. Indeed, Realtek advertises that its products for sale in the USA can be purchased via its distributors Future Electronics or WPG Americas Inc., which is located in San Jose, CA. https://www.realtek.com/Sales/Distributors?cate_id=481&menu_id=852. Indeed, Future Electronics offered for sale Realtek's RTL8723D, an Accused Product, as of March 2022. *See Bandspeed, LLC v. Realtek Semiconductor Corporation*, No. 1:20-CV-00765-LY, Dkt. No. 22 (W.D. Tex. Mar. 13, 2022) at ¶ 21.

58. Defendant has an ongoing commercial relationship with entities of Asus, Lenovo, and/or other downstream manufacturers of Wi-Fi devices incorporating Defendant's Accused Products, and Defendant accessed the Texas consumer-electronics market vis-à-vis those relationships. Given Defendant's relationship with such behemoths in the United States market, jurisdiction in this Court is fair and reasonable.

59. In the alternative, the Court has personal jurisdiction over Defendant under Federal Rule of Civil Procedure 4(k)(2), because the claims for patent infringement in this action arise under federal law, Defendant is not subject to the jurisdiction of the courts of general jurisdiction of any state and exercising jurisdiction over Defendant is consistent with the U.S. Constitution. Exercising jurisdiction comports with due process given Defendant's purposeful availment from the sales of downstream Wi-Fi products (e.g., TVs, laptops, routers, etc.) incorporating Defendant's Accused Products sold in the Unites States and this District.

60. With respect to the '130 patent and the '517 patent, the Accused Products are devices that include, but are not limited to, Realtek's devices and third party devices that comprise one or more of Realtek's mesh devices that are compliant with IEEE 802.11 (*e.g.*, the BE3600 (RTL8198E/ RTL8932AR/RTL8902AR/RTL8221B) series) as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same. With respect to the '901 patent, '371 patent, '224 patent, '005 patent, and '300 patent, the Accused Products are devices that include, but are not limited to, Realtek's devices and third party devices that include one or more of Realtek's devices that are compliant with IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be (*e.g.*, the BE3600 (RTL8198E/ RTL8932AR/RTL8902AR/RTL8221B), BE7200 (RTL8198E/RTL8934AR/ RTL8294XAR/RTL8221B), RTL8192EE, RTL8192ER, RTL8192ES, RTL8192EU,

RTL8194AR, RTL8812AE, RTL8812AR, RTL8812AU, RTL8812BRH, RTL8812BU, RTL8814AE, RTL8814AR, RTL8814AU, RTL8822BE, RTL8822BEH-VR, RTL8822BS, RTL8822BU, RTL8851BE, RTL8852CE, RTL8922 series) as well as their components (*e.g.*, hardware, software, and/or firmware), and processes related to the same.[1]

COUNT I

(INFRINGEMENT OF U.S. PATENT NO. 7,664,130)

61. Plaintiff incorporates paragraphs 1 through 60 herein by reference.

62. Redwood is the assignee of the '130 patent, entitled "Wireless Communication System, Wireless Communication Apparatus, Wireless Communication Method, and Computer Program," with ownership of all substantial rights in the '130 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

63. The '130 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '130 patent issued from U.S. Patent Application No. 11/066,482.

64. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '130 patent in this judicial district and elsewhere in Texas and the United States.

65. Realtek directly infringes the '130 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '130 patent.

66. Furthermore, Realtek. directly infringes the '130 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries

[1] Each of the relevant standards cited herein, and related to the Asserted Patents, are specifically incorporated into this Complaint.

conduct activities that constitute direct infringement of the ’130 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the ’130 patent. Further, Defendant is vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek, and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek sells and makes some Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek’s Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the ’130 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

67. For example, Realtek infringes claim 10 of the ’130 patent via the Accused Products, including the BE3600 router/extender. The Accused Products, including the BE3600, are mesh devices compliant with IEEE 802.11 and comprise a wireless communication station. *See, e.g.*, Fig. 19-2 of IEEE 802.11 2016; https://www.realtek.com/Article/NewsDetail?id=4552&app_id=18&lang=en-GB (Realtek used the BE3600 in the United States in January 2025 at CES. The BE3600 is a Wi-Fi 7 mesh device compliant with IEEE 802.11.)

68. The Accused Products, including the BE3600, each comprise a transmitter configured to transmit beacons with information associated with a network being described therein to other communication stations to construct a network. For example, the Accused Products, including the BE3600, comprise a transmitter configured to transmit a beacon containing a Mesh Configuration element advertising the mesh services of a mesh network. *See, e.g.*, Sections 9.3.3.3, 9.4.2.98.1 and 14.13.3.31 of IEEE 802.11 2016; https://www.realtek.com/Article/NewsDetail?id=4384&app_id=18 (The BE3600 is a router that includes two transmitters and two receivers (2T2R).)

69. The Accused Products, including the BE3600, each comprise a receiver configured to receive timing information concerning priority transmission of a neighborhood communication station from said other communication stations. For example, the Accused Products comprise a receiver configured to receive a beacon that contains the Beacon Timing element, which comprises Beacon Timing Information fields that prioritize transmissions from neighborhood communications to avoid Beacon frame collisions. *See, e.g.*, Sections 9.4.2.105, 14.13.4.2.6, and 14.13.4.3 and Figures 9-462 and 9-464 of IEEE 802.11 2016; https://www.realtek.com/Article/NewsDetail?id=4384&app_id=18 (The BE3600 is a router that includes two transmitters and two receivers (2T2R).)

70. The Accused Products, including the BE3600, each comprise a transmitter further configured to transmit a message to the neighborhood communication station, the message requesting a report of timing information concerning priority transmission of the neighborhood communication station. For example, the Accused Products, including the BE3600, each comprise a transmitter further configured to transmit a Probe Request frame to request Beacon Timing

Information concerning priority transmission of the neighborhood communication station. *See, e.g.*, Section 14.13.4.2.6 and Figure 9-464 of IEEE 802.11 2016.

71. The specific ways in which the Accused Products, including the BE3600, are configured to support the aforementioned features of IEEE 802.11 2016 are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 10 of the '130 patent.

72. Furthermore, the Accused Products, including the BE3600, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 10 of the '130 patent.

73. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

74. The claims of the '130 patent are patent eligible under 35 U.S.C. § 101. The '130 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it offers, for example, a technologically complex invention that "relates to a wireless communication system, a wireless communication apparatus, a wireless communication method and a computer program, all enabling each communication station to evade mutual interference while performing communication securing a band by providing a prioritized utilization region." '130 patent, 1:35-41. The '130 patent provides a technical solution to advance the goal above, for example, by describing that "each communication station can gather the transmission-reception dangerous zone by receiving the prioritized transmission frame from a neighboring station, and the system may be adapted so that each communication station informs the acquired information pertaining to the transmission-reception dangerous zone to the neighboring station. In such a case, when each

communication station tries to perform a frame transmission, the communication station can prevent collisions previously by performing the frame transmission in the way of avoiding the transmission-reception dangerous zones recorded in the information signal received from the transmission destination." '130 patent, 14:30-41. That solution is reflected in independent claim 10 of the '130 patent, which includes a limitation that recites "requesting a report of timing information concerning priority transmission of the neighborhood communication station."

