

1 Alex Chan (SBN 278805)  
2 DEVLIN LAW FIRM LLC  
3 16219 Flamstead Drive  
4 Hacienda Heights, CA 91745  
5 Telephone: (646) 331-0604  
6 Facsimile: (302) 353-4251  
7 achan@devlinlawfirm.com

8 *Attorneys for Plaintiff*  
9 *Bell Northern Research LLC*

10 **IN THE UNITED STATES DISTRICT COURT**  
11 **FOR THE CENTRAL DISTRICT OF CALIFORNIA**  
12 **SOUTHERN DIVISION**

13 BELL NORTHERN RESEARCH, LLC

14 Plaintiff,

15 v.

16 QUALCOMM INC.; QUALCOMM  
17 TECHNOLOGIES, INC.; MEDIATEK  
18 USA INC.; MEDIATEK NORTH  
19 AMERICA INC.; D-LINK SYSTEMS,  
20 INC.; LINKSYS USA, INC.; NETGEAR,  
21 INC.; TP-LINK USA CORPORATION;  
22 ZYXEL COMMUNICATIONS, INC.;  
23 AND ZYXEL NETWORKS INC.

24 Defendants.

**Case No. 8:23-cv-1065**

**ORIGINAL COMPLAINT**

**JURY TRIAL DEMANDED**

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26  
27  
28  
**ORIGINAL COMPLAINT**

1 Plaintiff BNR, LLC (“BNR” or “Plaintiff”) brings this Complaint against  
2 Defendants Qualcomm Inc. and Qualcomm Technologies, Inc. (collectively  
3 “Qualcomm”) for infringement of U.S. Patent Nos. RE 48,629, 8,416,862, and  
4 7,564,914 (collectively, the “Asserted Patents”). Plaintiff also brings this Complaint  
5 against the remaining Defendants, customers of both Qualcomm and MediaTek, for  
6 infringement of the Asserted Patents. Plaintiff, on personal knowledge of its own acts,  
7 and on information and belief as to all others based on investigation, alleges as  
8 follows:

9 **SUMMARY OF THE ACTION**

10 1. This is a patent infringement suit relating to Qualcomm’s and  
11 MediaTek’s unauthorized and unlicensed use of the Asserted Patents. The wireless  
12 communications technology claimed in the Asserted Patents is used by Qualcomm’s  
13 chips and/or chipsets and MediaTek’s chips and/or chipsets that are used to  
14 communicate over wireless networks using the Wi-Fi 6E, Wi-Fi 6, Wi-Fi 5, 802.11ax,  
15 802.11ac, and/or 802.11n standards.<sup>1</sup> The remaining Defendants, along with other  
16 unlicensed downstream customers of Qualcomm and/or MediaTek, each incorporate  
17 into each of their respective Accused Products (which comprise, among other things,  
18 wireless routers and access points, mesh nodes, wireless communications dongles and  
19 cards, and wireless range extenders) at least one Qualcomm Accused Product or  
20 MediaTek Accused Product (collectively, “Downstream Accused Products”). Those  
21 Downstream Accused Products, which are imported, offered for sale, and/or sold in  
22 the United States by the remaining Defendants, each utilize at least one Qualcomm  
23 Accused Product or MediaTek Accused Product to communicate over wireless  
24 networks using the Wi-Fi 6E, Wi-Fi 6, Wi-Fi 5, 802.11ax, 802.11ac, and/or 802.11n  
25 standards.

26 2. BNR brings this action to put a stop to the Defendants’ unauthorized and  
27 unlicensed use of the inventions claimed in the Asserted Patents.

28 <sup>1</sup> “Qualcomm Accused Products” and “MediaTek Accused Products,” respectively.

1 **THE PARTIES**

2 3. Plaintiff BNR is a limited liability company organized under the laws of  
3 the State of Delaware with a place of business at 401 North Michigan Avenue,  
4 Chicago, Illinois 60611.

5 4. The Asserted Patents come from a rich pedigree dating back to the late  
6 19th century. This is when Bell Labs sprang to life from the combined efforts of  
7 AT&T and Western Electric. Bell Labs is one of America’s greatest technology  
8 incubators, and paved the way for many technological advances we know and use  
9 today, including the transistor, several kinds of lasers, the UNIX operating system,  
10 and computer languages such as C++. In total, Bell Labs received nine Nobel Prizes  
11 for its work over the years.

12 5. Eventually the Bell system broke up and spawned several new  
13 companies. They included telecommunications powerhouses Lucent and Agere  
14 Systems. Lucent was absorbed by Nokia, while Agere Systems was acquired by LSI,  
15 then Avago, and ultimately renamed Broadcom. The Bell system also spun off  
16 Northern Electric which led to the creation of a research lab known as BNR. This lab  
17 grew to host thousands of engineers in offices around the globe. One of those was an  
18 800,000-square-foot campus in Richardson, Texas.

19 6. Collectively, these companies spurred a digital revolution in  
20 telecommunications, starting with the first digital telephone switch in 1975. They  
21 continued to push the industry to new heights in the late-80s, when BNR announced  
22 the desire to create a global fiber optic network (called “FiberWorld”). Its goal was to  
23 give users easy, reliable, and fast access to a variety of multimedia services. To  
24 realize this vision, Bell Labs and subsequent innovators made numerous  
25 breakthroughs in laser, integrated circuit, photodetector, amplifier, and waveguide  
26 designs. These advancements led to the modern fiber optic systems we use today.

27 7. This work naturally evolved to include cellular telecommunications as  
28 well. On May 6, 1992, BNR VP George Brody—along with executives from Bell

1 Cellular and Northern Electric—made the first Canada-US digital cellular call. It  
2 stretched from Toronto, Ontario to Fort Worth, Texas.

3 8. Eventually, Nortel Networks absorbed BNR. Although Nortel was  
4 ultimately unsuccessful in its bid to supply digital telecommunications and  
5 networking solutions to the market, some Bell Labs and Nortel alumni decided to  
6 reenergize BNR in 2017. Today it is the successor in interest to many of the key  
7 telecommunications technologies.

8 9. The BNR Patent portfolio comprises hundreds of patents that reflect  
9 important developments in telecommunications that were invented and refined by  
10 leading technology research companies, including Agere, LSI, and Broadcom. These  
11 include U.S. Patent Nos. RE 48,629, 8,416,862, and 7,564,914 (collectively, these  
12 patents comprise the “Asserted Patents”).

13 10. Portions of the BNR portfolio are presently licensed and/or were  
14 previously licensed to leading technology companies.

15 11. On information and belief, Qualcomm Inc. has its principal place of  
16 business and headquarters at 5775 Morehouse Drive, San Diego, CA 92121. On  
17 information and belief, Qualcomm Technologies, Inc., a wholly-owned subsidiary of  
18 Qualcomm Inc., “operates, along with its subsidiaries, substantially all of  
19 Qualcomm’s engineering, research and development functions, and substantially all  
20 of its products and services businesses, including its QCT semiconductor business.”  
21 About Qualcomm, <https://www.qualcomm.com/company/about> (last visited Aug. 12,  
22 2022).

23 12. On information and belief, MediaTek North America Inc. is a Delaware  
24 corporation having a regular place of business at 1 Ada, Suite 200, Irvine, CA 92618.  
25 On information and belief, MediaTek USA Inc. is also a Delaware corporation having  
26 a regular place of business at 1 Ada, Suite 200, Irvine, CA 92618. On information and  
27 belief, MediaTek North America and MediaTek USA (collectively, “MediaTek”) are  
28 domestic subsidiaries of MediaTek Incorporated, a Taiwanese fabless semiconductor

1 company, and are listed on MediaTek Incorporated’s website as being located in  
2 MediaTek Incorporated’s United States Office locations. United States Office  
3 Locations, <https://corp.mediatek.com/about/office-locations/mediatek-usa-offices> (last  
4 visited June 13, 2023).

5 13. On information and belief, D-Link Systems, Inc. (“D-Link”) is a  
6 corporation organized and existing under the laws of California, with a principal place  
7 of business and a registered agent for service of process (Brett S Adair) at 14420  
8 Myford Road, Suite 100, Irvine, CA 92606.

9 14. On information and belief, Linksys USA, Inc. (“Linksys”) is a  
10 corporation organized and existing under the laws of Delaware with its principal place  
11 of business at 121 Theory Drive, Irvine, CA 92617. Linksys has a registered agent  
12 for service of process at C T Corporation System, 330 N Brand Blvd., Suite 700,  
13 Glendale, CA 91203.

14 15. On information and belief, Netgear, Inc. (“Netgear”) is a public  
15 corporation organized and existing under the laws of Delaware. Netgear has a  
16 registered agent for service of process at C T Corporation System, 330 N Brand Blvd.,  
17 Suite 700, Glendale, CA 91203.

18 16. On information and belief, TP-Link USA Corporation (“TP-Link”) is a  
19 corporation organized and existing under the laws of California, with a principal place  
20 of business and a registered agent for service of process (Deyi Shu) at 10 Mauchly,  
21 Irvine, CA 92618.

22 17. On information and belief, ZyXEL Communications, Inc. is a  
23 corporation organized and existing under the laws of California, with a principal place  
24 of business at 1130 N Miller St., Anaheim, CA 92806. On information and belief,  
25 ZyXEL Networks Inc. is also a corporation organized and existing under the laws of  
26 California, with a principal place of business at 1130 N Miller St., Anaheim, CA  
27 92806. On information and belief, ZyXEL Communications, Inc. and ZyXEL  
28 Networks Inc. (collectively “ZyXEL”) are domestic subsidiaries of ZyXEL Networks

1 Corporation, a Taiwanese entity, and have a registered agent for service of process  
2 (Lorelie Paunan Esber) at 1130 N Miller St., Anaheim CA 92806.

3 18. On information and belief, D-Link, Linksys, Netgear, TP-Link, and  
4 ZyXEL (collectively, “Downstream Defendants”) each offers for sale, sells, develops,  
5 uses, imports, tests, and/or manufactures products in the United States, including in  
6 this District, that use the methods of the Asserted Patents; and/or distributes, markets,  
7 sells, or offers to sell in the United States and/or imports Downstream Accused  
8 Products into the United States, including in this District, which incorporate  
9 Qualcomm Accused Products or MediaTek Accused Products that use the patented  
10 methods of the Asserted Patents. Additionally, each Downstream Defendant  
11 introduces its respective Downstream Accused Products into the stream of commerce  
12 knowing that they will be sold and/or used in this District and elsewhere in the United  
13 States.

14 **JURISDICTION AND VENUE**

15 19. This is an action for patent infringement arising under the patent laws of  
16 the United States, Title 35 of the United States Code. Accordingly, this Court has  
17 subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

18 20. This Court has personal jurisdiction over Qualcomm under the laws of  
19 the State of California, due at least to its substantial business in California and in this  
20 District. Qualcomm has purposefully and voluntarily availed itself of the privileges of  
21 conducting business in the United States, in the State of California, and in this District  
22 by continuously and systematically placing goods into the stream of commerce  
23 through an established distribution channel with the expectation that they will be  
24 purchased by consumers in this District. In the State of California and in this District,  
25 Qualcomm, directly or through intermediaries: (i) performs at least a portion of the  
26 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
27 according to claims of each Asserted Patent; (iii) distributes, markets, sells, or offers  
28 to sell products that Asserted Patent; and/or (iv) imports products formed according to

1 the '269 patented processes/methodologies and/or the structures of the other Asserted  
2 Patents.

3 21. On information and belief, venue is proper in this Court pursuant to 28  
4 U.S.C. §§ 1391 and 1400 with respect to Qualcomm because Qualcomm has  
5 committed, and continues to commit, acts of infringement in this District and has a  
6 regular and established place of business in this District. For example, Qualcomm  
7 maintains regular and established places of business at (1) 1100 Glendon Ave., Los  
8 Angeles, CA 90024; and (2) 3347 Michelson Drive, Suite 250, Irvine, CA 92612–  
9 both of which are located in this District. See Qualcomm Global Office Locations  
10 (<https://www.qualcomm.com/company/facilities/offices?country=USA>) (last visited  
11 Aug. 9, 2022).

12 22. In addition to the foregoing, Qualcomm has numerous other business  
13 locations throughout California, to which this District is centrally located. More  
14 specifically, 44 of Qualcomm's 70 United States offices are located in California,  
15 with locations in Carlsbad, Irvine, Los Angeles, Los Gatos, San Diego, San Francisco,  
16 San Jose, Santa Clara, and Saratoga. See 70 Offices in USA, Qualcomm (available at  
17 <https://www.qualcomm.com/company/facilities/offices?country=USA&page=3>) (last  
18 visited Aug. 12, 2022).

19 23. Currently, Qualcomm is advertising over 1300 jobs in its California  
20 locations. These positions include those that relate to the Asserted Patents'  
21 technology, such as numerous positions for Packaging Engineer. See Transform Your  
22 Career, Qualcomm (<https://qualcomm.wd5.myworkdayjobs.com/en-US/External>)  
23 (last visited Aug. 12, 2022).

24 24. Venue is also convenient in this District. This is at least true because of  
25 this District's close ties to this case—including the technology, relevant witnesses,  
26 and sources of proof noted above—and its ability to quickly and efficiently move this  
27 case to resolution. Further, Qualcomm has purposely availed itself of the court system  
28 in this District by, *inter alia*, intervening in disputes filed in this District (*see, e.g.*,

1 *TCL Commc 'n Tech. Holdings, Ltd v. Telefonaktienbolaget LM Ericsson*, Case No.  
2 8:14-cv-00341-JVS-DFM, Dkt. 1305 (C.D. Cal. Jan. 10, 2017)).

3 25. On information and belief, BNR's cause of action arises directly from  
4 Qualcomm's circuit design work and other activities in this District. Moreover, on  
5 information and belief, Qualcomm has derived substantial revenues from its  
6 infringing acts occurring within the State of California and within this District.

