IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

GENERAL ACCESS SOLUTIONS, LTD., Plaintiff, v. VERIZON COMMUNICATIONS, INC., CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, VERIZON SERVICES CORP., VERIZON BUSINESS GLOBAL, LLC, VERIZON BUSINESS NETWORK SERVICES, LLC, VERIZON CORPORATE SERVICES GROUP, INC., VERIZON DATA SERVICES, LLC, VERIZON ONLINE, LLC. Defendant.	CIVIL ACTION NO. 2:22-cv-394 JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff General Access Solutions, LTD ("General Access" or "Plaintiff"), for Complaint against Defendants Verizon Communications, Inc., Cellco Partnership d/b/a Verizon Wireless, Verizon Services Corp., Verizon Business Global, LLC, Verizon Business Network Services, LLC, Verizon Corporate Services Group Inc., Verizon Data Services, LLC, and Verizon Online, LLC (collectively, "Defendants" or "Verizon") alleges the following:

NATURE OF THE ACTION

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

THE PARTIES

2. Plaintiff General Access is a domestic limited partnership organized under the laws of the State of Texas with its principal place of business in Dallas, TX 75219. General Access (formerly known as "Access Solutions, Ltd.") was previously associated with and acquired certain

assets of Raze Technologies, Inc. (see below), which had an office at 2540 Plano Pkwy Suite 188 Plano TX 75074. General Access maintained and maintains storage facilities for documents and equipment at 2560 Kathryn Lane, Plano TX, 75025.

3. Upon information and belief, Verizon Communications, Inc. ("VCI") is a Delaware corporation with its principal place of business at 1095 Avenue of the Americas, New York, New York. On information and belief, VCI may be served with process via its registered agent, CT Corporation System, 350 North St. Paul Street, Dallas, Texas 75201.

4. Upon information and belief, Cellco Partnership d/b/a Verizon Wireless ("Verizon Wireless") is a Delaware partnership with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920. On information and belief, Verizon Wireless may be served with process via its registered agent, the Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington DE 19801.

5. Upon information and belief, Verizon Services Corp. ("VSC") is a Delaware corporation with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920. On information and belief, VSC may be served with process via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

6. Upon information and belief, Verizon Business Global, LLC ("VBG") is a Delaware limited liability company with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920. On information and belief, VBG may be served with process via its registered agent, the Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington DE 19801.

7. Upon information and belief, Verizon Business Network Services, LLC ("VBNS") is a Delaware limited liability company with its principal place of business at One Verizon Way,

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Basking Ridge, New Jersey 07920. On information and belief, VBNS may be served with process via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

8. Upon information and belief, Verizon Corporate Services Group Inc. ("VCSG") is a New York corporation with its principal place of business at One Verizon Way, Basking Ridge, New Jersey 07920. On information and belief, VCSG may be served with process via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

9. Upon information and belief, Verizon Data Services, LLC ("VDS") is a Delaware limited liability company with its principal place of business at One East Telecom Parkway, B3E, Temple Terrace, Florida 33637. On information and belief, VDS may be served with process via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

10. Upon information and belief, Verizon Online, LLC ("VO") is a Delaware limited liability company with its principal place of business at 22001 Loudoun County Parkway, Ashburn, Virginia 33637. On information and belief, VO may be served with process via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

11. Upon information and belief, Defendant VCI is the ultimate parent corporation, either directly or indirectly, of each of Defendants Verizon Wireless, VSC, VBG, VNBS, VCSG, VDS, and VO. Defendants collectively provide communications, technology, information, and entertainment products and services to consumers, businesses, and government entities throughout the State of Texas, including the Eastern District of Texas.

12. Upon information and belief, Defendants have regular and established places of business in the Eastern District of Texas, including at 1111 E Grand Ave., Marshall, TX 75670, 500 E Loop 281, Longview, TX 75605, and at 2400 S Jefferson Ave., Mount Pleasant, TX 75455.

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JURISDICTION, VENUE, AND JOINDER

13. This is an action for patent infringement arising under the Patent Laws of the United States, Title 35 of the United States Code.