75. At a minimum, Realtek has known of the '130 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the '130 patent since at least May 12, 2022, when Realtek received notice of its infringement of the '130 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '130 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the '130 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '130 patent, where Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the '130 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the '130 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the '130 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the '130 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood's notice letters delivered by FedEx and refused to respond to any of Redwood's emails.

76. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '130 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '130 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

77. On information and belief, despite having knowledge of the '130 patent and their infringement, Defendant specifically intended for others to import and sell products accused of infringing the '130 patent. For example, Defendant specifically intended for its U.S.-based subsidiaries, distributors, or customers to import and sell products accused of infringing the '130

patent. On information and belief, Defendant instructed and encouraged the importers to import and/or sell products accused of infringing the ’130 patent. On information and belief, the purchase and sale agreements between Realtek, its subsidiaries, distributors, downstream manufacturers that incorporate Realtek’s Accused Products into Wi-Fi products, and/or importers provide such instruction and/or encouragement. Further, on information and belief, Defendant’s U.S.-based subsidiaries, distributors, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the ’130 patent in the United States.

78. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the ’130 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the ’130 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the ’130 patent that are especially made or especially adapted for use in end user products that infringe the ’130 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

79. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '130 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where Realtek actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where Realtek actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing

the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

80. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '130 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such

components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '130 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

81. On information and belief, despite having knowledge of the '130 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '130 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek's infringing activities relative to the '130 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

82. Redwood has been damaged as a result of Realtek's infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT II

(INFRINGEMENT OF U.S. PATENT NO. 7,688,901)

83. Plaintiff incorporates paragraphs 1 through 82 herein by reference.

84. Redwood is the assignee of the '901 patent, entitled "Transmission Method, Transmission Apparatus, and Reception Apparatus," with ownership of all substantial rights in the '901 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

85. The '901 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '901 patent issued from U.S. Patent Application No. 10/486,895.

86. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '901 patent in this judicial district and elsewhere in Texas and the United States.

87. Realtek directly infringes the '901 patent via 35 U.S.C. § 271(a) by using and/or testing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '901 patent. As another example, Realtek infringes each step of the one or more method claims of the '901 patent because the Realtek Accused Products automatically, and without user modification, perform each of the claimed steps that are controlled by Realtek.

88. Furthermore, Realtek directly infringes the '901 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the '901 patent under 35 U.S.C. § 271(a) by using and/or testing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '901 patent.

Further, Defendant is vicariously liable for this infringing conduct of their respective subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek makes and sells the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be used in the United States, thereby directly infringing the '901 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

89. For example, Realtek infringes claim 1 of the '901 patent via the Accused Products. The Accused Products, including the RTL8812BU, transmit modulation signals. *See, e.g.*, Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; https://www.realtek.com/Product/Index?id=576&cate_id=194 (RTL8812BU is compliant with IEEE 802.11n and IEEE 802.11ac. "The Realtek RTL8812BU-CG is a highly integrated single-chip that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) and Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip.").

90. The Accused Products, including the RTL8812BU, each generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of

antennas, where each modulation signal is to include one or more preamble symbol groups each consisting of a plurality of preamble symbols used for demodulation. For example, the Accused Products generate modulation signals (e.g., HT-mixed format PPDUs) which are to be transmitted from a plurality of antennas. *See, e.g.*, Sections 19.3.3 of IEEE 802.11 2016. Each OFDM symbol within a modulation signal comprises a pilot symbol sequence consisting of four pilot symbols used for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

91. The Accused Products, including the RTL8812BU, each insert the one or more preamble symbol groups at the same one or more temporal points in each modulation signal, wherein the one or more preamble symbol groups at the one or more temporal points are orthogonal to other preamble symbol groups at the same one or more temporal points with zero mutual correlation among the plurality of modulation signals, each preamble symbol having a non-zero amplitude, and each preamble symbol group consisting of preamble symbols the quantity of which is greater than that of the plurality of modulation signals to be transmitted. For example, each of the Accused Products insert one or more OFDM symbols comprising a pilot symbol sequence in each modulation signal, where each modulation signal that are to be sent from different antennas are transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences corresponding to different spatial streams are orthogonal at the same one or more temporal points with zero mutual correlation among the plurality of spatial streams. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. The pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section 17.3.5.9 of IEEE 802.11 2016. Each pilot symbol sequence contains four pilot symbols, which is greater than the modulation signals to be transmitted by two or three antennas. *See, e.g.*, Sections 19.1.1 and 19.3.11.10 of IEEE 802.11 2016.

92. The Accused Products, including the RTL8812BU, each transmit the plurality of modulation signals, each comprising transmission data, which is different between the plurality of modulation signals, and the one or more preamble symbol groups, from the plurality of antennas, respectively, in an identical frequency band. For example, each of the Accused Products transmit the plurality of modulation signals comprising transmission data and the pilot symbol sequence from the two or three antennas in the same channel having a particular width (*e.g.*, 20 MHz). *See, e.g.*, Section 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016. Each stream of data to be transmitted is divided into multiple spatial streams to form respective modulation signals having different transmission data during the encoding process. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016.

93. The specific ways in which the Accused Products, including the RTL8812BU, are configured to support the aforementioned features of IEEE 802.11n and/or 802.11ac and/or 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products, including the RTL8812BU, as to Claim 1 of the ’901 patent.

94. Furthermore, the Accused Products, including the RTL8812BU, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the ’901 patent.

95. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

96. The claims of the ’901 patent are patent eligible under 35 U.S.C. § 101. The ’901 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it is a

technologically complex, particularized method of transmitting modulation signals. As the '901 patent explains, the "present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals." '901 patent, 1:50-52. The '901 patent further explains that the "conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels." '901 patent, 1:41-45.

97. The '901 patent provides the technical solution above by, for example, "plac[ing] the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other." '901 patent, 2:16-18. The '901 patent explains that "[t]his preparation, i.e. the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels." '901 patent, 2:18-22. That solution is reflected in the claims of the '901 patent such as independent claim 1.

98. At a minimum, Realtek has known of the '901 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the '901 patent since at least May 12, 2022, when Realtek received notice of its infringement of the '901 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '901 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the '901 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '901 patent, where

Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the ’901 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the ’901 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the ’901 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the ’901 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood’s notice letters delivered by FedEx and refused to respond to any of Redwood’s emails.

99. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the ’901 patent by testing and/or using the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the ’901 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products that are then used and/or tested by distributors, customers,

subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

100. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '901 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the '901 patent by making the Realtek Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '901 patent that are especially made or especially adapted for use in end user products that infringe the '901 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

101. On information and belief, despite having knowledge of the '901 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '901 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek's infringing activities relative to the '901 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful,

flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

102. Redwood has been damaged as a result of Realtek's infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT III

(INFRINGEMENT OF U.S. PATENT NO. 7,974,371)

103. Plaintiff incorporates paragraphs 1 through 102 herein by reference.

104. Redwood is the assignee of the '371 patent, entitled "Communication Method and Radio Communication Apparatus," with ownership of all substantial rights in the '371 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

105. The '371 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '371 patent issued from U.S. Patent Application No. 10/486,896.

106. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '371 patent in this judicial district and elsewhere in Texas and the United States.