7 26. This Court has personal jurisdiction over MediaTek under the laws of the  
8 State of California, due at least to its substantial business in California and in this  
9 District. MediaTek has purposefully and voluntarily availed itself of the privileges of  
10 conducting business in the United States, in the State of California, and in this District  
11 by continuously and systematically placing goods into the stream of commerce  
12 through an established distribution channel with the expectation that they will be  
13 purchased by consumers in this District. In the State of California and in this District,  
14 MediaTek, directly or through intermediaries: (i) performs at least a portion of the  
15 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
16 according to claims of each Asserted Patent; (iii) distributes, markets, sells, or offers  
17 to sell products that Asserted Patent; and/or (iv) imports products formed according to  
18 the '269 patented processes/methodologies and/or the structures of the other Asserted  
19 Patents.

20 27. On information and belief, venue is proper in this Court pursuant to 28  
21 U.S.C. §§ 1391 and 1400 with respect to MediaTek because MediaTek has  
22 committed, and continues to commit, acts of infringement in this District and has a  
23 regular and established place of business in this District. For example, MediaTek  
24 maintains a regular and established place of business at 1 Ada, Suite 200, Irvine, CA  
25 92618—which is located in this District. See MediaTek United States Offices  
26 (<https://corp.mediatek.com/about/office-locations/mediatek-usa-offices>) (last visited  
27 June 9, 2023).



1           28. In addition to the foregoing, MediaTek has several other business  
2 locations throughout California, to which this District is centrally located. More  
3 specifically, 3 of MediaTek’s 8 United States offices are located in California (with  
4 no other state having more than 2 offices), with the other California locations in San  
5 Diego and San Jose. *See id.*

6           29. Currently, MediaTek is advertising over 30 jobs in its California  
7 locations. These positions include those that relate to the Asserted Patents’  
8 technology, such as numerous positions for Packaging Engineer. *See Transform Your*  
9 *Career, MediaTek* (<https://MediaTek.wd5.myworkdayjobs.com/en-US/External>) (last  
10 visited Aug. 12, 2022).

11           30. Venue is also convenient in this District. This is at least true because of  
12 this District’s close ties to this case—including the technology, relevant witnesses,  
13 and sources of proof noted above—and its ability to quickly and efficiently move this  
14 case to resolution. Further, MediaTek has purposely availed itself of the court system  
15 in this District by, *inter alia*, filing disputes filed in this District (*see, e.g., Mediatek*  
16 *Inc., et al. v. NXP Semiconductors NV, et al.*, Case Nos. 2:21-cv-04969 & 2:21-cv-  
17 04970 (C.D. Cal. June 17, 2021)).

18           31. On information and belief, BNR’s cause of action arises directly from  
19 MediaTek’s circuit design work, sales, and other activities in this District. Moreover,  
20 on information and belief, MediaTek has derived substantial revenues from its  
21 infringing acts occurring within the State of California and within this District.

22           32. This Court has personal jurisdiction over D-Link under the laws of the  
23 State of California, due at least to its substantial business in California and in this  
24 District. D-Link has purposefully and voluntarily availed itself of the privileges of  
25 conducting business in the United States, in the State of California, and in this District  
26 by continuously and systematically placing goods into the stream of commerce  
27 through an established distribution channel with the expectation that they will be  
28 purchased by consumers in this District. In the State of California and in this District,

1 D-Link, directly or through intermediaries: (i) performs at least a portion of the  
2 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
3 according to at least one of the claims of each Asserted Patent; (iii) distributes,  
4 markets, sells, or offers to sell products that each infringe at least one claim of each  
5 Asserted Patent and contain at least one Qualcomm Accused Product and/or  
6 MediaTek Accused Product (hereinafter, “D-Link Downstream Accused Products”);  
7 and/or (iv) imports D-Link Downstream Accused Products.

8 33. On information and belief, venue is proper in this Court pursuant to 28  
9 U.S.C. §§ 1391 and 1400 with respect to D-Link because D-Link has committed, and  
10 continues to commit, acts of infringement in this District (including but not limited to  
11 directly selling and offering for sale Downstream Accused Products through its  
12 shopus.tp-link.com website) and has regular and established places of business in this  
13 District. For example, D-Link maintains its principal place of business in the United  
14 States at 14420 Myford Road, Suite 100, Irvine, CA 92606, which is located in this  
15 District.

16 34. On information and belief, D-Link employs a number of  
17 persons in this District, who include engineering personnel and others with knowledge  
18 relevant to the claims at issue in this litigation.

19 35. This Court has personal jurisdiction over Linksys under the laws of the  
20 State of California, due at least to its substantial business in California and in this  
21 District. Linksys has purposefully and voluntarily availed itself of the privileges of  
22 conducting business in the United States, in the State of California, and in this District  
23 by continuously and systematically placing goods into the stream of commerce  
24 through an established distribution channel with the expectation that they will be  
25 purchased by consumers in this District. In the State of California and in this District,  
26 Linksys, directly or through intermediaries: (i) performs at least a portion of the  
27 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
28 according to at least one of the claims of each Asserted Patent; (iii) distributes,

1 markets, sells, or offers to sell products that each infringe at least one claim of each  
2 Asserted Patent and contain at least one Qualcomm Accused Product and/or  
3 MediaTek Accused Product (hereinafter, “Linksys Downstream Accused Products”);  
4 and/or (iv) imports Linksys Downstream Accused Products.

5 36. On information and belief, venue is proper in this Court pursuant to 28  
6 U.S.C. §§ 1391 and 1400 with respect to Linksys because Linksys has committed, and  
7 continues to commit, acts of infringement in this District (including but not limited to  
8 directly selling and offering for sale Linksys Downstream Accused Products through  
9 its linksys.com website) and has regular and established places of business in this  
10 District. For example, Linksys maintains (1) its headquarters in Irvine, and (2) an  
11 office at 12045 East Waterfront Drive, Playa Vista, CA 90094—each of which is  
12 located in this District.

13 37. On information and belief, Linksys employs at least 60 persons in this  
14 District and is currently advertising for employment in this District. These employees  
15 include engineering personnel and others with knowledge relevant to the claims at  
16 issue in this litigation.

17 38. This Court has personal jurisdiction over Netgear under the laws of the  
18 State of California, due at least to its substantial business in California and in this  
19 District. Netgear has purposefully and voluntarily availed itself of the privileges of  
20 conducting business in the United States, in the State of California, and in this District  
21 by continuously and systematically placing goods into the stream of commerce  
22 through an established distribution channel with the expectation that they will be  
23 purchased by consumers in this District. In the State of California and in this District,  
24 Netgear, directly or through intermediaries: (i) performs at least a portion of the  
25 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
26 according to at least one of the claims of each Asserted Patent; (iii) distributes,  
27 markets, sells, or offers to sell products that each infringe at least one claim of each  
28 Asserted Patent and contain at least one Qualcomm Accused Product and/or

1 MediaTek Accused Product (hereinafter, “Netgear Downstream Accused Products”);  
2 and/or (iv) imports Netgear Downstream Accused Products.

3 39. On information and belief, venue is proper in this Court pursuant to 28  
4 U.S.C. §§ 1391 and 1400 with respect to Netgear because Netgear has committed, and  
5 continues to commit, acts of infringement in this District (including but not limited to  
6 directly selling and offering for sale Downstream Accused Products through its  
7 netgear.com website) and has regular and established places of business in this  
8 District. For example, Netgear maintains a place of business at 408 S Brea Canyon  
9 Rd, City of Industry, CA 91789, which is located in this District.

10 40. On information and belief, Netgear employs at least 20 persons in this  
11 District. These employees include engineering personnel and others with knowledge  
12 relevant to the claims at issue in this litigation. Netgear additionally identifies its  
13 warehouse in this District and two ports in this District—in Los Angeles and Long  
14 Beach—as materially affecting its business.

15 41. This Court has personal jurisdiction over TP-Link under the laws of the  
16 State of California, due at least to its substantial business in California and in this  
17 District. TP-Link has purposefully and voluntarily availed itself of the privileges of  
18 conducting business in the United States, in the State of California, and in this District  
19 by continuously and systematically placing goods into the stream of commerce  
20 through an established distribution channel with the expectation that they will be  
21 purchased by consumers in this District. In the State of California and in this District,  
22 TP-Link, directly or through intermediaries: (i) performs at least a portion of the  
23 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
24 according to at least one of the claims of each Asserted Patent; (iii) distributes,  
25 markets, sells, or offers to sell products that each infringe at least one claim of each  
26 Asserted Patent and contain at least one Qualcomm Accused Product and/or  
27 MediaTek Accused Product (hereinafter, “TP-Link Downstream Accused Products”);  
28 and/or (iv) imports TP-Link Downstream Accused Products.

1           42. On information and belief, venue is proper in this Court pursuant to 28  
2 U.S.C. §§ 1391 and 1400 with respect to TP-Link because TP-Link has committed,  
3 and continues to commit, acts of infringement in this District (including but not  
4 limited to directly selling and offering for sale Downstream Accused Products  
5 through its shopus.tp-link.com website) and has regular and established places of  
6 business in this District. For example, TP-Link maintains its principal place of  
7 business at 10 Mauchly, Irvine, CA 92618, which is located in this District. TP-Link  
8 additionally maintains an office in this District at 145 South State College Blvd. Suite  
9 400, Brea, CA 92821.

10           43. On information and belief, TP-Link employs at least 25 persons in this  
11 District. These employees include engineering personnel and others with knowledge  
12 relevant to the claims at issue in this litigation.

13           44. This Court has personal jurisdiction over ZyXEL under the laws of the  
14 State of California, due at least to its substantial business in California and in this  
15 District. ZyXEL has purposefully and voluntarily availed itself of the privileges of  
16 conducting business in the United States, in the State of California, and in this District  
17 by continuously and systematically placing goods into the stream of commerce  
18 through an established distribution channel with the expectation that they will be  
19 purchased by consumers in this District. In the State of California and in this District,  
20 ZyXEL, directly or through intermediaries: (i) performs at least a portion of the  
21 infringements alleged herein; (ii) develops, designs, and/or manufactures products  
22 according to at least one of the claims of each Asserted Patent; (iii) distributes,  
23 markets, sells, or offers to sell products that each infringe at least one claim of each  
24 Asserted Patent and contain at least one Qualcomm Accused Product and/or  
25 MediaTek Accused Product (hereinafter, “ZyXEL Downstream Accused Products”);  
26 and/or (iv) imports ZyXEL Downstream Accused Products.

27           45. On information and belief, venue is proper in this Court pursuant to 28  
28 U.S.C. §§ 1391 and 1400 with respect to ZyXEL because ZyXEL has committed, and

1 continues to commit, acts of infringement in this District (including but not limited to  
2 directly selling and offering for sale Downstream Accused Products through its  
3 shopus.ZyXEL.com website) and has regular and established places of business in  
4 this District. For example, ZyXEL maintains its principal place of business in the  
5 United States at 1130 N Miller St., Anaheim CA 92806, which is located in this  
6 District.

7 46. On information and belief, ZyXEL employs at least 60 persons in this  
8 District. These employees include engineering personnel and others with knowledge  
9 relevant to the claims at issue in this litigation.

10  
11 **U.S. Patent No. RE 48,629**

12 47. Jason Alexander Trachewsky and Rajendra T. Moorti are the inventors of  
13 U.S. Patent No. RE 48,629 (the '629 patent). A true and correct copy of the '629  
14 patent is attached as Exhibit A.

15 48. The '629 patent is valid and enforceable under the United States patent  
16 laws.

17 49. On July 6, 2021, the '629 patent was duly and legally reissued by the  
18 United States Patent and Trademark Office under the title "Backward-compatible  
19 Long Training Sequences for Wireless Communication Networks."

20 50. BNR is the assignee and owner of the right, title and interest in and to the  
21 '629 patent, including the right to assert all causes of action arising under the Patent  
22 and the right to any remedies for infringement of it.

23 51. The '629 patent resulted from the pioneering efforts of Messrs.  
24 Trachewsky and Moorti (hereinafter "the Inventors") in the general area of wireless  
25 communication systems and more particularly to long training sequences of minimum  
26 peak-to-average power ratio which may be used in legacy systems. At the time of  
27 these pioneering efforts, conventionally implemented technology did not sufficiently  
28 address the problem of different wireless devices compliant with different standards

1 or different versions of the same standard while enabling backward compatibility with  
2 legacy devices that avoids collisions. For example, in the 802.11a and 802.11g  
3 standards, each data packet starts with a preamble which includes a short training  
4 sequence followed by a long training sequence. The short and long training  
5 sequences are used for synchronization between the sender and the receiver. The long  
6 training sequence of 802.11a and 802.11g is defined such that each of sub-carriers -26  
7 to +26, except for the subcarrier 0 which is set to 0, has one binary phase shift keying  
8 constellation point, either +1 or -1.

9 52. There existed a need to create a long training sequence of minimum  
10 peak-to-average ratio that uses more sub-carriers without interfering with adjacent  
11 channels.