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

15. Verizon is subject to this Court's general personal jurisdiction because Verizon has substantial and continuous contacts with the State of Texas and this District. Among other things, Verizon has purposefully availed itself of the privileges of conducting business in the State of Texas and in this District, and regularly conducts and solicits a wide variety of business within the State of Texas and within this District, including the sale of mobile devices and wireless services. Verizon is also subject to this Court's specific personal jurisdiction because Verizon has sufficient minimum contacts with the State of Texas and this District and has engaged in acts of infringement alleged in this Complaint within the State of Texas and this District.

16. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b), (c), (d) and/or 1400(b). Verizon conducts business in this District and engages in the acts of infringement alleged in this Complaint within this District.

17. For example, Verizon maintains or has authorized retail locations in this District, including at the addresses listed above in Paragraph 12, where mobile hotspots, phones, and other infringing devices have been sold.

18. Verizon also owns, leases, maintains and/or operates cell phone towers in this District that provide 5G data services to Verizon customers in this District, including numerous cell tower locations in Tyler, Texas; Longview, Texas; and East Dallas, Texas.

19. According to its website, Verizon offers 5G data coverage to customers in this District and within the Marshall division. Furthermore, according to its website, Verizon also offers and/or provides 4G and 5G home internet services and equipment to customers in this District.

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20. Defendants are properly joined under 35 U.S.C. § 299(a)(1) and (a)(2). As set forth in more detail below, and upon information and belief, Defendants jointly and collectively provide infringing products and services, such that at least one or more of General Access's claims for relief is asserted jointly, severally, or in the alternative with respect to or arising out of the same transactions, occurrences, or series of transactions and occurrences, and such that common questions of fact will arise to all Defendants in this action.

BACKGROUND

21. In the 1999-2000 time period, a Plano-based start-up company known as WestEnd Broadband, Inc. worked on research and development of next generation wireless communications networks.

22. Mr. Paul Struhsaker, one of the founders of WestEnd Broadband and the inventor of the patents-in-suit, had years of experience in the military and National Security Agency. Mr. Struhsaker understood and appreciated the possibilities that wireless communications networks offered, as well as the challenges they would need to overcome.

23. Among the challenges faced by wireless communications networks are the ever-increasing demands for bandwidth, speed, and throughput, specifically for data. Mr. Struhsaker foresaw this development during his work at Raze.

24. For example, average mobile network speeds have more than doubled in the United States since 2018:

Table 7. Average mobile network connection speeds (in Mbps) by region and country

Region	2018	2019	2020	2021	2022	2023	CAGR (2018–2023)
Global speed: All handsets	13.2	17.7	23.5	29.4	35.9	43.9	27%
Asia Pacific	14.3	18.0	24.7	32.4	39.0	45.7	26%
Latin America	8.0	11.2	15.7	21.1	24.8	28.8	29%
North America	21.6	27.0	34.9	42.4	50.6	58.4	22%
Western Europe	23.6	31.2	40.1	48.2	54.4	62.4	21%
Central and Eastern Europe	12.9	15.7	21.3	30.3	36.1	43.0	27%
Middle East and Africa	6.9	9.4	13.3	17.6	20.3	24.8	29%

Source: Cisco Annual Internet Report, 2018–2023

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See https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.pdf at Section 2.

25. Back in 2000, cellular networks were used primarily for voice communications. Today, the average user spends more than four hours a day on their phone or tablet. https://www.bankmycell.com/blog/smartphone-addiction/#chapter2. The average 18-29-year-old taps, clicks, or swipes on their phone nearly 3,000 times a day. *Id.*

26. At WestEnd Broadband, Mr. Struhsaker developed a number of technologies in the area of wireless communications. One of the technologies Mr. Struhsaker worked to incorporate into wireless networks was "beamforming"—specifically the use of advanced antenna arrays to generate focused beams of radio-frequency energy in a desired direction. In particular, Mr. Struhsaker sought to use beamforming in conjunction with Time Division Duplexing ("TDD") to extend the range, speed, quality, and throughput of cellular wireless networks.