107. Realtek directly infringes the '371 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '371 patent.

108. Furthermore, Realtek directly infringes the '371 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the '371 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '371 patent. Further, Defendant is vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '371 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

109. For example, Realtek infringes claim 14 of the '371 patent via the Accused Products, including the RTL8812BU. The Accused Products, including the RTL8812BU, comprise a radio transmission apparatus. *See, e.g.*, Fig. 19-2 of IEEE 802.11 2016; https://www.realtek.com/Product/Index?id=576&cate_id=194 (RTL8812BU is compliant with IEEE 802.11n and IEEE 802.11ac. "The Realtek RTL8812BU-CG is a highly integrated single-

chip that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) and Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip.").

110. The Accused Products, including the RTL8812BU, each comprise circuitry and/or components (hardware and/or software) comprising a transmission method determining unit configured to select one of a first transmission method and a second transmission method based on received information of an estimated radio-wave propagation environment corresponding to a communication partner. For example, the Accused Products receive information associated with a channel quality assessment to select an appropriate Modulation and Coding Scheme (MCS) for Accused Products to utilize in subsequent transmissions to a receiving station, where the MCS value is utilized to determine the modulation, coding, and number of spatial channels based on information associated with the channel quality assessment. *See, e.g.*, Sections 19.3.13.4 and 19.3.5 of IEEE 802.11 2016.

111. The Accused Products, including the RTL8812BU, each comprise circuitry and/or components (hardware and/or software) comprising a modulation signal generator configured to generate a single modulation signal if said transmission method determining unit choose selects said first transmission method, and to generate a plurality of modulation signals which include different information from each other for transmission to an identical frequency band at an identical temporal point, if said transmission method determining unit selects said second transmission method. For example, if the MCS indicates that a transmission will utilize only one spatial stream, the Accused Products generate a single modulation signal. *See, e.g.*, Section 19.3.5 of IEEE 802.11 2016. If the MCS indicates that a transmission will include multiple spatial streams for, *e.g.*, spatial multiplexing, a plurality of modulation signals are produced, where each of the

modulation signals represents a respective spatial stream and each spatial stream includes distinct information. *See, e.g.*, Section 19.3.5 of IEEE 802.11 2016. Spatial multiplexing increases bandwidth by transmitting data over multiple available spatial channels. Transmissions are simultaneous and are transmitted using the same channel having a particular width (*e.g.*, 20 MHz). *See, e.g.*, Section 19.3.15.1 and Tables 19-28, 19-29, and 19-30 of IEEE 802.11 2016.

112. The single modulation signal and the plurality of modulation signals contain information indicating the number of modulation signals to multiplex and transmit at the same time. For example, all HT transmissions of the Accused Products, including the RTL8812BU, utilize an HT-SIG, which contains an MCS that indicates the number of modulation signals to multiplex and transmit at the same time. *See, e.g.*, Sections 19.3.9.4.3 and 19.3.5 of IEEE 802.11 2016.

113. The specific ways in which the Accused Products, including the RTL8812BU, are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 14 of the ’371 patent.

114. Furthermore, the Accused Products, including the RTL8812BU, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 14 of the ’371 patent.

115. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

116. The claims of the ’371 patent are patent eligible under 35 U.S.C. § 101. The ’371 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, it offers,

for example, a technologically complex communication method and a radio communication apparatus that, for example, "switches between the method of transmitting modulation signals of a plurality of channels to the same frequency band from a plurality of antennas and the method of transmitting a modulation signal of one channel from an antenna." '371 patent, 4:27-31. This allows the transmitter to choose which of these transmission methods is used, based on estimated channel conditions. The '371 patent explains that "when the communication method is used, which multiplexes modulation signals of a plurality of channels to the same frequency band, a receiver transmits the information of an estimated radio-wave propagation environment to a transmitter. The transmitter then selects a communication method based on the information. Multiplexing modulation signals of a plurality of channels to the same frequency band by using the foregoing method can increase the data transmission rate. At the same time, a radio communication apparatus of the present invention can advantageously demultiplex the multiplexed modulation signals received with ease." '371 patent, 5:4-16. That solution is reflected in, for example, claim 14 of the '371 patent.

117. At a minimum, Realtek has known of the '371 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the '371 patent since at least May 12, 2022, when Realtek received notice of its infringement of the '371 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '371 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the '371 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '371 patent, where

Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the ’371 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the ’371 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the ’371 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the ’371 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood’s notice letters delivered by FedEx and refused to respond to any of Redwood’s emails.

118. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the ’371 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the ’371 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers,

distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

119. On information and belief, despite having knowledge of the ’371 patent and their infringement, Defendant specifically intended for others to import and sell products accused of infringing the ’371 patent. For example, Defendant specifically intended for its U.S.-based subsidiaries, distributors, or customers to import and sell products accused of infringing the ’371 patent. On information and belief, Defendant instructed and encouraged the importers to import and/or sell products accused of infringing the ’371 patent. On information and belief, the purchase and sale agreements between Realtek, its subsidiaries, distributors, downstream manufacturers that incorporate Realtek’s Accused Products into Wi-Fi products, and/or importers provide such instruction and/or encouragement. Further, on information and belief, Defendant’s U.S.-based subsidiaries, distributors, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the ’371 patent in the United States.

120. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the ’371 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the ’371 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of

commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the ’371 patent that are especially made or especially adapted for use in end user products that infringe the ’371 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

121. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the ’371 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’371 patent, where Realtek actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’371 patent, where Realtek actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the

United States. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

122. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '371 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such

combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the ’371 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the ’371 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

123. On information and belief, despite having knowledge of the ’371 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’371 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek’s infringing activities relative to the ’371 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical

infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

124. Redwood has been damaged as a result of Realtek's infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT IV

(INFRINGEMENT OF U.S. PATENT NO. 8,155,224)

125. Plaintiff incorporates paragraphs 1 through 124 herein by reference.

126. Redwood is the assignee of the '224 patent, entitled "Transmission Method, Transmission Apparatus, and Reception Apparatus," with ownership of all substantial rights in the '224 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

127. The '224 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '224 patent issued from U.S. Patent Application No. 12/698,917.

128. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '224 patent in this judicial district and elsewhere in Texas and the United States.

129. Realtek directly infringes the '224 patent via 35 U.S.C. § 271(a) by using and/or testing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '224 patent. As another example, Realtek infringes each step of the one or more method claims of the '224 patent because

the Realtek Accused Products automatically, and without user modification, perform each of the claimed steps that are controlled by Realtek.

130. Furthermore, Furthermore, Realtek directly infringes the ’224 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the ’224 patent under 35 U.S.C. § 271(a) by using and/or testing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the ’224 patent. Further, Defendant is vicariously liable for this infringing conduct of their respective subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek makes and sells the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek’s Accused Products are destined for the United States and/or designing those products for inclusion in other products to be used in the United States, thereby directly infringing the ’224 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

131. For example, Realtek infringes claim 1 of the ’224 patent via the Accused Products. The Accused Products, including the RTL8812BU, perform a method of transmitting modulation signals. *See, e.g.*, Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016;

https://www.realtek.com/Product/Index?id=576&cate_id=194 (RTL8812BU is compliant with IEEE 802.11n and IEEE 802.11ac. "The Realtek RTL8812BU-CG is a highly integrated single-chip that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) and Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip.").