12 53. For example, the Inventors developed a wireless communications device,  
13 comprising: a signal generator that generates an extended long training sequence; and  
14 an Inverse Fourier Transformer operatively coupled to the signal generator, wherein  
15 the Inverse Fourier Transformer processes the extended long training sequence from  
16 the signal generator and provides an optimal extended long training sequence with a  
17 minimal peak-to-average ratio, and wherein at least the optimal extended long training  
18 sequence is carried by a greater number of subcarriers than a standard wireless  
19 networking configuration for an Orthogonal Frequency Division Multiplexing  
20 scheme, wherein the optimal extended long training sequence is carried by exactly 56  
21 active sub-carriers, and wherein the optimal extended long training sequence is

1 represented by encodings for indexed sub-carriers -28 to +28, excluding indexed sub-  
 2 carrier 0 which is set to zero, as follows:

<i>Sub-carrier</i>	-28	-27	-26	-25	-24	-23	-22
<i>Encoding</i>	+1	+1	+1	+1	-1	-1	+1
<i>Sub-carrier</i>	-14	-13	-12	-11	-10	-9	-8
<i>Encoding</i>	+1	+1	+1	-1	-1	+1	+1
<i>Sub-carrier</i>	1	2	3	4	5	6	7
<i>Encoding</i>	+1	-1	-1	+1	+1	-1	+1
<i>Sub-carrier</i>	15	16	17	18	19	20	21
<i>Encoding</i>	+1	+1	-1	-1	+1	-1	+1
<i>Sub-carrier</i>	-21	-20	-19	-18	-17	-16	-15
<i>Encoding</i>	+1	-1	+1	-1	+1	+1	+1
<i>Sub-carrier</i>	-7	-6	-5	-4	-3	-2	-1
<i>Encoding</i>	-1	+1	-1	+1	+1	+1	+1
<i>Sub-carrier</i>	8	9	10	11	12	13	14
<i>Encoding</i>	-1	+1	-1	-1	-1	-1	-1
<i>Sub-carrier</i>	22	23	24	25	26	27	28
<i>Encoding</i>	-1	+1	+1	+1	+1	-1	-1

10 54. One advantage of the patented invention is that it provides an expanded  
 11 long training sequence of minimum peak-to-average power ratio thereby decreasing  
 12 power back-off. (See '629 patent at 4:15-17.)

13 55. Another advantage of the invention is that expanded long training  
 14 sequence may be used by 802.11a and 802.11g devices for estimating the channel  
 15 impulse response and by a receiver for estimating the carrier frequency offset between  
 16 the transmitter clock and receiver clock. (See '629 patent at 4:17-21.)

### **U.S. Patent No. 8,416,862**

18 56. Carlos Aldana and Joonsuk Kim are the inventors of U.S. Patent No  
 19 8,416,862 (“the '862 patent”). A true and correct copy of the '862 patent is attached  
 20 as Exhibit B.

21 57. The '862 patent is valid and enforceable under the United States patent  
 22 laws.

23 58. On April 9, 2013, the '862 patent was duly and legally issued by the  
 24 United States Patent and Trademark Office under the title “Efficient Feedback of  
 25 Channel Information in a Closed Loop Beamforming Wireless Communications  
 26 System.”



1 59. BNR is the assignee and owner of the right, title and interest in and to the  
2 '862 patent, including the right to assert all causes of action arising under the patent  
3 and the right to any remedies for infringement of it.

4 60. The '862 patent resulted from the pioneering efforts of Messrs. Aldana  
5 and Kim (hereinafter "the Inventors") in the area of wireless communications systems  
6 using beamforming. These efforts resulted in the development of a method and  
7 system for the efficient feedback of channel information in a closed loop  
8 beamforming wireless communication system.

9 61. At the time of these pioneering efforts, the most widely implemented  
10 technology used to address reduced beam forming feedback information for wireless  
11 communications was to reduce the size of the feedback. For instance, in a 2x2 MIMO  
12 wireless communication, the feedback needs four elements that are all complex  
13 Cartesian coordinate values  $V_{11}$   $V_{12}$ ;  $V_{21}$   $V_{22}$ . In general,  $V_{ik} = a_{ik} + j * b_{ik}$ , where  $a_{ik}$   
14 and  $b_{ik}$  are values between -1, 1. Thus, with 1 bit express per each element for each  
15 of the real and imaginary components,  $a_{ik}$  and  $b_{ik}$  can be either -1/2 or +1/2, which  
16 requires  $4 \times 2 \times 1 = 8$  bits per tone. With 4 bit expressions per each element of  $V(f)$  in an  
17 orthogonal frequency division multiplexing (OFDM) 2x2 MIMO wireless  
18 communication, the number of bits required is 1728 per tone (e.g.,  $42 * 54 * 4 = 1728$ , 4  
19 elements per tone, 2 bits for real and imaginary components per tone, 54 data tones  
20 per frame, and 4 bits per element), which requires overhead for a packet exchange that  
21 is too large for practical applications.

22 62. The Inventors conceived of the invention claimed in the '862 patent as a  
23 way to reduce beam forming feedback information for wireless communications.

24 63. For example, the Inventors developed a method for feeding back  
25 transmitter beamforming information from a receiving wireless communication  
26 device to a transmitting wireless communication device, the method comprising: the  
27 receiving wireless communication device receiving a preamble sequence from the  
28 transmitting wireless device; the receiving wireless device estimating a channel

1 response based upon the preamble sequence; the receiving wireless device  
2 determining an estimated transmitter beamforming unitary matrix (V) based upon the  
3 channel response and a receiver beamforming unitary matrix (U); the receiving  
4 wireless device decomposing the estimated transmitter beamforming unitary matrix  
5 (V) to produce the transmitter beamforming information; and the receiving wireless  
6 device wirelessly sending the transmitter beamforming information to the transmitting  
7 wireless device.

8 64. One advantage of the patented invention is a reduction of beamforming  
9 feedback information for wireless communications. (*See* '862 patent at 3:49-51.)

10 **U.S. Patent No. 7,564,914**

11 65. Christopher J. Hansen, Carlos H. Aldana, and Joonsuk Kim are the  
12 inventors of U.S. Patent No. 7,564,914 (“the '914 patent”). A true and correct copy  
13 of the '914 patent is attached as Exhibit C.

14 66. The '914 patent is valid and enforceable under the United States patent  
15 laws.

16 67. On July 21, 2009, the '914 patent was duly and legally issued by the  
17 United States Patent and Trademark Office under the title “Method and System for  
18 Frame Formats for MIMO Channel Measurement Exchange.”

19 68. BNR is the assignee and owner of the right, title and interest in and to the  
20 '914 patent, including the right to assert all causes of action arising under the patent  
21 and the right to any remedies for infringement of it.

22 69. The '914 patent resulted from the pioneering efforts of Messrs. Hansen,  
23 Aldana, and Kim (hereinafter “the Inventors”) in the general area of wireless  
24 networking.

25 70. For example, the Inventors developed a method for communicating  
26 information in a communication system, the method comprising: transmitting data via  
27 a plurality of radio frequency (RF) channels utilizing a plurality of transmitting  
28 antennas; receiving feedback information via at least one of said plurality of RF

1 channels; modifying a transmission mode based on said feedback information;  
2 receiving said feedback information comprising channel estimates based on  
3 transmission characteristics of said transmitted data via at least one of said plurality of  
4 transmitting antennas; and deriving said feedback information from mathematical  
5 matrix decomposition of said channel estimates.

6 71. One advantage of the '914 patent is the more precise estimation of  
7 channel characteristics. (*See* '914 patent at 18:12-15.)

8 72. Another advantage of the patented invention is that it minimizes the  
9 quantity of feedback information and in turn reduces overhead. (*See* '914 patent at  
10 18:35-39.)

11 73. Further advantages include higher information transfer rates, and more  
12 effective beamforming on transmitted signals. (*See* '914 patent at 18:40-45.)

### 13 **DEFENDANTS' ACTIVITIES**

14 74. Qualcomm makes, uses, offers for sale, sells, imports and/or provides or  
15 causes to be used wireless communications devices, such as the IPQ8074 (the  
16 Qualcomm Exemplary Accused Product), and other Qualcomm Accused Products  
17 including (but not limited to) the IPQ4018, IPQ4019, IPQ5000, IPQ5018, QCA9884,  
18 QCA9886, QCA9984, QCN5022, QCN5024, QCN5052, QCN5054, QCN5500,  
19 QCN5502, QCN6024, QCN6102, QCN9024, and WCN3998 series products.<sup>2</sup>

20 75. MediaTek makes, uses, offers for sale, sells, imports and/or provides or  
21 causes to be used wireless communications devices, such as the MT7922 (the  
22 MediaTek Exemplary Accused Product), and other MediaTek Accused Products  
23 including (but not limited to) the MT7592, MT7602, MT7603, MT7610, MT7612,  
24 MT7613, MT7615, MT7620, MT7622, MT7628, MT7650, MT7761, MT7762,  
25

26  
27 <sup>2</sup> By "series products," BNR means to include all versions of all products containing  
28 the identifier listed above. As a non-limiting illustrative example, "IPQ8074 series  
products" includes the IPQ8074 and IPQ8074 v2.

1 MT7902, MT7905, MT7911, MT7915, MT7921, MT7922, MT7975, MT7976,  
2 MT7981, MT7986, PSB 8224, PSB 50368, and PSB 81312 series products.<sup>3</sup>

3 76. D-Link makes, uses, offers for sale, sells, imports and/or provides or  
4 causes to be used wireless communications devices that incorporate a Qualcomm  
5 Accused Product (collectively, “D-Link Qualcomm Accused Products”), such as the  
6 D-Link COVR-1300E range extender and mesh node, which includes a Qualcomm  
7 IPQ4018 chip used to communicate over a wireless network in a manner that  
8 infringes the Asserted Patents.

9 77. D-Link also makes, uses, offers for sale, sells, imports and/or provides or  
10 causes to be used wireless communications devices that incorporate a MediaTek  
11 Accused Product (collectively, “D-Link MediaTek Accused Products”), such as the  
12 D-Link DIR-X1860 rev A1 wireless router, which includes MediaTek MT7915DAN,  
13 MT7915DN, and MT7975AN chips used to communicate over a wireless network in  
14 a manner that infringes the Asserted Patents.

15 78. On information and belief, D-Link also makes, uses, offers for sale, sells,  
16 imports and/or provides or causes to be used wireless communications devices that  
17 incorporate an unlicensed wireless communications chip not provided or  
18 manufactured by Qualcomm or MediaTek (collectively, “D-Link Other Accused  
19 Products) that use the unlicensed wireless communications chip(s) to communicate  
20 over a wireless network in a manner that infringes the Asserted Patents.

21 79. Linksys makes, uses, offers for sale, sells, imports and/or provides or  
22 causes to be used wireless communications devices that incorporate a Qualcomm  
23 Accused Product (collectively, “Linksys Qualcomm Accused Products”), such as the  
24 MX4200 Wireless System/Mesh Node, which includes Qualcomm QCN5024 and  
25

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26 <sup>3</sup> By “series products,” BNR means to include all versions of all products containing  
27 the identifier listed above. As a non-limiting illustrative example, “MT7615 series  
28 products” includes MT7615, MT7615B, MT7615DN, MT7615E, MT7615EN, and  
MT7615N chips.

1 QCN5054 chips used to communicate over a wireless network in a manner that  
2 infringes the Asserted Patents.

3 80. Linksys also makes, uses, offers for sale, sells, imports and/or provides  
4 or causes to be used wireless communications devices that incorporate a MediaTek  
5 Accused Product (collectively, “Linksys MediaTek Accused Products”), such as the  
6 Linksys E8450 Wireless Router, which includes MediaTek MT7915AN and  
7 MT7975AN chips used to communicate over a wireless network in a manner that  
8 infringes the Asserted Patents.

9 81. On information and belief, Linksys also makes, uses, offers for sale,  
10 sells, imports and/or provides or causes to be used wireless communications devices  
11 that incorporate an unlicensed wireless communications chip not provided or  
12 manufactured by Qualcomm or MediaTek (collectively, “Linksys Other Accused  
13 Products) that use the unlicensed wireless communications chip(s) to communicate  
14 over a wireless network in a manner that infringes the Asserted Patents.

15 82. Netgear makes, uses, offers for sale, sells, imports and/or provides or  
16 causes to be used wireless communications devices that incorporate a Qualcomm  
17 Accused Product (collectively, “Netgear Qualcomm Accused Products”), such as the  
18 Netgear RAX120 (Nighthawk AX12) wireless router, which includes Qualcomm  
19 QCN5024 and QCN5054 chips used to communicate over a wireless network in a  
20 manner that infringes the Asserted Patents.

21 83. Netgear also makes, uses, offers for sale, sells, imports and/or provides  
22 or causes to be used wireless communications devices that incorporate a MediaTek  
23 Accused Product (collectively, “Netgear MediaTek Accused Products”), such as the  
24 Netgear Nighthawk AC2400 wireless router, which includes MediaTek MT7615N  
25 chips used to communicate over a wireless network in a manner that infringes the  
26 Asserted Patents.

27 84. On information and belief, Netgear also makes, uses, offers for sale,  
28 sells, imports and/or provides or causes to be used wireless communications devices

1 that incorporate an unlicensed wireless communications chip not provided or  
2 manufactured by Qualcomm or MediaTek (collectively, “Netgear Other Accused  
3 Products) that use the unlicensed wireless communications chip(s) to communicate  
4 over a wireless network in a manner that infringes the Asserted Patents.

5 85. TP-Link makes, uses, offers for sale, sells, imports and/or provides or  
6 causes to be used wireless communications devices that incorporate a Qualcomm  
7 Accused Product (collectively, “TP-Link Qualcomm Accused Products”), such as the  
8 Deco X60 Mesh Node, which includes Qualcomm QCN5024 and QCN5054 chips  
9 used to communicate over a wireless network in a manner that infringes the Asserted  
10 Patents.

11 86. TP-Link also makes, uses, offers for sale, sells, imports and/or provides  
12 or causes to be used wireless communications devices that incorporate a MediaTek  
13 Accused Product (collectively, “TP-Link MediaTek Accused Products”), such as the  
14 AX6000 Wireless Router, which includes MediaTek 976AN and MT7976GN chips  
15 used to communicate over a wireless network in a manner that infringes the Asserted  
16 Patents.