27. Another of the technologies developed by Mr. Struhsaker was the use of WiFi to rebroadcast communications received from a larger cellular network to multiple wireless devices. As discussed below, the technology he developed is commonly used today in connection with wireless cellular networks, including with so-called wireless "hotspots."

28. In 2000-2001, WestEnd Broadband changed its name to Raze Technologies, Inc. Continuing the work of WestEnd Broadband, Inc., Raze continued to pioneer the development of wireless telecommunications equipment, sometimes referred to as "4G" networks, which would accommodate broadband data services (along with voice) with better speed, throughput, reliability, and quality.

29. In 2000-2002, Raze successfully designed, developed, built, and tested 4G wireless networks in Texas. Prototype systems were field tested in east Texas. And Raze presented its equipment and capabilities to wireless carriers pursuant to non-disclosure agreements.

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30. Paul Struhsaker and his colleagues at Raze applied for, and were granted, several fundamental patents related to wireless communications. Most notably for present purposes, on April 20, 2001, a patent application was filed on behalf of Mr. Struhsaker which ultimately led to the issuance by the U.S. Patent and Trademark Office (U.S.P.T.O.) of U.S. Patent No. 9,426,794. And on September 5, 2001, a patent application was filed on behalf of Mr. Struhsaker which led to the issuance of U.S. Patent No. 7,230,931.

31. In 2002, with the collapse of the telecommunication sector following the events of September 11, 2001, Raze was forced to shut down its business operations. Following certain reorganizations, Raze came to be known as General Access Solutions, Ltd. ("General Access"). General Access owns all right, title and interest to the patent portfolio arising out of Raze's pioneering work in wireless communications, including the '931 Patent and '794 Patent.

THE INFRINGING INSTRUMENTALITIES

32. Verizon operates cellular wireless networks employing 4G and 5G technologies. Verizon also sells and offers for sale a variety of devices that make use of these same wireless communication technologies.

33. Beginning in the mid to late 2000s, the cellular industry changed dramatically with the rising popularity of smartphones, which combine the features of a mobile cell phone with a personal computer operating system capable of wirelessly transmitting data over the carrier's network. The great demand for smartphones with high-speed data functionality prompted the major wireless cellular carriers to invest heavily in 4G networks, and to use their existing licenses, acquire licenses from other owners, or purchase licenses from the FCC for increased bandwidth capacity in the 700 MHz, 1700-2100 MHz, 1900MHz and 2500- 2700 MHz spectrums. *See e.g.* http://www.tmonews.com/2014/12/fcc-speeds-up-aws-3-auction-as-bids-reach-41-billion.

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Consequently, most of the wireless carriers began to transition from 3G networks to 4G (WiMAX and LTE) networks.

34. In or around October 2018, Verizon began to roll out its 5G network. *See, e.g.*, https://www.verizon.com/about/our-company/5g/when-will-verizon-have-5g. Verizon first rolled-out 5G home broadband. It followed with deployments of 5G mobile services throughout 2019. *Id.*

35. The products accused of infringing the '931 Patent ("the '931 Accused Products") include the Defendants' 5G base station equipment. More details concerning some exemplary '931 Accused Products are provided below.

36. The products accused of infringing the '794 Patent ("the '794 Accused Products") include wireless devices Defendants have sold in the United States that receive a cellular signal using 4G or 5G protocols and then route information to mobile stations using 802.11 WiFi communication protocols. These products include, for example, WiFi home or office routers with cellular backhaul, WiFi "hot spots," as well as smartphones with WiFi hot spot functionality (including, for example, Samsung Android and Apple iPhone smartphones). More details concerning some exemplary '794 Accused Products are provided below.

COUNT I – INFRINGEMENT OF U.S. PATENT NO. 7,230,931

37. General Access incorporates and realleges the foregoing paragraphs of this Complaint.

38. On June 12, 2007, U.S. Patent No. 7,230,931 ("the '931 Patent"), entitled "Wireless Access System Using Selectively Adaptable Beam Forming in TDD Frames and Method of Operation," was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '931 Patent is attached as Exhibit 1.