132. The Accused Products, including the RTL8812BU, each generate a plurality of modulation signals, where each modulation signal to be transmitted from a different one of a plurality of antennas, where each modulation signal includes a pilot symbol sequence consisting of a plurality of pilot symbols used for demodulation. For example, each of the Accused Products generates modulation signals (e.g., HT-mixed format PPDUs) which are to be sent to a plurality of antennas. *See, e.g.*, Section 19.3.3 of IEEE 802.11 2016. Each OFDM symbol includes a pilot symbol sequence consisting of four pilot symbols used for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

133. Each of the Accused Products, including the RTL8812BU, insert each of the pilot symbol sequences at the same temporal point in each modulation signal, wherein the pilot symbol sequences are orthogonal to each other with zero mutual correlation among the plurality of modulation signals, where each pilot symbol has a non-zero amplitude, where the quantity of the plurality of pilot symbols in each sequence being greater than the quantity of the plurality of modulation signals to be transmitted. For example, the Accused Products insert each of the four pilot symbol sequences at the same temporal point in each modulation signal. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences corresponding to different spatial streams are orthogonal and have zero mutual correlation. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. The pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section

17.3.5.9 of IEEE 802.11 2016. Each pilot symbol sequence contains four pilot symbols, which is greater than the modulation signals to be transmitted by two or three antennas utilized by the Accused Products. *See, e.g.*, Sections 19.1.1 and 19.3.11.10 of IEEE 802.11 2016.

134. Each of the Accused Products, including the RTL8812BU, transmit in an identical frequency band the plurality of modulation signals from the plurality of antennas, where each modulation signal comprises different transmission data and one of the pilot symbol sequences. For example, each of the Accused Products transmit the plurality of modulation signals in the same channel having a particular width (e.g., 20 MHz) from two or three antennas. *See, e.g.*, Sections 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016. Each stream of data is divided into multiple spatial streams by the Accused Products to form respective modulation signals comprising different transmission data during encoding. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016. Further, each of the modulation signals comprises one of the pilot symbol sequences. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

135. The specific ways in which the Accused Products, including the RTL8812BU, are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 1 of the ’224 patent.

136. Furthermore, the Accused Products, including the RTL8812BU, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the ’224 patent.

137. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

138. The claims of the ’224 patent are patent eligible under 35 U.S.C. § 101. The ’224 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the ’224 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels to the same frequency band and its claims are directed to specific ways of solving that problem. ’224 patent, 1:21-24. The patent describes that “the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels.” *Id*. at 1:53-58. “The present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals.” *Id*. at 1:62-64.

139. To overcome the aforementioned problems, the ’224 patent and its claims describe specific solutions for transmitting multiplexed communications. “The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus.” *Id*., 2:9-21. Clam 1 recites that “each pilot symbol ha[s] a non-zero amplitude.”

140. The ’224 patent and its claims describe another specific solution to overcome the aforementioned problems. “The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels.” *Id*., 2:28-34. This additional solution is recited by claim 1 by the steps of “inserting each of the pilot symbol sequences at the same temporal point in each modulation signal, wherein the pilot symbol sequences are orthogonal to each other.” *Id*., claim 1.

141. The ’224 patent describes a specific problem to be solved in multiplexing modulation signals from a plurality of antennas and its claims are directed to specific ways of solving that problem. That solution is further implemented in the claims, including claim 1. Therefore, the claims of ’224 patent are patent eligible. In addition, the claims of the ’224 Patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

142. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.,* ’224 patent, claim 1, 1:53-64, 2:9-21, 2:28-34.

143. At a minimum, Realtek has known of the ’224 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the ’224 patent since at least May 12, 2022, when Realtek received notice of its infringement of the ’224 patent via an email sent by

Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '224 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the '224 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '224 patent, where Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the '224 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the '224 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the '224 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the '224 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood's notice letters delivered by FedEx and refused to respond to any of Redwood's emails.

144. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '224 patent by testing and/or using the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '224 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge

of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products that are then used and/or tested by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

145. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '224 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the '224 patent by making the Realtek Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '224 patent that are especially made or especially adapted for use in end

user products that infringe the ’224 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

146. On information and belief, despite having knowledge of the ’224 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’224 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek’s infringing activities relative to the ’224 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

147. Redwood has been damaged as a result of Realtek’s infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT V

(INFRINGEMENT OF U.S. PATENT NO. 8,744,005)

148. Plaintiff incorporates paragraphs 1 through 147 herein by reference.

149. Redwood is the assignee of the ’005 patent, entitled “Method and Apparatus for Generating Modulation Signals,” with ownership of all substantial rights in the ’005 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

150. The ’005 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The ’005 patent issued from U.S. Patent Application No. 14/019,346.

151. Realtek has and continues to directly and/or indirectly infringe one or more claims of the ’005 patent in this judicial district and elsewhere in Texas and the United States.

152. Realtek directly infringes the ’005 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the ’005 patent.

153. Furthermore, Realtek directly infringes the ’005 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the ’005 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the ’005 patent. Further, Defendant is vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include

Realtek's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '005 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

154. For example, Realtek infringes claim 9 of the '005 patent via the Accused Products, including the RTL8812BU. The Accused Products, including the RTL8812BU, are each a signal generation apparatus configured to generate modulation signals. For example, the Accused Products are each compliant with IEEE 802.11n, which specifies generating modulation signals. *See, e.g.*, Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016; https://www.realtek.com/Product/Index?id=576&cate_id=194 (RTL8812BU is compliant with IEEE 802.11n and IEEE 802.11ac. "The Realtek RTL8812BU-CG is a highly integrated single-chip that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) and Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip.").

155. The Accused Products, including the RTL8812BU, comprise one or more processing devices configured to generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of antennas in an identical frequency band, wherein each modulation signal includes a pilot symbol sequence each comprising a plurality of pilot symbols used for demodulation. For example, the Accused Products generate modulation signals, e.g., HT-mixed format PPDUs, which are to be transmitted from a different one of a plurality of antennas in an identical frequency band (e.g., a 20 MHz channel). *See, e.g.*, Sections 19.3.3, 19.3.15, 19.3.14.1, Tables 19-28, 19-29, 19-30, and Figure 17-13 of IEEE 802.11 2016. Each OFDM symbol within a modulation signal includes a pilot symbol sequence of four pilot symbols,

which are used for detecting frequency offsets and phase noise for demodulation. *See, e.g.*, Sections 17.3.5.9 and 19.3.11.10 of IEEE 802.11 2016.

156. The Accused Products, including the RTL8812BU, comprise one or more processing devices configured to insert each of the pilot symbol sequences at the same temporal point in each modulation signal. For example, each modulation signal is made up of OFDM symbols containing a pilot symbol sequence inserted at the same temporal point in each modulation signal, where the modulation signals to be sent from different antennas are transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 and Equation 19-54 of IEEE 802.11 2016.

157. The Accused Products, including the RTL8812BU, comprise one or more processing devices configured to output the plurality of modulation signals, each comprising different transmission data and one of the pilot symbol sequences, to the plurality of antennas. For example, the Accused Products divide a stream of data to be transmitted into multiple spatial streams to form respective modulation signals during the encoding and mapping process, where the divided data is then sent to a plurality of antennas. *See, e.g.*, Section 19.3.4 of IEEE 802.11 2016. Each divided stream of data includes one of the pilot symbol sequences. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

158. The pilot symbol sequences are orthogonal to each other with zero mutual correlation among the plurality of modulation signals. For example, the pilot sequences corresponding to different spatial streams are orthogonal and have zero mutual correlation, such that the dot product of the two vectors is zero and the vectors are perpendicular in space. *See, e.g.*, Table 19-19 19.1.1 of IEEE 802.11 2016.