17 87. On information and belief, TP-Link also makes, uses, offers for sale,  
18 sells, imports and/or provides or causes to be used wireless communications devices  
19 that incorporate an unlicensed wireless communications chip not provided or  
20 manufactured by Qualcomm or MediaTek (collectively, “TP-Link Other Accused  
21 Products) that use the unlicensed wireless communications chip(s) to communicate  
22 over a wireless network in a manner that infringes the Asserted Patents.

23 88. ZyXEL makes, uses, offers for sale, sells, imports and/or provides or  
24 causes to be used wireless communications devices that incorporate a Qualcomm  
25 Accused Product (collectively, “ZyXEL Qualcomm Accused Products”), such as the  
26 NBG7815 (Armor G5) Wireless Router/Wireless System, which includes Qualcomm  
27 QCN5024 and QCN5054 chips used to communicate over a wireless network in a  
28 manner that infringes the Asserted Patents.

1 89. ZyXEL also makes, uses, offers for sale, sells, imports and/or provides or  
2 causes to be used wireless communications devices that incorporate a MediaTek  
3 Accused Product (collectively, “ZyXEL MediaTek Accused Products”), such as the  
4 ZyXEL Keenetic Giga III wireless router, which includes MediaTek MT7602EN and  
5 MT7612EN chips used to communicate over a wireless network in a manner that  
6 infringes the Asserted Patents.

7 90. On information and belief, ZyXEL also makes, uses, offers for sale, sells,  
8 imports and/or provides or causes to be used wireless communications devices that  
9 incorporate an unlicensed wireless communications chip not provided or  
10 manufactured by Qualcomm or MediaTek (collectively, “ZyXEL Other Accused  
11 Products) that use the unlicensed wireless communications chip(s) to communicate  
12 over a wireless network in a manner that infringes the Asserted Patents.

13 **COUNT I – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

14 **(QUALCOMM)**

15 91. BNR re-alleges and incorporates by reference the allegations of the  
16 foregoing paragraphs as if fully set forth herein.

17 92. Upon information and belief, the Defendants have and continues to  
18 directly infringe one or more claims of the ’629 patent, including at least claim 1,  
19 making, using, selling, importing and/or providing and causing to be used the  
20 Accused Instrumentalities that operate according to the 802.11n standard, such as  
21 IPQ8074 devices, which operate using the 802.11ac standard that is backward-  
22 compatible with the 802.11n standard. A chart showing exemplary infringement of  
23 the ’629 patent by Qualcomm’s IPQ8074 device is provided in Exhibit D to this  
24 Complaint.

25 93. The 802.11n standard was introduced on or about October 2009, and  
26 provides a definition for a High Throughput Long Training Field (“HT-LTF”). The  
27 first part of the HT-LTF “consists of one, two, or four HT-LTFs that are necessary for  
28 demodulation of the HT-Data portion of the PPDU” (i.e., Protocol Data Unit). The

1 802.11n standard provides a specific HT-LTF sequence that is transmitted in the case  
2 of 20 MHz operation. (*See* 802.11-2016 at 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6.)

3 94. Upon information and belief after a reasonable investigation, at least the  
4 Qualcomm Accused Products infringe the '629 patent. The Qualcomm Accused  
5 Products are wireless communication devices that include a signal generator that  
6 generates an extended long training sequence. For instance, the IPQ8074 is 802.11n  
7 compliant because it is 802.11ac compliant, and, therefore, uses a specific HT-LTF  
8 sequence that is transmitted in the case of 20 MHz operation. (*See* 802.11-2016 at  
9 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6; *see, e.g.*, Ex. D.) This corresponds to the  
10 long training sequence with minimum peak-to-average power ratio described in the  
11 '629 patent. (*See id.*) Devices operating in accordance with the 802.11n standard  
12 (known as “wireless stations” or “STAs”) must be able to generate the HT-LTF  
13 described.

14 95. The Accused Instrumentalities include an Inverse Fourier Transformer  
15 operatively coupled to the signal generator. For instance, the IPQ8074 is 802.11n  
16 compliant and, therefore, uses an encoding process that requires a reverse Fourier  
17 transformer. (*See* 802.11-2016 and 19.3.4(b) or 802.11-2009 at 20.3.4(b); *see, e.g.*,  
18 Ex. D.)

19 96. The Accused Instrumentalities include an Inverse Fourier Transformer  
20 (as explained above) that processes the extended long training sequence from the  
21 signal generator and provides an optimal extended long training sequence with a  
22 minimal peak-to-average ratio. For instance, the IPQ8074 is 802.11n compliant and,  
23 therefore, processes the HT-LTF training sequence from the signal generator. (*See*  
24 802.11-2016 at Figure 19-9 and 19.3.9.4.6; *see, e.g.*, Ex. D.) The IPQ8074 also  
25 provides an optimal HT-LTF training sequence with a minimal peak-to-average ratio.  
26 (*See* 802.11-2016 at 19.3.9.4.6 at Equation 19-23; *see, e.g.*, Ex. D.)

27 97. The Accused Instrumentalities also include an optimal extended long  
28 training sequence that is carried by a greater number of subcarriers than a standard



1 wireless networking configuration for an OFDM scheme. For instance, the IPQ8074  
 2 is 802.11n compliant and, therefore, includes an optimal HT-LTF training sequence  
 3 that is carried by a greater number of subcarriers than is standard for an OFDM  
 4 scheme. (See 802.11-2016 at 19.3.9.4.6 at Equation 19-23 and additional subcarriers  
 5 noted therein as compared to L-LT; *see, e.g.*, Ex. D)

6 98. The Accused Instrumentalities also include an optimal extended long  
 7 training sequence that is carried by exactly 56 active subcarriers. For instance, the  
 8 IPQ8074 is 802.11n compliant and, therefore, includes an optimal HT-LTF training  
 9 sequence that is carried by 56 active subcarriers. (See 802.11-2016 at 19.3.9.4.6; *see,*  
 10 *e.g.*, Ex. D.)

Sub-carrier	-28	-27	-26	-25	-24	-23	-22
Encoding	+1	+1	+1	+1	-1	-1	+1
Sub-carrier	-14	-13	-12	-11	-10	-9	-8
Encoding	+1	+1	+1	-1	-1	+1	+1
Sub-carrier	1	2	3	4	5	6	7
Encoding	+1	-1	-1	+1	+1	-1	+1
Sub-carrier	15	16	17	18	19	20	21
Encoding	+1	+1	-1	-1	+1	-1	+1
Sub-carrier	-21	-20	-19	-18	-17	-16	-15
Encoding	+1	-1	+1	-1	+1	+1	+1
Sub-carrier	-7	-6	-5	-4	-3	-2	-1
Encoding	-1	+1	-1	+1	+1	+1	+1
Sub-carrier	8	9	10	11	12	13	14
Encoding	-1	+1	-1	-1	-1	-1	-1
Sub-carrier	22	23	24	25	26	27	28
Encoding	-1	+1	+1	+1	+1	-1	-1

17 99. The Accused Instrumentalities also include an optimal extended long  
 18 training sequence (as explained above) that is represented by encodings for indexed  
 19 subcarriers -28 to +28, excluding indexed subcarrier 0 which is set to zero, as follows:

20 100. For instance, the IPQ8074 is 802.11n compliant, and therefore includes  
 21 an optimal HT-LTF training sequence that is represented by encodings for indexed  
 22 subcarriers -28 to +28, excluding indexed subcarrier 0 according to the chart above.  
 23 (See 19.3.9.4.6 at Equation 19-23; *see, e.g.*, Ex. D.)

24 101. Qualcomm and the Downstream Defendants have infringed and is  
 25 infringing, individually and/or jointly, either literally or under the doctrine of  
 26 equivalents, at least claim one claim of the '629 patent, *e.g.*, claim 1, in violation of  
 27 35 U.S.C. §§ 271, *et seq.*, directly or indirectly, by making, using, offering for sale,  
 28

1 selling, offering for lease, leasing in the United States, and/or importing into the  
2 United States without authority or license, wireless communications devices  
3 comprising or containing Qualcomm Accused Products.

4 102. Upon information and belief, Qualcomm has been aware of the '629  
5 patent and its infringement thereof at least as early as February 6, 2023, when BNR  
6 sent a notice letter to Qualcomm.

7 103. Upon information and belief, since the Defendants have had knowledge  
8 of the '629 patent, Qualcomm has induced and continues to induce others to infringe  
9 at least claim 1 of the '629 patent under 35 U.S.C. § 271(b) by, among other things,  
10 and with specific intent or willful blindness, actively aiding and abetting others to  
11 infringe, including but not limited to Qualcomm's partners, clients, customers, and  
12 end users whose use of the Accused Instrumentalities constitutes direct infringement  
13 of at least claim 1 of the '629 patent.

14 104. In particular, Qualcomm's actions that aid and abet others such as its  
15 partners, customers, clients, and end users to infringe include advertising and  
16 distributing the Accused Instrumentalities and providing instruction materials,  
17 training, and services regarding the Accused Instrumentalities. On information and  
18 belief, Qualcomm has engaged in such actions with specific intent to cause  
19 infringement or with willful blindness to the resulting infringement because  
20 Qualcomm has had actual knowledge of the '629 patent and knowledge that its acts  
21 were inducing infringement of the '629 patent since at least the date Qualcomm  
22 received notice that such activities infringed the '629 patent.

23 105. Upon information and belief, the Defendants have engaged in such  
24 actions with specific intent to cause infringement or with willful blindness to the  
25 resulting infringement because the Defendants have had actual knowledge of the '629  
26 patent and that its acts were inducing infringement of the '629 patent since Qualcomm  
27 has had knowledge of the '629 patent.

1 106. Qualcomm’s infringement of the ’629 patent is willful and deliberate,  
2 entitling BNR to enhanced damages and attorneys’ fees.

3 107. Qualcomm’s infringement of the ’629 patent is exceptional and entitles  
4 BNR to attorneys’ fees and costs incurred in prosecuting this action under 35 U.S.C. §  
5 285.

6 108. BNR is entitled to recover from Qualcomm all damages that BNR has  
7 sustained as a result of Defendants’ infringement of the ’629 patent, including without  
8 limitation and/or not less than a reasonable royalty.

9 **COUNT II – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

10 **(QUALCOMM)**

11 109. BNR re-alleges and incorporates by reference the allegations of the  
12 foregoing paragraphs as if fully set forth herein.

13 110. Upon information and belief, Qualcomm has and continues to directly or  
14 indirectly infringe one or more claims of the ’862 patent, *e.g.*, claim 1, by selling,  
15 offering to sell, making, using, and/or providing and causing to be used Accused  
16 Instrumentalities that operate according to the 802.11ac standard, such as IPQ8074  
17 devices. A chart showing exemplary infringement of the ’862 patent by the IPQ8074  
18 is attached as Exhibit E.

19 111. The 802.11ac standard was introduced on or about December 2013, and  
20 provides a definition and standardization for channel sounding for beamforming for  
21 Multiple Input Multiple Output (“MIMO”) RF radio links, including how a receiving  
22 wireless device communicates channel sounding to a base station. Beamforming  
23 requires the use of a steering matrix that improves the reception to the beamformee.  
24 The 802.11ac standard provides a specific way to compress the beamforming  
25 feedback matrix by the beamformee, and how to determine and decompose the  
26 estimated transmitter beamforming unitary matrix and compressed into angles for  
27 efficient transmission to the beamformer, which generates a next steering matrix.  
28 (*See* 802.11-2016 at 19.3.12.1.)

1 112. Upon information and belief after a reasonable investigation, at least the  
2 Accused Instrumentalities infringe the '862 patent that provide a method for feeding  
3 back transmitter beamforming information from a receiving wireless communication  
4 device to a transmitting wireless communication device. For instance, the IPQ8074 is  
5 802.11ac compliant and therefore provides a compressed beamforming feedback  
6 matrix to a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.12.1; Ex. E.)

7 113. The Accused Instrumentalities, for example, receive a preamble  
8 sequence from a transmitting wireless device. For instance, the IPQ8074 is an  
9 802.11ac compliant receiver and, therefore, receives a PHY preamble with HT-LTFs  
10 from a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.13.1; Ex. E.)

11 114. The Accused Instrumentalities include estimating a channel response  
12 based upon the preamble sequence. For instance, the IPQ8074 is an 802.11ac  
13 compliant wireless device and, therefore, estimates a channel response as a result of  
14 receiving the HT-LTF's which are part of the PHY preamble. (*See, e.g.*, 802.11-2016  
15 at 19.3.13.1; Ex. E.)

16 115. The Accused Instrumentalities include determining an estimated  
17 transmitter beamforming unitary matrix ( $V$ ) based upon the channel response and a  
18 receiver beamforming unitary matrix ( $U$ ). For instance, the IPQ8074 is an 802.11ac  
19 compliant wireless device, and therefore calculates a beamforming unitary matrix  $V$   
20 based on a singular value decomposition of the channel response  $H=UDV^*$ , where  $D$   
21 is a diagonal matrix and  $U$  is a receiver unitary matrix. (*See, e.g.*, 802.11-2016 at  
22 19.3.12.3.6; Ex. E.)

23 116. The Accused Instrumentalities include decomposing the estimated  
24 transmitter beamforming unitary matrix ( $V$ ) to produce the transmitter beamforming  
25 information. For instance, the IPQ8074 is an 802.11ac compliant wireless device and,  
26 therefore, determines beamforming feedback matrices and compresses those into the  
27 form of angles. (*See, e.g.*, 802.11-2016 at 19.3.12.3.6; Ex. E.)  
28

1 117. The Accused Instrumentalities include wirelessly sending the transmitter  
2 beamforming information to the transmitting wireless device. For instance, the  
3 IPQ8074 is an 802.11ac compliant wireless device and, therefore, wirelessly sends the  
4 compressed beamformed matrices to the beamformer. (*See, e.g.*, 802.11-2016 at  
5 19.3.12.3.6; Ex. E.)

6 118. Qualcomm has infringed and is infringing, individually and/or jointly,  
7 either literally or under the doctrine of equivalents, at least one claim of the '862  
8 patent, e.g. claim 1, in violation of 35 U.S.C. §§ 271, *et seq.*, directly and/or  
9 indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the  
10 United States, and/or importing into the United States without authority or license, the  
11 Accused Instrumentalities.

12 119. Upon information and belief Qualcomm has been aware of the '862  
13 patent and its infringement thereof at least as early as February 6, 2023, upon the  
14 receipt of a notice letter from BNR.

15 120. Upon information and belief, since Qualcomm has had knowledge of the  
16 '862 patent, Qualcomm has induced and continues to induce others to infringe at least  
17 claim 1 of the '862 patent under 35 U.S.C. § 271(b) by, among other things, and with  
18 specific intent or willful blindness, actively aiding and abetting others to infringe,  
19 including but not limited to Qualcomm's partners, clients, customers, and end users  
20 across the country and in this District, whose use of the Accused Instrumentalities  
21 constitutes direct infringement of at least one claim of the '862 patent.

22 121. In particular, Qualcomm's actions that aid and abet others such as its  
23 partners, customers, clients, and end users to infringe include advertising and  
24 distributing the Accused Instrumentalities and providing instruction materials,  
25 training, and services regarding the Accused Instrumentalities. On information and  
26 belief, Qualcomm has engaged in such actions with specific intent to cause  
27 infringement or with willful blindness to the resulting infringement because  
28 Qualcomm has had actual knowledge of the '862 patent and knowledge that its acts

1 were inducing infringement of the '862 patent since at least the date Qualcomm  
2 received notice that such activities infringed the '862 patent.

3 122. Upon information and belief, Qualcomm has engaged in such actions  
4 with specific intent to cause infringement or with willful blindness to the resulting  
5 infringement because Qualcomm has had actual knowledge of the '862 patent and that  
6 its acts were inducing infringement of the '862 patent since Qualcomm has had  
7 knowledge of the '862 patent.

8 123. Qualcomm's infringement of the '862 patent is willful and deliberate,  
9 entitling BNR to enhanced damages and attorneys' fees.

10 124. Qualcomm's infringement of the '862 patent is exceptional and entitles  
11 BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. §  
12 285.

13 125. BNR is entitled to recover from Qualcomm all damages that BNR has  
14 sustained as a result of Qualcomm's infringement of the '862 patent, including  
15 without limitation and/or not less than a reasonable royalty.

16 126. Plaintiff has been harmed by Qualcomm's infringing activities.

17 **COUNT III – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

18 **(QUALCOMM)**

19 127. BNR re-alleges and incorporates by reference the allegations of the  
20 foregoing paragraphs as if fully set forth herein.

21 128. Upon information and belief, the Defendants have and continues to  
22 directly infringe one or more claims of the '914 patent, including at least claim 13, by  
23 selling, offering to sell, making, using, and/or providing and causing to be used  
24 instrumentalities that operate according to the 802.11ac standard, including the  
25 Accused Instrumentalities. A chart showing exemplary infringement of the '914  
26 patent by the IPQ8074 is attached as Exhibit F.

27 129. The 802.11ac standard provides for a "compressed beamforming  
28 feedback matrix" and specifies that "[i]n compressed beamforming feedback matrix,

1 the beamformee shall remove the space-time stream CSD in Table 19-10 from the  
2 measured channel before computing a set of matrices for feedback to the  
3 beamformer.” (See 802.11-2016 at 19.3.12.3.6.) Furthermore, “[t]he beamforming  
4 feedback matrices,  $V(k)$ , found by the beamformee are compressed in the form of  
5 angles, which are sent to the beamformer.” (*Id.*) Devices implementing the  
6 beamforming standardization according to 802.11ac standard must be capable of  
7 providing compressed beamforming feedback matrices as set forth above.

8 130. On information and belief after a reasonable investigation, the Accused  
9 Instrumentalities infringe the '914 patent that provide a method for receiving data via  
10 a plurality of radio frequency (RF) channels utilizing a plurality of receiving antennas.  
11 For instance, the IPQ8074 is an 802.11ac compliant wireless device that transmits  
12 data via a plurality of radio frequency (RF) channels utilizing a plurality of  
13 transmitting antennas. See Ex. F.

14 131. The Accused Instrumentalities transmit feedback information via at least  
15 one of the plurality of RF channels. For instance, the IPQ8074 is an 802.11ac  
16 compliant wireless device that transmits feedback information via at least one of the  
17 plurality of RF channels. See Ex. F.

18 132. The Accused Instrumentalities request modification of a transmission  
19 mode based on the feedback information in transmitted response messages. For  
20 instance, the IPQ8074 is an 802.11ac compliant wireless device that modifies a  
21 transmission mode based on the feedback information. See Ex. F.

22 133. The Accused Instrumentalities transmit, via at least one of the plurality  
23 of receiving antennas, the feedback information comprising channel estimates based  
24 on transmission characteristics of the received data. For instance, the IPQ8074 is an  
25 802.11ac compliant wireless device that transmits, via at least one of the plurality of  
26 receiving antennas, the feedback information comprising channel estimates based on  
27 transmission characteristics of the received data See Ex. F.

28

1 134. The Accused Instrumentalities derive the feedback information from  
2 mathematical matrix decomposition of channel estimates. For instance, the IPQ8074  
3 is an 802.11ac compliant wireless device that derives the feedback information from  
4 mathematical matrix decomposition of channel estimates. *See* Ex. F.

5 135. Qualcomm has infringed and is infringing, individually and/or jointly,  
6 either literally or under the doctrine of equivalents, at least one claim of the '914  
7 patent, *e.g.*, claim 13, in violation of 35 U.S.C. §§ 271, *et seq.*, directly or indirectly,  
8 by making, using, offering for sale, selling, offering for lease, leasing in the United  
9 States, and/or importing into the United States without authority or license, the  
10 Accused Instrumentalities.

11 136. On information and belief, these Accused Instrumentalities are used  
12 marketed, provided to, and/or used by or for Qualcomm's partners, clients, customers  
13 and end users across the country and in this District.

14 137. Upon information and belief, Qualcomm has been aware of the '914  
15 patent and its infringement thereof at least as early as February 6, 2023 upon the  
16 receipt of a notice letter from BNR.

17 138. Upon information and belief, since Qualcomm has had knowledge of the  
18 '914 patent, Qualcomm has induced and continues to induce others to infringe at least  
19 claim 13 of the '914 patent under 35 U.S.C. § 271(b) by, among other things, and  
20 with specific intent or willful blindness, actively aiding and abetting others to  
21 infringe, including but not limited to Qualcomm's partners, customers, clients, and  
22 end users, whose use of the Accused Instrumentalities constitutes direct infringement  
23 of at least claim 13 of the '914 patent.

24 139. In particular, Qualcomm's actions that aid and abet others such as its  
25 partners, customers, clients, and end users to infringe include advertising and  
26 distributing the Accused Instrumentalities and providing instruction materials,  
27 training, and services regarding the Accused Instrumentalities. On information and  
28 belief, Qualcomm has engaged in such actions with specific intent to cause



1 infringement or with willful blindness to the resulting infringement because  
2 Qualcomm has had actual knowledge of the '914 patent and knowledge that its acts  
3 were inducing infringement of the '914 patent since at least the date Qualcomm  
4 received notice that such activities infringed the '914 patent.

5 140. Upon information and belief, Qualcomm has engaged in such actions  
6 with specific intent to cause infringement or with willful blindness to the resulting  
7 infringement because Qualcomm has had actual knowledge of the '914 patent and that  
8 its acts were inducing infringement of the '914 patent since Qualcomm has had  
9 knowledge of the '914 patent.

10 141. Qualcomm's infringement of the '914 patent is exceptional and entitles  
11 BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. §  
12 285.

13 142. BNR is entitled to recover from Qualcomm all damages that BNR has  
14 sustained as a result of Qualcomm's infringement of the '914 patent, including  
15 without limitation and/or not less than a reasonable royalty.

16 143. Plaintiff has been harmed by Qualcomm's infringing activities.

17 **COUNT IV – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

18 **(MEDIATEK)**

19 144. BNR re-alleges and incorporates by reference the allegations of the  
20 foregoing paragraphs as if fully set forth herein.

21 145. Upon information and belief, the Defendants have and continues to  
22 directly infringe one or more claims of the '629 patent, including at least claim 1,  
23 making, using, selling, importing and/or providing and causing to be used the  
24 Accused Instrumentalities that operate according to the 802.11n standard, such as  
25 MT7922 devices, which operate using the 802.11ac standard that is backward-  
26 compatible with the 802.11n standard. A chart showing exemplary infringement of  
27 the '629 patent by MediaTek's MT7922 device is provided in Exhibit G to this  
28 Complaint.

1 146. The 802.11n standard was introduced on or about October 2009, and  
2 provides a definition for a High Throughput Long Training Field (“HT-LTF”). The  
3 first part of the HT-LTF “consists of one, two, or four HT-LTFs that are necessary for  
4 demodulation of the HT-Data portion of the PPDU” (i.e., Protocol Data Unit). The  
5 802.11n standard provides a specific HT-LTF sequence that is transmitted in the case  
6 of 20 MHz operation. (*See* 802.11-2016 at 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6.)

7 147. Upon information and belief after a reasonable investigation, at least the  
8 MediaTek Accused Products infringe the ’629 patent. The MediaTek Accused  
9 Products are wireless communication devices that include a signal generator that  
10 generates an extended long training sequence. For instance, the MT7922 is 802.11n  
11 compliant because it is 802.11ac compliant, and, therefore, uses a specific HT-LTF  
12 sequence that is transmitted in the case of 20 MHz operation. (*See* 802.11-2016 at  
13 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6; *see, e.g.*, Ex. G.) This corresponds to the  
14 long training sequence with minimum peak-to-average power ratio described in the  
15 ’629 patent. (*See id.*) Devices operating in accordance with the 802.11n standard  
16 (known as “wireless stations” or “STAs”) must be able to generate the HT-LTF  
17 described.

18 148. The Accused Instrumentalities include an Inverse Fourier Transformer  
19 operatively coupled to the signal generator. For instance, the MT7922 is 802.11n  
20 compliant and, therefore, uses an encoding process that requires a reverse Fourier  
21 transformer. (*See* 802.11-2016 and 19.3.4(b) or 802.11-2009 at 20.3.4(b); *see, e.g.*,  
22 Ex. G.)

23 149. The Accused Instrumentalities include an Inverse Fourier Transformer  
24 (as explained above) that processes the extended long training sequence from the  
25 signal generator and provides an optimal extended long training sequence with a  
26 minimal peak-to-average ratio. For instance, the MT7922 is 802.11n compliant and,  
27 therefore, processes the HT-LTF training sequence from the signal generator. (*See*  
28 802.11-2016 at Figure 19-9 and 19.3.9.4.6; *see, e.g.*, Ex. G.) The MT7922 also

1 provides an optimal HT-LTF training sequence with a minimal peak-to-average ratio.  
 2 (See 802.11-2016 at 19.3.9.4.6 at Equation 19-23; *see, e.g.*, Ex. G.)

3 150. The Accused Instrumentalities also include an optimal extended long  
 4 training sequence that is carried by a greater number of subcarriers than a standard  
 5 wireless networking configuration for an OFDM scheme. For instance, the MT7922  
 6 is 802.11n compliant and, therefore, includes an optimal HT-LTF training sequence  
 7 that is carried by a greater number of subcarriers than is standard for an OFDM  
 8 scheme. (See 802.11-2016 at 19.3.9.4.6 at Equation 19-23 and additional subcarriers  
 9 noted therein as compared to L-LT; *see, e.g.*, Ex. G)

10 151. The Accused Instrumentalities also include an optimal extended long  
 11 training sequence that is carried by exactly 56 active subcarriers. For instance, the  
 12 MT7922 is 802.11n compliant and, therefore, includes an optimal HT-LTF training  
 13 sequence that is carried by 56 active subcarriers. (See 802.11-2016 at 19.3.9.4.6; *see,*  
 14 *e.g.*, Ex. G.)

Sub-carrier	-28	-27	-26	-25	-24	-23	-22
Encoding	+1	+1	+1	+1	-1	-1	+1
Sub-carrier	-14	-13	-12	-11	-10	-9	-8
Encoding	+1	+1	+1	-1	-1	+1	+1
Sub-carrier	1	2	3	4	5	6	7
Encoding	+1	-1	-1	+1	+1	-1	+1
Sub-carrier	15	16	17	18	19	20	21
Encoding	+1	+1	-1	-1	+1	-1	+1
Sub-carrier	-21	-20	-19	-18	-17	-16	-15
Encoding	+1	-1	+1	-1	+1	+1	+1
Sub-carrier	-7	-6	-5	-4	-3	-2	-1
Encoding	-1	+1	-1	+1	+1	+1	+1
Sub-carrier	8	9	10	11	12	13	14
Encoding	-1	+1	-1	-1	-1	-1	-1
Sub-carrier	22	23	24	25	26	27	28
Encoding	-1	+1	+1	+1	+1	-1	-1

21 152. The Accused Instrumentalities also include an optimal extended long  
 22 training sequence (as explained above) that is represented by encodings for indexed  
 23 subcarriers -28 to +28, excluding indexed subcarrier 0 which is set to zero, as follows:

24 153. For instance, the MT7922 is 802.11n compliant, and therefore includes  
 25 an optimal HT-LTF training sequence that is represented by encodings for indexed  
 26 subcarriers -28 to +28, excluding indexed subcarrier 0 according to the chart above.  
 27 (See 19.3.9.4.6 at Equation 19-23; *see, e.g.*, Ex. G.)  
 28

1           154. MediaTek and the Downstream Defendants have infringed and is  
2 infringing, individually and/or jointly, either literally or under the doctrine of  
3 equivalents, at least claim one claim of the '629 patent, *e.g.*, claim 1, in violation of  
4 35 U.S.C. §§ 271, *et seq.*, directly or indirectly, by making, using, offering for sale,  
5 selling, offering for lease, leasing in the United States, and/or importing into the  
6 United States without authority or license, wireless communications devices  
7 comprising or containing MediaTek Accused Products.