159. Each pilot symbol has a non-zero amplitude. For example, the pilot symbols are BPSK modulated and have a non-zero amplitude. *See, e.g.*, Section 17.3.5.9 of IEEE 802.11 2016.

160. A quantity of the plurality of pilot symbols in each sequence are greater than a quantity of the plurality of modulation signals to be transmitted. For example, each pilot symbol sequence contains four pilot symbols. Therefore, when the modulation signals are to be transmitted using fewer than four antennas, the number of pilot symbols per sequence is greater than the number of modulation signals to be transmitted. *See, e.g.*, Sections 19.1.1, 19.3.11.10, and Equation 19-54 of IEEE 802.11 2016.

161. The specific ways in which the Accused Products, including the RTL8812BU, are configured to support the aforementioned features of IEEE 802.11n and/or 802.11ac and/or 802.11ax and/or IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 9 of the '005 patent.

162. Furthermore, the Accused Products, including the RTL8812BU, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 9 of the '005 patent.

163. The technology discussion above and the exemplary Accused Products provide context for Plaintiff's infringement allegations.

164. The claims of the '005 patent are patent eligible under 35 U.S.C. § 101. The '005 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the '005 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels to the same frequency band and its claims are directed to specific ways of solving that problem. '005 patent, 1:23-26. The patent describes that "the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this

structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels." *Id*. at 1:56-61. "The present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals." *Id*. at 1:65-67.

165. To overcome the aforementioned problems, the '005 patent and its claims describe specific solutions for transmitting multiplexed communications. "The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus." *Id*., 2:12-24. Clam 9 recites that "each pilot symbol ha[s] a non-zero amplitude."

166. The '005 patent and its claims describe another specific solution to overcome the aforementioned problems. "The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels." *Id*., 2:31-37. This additional solution is recited by claim 9 by the steps of "insert each of the pilot symbol sequences at the same temporal point in each modulation signal …, wherein the pilot symbol sequences are orthogonal to each other." *Id*., claim 9.

167. The ’005 patent describes a specific problem to be solved in multiplexing modulation signals to be sent from a plurality of antennas and its claims are directed to specific ways of solving that problem. That solution is further implemented in the claims, including claim 9. Therefore, the claims of ’005 patent are patent eligible. In addition, the claims of the ’005 Patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

168. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.,* ’005 patent, claim 9, 1:56-67, 2:12-24, 2:31-37.

169. At a minimum, Realtek has known of the ’005 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the ’005 patent since at least May 12, 2022, when Realtek received notice of its infringement of the ’005 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood’s data room for the infringement chart of the ’005 patent, which provided further notice of Realtek’s infringement. The May 12, 2022 email also attached two notice letters regarding the ’005 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek’s infringement of the ’005 patent, where Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the ’005 patent since at least September 15, 2023, when Realtek again received notice of its

infringement of the ’005 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the ’005 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the ’005 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood’s notice letters delivered by FedEx and refused to respond to any of Redwood’s emails.

170. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the ’005 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the ’005 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the

Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

171. On information and belief, despite having knowledge of the ’005 patent and their infringement, Defendant specifically intended for others to import and sell products accused of infringing the ’005 patent. For example, Defendant specifically intended for its U.S.-based subsidiaries, distributors, or customers to import and sell products accused of infringing the ’005 patent. On information and belief, Defendant instructed and encouraged the importers to import and/or sell products accused of infringing the ’005 patent. On information and belief, the purchase and sale agreements between Realtek, its subsidiaries, distributors, downstream manufacturers that incorporate Realtek’s Accused Products into Wi-Fi products, and/or importers provide such instruction and/or encouragement. Further, on information and belief, Defendant’s U.S.-based subsidiaries, distributors, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the ’005 patent in the United States.

172. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the ’005 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the ’005 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells,

and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the ’005 patent that are especially made or especially adapted for use in end user products that infringe the ’005 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

173. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the ’005 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’005 patent, where Realtek actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’005 patent, where Realtek actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Realtek intends to cause, and has taken affirmative steps to induce infringement by

distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

174. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '005 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be

supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the ’005 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the ’005 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

175. On information and belief, despite having knowledge of the ’005 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’005 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek’s infringing activities relative to the ’005 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

176. Redwood has been damaged as a result of Realtek's infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT VI

(INFRINGEMENT OF U.S. PATENT NO. 8,873,517)

177. Plaintiff incorporates paragraphs 1 through 170 herein by reference.

178. Redwood is the assignee of the '517 patent, entitled "Wireless Communication System, Wireless Communication Apparatus, Wireless Communication Method and Computer Program," with ownership of all substantial rights in the '517 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

179. The '517 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '517 patent issued from U.S. Patent Application No. 11/333,582.

180. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '517 patent in this judicial district and elsewhere in Texas and the United States.

181. Realtek directly infringes the '517 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes, and/or products containing the same that incorporate the fundamental technologies covered by the '517 patent.

182. Furthermore, Realtek directly infringes the '517 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the '517 patent under 35 U.S.C. § 271(a)

by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '517 patent. Further, Defendant is vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '517 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

183. For example, Realtek infringes claim 1 of the '517 patent via the Accused Products, including the BE3600. The Accused Products, including the BE3600, are mesh stations that are mesh devices compliant with IEEE 802.11 in a wireless communication system using a signal described in IEEE 802.11. *See, e.g.*, Sections 14.3.2 and 14.13.2.1 of IEEE 802.11 2016; https://www.realtek.com/Article/NewsDetail?id=4552&app_id=18&lang=en-GB (Realtek used the BE3600 in the United States in January 2025 at CES. The BE3600 is a Wi-Fi 7 mesh station compliant with IEEE 802.11.);

https://www.realtek.com/Article/NewsDetail?id=4384&app_id=18 (The BE3600 is a router that includes two transmitters and two receivers (2T2R).).

184. The Accused Products, including the BE3600, each comprise circuitry configured to set a duration of transmission opportunity and an offset of the transmission opportunity indicating a beginning of the transmission opportunity with respect to a beginning of a transmission interval. For example, the Accused Products, including the BE3600, comprise circuitry configured to set a duration of a transmission opportunity via a Mesh Awake Window, which specifies the duration of a transmission opportunity. *See, e.g.*, Figure 14-6 of IEEE 802.11 2016. The Accused Products comprise circuitry configured to perform a Target Beacon Transmission Time ("TBTT") adjustment procedure, subtracting a delay amount as an offset from the TBTT, which indicates a beginning of the Mesh Awake Windows. *See, e.g.,* Section 14.13.4.4.3 and Figure 14-6 of IEEE 802.11 2016. The adjusted TBTT indicates a beginning of the Mesh Awake Window with respect to the beginning of a Beacon Interval. *See, e.g.,* Section 14.13.4.4.3 and Figure 14-6 of IEEE 802.11 2016.