8           155. Upon information and belief, MediaTek has been aware of the '629  
9 patent and its infringement thereof at least as early as February 6, 2023, when BNR  
10 sent a notice letter to MediaTek.

11           156. Upon information and belief, since the Defendants have had knowledge  
12 of the '629 patent, MediaTek has induced and continues to induce others to infringe at  
13 least claim 1 of the '629 patent under 35 U.S.C. § 271(b) by, among other things, and  
14 with specific intent or willful blindness, actively aiding and abetting others to  
15 infringe, including but not limited to MediaTek's partners, clients, customers, and end  
16 users whose use of the Accused Instrumentalities constitutes direct infringement of at  
17 least claim 1 of the '629 patent.

18           157. In particular, MediaTek's actions that aid and abet others such as its  
19 partners, customers, clients, and end users to infringe include advertising and  
20 distributing the Accused Instrumentalities and providing instruction materials,  
21 training, and services regarding the Accused Instrumentalities. On information and  
22 belief, MediaTek has engaged in such actions with specific intent to cause  
23 infringement or with willful blindness to the resulting infringement because  
24 MediaTek has had actual knowledge of the '629 patent and knowledge that its acts  
25 were inducing infringement of the '629 patent since at least the date MediaTek  
26 received notice that such activities infringed the '629 patent.

27           158. Upon information and belief, the Defendants have engaged in such  
28 actions with specific intent to cause infringement or with willful blindness to the

1 resulting infringement because the Defendants have had actual knowledge of the '629  
2 patent and that its acts were inducing infringement of the '629 patent since MediaTek  
3 has had knowledge of the '629 patent.

4 159. MediaTek's infringement of the '629 patent is willful and deliberate,  
5 entitling BNR to enhanced damages and attorneys' fees.

6 160. MediaTek's infringement of the '629 patent is exceptional and entitles  
7 BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. §  
8 285.

9 161. BNR is entitled to recover from MediaTek all damages that BNR has  
10 sustained as a result of Defendants' infringement of the '629 patent, including without  
11 limitation and/or not less than a reasonable royalty.

12 **COUNT V – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

13 **(MEDIATEK)**

14 162. BNR re-alleges and incorporates by reference the allegations of the  
15 foregoing paragraphs as if fully set forth herein.

16 163. Upon information and belief, MediaTek has and continues to directly or  
17 indirectly infringe one or more claims of the '862 patent, *e.g.*, claim 1, by selling,  
18 offering to sell, making, using, and/or providing and causing to be used Accused  
19 Instrumentalities that operate according to the 802.11ac standard, such as MT7922  
20 devices. A chart showing exemplary infringement of the '862 patent by the MT7922  
21 is attached as Exhibit H.

22 164. The 802.11ac standard was introduced on or about December 2013, and  
23 provides a definition and standardization for channel sounding for beamforming for  
24 Multiple Input Multiple Output ("MIMO") RF radio links, including how a receiving  
25 wireless device communicates channel sounding to a base station. Beamforming  
26 requires the use of a steering matrix that improves the reception to the beamformee.  
27 The 802.11ac standard provides a specific way to compress the beamforming  
28 feedback matrix by the beamformee, and how to determine and decompose the

1 estimated transmitter beamforming unitary matrix and compressed into angles for  
2 efficient transmission to the beamformer, which generates a next steering matrix.  
3 (*See* 802.11-2016 at 19.3.12.1.)

4 165. Upon information and belief after a reasonable investigation, at least the  
5 Accused Instrumentalities infringe the '862 patent that provide a method for feeding  
6 back transmitter beamforming information from a receiving wireless communication  
7 device to a transmitting wireless communication device. For instance, the MT7922 is  
8 802.11ac compliant and therefore provides a compressed beamforming feedback  
9 matrix to a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.12.1; Ex. H.)

10 166. The Accused Instrumentalities, for example, receive a preamble  
11 sequence from a transmitting wireless device. For instance, the MT7922 is an  
12 802.11ac compliant receiver and, therefore, receives a PHY preamble with HT-LTFs  
13 from a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.13.1; Ex. H.)

14 167. The Accused Instrumentalities include estimating a channel response  
15 based upon the preamble sequence. For instance, the MT7922 is an 802.11ac  
16 compliant wireless device and, therefore, estimates a channel response as a result of  
17 receiving the HT-LTF's which are part of the PHY preamble. (*See, e.g.*, 802.11-2016  
18 at 19.3.13.1; Ex. H.)

19 168. The Accused Instrumentalities include determining an estimated  
20 transmitter beamforming unitary matrix ( $V$ ) based upon the channel response and a  
21 receiver beamforming unitary matrix ( $U$ ). For instance, the MT7922 is an 802.11ac  
22 compliant wireless device, and therefore calculates a beamforming unitary matrix  $V$   
23 based on a singular value decomposition of the channel response  $H=UDV^*$ , where  $D$   
24 is a diagonal matrix and  $U$  is a receiver unitary matrix. (*See, e.g.*, 802.11-2016 at  
25 19.3.12.3.6; Ex. H.)

26 169. The Accused Instrumentalities include decomposing the estimated  
27 transmitter beamforming unitary matrix ( $V$ ) to produce the transmitter beamforming  
28 information. For instance, the MT7922 is an 802.11ac compliant wireless device and,

1 therefore, determines beamforming feedback matrices and compresses those into the  
2 form of angles. (*See, e.g.*, 802.11-2016 at 19.3.12.3.6; Ex. H.)

3 170. The Accused Instrumentalities include wirelessly sending the transmitter  
4 beamforming information to the transmitting wireless device. For instance, the  
5 MT7922 is an 802.11ac compliant wireless device and, therefore, wirelessly sends the  
6 compressed beamformed matrices to the beamformer. (*See, e.g.*, 802.11-2016 at  
7 19.3.12.3.6; Ex. H.)

8 171. MediaTek has infringed and is infringing, individually and/or jointly,  
9 either literally or under the doctrine of equivalents, at least one claim of the '862  
10 patent, e.g. claim 1, in violation of 35 U.S.C. §§ 271, *et seq.*, directly and/or  
11 indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the  
12 United States, and/or importing into the United States without authority or license, the  
13 Accused Instrumentalities.

14 172. Upon information and belief MediaTek has been aware of the '862 patent  
15 and its infringement thereof at least as early as February 6, 2023, upon the receipt of a  
16 notice letter from BNR.

17 173. Upon information and belief, since MediaTek has had knowledge of the  
18 '862 patent, MediaTek has induced and continues to induce others to infringe at least  
19 claim 1 of the '862 patent under 35 U.S.C. § 271(b) by, among other things, and with  
20 specific intent or willful blindness, actively aiding and abetting others to infringe,  
21 including but not limited to MediaTek's partners, clients, customers, and end users  
22 across the country and in this District, whose use of the Accused Instrumentalities  
23 constitutes direct infringement of at least one claim of the '862 patent.

24 174. In particular, MediaTek's actions that aid and abet others such as its  
25 partners, customers, clients, and end users to infringe include advertising and  
26 distributing the Accused Instrumentalities and providing instruction materials,  
27 training, and services regarding the Accused Instrumentalities. On information and  
28 belief, MediaTek has engaged in such actions with specific intent to cause

1 infringement or with willful blindness to the resulting infringement because  
2 MediaTek has had actual knowledge of the '862 patent and knowledge that its acts  
3 were inducing infringement of the '862 patent since at least the date MediaTek  
4 received notice that such activities infringed the '862 patent.

5 175. Upon information and belief, MediaTek has engaged in such actions with  
6 specific intent to cause infringement or with willful blindness to the resulting  
7 infringement because MediaTek has had actual knowledge of the '862 patent and that  
8 its acts were inducing infringement of the '862 patent since MediaTek has had  
9 knowledge of the '862 patent.

10 176. MediaTek's infringement of the '862 patent is willful and deliberate,  
11 entitling BNR to enhanced damages and attorneys' fees.

12 177. MediaTek's infringement of the '862 patent is exceptional and entitles  
13 BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. §  
14 285.

15 178. BNR is entitled to recover from MediaTek all damages that BNR has  
16 sustained as a result of MediaTek's infringement of the '862 patent, including without  
17 limitation and/or not less than a reasonable royalty.

18 179. Plaintiff has been harmed by MediaTek's infringing activities.

19 **COUNT VI – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

20 **(MEDIATEK)**

21 180. BNR re-alleges and incorporates by reference the allegations of the  
22 foregoing paragraphs as if fully set forth herein.

23 181. Upon information and belief, the Defendants have and continues to  
24 directly infringe one or more claims of the '914 patent, including at least claim 13, by  
25 selling, offering to sell, making, using, and/or providing and causing to be used  
26 instrumentalities that operate according to the 802.11ac standard, including the  
27 Accused Instrumentalities. A chart showing exemplary infringement of the '914  
28 patent by the MT7922 is attached as Exhibit I.



1           182. The 802.11ac standard provides for a “compressed beamforming  
2 feedback matrix” and specifies that “[i]n compressed beamforming feedback matrix,  
3 the beamformee shall remove the space-time stream CSD in Table 19-10 from the  
4 measured channel before computing a set of matrices for feedback to the  
5 beamformer.” (*See* 802.11-2016 at 19.3.12.3.6.) Furthermore, “[t]he beamforming  
6 feedback matrices,  $V(k)$ , found by the beamformee are compressed in the form of  
7 angles, which are sent to the beamformer.” (*Id.*) Devices implementing the  
8 beamforming standardization according to 802.11ac standard must be capable of  
9 providing compressed beamforming feedback matrices as set forth above.

10           183. On information and belief after a reasonable investigation, the Accused  
11 Instrumentalities infringe the ’914 patent that provide a method for receiving data via  
12 a plurality of radio frequency (RF) channels utilizing a plurality of receiving antennas.  
13 For instance, the MT7922 is an 802.11ac compliant wireless device that transmits data  
14 via a plurality of radio frequency (RF) channels utilizing a plurality of transmitting  
15 antennas. *See* Ex. I.

16           184. The Accused Instrumentalities transmit feedback information via at least  
17 one of the plurality of RF channels. For instance, the MT7922 is an 802.11ac  
18 compliant wireless device that transmits feedback information via at least one of the  
19 plurality of RF channels. *See* Ex. I.

20           185. The Accused Instrumentalities request modification of a transmission  
21 mode based on the feedback information in transmitted response messages. For  
22 instance, the MT7922 is an 802.11ac compliant wireless device that modifies a  
23 transmission mode based on the feedback information. *See* Ex. I.

24           186. The Accused Instrumentalities transmit, via at least one of the plurality  
25 of receiving antennas, the feedback information comprising channel estimates based  
26 on transmission characteristics of the received data. For instance, the MT7922 is an  
27 802.11ac compliant wireless device that transmits, via at least one of the plurality of  
28

1 receiving antennas, the feedback information comprising channel estimates based on  
2 transmission characteristics of the received data *See Ex. I.*

3 187. The Accused Instrumentalities derive the feedback information from  
4 mathematical matrix decomposition of channel estimates. For instance, the MT7922  
5 is an 802.11ac compliant wireless device that derives the feedback information from  
6 mathematical matrix decomposition of channel estimates. *See Ex. I.*

7 188. MediaTek has infringed and is infringing, individually and/or jointly,  
8 either literally or under the doctrine of equivalents, at least one claim of the '914  
9 patent, *e.g.*, claim 13, in violation of 35 U.S.C. §§ 271, *et seq.*, directly or indirectly,  
10 by making, using, offering for sale, selling, offering for lease, leasing in the United  
11 States, and/or importing into the United States without authority or license, the  
12 Accused Instrumentalities.

13 189. On information and belief, these Accused Instrumentalities are used  
14 marketed, provided to, and/or used by or for MediaTek's partners, clients, customers  
15 and end users across the country and in this District.

16 190. Upon information and belief, MediaTek has been aware of the '914  
17 patent and its infringement thereof at least as early as February 6, 2023, upon the  
18 receipt of a notice letter from BNR.

19 191. Upon information and belief, since MediaTek has had knowledge of the  
20 '914 patent, MediaTek has induced and continues to induce others to infringe at least  
21 claim 13 of the '914 patent under 35 U.S.C. § 271(b) by, among other things, and  
22 with specific intent or willful blindness, actively aiding and abetting others to  
23 infringe, including but not limited to MediaTek's partners, customers, clients, and end  
24 users, whose use of the Accused Instrumentalities constitutes direct infringement of at  
25 least claim 13 of the '914 patent.

26 192. In particular, MediaTek's actions that aid and abet others such as its  
27 partners, customers, clients, and end users to infringe include advertising and  
28 distributing the Accused Instrumentalities and providing instruction materials,

1 training, and services regarding the Accused Instrumentalities. On information and  
2 belief, MediaTek has engaged in such actions with specific intent to cause  
3 infringement or with willful blindness to the resulting infringement because  
4 MediaTek has had actual knowledge of the '914 patent and knowledge that its acts  
5 were inducing infringement of the '914 patent since at least the date MediaTek  
6 received notice that such activities infringed the '914 patent.

7 193. Upon information and belief, MediaTek has engaged in such actions with  
8 specific intent to cause infringement or with willful blindness to the resulting  
9 infringement because MediaTek has had actual knowledge of the '914 patent and that  
10 its acts were inducing infringement of the '914 patent since MediaTek has had  
11 knowledge of the '914 patent.

12 194. MediaTek's infringement of the '914 patent is exceptional and entitles  
13 BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. §  
14 285.

15 195. BNR is entitled to recover from MediaTek all damages that BNR has  
16 sustained as a result of MediaTek's infringement of the '914 patent, including without  
17 limitation and/or not less than a reasonable royalty.

18 196. Plaintiff has been harmed by MediaTek's infringing activities.

19 **COUNT VII – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

20 **(D-LINK)**

21 197. BNR re-alleges and incorporates by reference the allegations of the  
22 foregoing paragraphs as if fully set forth herein.

23 198. On information and belief, D-Link has and continues to directly infringe,  
24 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
25 or more claims of the '629 patent by making, using, offering to sell, or selling within  
26 the United States, or importing into the United States, products comprising or  
27 containing one or more unlicensed wireless communications devices that  
28 communicate over wireless networks. These include: (a) D-Link Qualcomm Accused

1 Products, including as non-limiting examples the COVR-1300E, COVR-2200 rev A1,  
2 DAP-1655 rev A1, DAP-2610 revA1, DAP-2682 rev A1, and DWL7620AP rev A1  
3 products; (b) D-Link MediaTek Accused Products, including as non-limiting  
4 examples the DIR-X1860 rev A1, DAP-1620 rev A1, DRA-1360, DSL-3782, DWA-  
5 171 rev B1, and DWR-118 rev A1 and A2; and (c) on information and belief, D-Link  
6 Other Accused Products (collectively, “D-Link Accused Products”).

7 199. As of the date of this Complaint, D-Link’s infringement of the ’629  
8 patent is, and continues to be, done with knowledge of the ’629 patent and with  
9 knowledge of BNR’s contention that D-Link is infringing the ’629 patent. D-Link’s  
10 infringement of the ’629 patent after this date is thus willful and deliberate, entitling  
11 BNR to enhanced damages and attorneys’ fees.

12 200. BNR has been damaged by D-Link’s infringement of the ’629 patent and  
13 will continue to be damaged unless D-Link are enjoined by this Court. BNR has  
14 suffered and continues to suffer irreparable injury for which there is no adequate  
15 remedy at law. The balance of hardships favors BNR, and public interest is not  
16 disserved by an injunction.

17 201. BNR is entitled to recover from D-Link all damages that BNR has  
18 sustained as a result of D-Link’s infringement of the ’629 patent, including without  
19 limitation and/or not less than a reasonable royalty.

20 **COUNT VIII – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

21 **(D-LINK)**

22 202. BNR re-alleges and incorporates by reference the allegations of the  
23 foregoing paragraphs as if fully set forth herein.

24 203. On information and belief, D-Link has and continues to directly infringe,  
25 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
26 or more claims of the ’862 patent by making, using, offering to sell, or selling within  
27 the United States, or importing into the United States, the D-Link Accused Products.  
28

1           204. As of the date of this Complaint, D-Link’s infringement of the ’862  
2 patent is, and continues to be, done with knowledge of the ’862 patent and with  
3 knowledge of BNR’s contention that D-Link is infringing the ’862 patent. D-Link’s  
4 infringement of the ’862 patent after this date is thus willful and deliberate, entitling  
5 BNR to enhanced damages and attorneys’ fees.

6           205. BNR has been damaged by D-Link’s infringement of the ’862 patent and  
7 will continue to be damaged unless D-Link are enjoined by this Court. BNR has  
8 suffered and continues to suffer irreparable injury for which there is no adequate  
9 remedy at law. The balance of hardships favors BNR, and public interest is not  
10 disserved by an injunction.

11           206. BNR is entitled to recover from D-Link all damages that BNR has  
12 sustained as a result of D-Link’s infringement of the ’862 patent, including without  
13 limitation and/or not less than a reasonable royalty.

14           **COUNT IX – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

15                           **(D-LINK)**

16           207. BNR re-alleges and incorporates by reference the allegations of the  
17 foregoing paragraphs as if fully set forth herein.

18           208. On information and belief, D-Link has and continues to directly infringe,  
19 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
20 or more claims of the ’914 patent by making, using, offering to sell, or selling within  
21 the United States, or importing into the United States, the D-Link Accused Products.

22           209. As of the date of this Complaint, D-Link’s infringement of the ’914  
23 patent is, and continues to be, done with knowledge of the ’914 patent and with  
24 knowledge of BNR’s contention that D-Link is infringing the ’914 patent. D-Link’s  
25 infringement of the ’914 patent after this date is thus willful and deliberate, entitling  
26 BNR to enhanced damages and attorneys’ fees.

27           210. BNR has been damaged by D-Link’s infringement of the ’914 patent and  
28 will continue to be damaged unless D-Link are enjoined by this Court. BNR has

1 suffered and continues to suffer irreparable injury for which there is no adequate  
2 remedy at law. The balance of hardships favors BNR, and public interest is not  
3 disserved by an injunction.

4 211. BNR is entitled to recover from D-Link all damages that BNR has  
5 sustained as a result of D-Link's infringement of the '914 patent, including without  
6 limitation and/or not less than a reasonable royalty.

7 **COUNT X – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

8 **(LINKSYS)**

9 212. BNR re-alleges and incorporates by reference the allegations of the  
10 foregoing paragraphs as if fully set forth herein.

11 213. On information and belief, Linksys has and continues to directly infringe,  
12 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
13 or more claims of the '629 patent by making, using, offering to sell, or selling within  
14 the United States, or importing into the United States, products comprising or  
15 containing one or more unlicensed wireless communications devices that  
16 communicate over wireless networks. These include: (a) Linksys Qualcomm  
17 Accused Products, including as non-limiting examples the EA8250,  
18 EA8300,MR7350, MX10 Velop AX, MX4200, and Velop (WHW01 and WHW03)  
19 products; (b) Linksys MediaTek Accused Products, including as non-limiting  
20 examples the AE6000, E7350, E8450, EA6100, EA8100, RE6300, and RE9000  
21 products; and (c) on information and belief, Linksys Other Accused Products  
22 (collectively, "Linksys Accused Products").

23 214. As of the date of this Complaint, Linksys's infringement of the '629  
24 patent is, and continues to be, done with knowledge of the '629 patent and with  
25 knowledge of BNR's contention that Linksys is infringing the '629 patent. Linksys's  
26 infringement of the '629 patent after this date is thus willful and deliberate, entitling  
27 BNR to enhanced damages and attorneys' fees.

1           215. BNR has been damaged by Linksys's infringement of the '629 patent and  
2 will continue to be damaged unless Linksys are enjoined by this Court. BNR has  
3 suffered and continues to suffer irreparable injury for which there is no adequate  
4 remedy at law. The balance of hardships favors BNR, and public interest is not  
5 disserved by an injunction.

6           216. BNR is entitled to recover from Linksys all damages that BNR has  
7 sustained as a result of Linksys's infringement of the '629 patent, including without  
8 limitation and/or not less than a reasonable royalty.

9                           **COUNT XI – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

10   **(LINKSYS)**

11           217. BNR re-alleges and incorporates by reference the allegations of the  
12 foregoing paragraphs as if fully set forth herein.

13           218. On information and belief, Linksys has and continues to directly infringe,  
14 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
15 or more claims of the '862 patent by making, using, offering to sell, or selling within  
16 the United States, or importing into the United States, the Linksys Accused Products.

17           219. As of the date of this Complaint, Linksys's infringement of the '862  
18 patent is, and continues to be, done with knowledge of the '862 patent and with  
19 knowledge of BNR's contention that Linksys is infringing the '862 patent. Linksys's  
20 infringement of the '862 patent after this date is thus willful and deliberate, entitling  
21 BNR to enhanced damages and attorneys' fees.

22           220. BNR has been damaged by Linksys's infringement of the '862 patent and  
23 will continue to be damaged unless Linksys are enjoined by this Court. BNR has  
24 suffered and continues to suffer irreparable injury for which there is no adequate  
25 remedy at law. The balance of hardships favors BNR, and public interest is not  
26 disserved by an injunction.

1 221. BNR is entitled to recover from Linksys all damages that BNR has  
2 sustained as a result of Linksys's infringement of the '862 patent, including without  
3 limitation and/or not less than a reasonable royalty.

4 **COUNT XII – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

5 **(LINKSYS)**

6 222. BNR re-alleges and incorporates by reference the allegations of the  
7 foregoing paragraphs as if fully set forth herein.

8 223. On information and belief, Linksys has and continues to directly infringe,  
9 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
10 or more claims of the '914 patent by making, using, offering to sell, or selling within  
11 the United States, or importing into the United States, the Linksys Accused Products.

12 224. As of the date of this Complaint, Linksys's infringement of the '914  
13 patent is, and continues to be, done with knowledge of the '914 patent and with  
14 knowledge of BNR's contention that Linksys is infringing the '914 patent. Linksys's  
15 infringement of the '914 patent after this date is thus willful and deliberate, entitling  
16 BNR to enhanced damages and attorneys' fees.

17 225. BNR has been damaged by Linksys's infringement of the '914 patent and  
18 will continue to be damaged unless Linksys are enjoined by this Court. BNR has  
19 suffered and continues to suffer irreparable injury for which there is no adequate  
20 remedy at law. The balance of hardships favors BNR, and public interest is not  
21 disserved by an injunction.

22 226. BNR is entitled to recover from Linksys all damages that BNR has  
23 sustained as a result of Linksys's infringement of the '914 patent, including without  
24 limitation and/or not less than a reasonable royalty.

25 **COUNT XIII – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

26 **(NETGEAR)**

27 227. BNR re-alleges and incorporates by reference the allegations of the  
28 foregoing paragraphs as if fully set forth herein.



1           228. On information and belief, Netgear has and continues to directly infringe,  
2 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
3 or more claims of the '629 patent by making, using, offering to sell, or selling within  
4 the United States, or importing into the United States, products comprising or  
5 containing one or more unlicensed wireless communications devices that  
6 communicate over wireless networks. These include: (a) Netgear Qualcomm  
7 Accused Products, including as non-limiting examples the EX7500, Nighthawk AX12  
8 (RAX120), Nighthawk M5 Fusion (MR5000), Orbi Router (RBR850), Orbi Satellite  
9 (RBS850), WAC510, and WAX610 products; (b) Netgear MediaTek Accused  
10 Products, including as non-limiting examples the A6210, D6000, EX3800, JR6150,  
11 N600 5G Wireless Card, Nighthawk AC2400, R6350, WAC104, and WNDR3700 v5  
12 products; and (c) on information and belief, Netgear Other Accused Products  
13 (collectively, "Netgear Accused Products").

14           229. As of the date of this Complaint, Netgear's infringement of the '629  
15 patent is, and continues to be, done with knowledge of the '629 patent and with  
16 knowledge of BNR's contention that Netgear is infringing the '629 patent. Netgear's  
17 infringement of the '629 patent after this date is thus willful and deliberate, entitling  
18 BNR to enhanced damages and attorneys' fees.

19           230. BNR has been damaged by Netgear's infringement of the '629 patent and  
20 will continue to be damaged unless Netgear are enjoined by this Court. BNR has  
21 suffered and continues to suffer irreparable injury for which there is no adequate  
22 remedy at law. The balance of hardships favors BNR, and public interest is not  
23 disserved by an injunction.

24           231. BNR is entitled to recover from Netgear all damages that BNR has  
25 sustained as a result of Netgear's infringement of the '629 patent, including without  
26 limitation and/or not less than a reasonable royalty.

1                   **COUNT XIV – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

2                                   **(NETGEAR)**

3           232. BNR re-alleges and incorporates by reference the allegations of the  
4 foregoing paragraphs as if fully set forth herein.

5           233. On information and belief, Netgear has and continues to directly infringe,  
6 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
7 or more claims of the '862 patent by making, using, offering to sell, or selling within  
8 the United States, or importing into the United States, the Netgear Accused Products.

9           234. As of the date of this Complaint, Netgear's infringement of the '862  
10 patent is, and continues to be, done with knowledge of the '862 patent and with  
11 knowledge of BNR's contention that Netgear is infringing the '862 patent. Netgear's  
12 infringement of the '862 patent after this date is thus willful and deliberate, entitling  
13 BNR to enhanced damages and attorneys' fees.

14           235. BNR has been damaged by Netgear's infringement of the '862 patent and  
15 will continue to be damaged unless Netgear are enjoined by this Court. BNR has  
16 suffered and continues to suffer irreparable injury for which there is no adequate  
17 remedy at law. The balance of hardships favors BNR, and public interest is not  
18 disserved by an injunction.

19           236. BNR is entitled to recover from Netgear all damages that BNR has  
20 sustained as a result of Netgear's infringement of the '862 patent, including without  
21 limitation and/or not less than a reasonable royalty.

22                   **COUNT XV – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

23                                   **(NETGEAR)**

24           237. BNR re-alleges and incorporates by reference the allegations of the  
25 foregoing paragraphs as if fully set forth herein.

26           238. On information and belief, Netgear has and continues to directly infringe,  
27 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
28

1 or more claims of the '914 patent by making, using, offering to sell, or selling within  
2 the United States, or importing into the United States, the Netgear Accused Products.

3 239. As of the date of this Complaint, Netgear's infringement of the '914  
4 patent is, and continues to be, done with knowledge of the '914 patent and with  
5 knowledge of BNR's contention that Netgear is infringing the '914 patent. Netgear's  
6 infringement of the '914 patent after this date is thus willful and deliberate, entitling  
7 BNR to enhanced damages and attorneys' fees.

8 240. BNR has been damaged by Netgear's infringement of the '914 patent and  
9 will continue to be damaged unless Netgear are enjoined by this Court. BNR has  
10 suffered and continues to suffer irreparable injury for which there is no adequate  
11 remedy at law. The balance of hardships favors BNR, and public interest is not  
12 disserved by an injunction.