185. The Accused Products, including the BE3600, each comprise circuitry configured to transmit information specifying the duration and the offset to at least one or more other mesh stations. For example, the Accused Products are configured to transmit Mesh Beacons specifying the duration and the offset to at least one or more other mesh stations. *See, e.g.*, Sections 9.4.2.105, 14.13.4.2.5, 14.13.3.1, and 14.13.4.4.3 of IEEE 802.11 2016.

186. The Accused Products, including the BE3600, each comprise circuitry configured to transmit or receive data during the transmission opportunity. For example, the Accused Products are configured to transmit or receive data during the Mesh Awake Window. *See, e.g.*, Section 14.14.4.7 and Figure 14-6 of IEEE 802.11 2016.

187. The specific ways in which the Accused Products, including the BE3600, are configured to support the aforementioned features of IEEE 802.11 2016 are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least Claim 1 of the ’517 patent.

188. Furthermore, the Accused Products, including the BE3600, are configured or implemented in an infringing manner with the features and functionality recited in at least Claim 1 of the ’517 patent.

189. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

190. The claims of the ’517 patent are patent eligible under 35 U.S.C. § 101. The ’517 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the ’517 patent describes a specific problem to be solved in signal transmission and communication, and its claims are directed to specific ways of solving that problem. The ’517 patent is eligible because it is directed to a non-abstract improvement in an existing technological process. Indeed, the ’517 patent is directed to improving the efficiency of a wireless network by setting durations and transmission opportunities to evade mutual interference among communication stations within a mesh network. *See, e.g.*,’517 patent, 1:40-46) (the ’517 patent enables a “communication station[s] to evade mutual interference”).

191. For example, the claims of the ’517 patent provide a specific solution of evading mutual interference by setting durations and periodicities of transmission opportunities. As the ’517 patent explains, these limitations effectively shift beacon transmission times away from each other to evade overlapping transmissions among communication stations, thus advancing the goal

of evading interference. *See, e.g.*, '517 patent, 21:50-60 ("By providing the TBTT offset, actual beacon transmission times can be shifted from each other even in a case where two communication stations arrange their beacon transmission timing in the same slot on a super frame."). Accordingly, claim 1 does not cover an abstract idea but instead covers a patentable improvement in signal transmission. *See, e.g., Id*., claim 1 ("set a duration of transmission opportunity and an offset of the transmit opportunity indicating a beginning of the transmission opportunity with respect to a beginning of a transmission interval."). In addition, the claims of the '517 patent are directed to solving problems, e.g., signal interference, that solely arise in computer technology (digital signal communication and transmission) via a specific improvement in its operation, e.g., shifting beacon transmission times away from each other to evade overlapping transmissions among communication stations. As such, they are not patent ineligible abstract ideas.

192. The claims of the '517 patent also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. As explained above, the claims shift beacon transmission times away from each other to evade overlapping transmissions among communication stations, thus advancing the goal of evading interference. The claims are directed to the technical solutions described in the specification. *See, e.g.*, '517 patent, claim 1, 1:40-46, 21:50-60.

193. At a minimum, Realtek has known of the '517 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the '517 patent since at least May 12, 2022, when Realtek received notice of its infringement of the '517 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '517 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the

'517 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '517 patent, where Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the '517 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the '517 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the '517 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the '517 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood's notice letters delivered by FedEx and refused to respond to any of Redwood's emails.

194. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '517 patent by making, using, offering for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the '517 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11

standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

195. On information and belief, despite having knowledge of the '517 patent and their infringement, Defendant specifically intended for others to import and sell products accused of infringing the '517 patent. For example, Defendant specifically intended for its U.S.-based subsidiaries, distributors, or customers to import and sell products accused of infringing the '517 patent. On information and belief, Defendant instructed and encouraged the importers to import and/or sell products accused of infringing the '517 patent. On information and belief, the purchase and sale agreements between Realtek, its subsidiaries, distributors, downstream manufacturers that incorporate Realtek's Accused Products into Wi-Fi products, and/or importers provide such instruction and/or encouragement. Further, on information and belief, Defendant's U.S.-based subsidiaries, distributors, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '517 patent in the United States.

196. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '517 patent, constituting a material part of the invention. On information and

belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the ’517 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the ’517 patent that are especially made or especially adapted for use in end user products that infringe the ’517 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

197. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the ’517 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’517 patent, where Realtek actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented

inventions of the ’517 patent, where Realtek actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

198. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek’s infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the ’517 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for

substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '517 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '517 patent, where such components are uncombined in whole or in part with other components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

199. On information and belief, despite having knowledge of the '517 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the '517 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek's infringing activities relative to the '517 patent have been,

and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

200. Redwood has been damaged as a result of Realtek's infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

COUNT VII

(INFRINGEMENT OF U.S. PATENT NO. 9,628,300)

201. Plaintiff incorporates paragraphs 1 through 200 herein by reference.

202. Redwood is the assignee of the '300 patent, entitled "Method and Signal Generating Apparatus for Generating Modulation Signals" with ownership of all substantial rights in the '300 patent, including the right to exclude others and to enforce, sue, and recover damages for past and future infringements.

203. The '300 patent is valid, enforceable, and was duly issued in full compliance with Title 35 of the United States Code. The '300 patent issued from U.S. Patent Application No. 14/591,346.

204. Realtek has and continues to directly and/or indirectly infringe one or more claims of the '300 patent in this judicial district and elsewhere in Texas and the United States.

205. Realtek directly infringes the '300 patent via 35 U.S.C. § 271(a) by making, using, offering for sale, selling, and/or importing the Accused Products, their components and processes,

and/or products containing the same that incorporate the fundamental technologies covered by the '300 patent.

206. Furthermore, Realtek directly infringes the '300 patent through its direct involvement in the activities of its subsidiaries, including Cortina and Ubilinx. Such subsidiaries conduct activities that constitute direct infringement of the '300 patent under 35 U.S.C. § 271(a) by making, using, testing, offering for sale, selling, and/or importing those Accused Products, their components and processes, and/or products containing the same that incorporated the fundamental technologies covered by the '300 patent. Further, Defendant is vicariously liable for this infringing conduct of its subsidiaries (under both the alter ego and agency theories) because, as an example and on information and belief, Realtek and its subsidiaries and related companies are essentially the same company, and Realtek has the right and ability to control their subsidiaries infringing acts and receive a direct financial benefit from the infringement of its subsidiaries. Furthermore, on information and belief, Realtek sells and makes the Accused Products outside of the United States, delivers those products to manufacturers, customers, distributors, and/or subsidiaries in the United States, or in the case that it delivers the Accused Products outside of the United States it does so intending and/or knowing that those products or products that are manufactured to include Realtek's Accused Products are destined for the United States and/or designing those products for inclusion in other products to be placed on sale and used in the United States, thereby directly infringing the '300 patent. *See, e.g., Lake Cherokee Hard Drive Techs., L.L.C. v. Marvell Semiconductor, Inc.*, 964 F. Supp. 2d 653, 658 (E.D. Tex. 2013).

207. For example, Realtek infringes claim 8 of the '300 patent via the Accused Products, including the RTL8812BU. Each of the Accused Products are a signal generation apparatus configured to generate signals. *See, e.g.*, Sections 19.1.1 and 19.1.2 of IEEE 802.11 2016;

https://www.realtek.com/Product/Index?id=576&cate_id=194 (RTL8812BU is compliant with IEEE 802.11n and IEEE 802.11ac. "The Realtek RTL8812BU-CG is a highly integrated single-chip that supports 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) and Wireless LAN (WLAN) USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single chip.").