13 241. BNR is entitled to recover from Netgear all damages that BNR has  
14 sustained as a result of Netgear's infringement of the '914 patent, including without  
15 limitation and/or not less than a reasonable royalty.

16 **COUNT XVI – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

17 **(TP-LINK)**

18 242. BNR re-alleges and incorporates by reference the allegations of the  
19 foregoing paragraphs as if fully set forth herein.

20 243. On information and belief, TP-Link has and continues to directly  
21 infringe, either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. §  
22 271(a) one or more claims of the '629 patent by making, using, offering to sell, or  
23 selling within the United States, or importing into the United States, products  
24 comprising or containing one or more unlicensed wireless communications devices  
25 that communicate over wireless networks. These include: (a) TP-Link Qualcomm  
26 Accused Products, including as non-limiting examples the Archer A9 v6.x, Deco M9  
27 Plus v1, Deco P7 v1.x, Deco X60, DecoX73-DSK, HC220-G1, M53, and TL-  
28 XDR5430 v2 products; (b) TP-Link MediaTek Accused Products, including as non-

1 limiting examples the Archer A10, Archer C54, AX6000, Deco M3W, EAP235-Wall  
2 v1.x, EC330-G5u v1.x, RE350, TL-WDN5200, TL-WER7660, TLWPA7510, TL-  
3 WR902AAC v3.x, TL-XDR1860, TL-XDR3230, and TL-XDR6020 products; and (c)  
4 on information and belief, TP-Link Other Accused Products (collectively, “TP-Link  
5 Accused Products”).

6 244. As of the date of this Complaint, TP-Link’s infringement of the ’629  
7 patent is, and continues to be, done with knowledge of the ’629 patent and with  
8 knowledge of BNR’s contention that TP-Link is infringing the ’629 patent. TP-Link’s  
9 infringement of the ’629 patent after this date is thus willful and deliberate, entitling  
10 BNR to enhanced damages and attorneys’ fees.

11 245. BNR has been damaged by TP-Link’s infringement of the ’629 patent  
12 and will continue to be damaged unless TP-Link are enjoined by this Court. BNR has  
13 suffered and continues to suffer irreparable injury for which there is no adequate  
14 remedy at law. The balance of hardships favors BNR, and public interest is not  
15 disserved by an injunction.

16 246. BNR is entitled to recover from TP-Link all damages that BNR has  
17 sustained as a result of TP-Link’s infringement of the ’629 patent, including without  
18 limitation and/or not less than a reasonable royalty.

19 **COUNT XVII – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

20 **(TP-LINK)**

21 247. BNR re-alleges and incorporates by reference the allegations of the  
22 foregoing paragraphs as if fully set forth herein.

23 248. On information and belief, TP-Link has and continues to directly  
24 infringe, either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. §  
25 271(a) one or more claims of the ’862 patent by making, using, offering to sell, or  
26 selling within the United States, or importing into the United States, the TP-Link  
27 Accused Products.

1 249. As of the date of this Complaint, TP-Link's infringement of the '862  
2 patent is, and continues to be, done with knowledge of the '862 patent and with  
3 knowledge of BNR's contention that TP-Link is infringing the '862 patent. TP-Link's  
4 infringement of the '862 patent after this date is thus willful and deliberate, entitling  
5 BNR to enhanced damages and attorneys' fees.

6 250. BNR has been damaged by TP-Link's infringement of the '862 patent  
7 and will continue to be damaged unless TP-Link are enjoined by this Court. BNR has  
8 suffered and continues to suffer irreparable injury for which there is no adequate  
9 remedy at law. The balance of hardships favors BNR, and public interest is not  
10 disserved by an injunction.

11 251. BNR is entitled to recover from TP-Link all damages that BNR has  
12 sustained as a result of TP-Link's infringement of the '862 patent, including without  
13 limitation and/or not less than a reasonable royalty.

14 **COUNT XVIII – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

15 **(TP-LINK)**

16 252. BNR re-alleges and incorporates by reference the allegations of the  
17 foregoing paragraphs as if fully set forth herein.

18 253. On information and belief, TP-Link has and continues to directly  
19 infringe, either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. §  
20 271(a) one or more claims of the '914 patent by making, using, offering to sell, or  
21 selling within the United States, or importing into the United States, the TP-Link  
22 Accused Products.

23 254. As of the date of this Complaint, TP-Link's infringement of the '914  
24 patent is, and continues to be, done with knowledge of the '914 patent and with  
25 knowledge of BNR's contention that TP-Link is infringing the '914 patent. TP-Link's  
26 infringement of the '914 patent after this date is thus willful and deliberate, entitling  
27 BNR to enhanced damages and attorneys' fees.

28

1 255. BNR has been damaged by TP-Link’s infringement of the ’914 patent  
2 and will continue to be damaged unless TP-Link are enjoined by this Court. BNR has  
3 suffered and continues to suffer irreparable injury for which there is no adequate  
4 remedy at law. The balance of hardships favors BNR, and public interest is not  
5 disserved by an injunction.

6 256. BNR is entitled to recover from TP-Link all damages that BNR has  
7 sustained as a result of TP-Link’s infringement of the ’914 patent, including without  
8 limitation and/or not less than a reasonable royalty.

9 **COUNT XIX – INFRINGEMENT OF U.S. PATENT NO. RE 48,629**

10 **(ZYXEL)**

11 257. BNR re-alleges and incorporates by reference the allegations of the  
12 foregoing paragraphs as if fully set forth herein.

13 258. On information and belief, ZyXEL has and continues to directly infringe,  
14 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
15 or more claims of the ’629 patent by making, using, offering to sell, or selling within  
16 the United States, or importing into the United States, products comprising or  
17 containing one or more unlicensed wireless communications devices that  
18 communicate over wireless networks. These include: (a) ZyXEL Qualcomm Accused  
19 Products, including as non-limiting examples the Keenetic Extra II, Keenetic Giga III,  
20 Leenetic Ultra II, NBG6503, and NWD6505 products; (b) ZyXEL MediaTek Accused  
21 Products, including as non-limiting examples the NBG6617, NBG7815 (Armor G5),  
22 WRE6606, WSQ50, and WSQ60 products; and (c) on information and belief, ZyXEL  
23 Other Accused Products (collectively, “ZyXEL Accused Products”).

24 259. As of the date of this Complaint, ZyXEL’s infringement of the ’629  
25 patent is, and continues to be, done with knowledge of the ’629 patent and with  
26 knowledge of BNR’s contention that ZyXEL is infringing the ’629 patent. ZyXEL’s  
27 infringement of the ’629 patent after this date is thus willful and deliberate, entitling  
28 BNR to enhanced damages and attorneys’ fees.

1           260. BNR has been damaged by ZyXEL's infringement of the '629 patent and  
2 will continue to be damaged unless ZyXEL are enjoined by this Court. BNR has  
3 suffered and continues to suffer irreparable injury for which there is no adequate  
4 remedy at law. The balance of hardships favors BNR, and public interest is not  
5 disserved by an injunction.

6           261. BNR is entitled to recover from ZyXEL all damages that BNR has  
7 sustained as a result of ZyXEL's infringement of the '629 patent, including without  
8 limitation and/or not less than a reasonable royalty.

9                   **COUNT XX – INFRINGEMENT OF U.S. PATENT NO. 8,416,862**

10                                   **(ZYXEL)**

11           262. BNR re-alleges and incorporates by reference the allegations of the  
12 foregoing paragraphs as if fully set forth herein.

13           263. On information and belief, ZyXEL has and continues to directly infringe,  
14 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
15 or more claims of the '862 patent by making, using, offering to sell, or selling within  
16 the United States, or importing into the United States, the ZyXEL Accused Products.

17           264. As of the date of this Complaint, ZyXEL's infringement of the '862  
18 patent is, and continues to be, done with knowledge of the '862 patent and with  
19 knowledge of BNR's contention that ZyXEL is infringing the '862 patent. ZyXEL's  
20 infringement of the '862 patent after this date is thus willful and deliberate, entitling  
21 BNR to enhanced damages and attorneys' fees.

22           265. BNR has been damaged by ZyXEL's infringement of the '862 patent and  
23 will continue to be damaged unless ZyXEL are enjoined by this Court. BNR has  
24 suffered and continues to suffer irreparable injury for which there is no adequate  
25 remedy at law. The balance of hardships favors BNR, and public interest is not  
26 disserved by an injunction.

1 266. BNR is entitled to recover from ZyXEL all damages that BNR has  
2 sustained as a result of ZyXEL's infringement of the '862 patent, including without  
3 limitation and/or not less than a reasonable royalty.

4 **COUNT XXI – INFRINGEMENT OF U.S. PATENT NO. 7,564,914**

5 **(ZYXEL)**

6 267. BNR re-alleges and incorporates by reference the allegations of the  
7 foregoing paragraphs as if fully set forth herein.

8 268. On information and belief, ZyXEL has and continues to directly infringe,  
9 either literally or under the doctrine of equivalents, pursuant to 35 U.S.C. § 271(a) one  
10 or more claims of the '914 patent by making, using, offering to sell, or selling within  
11 the United States, or importing into the United States, the ZyXEL Accused Products.

12 269. As of the date of this Complaint, ZyXEL's infringement of the '914  
13 patent is, and continues to be, done with knowledge of the '914 patent and with  
14 knowledge of BNR's contention that ZyXEL is infringing the '914 patent. ZyXEL's  
15 infringement of the '914 patent after this date is thus willful and deliberate, entitling  
16 BNR to enhanced damages and attorneys' fees.

17 270. BNR has been damaged by ZyXEL's infringement of the '914 patent and  
18 will continue to be damaged unless ZyXEL are enjoined by this Court. BNR has  
19 suffered and continues to suffer irreparable injury for which there is no adequate  
20 remedy at law. The balance of hardships favors BNR, and public interest is not  
21 disserved by an injunction.

22 271. BNR is entitled to recover from ZyXEL all damages that BNR has  
23 sustained as a result of ZyXEL's infringement of the '914 patent, including without  
24 limitation and/or not less than a reasonable royalty.

25  
26 **PRAYER FOR RELIEF**

27 WHEREFORE, BNR respectfully requests that this Court enter judgment in its  
28 favor as follows and award BNR the following relief:



1 (a) a judgment declaring that Qualcomm has infringed one or more  
2 claims of each of the Asserted Patents in this litigation pursuant to 35  
3 U.S.C. § 271, *et seq.*;

4 (b) an award of damages adequate to compensate BNR for infringement  
5 of each of the Asserted Patents by Qualcomm, in an amount to be proven  
6 at trial, including supplemental post-verdict damages until such time as  
7 Qualcomm ceases its infringing conduct;

8 (c) a permanent injunction, pursuant to 35 U.S.C. § 283, prohibiting  
9 Qualcomm and its officers, directors, employees, agents, consultants,  
10 contractors, suppliers, distributors, all affiliated entities, and all others  
11 acting in privity with Qualcomm, from committing further acts of  
12 infringement;

13 (d) a judgment requiring Qualcomm to make an accounting of damages  
14 resulting from Qualcomm's infringement of each of the Asserted Patents;

15 (e) a judgment declaring that MediaTek has infringed one or more  
16 claims of each of the Asserted Patents in this litigation pursuant to 35  
17 U.S.C. § 271, *et seq.*;

18 (f) an award of damages adequate to compensate BNR for infringement  
19 of each of the Asserted Patents by MediaTek, in an amount to be proven  
20 at trial, including supplemental post-verdict damages until such time as  
21 MediaTek ceases its infringing conduct;

22 (g) a permanent injunction, pursuant to 35 U.S.C. § 283, prohibiting  
23 MediaTek and its officers, directors, employees, agents, consultants,  
24 contractors, suppliers, distributors, all affiliated entities, and all others  
25 acting in privity with MediaTek, from committing further acts of  
26 infringement;

27 (h) a judgment requiring MediaTek to make an accounting of damages  
28 resulting from MediaTek's infringement of each of the Asserted Patents;

1 (i) a judgment declaring that each Downstream Defendant has  
2 infringed one or more claims of each of the Asserted Patents in this  
3 litigation pursuant to 35 U.S.C. § 271, *et seq.*;

4 (j) an award of damages adequate to compensate BNR for infringement  
5 of the Asserted Patents by each Downstream Defendant, in an amount to  
6 be proven at trial, including supplemental post-verdict damages until such  
7 time as each Downstream Defendant ceases its infringing conduct;

8 (k) a permanent injunction, pursuant to 35 U.S.C. § 283, prohibiting  
9 each Downstream Defendant and its officers, directors, employees, agents,  
10 consultants, contractors, suppliers, distributors, all affiliated entities, and  
11 all others acting in privity with them, from committing further acts of  
12 infringement;

13 (l) a judgment requiring each Downstream Defendant to make an  
14 accounting of damages resulting from each Downstream Defendant's  
15 infringement of the Asserted Patents

16 (m) enhanced damages for willful infringement by Qualcomm and  
17 MediaTek;

18 (n) the costs of this action, as well as attorneys' fees as provided by 35  
19 U.S.C. § 285;

20 (o) pre-judgment and post-judgment interest at the maximum amount  
21 permitted by law;

22 (p) all other relief, in law or equity, to which BNR is entitled.

23 **DEMAND FOR JURY TRIAL**

24 Plaintiff hereby demands a jury trial for all issues so triable.  
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1 Dated: June 15, 2023

2 By: /s/Alex Chan  
3 Alex Chan (SBN 278805)  
4 DEVLIN LAW FIRM LLC  
5 16219 Flamstead Drive  
6 Hacienda Heights, CA 91745  
7 Telephone: (646) 331-0604  
8 Facsimile: (302) 353-4251  
9 achan@devlinlawfirm.com

10 *Attorneys for Plaintiff*  
11 *Bell Northern Research, LLC*  
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