208. The Accused Products, including the RTL8812BU, each comprise one or more processing devices configured to generate a plurality of modulation signals each of which is to be transmitted from a different one of a plurality of antennas. For example, each of the Accused Products generate modulation signals (e.g., HT-mixed format PPDUs) which are to be transmitted from a plurality of antennas. *See, e.g.*, Section 9.3.3 of IEEE 802.11 2016. Each modulation signal includes a pilot symbol sequence and/or a pilot subcarrier including a plurality of pilot symbols used for demodulation. For example, each OFDM symbol within a modulation signal includes a pilot symbol sequence, in a 20 MHz transmission, of four pilot symbols located at carrier positions -21, -7, 7, and 21, or a pilot symbol sequence, in a 40 MHz transmission, of six pilot symbols, where the pilot symbols are used for demodulation for detecting frequency offsets and phase noise. *See, e.g.*, Sections 17.3.5.9, 19.3.11.10, and Equation 19-54 of IEEE 802.11 2016.

209. Each of the Accused Products comprise one or more processing devices configured to insert each of the pilot symbol sequences and/or pilot subcarriers at a same temporal point in each modulation signal. For example, each of the modulation signals is comprised of pilot symbol sequences that include at least four pilot symbols inserted in, for example, carrier positions -21, -7, 7, and 21, such that each modulation signal and respective pilot symbol sequence are inserted and transmitted simultaneously in time. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016. The pilot symbol sequences and/or pilot subcarriers are orthogonal to each other, where each pilot

symbol has a non-zero amplitude. For example, the pilot sequences corresponding to different spatial streams are orthogonal to each other and have zero mutual correlation. *See, e.g.*, Table 19-19 of IEEE 802.11 2016. A quantity of the plurality of pilot symbols in each pilot symbol sequence and/or pilot subcarrier are greater than a quantity of the plurality of modulation signals to be transmitted. As previously discussed, each pilot symbol sequence contains at least four pilot symbols in a 20 MHz transmission and at least six pilot symbols in a 40 MHz transmission, such that these quantities are greater than a respective number of modulation signals to be transmitted by the Accused Products. *See, e.g.*, Sections 19.1.1, 19.3.11.10 and Equation 19-54 of IEEE 802.11 2016.

210. Each of the Accused Products comprise one or more processing devices configured to output the plurality of modulation signals, each including different transmission data and one of the pilot symbol sequences and/or pilot subcarriers, to the plurality of antennas. For example, each of the modulation signals is transmitted to at least two antennas, such that each of the modulation signals include different transmission data. *See, e.g.*, Section 19.3.15.1, Tables 19-28, 19-29, and 19-30, and Figure 17-13 of IEEE 802.11 2016.

211. As previously discussed, each of the plurality of modulation signals contains one of the pilot symbol sequences and/or pilot subcarriers. *See, e.g.*, Section 19.3.11.10 of IEEE 802.11 2016.

212. Furthermore, the Accused Products are configured or implemented in an infringing manner with the features and functionality recited in at least claim 8 of the ’300 patent.

213. The specific ways in which the Accused Products are configured to support the aforementioned features of IEEE 802.11n and/or IEEE 802.11ac and/or IEEE 802.11ax and/or

IEEE 802.11be are further detailed in confidential documents and/or source code that evidence infringement by the Accused Products as to at least claim 8 of the ’300 patent.

214. The technology discussion above and the exemplary Accused Products provide context for Plaintiff’s infringement allegations.

215. The claims of the ’300 patent are patent eligible under 35 U.S.C. § 101. The ’300 patent is not directed to an ineligible abstract idea. For example, it is not a mathematical algorithm executed on a generic computer or a fundamental economic business practice. Instead, the ’300 patent describes a specific problem to be solved in digital signal transmission and communication involving multiplexing modulation signals of a plurality of channels and its claims are directed to specific ways of solving that problem. ’300 patent, 1:26-29. The patent describes that “the foregoing conventional structure gives no thought to the synchronization between channels in the same frequency band as well as a frequency offset. As a result, this structure encounters the difficulty of achieving the most important factor in order to demultiplex a multiplexed signal, namely, obtaining an accuracy of estimating channels.” *Id*. at 1:56-62. “The present invention aims to provide a transmission method for estimating channels accurately and with ease from multiplexed modulation signals.” *Id*. at 1:66-2:1.

216. To overcome the aforementioned problems, the ’300 patent and its claims describe specific solutions for transmitting multiplexed communications. “The transmission method of the present invention transmits modulation signals of a plurality of channels available in the same frequency band from a plurality of antennas. A symbol used for demodulation is inserted in a given channel at a certain time, while in another channel symbol at the time, the same phase and quadrature signals in the in-phase quadrature plane are made to be zero signals. With this method, multiplexing the modulation signals of a plurality of channels to the same frequency allows

increasing a data transmission rate. Because the symbol used for demodulation has not undergone the time multiplexing, so that the demodulation symbol can be isolated with ease at the reception apparatus." *Id*., 2:14-27. Clam 8 recites that "each pilot symbol ha[s] a non-zero amplitude."

217. The '300 patent and its claims describe another specific solution to overcome the aforementioned problems. "The transmission method of the present invention places the symbols used for demodulation at an identical time of the respective channels and orthogonally to each other. This preparation, i.e., the symbols used for demodulation are placed to be orthogonal to each other, allows the reception apparatus to isolate the symbols with ease for estimating channels." *Id*., 2:34-40. This additional solution is recited by claim 8, where the one or more processing devices are configured to "insert each of the pilot symbol sequences and/or pilot subcarriers at a same temporal point in each modulation signal …, wherein the pilot symbol sequences and/or pilot subcarriers are orthogonal to each other." *Id*., claim 1.

218. The '300 patent describes a specific problem to be solved in multiplexing modulation signals to be transmitted from a plurality of antennas and its claims are directed to specific ways of solving that problem. That solution is further implemented in the claims, including claim 8. Therefore, the claims of '300 patent are patent eligible. In addition, the claims of the '300 patent are directed to solving problems that solely arise in computer technology (digital signal communication and transmission) via a specific improvement to its operation. For example, the claims are directed to a specific improvement in wireless systems as to multiplexing modulation signals of a plurality of channels to the same frequency band. As such, they are not patent ineligible abstract ideas.

219. The claims also survive step two of Alice because they recite an inventive concept that provides features that are more than well-understood, routine, conventional activity. *See e.g.,* '300 patent, claim 8, 1:56-2:1, 2:14-27, 2:34-40.

220. At a minimum, Realtek has known of the '300 patent at least as early as the filing date of the Complaint. In addition, Realtek has known about the '300 patent since at least May 12, 2022, when Realtek received notice of its infringement of the '300 patent via an email sent by Redwood to Sherry Chen of Realtek. The May 12, 2022 email also provided Realtek access to Redwood's data room for the infringement chart of the '300 patent, which provided further notice of Realtek's infringement. The May 12, 2022 email also attached two notice letters regarding the '300 patent originally sent to Realtek via FedEx on November 2, 2021 and December 8, 2021, where Realtek refused to accept delivery of the 2021 notice letters. On May 22, 2022, Redwood sent another notice letter via FedEx regarding Realtek's infringement of the '300 patent, where Realtek again refused to accept delivery of the 2022 notice letter. In addition, Realtek has known about the '300 patent since at least September 15, 2023, when Realtek again received notice of its infringement of the '300 patent via an email sent by Redwood to Alfred Kuo of Realtek. Furthermore, Realtek has known about the '300 patent since at least July 19, 2024, when Realtek again received notice of its infringement of the '300 patent via an email sent by Redwood to Gina Hung of Realtek. Realtek refused Redwood's notice letters delivered by FedEx and refused to respond to any of Redwood's emails.

221. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek has actively induced, under U.S.C. § 271(b), distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers to directly infringe one or more claims of the '300 patent by making, using, offering

for sale, selling, and/or importing the Accused Products. Since at least the notice provided on the above-mentioned dates, Realtek does so with knowledge, or with willful blindness of the fact, that the induced acts constitute infringement of the ’300 patent. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, end users, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the Accused Products in conformity with U.S. laws and regulations, manufacturing the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals for the Accused Products to purchasers and prospective buyers, providing the accused functionalities via hardware, software, and/or firmware that are included in the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, testing and certifying features related to infringing features in the Accused Products, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

222. On information and belief, despite having knowledge of the ’300 patent and their infringement, Defendant specifically intended for others to import and sell products accused of infringing the ’300 patent. For example, Defendant specifically intended for its U.S.-based subsidiaries, distributors, or customers to import and sell products accused of infringing the ’300 patent. On information and belief, Defendant instructed and encouraged the importers to import and/or sell products accused of infringing the ’300 patent. On information and belief, the purchase and sale agreements between Realtek, its subsidiaries, distributors, downstream manufacturers that incorporate Realtek’s Accused Products into Wi-Fi products, and/or importers provide such

instruction and/or encouragement. Further, on information and belief, Defendant's U.S.-based subsidiaries, distributors, affiliates, employees, agents, and/or related companies existed for inter alia, the purpose of importing and selling products accused of infringing the '300 patent in the United States.

223. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's contributory infringement pursuant to 35 U.S.C. § 271(c) includes offering to sell and/or license, selling and/or licensing, and/or providing within the United States, or importing into the United States, components of the patented invention of one or more claims of the '300 patent, constituting a material part of the invention. On information and belief, Realtek knows and has known the same to be especially made or especially adapted for use in an infringement of the '300 patent by making the Accused Products in conformity with the relevant IEEE 802.11 standards, and such components are not a staple article or commodity of commerce suitable for substantial noninfringing use. For example, Realtek offers to sell, sells, and/or licenses or otherwise provides hardware and/or software/firmware components of the Accused Products within the United States; the components constitute a material part of the claimed inventions of the '300 patent that are especially made or especially adapted for use in end user products that infringe the '300 patent; and the components are not a staple article or commodity of commerce suitable for substantial noninfringing use.

224. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(1) includes supplying or causing to be supplied in or from the United States all or a substantial portion of the components of the patented invention of one or more claims of the '300 patent, where such components are uncombined in whole or in part, in such manner as to actively induce the

combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’300 patent, where Realtek actively induces the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components of the Accused Products that comprise all or a substantial portion of the components of the patented inventions of the ’300 patent, where Realtek actively induces the combination of the hardware and/or software/firmware components with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. Realtek intends to cause, and has taken affirmative steps to induce infringement by distributors, customers, subsidiaries, importers, partners, affiliates, resellers, manufacturers, and/or consumers by at least, inter alia, creating advertisements that promote the infringing use of the Accused Products, creating and/or maintaining and/or knowledge of established distribution channels for the Accused Products into and within the United States, manufacturing the components of the Accused Products in conformity with U.S. laws and regulations, manufacturing the components of the Accused Products in conformity with the relevant IEEE 802.11 standards, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and software/firmware components, distributing or making available instructions or manuals or marketing materials regarding the combination of the hardware and/or software/firmware components with other components as part of making an end user device in part

or in whole, testing and certifying features related to infringing features in the Accused Products, providing software and/or firmware for the Accused Products to manufacturers, purchasers, sellers, distributors, and/or end users, and/or providing technical support, replacement parts, or services for these products to these purchasers and/or sellers in the United States.

225. On information and belief, since at least the above-mentioned dates when Realtek was on notice of its infringement, Realtek's infringement pursuant to 35 U.S.C. § 271(f)(2) includes supplying or causing to be supplied in or from the United States components of the patented invention of one or more claims of the '300 patent that are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use, where such components are uncombined in whole or in part, knowing that such components are so made or adapted and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. For example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where such components are uncombined in whole or in part, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States. In another example, Realtek supplies or causes to be supplied in or from the United States the hardware and/or software/firmware components that comprise all or a substantial portion of the components of the patented inventions of the '300 patent, where such components are uncombined in whole or in part with other

components of an end user device, knowing that such components are especially made or especially adapted for use in the invention and not staple articles or commodities of commerce suitable for substantial noninfringing use and intending that such components will be combined with other components of an end user device outside of the United States in a manner that would infringe the patent if such combination occurred within the United States.

226. On information and belief, despite having knowledge of the ’300 patent and knowledge that it is directly and/or indirectly infringing one or more claims of the ’300 patent, Realtek has nevertheless continued its infringing conduct and disregarded an objectively high likelihood of infringement. Realtek’s infringing activities relative to the ’300 patent have been, and continue to be, willful, wanton, malicious, in bad-faith, deliberate, consciously wrongful, flagrant, characteristic of a pirate, and an egregious case of misconduct beyond typical infringement such that Plaintiff is entitled under 35 U.S.C. § 284 to enhanced damages up to three times the amount found or assessed.

227. Redwood has been damaged as a result of Realtek’s infringing conduct described in this Count. Realtek is, thus, liable to Redwood in an amount that adequately compensates Redwood for Realtek’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

CONCLUSION

228. Plaintiff Redwood is entitled to recover from Realtek the damages sustained by Plaintiff as a result of Realtek’s wrongful acts, and willful infringement, in an amount subject to proof at trial, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court.

229. Plaintiff has incurred and will incur attorneys' fees, costs, and expenses in the prosecution of this action. The circumstances of this dispute may give rise to an exceptional case within the meaning of 35 U.S.C. § 285, and Plaintiff is entitled to recover its reasonable and necessary attorneys' fees, costs, and expenses.

JURY DEMAND

230. Plaintiff hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

231. Plaintiff respectfully requests that the Court find in its favor and against Realtek, and that the Court grant Plaintiff the following relief:

1. A judgment that Realtek has infringed the Asserted Patents as alleged herein, directly and/or indirectly;
2. A judgment for an accounting of all damages sustained by Plaintiff as a result of the acts of infringement by Realtek;
3. A judgment and order requiring Realtek to pay Plaintiff damages under 35 U.S.C. § 284, including up to treble damages as provided by 35 U.S.C. § 284, and any royalties determined to be appropriate;
4. A judgment and order requiring Realtek to pay Plaintiff pre-judgment and post-judgment interest on the damages awarded;
5. A judgment and order finding this to be an exceptional case and requiring Realtek to pay the costs of this action (including all disbursements) and attorneys' fees as provided by 35 U.S.C. § 285; and
6. Such other and further relief as the Court deems just and equitable.

Dated: March 25, 2025

Respectfully submitted,

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