39. Asserted Claims 28 and 29 of the '931 Patent are directed to a communication protocol allowing for the efficient use of beamforming in a TDD cellular wireless network.

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40. Claims 28 and 29 of the '931 Patent do not merely recite routine or conventional use of beamforming in wireless access communications technology. Instead, they provide a communication protocol whereby certain information is broadcasted widely to multiple devices at the start of a TDD frame using a "broadcast beam signal," and downlink data traffic is subsequently transmitted to specific mobile devices on more focused, beamformed "directed scanning beam signals."

41. The communication protocol of Claims 28 and 29 of the '931 Patent are fundamental for the efficient use of beamforming in a modern cellular wireless network, significantly increasing the range, quality, speed, and throughput of such networks.

42. General Access is the assignee and owner of all right, title, and interest in and to the '931 Patent, including the right to assert all causes of action arising under said patent and the right to any remedies for infringement of the '931 Patent.

43. Defendants directly infringe Claims 28 and 29 of the '931 Patent by making, using, selling, and/or offering for sale a wireless network that utilizes beamforming and TDD in accordance with Claims 28 and 29.

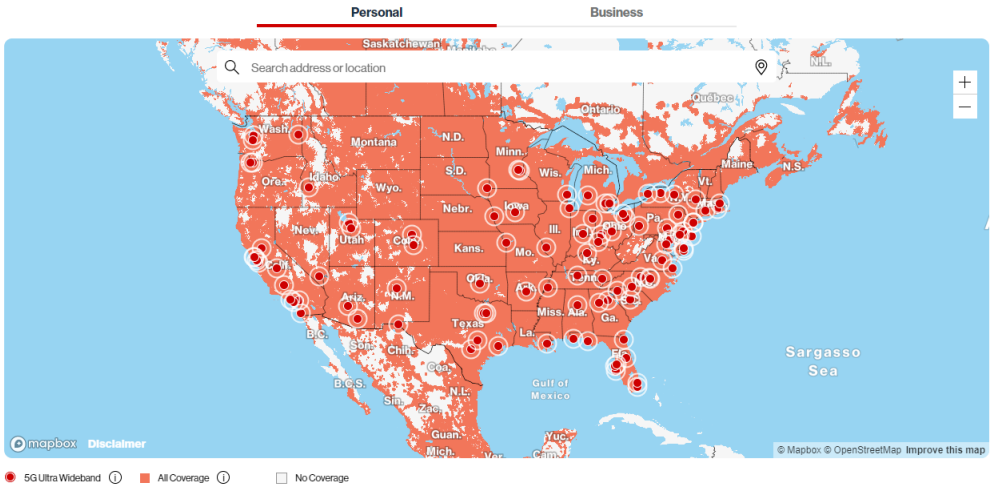
44. For example, Claim 28 depends on Claim 1, which recites the following:

> For use in a wireless access network comprising a plurality of base stations, each of said plurality of base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises in an associated cell site of said wireless access network, a transceiver associated with a first of said plurality of base stations comprising:
>
> transmit path circuitry associated with a beam forming network capable of transmitting directed scanning beam signals each directed to substantially only wireless access devices within a different one of a plurality of sectors of a cell site associated with said first base station, wherein said transmit path circuitry
>
> transmits, at a start of a TDD frame, a broadcast beam signal to wireless access devices within more than one of said sectors, the broadcast beam signal comprising a start of frame field, and
>
> subsequently transmits, in a downlink portion of said TDD frame,

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first downlink data traffic to substantially only wireless access devices within one of said sectors using one of said directed scanning beam signals.

45. The Defendants' 5G network satisfies all the limitations of independent Claim 1. Defendants' 5G wireless access network comprises a plurality of base stations. By way of example, and not limitation, Verizon's network comprises a plurality of base stations providing 5G cellular services. The below map, from Verizon's website, depicts areas in the United States served by Verizon's infringing base stations:



See https://www.verizon.com/coverage-map/.

46. Verizon's 5G network utilizes TDD. The following lists some of the network channels ("bands") Verizon has used to provide 5G service:

Band	Frequency	Band Type
n40	2.3GHz	Mid-band sub-6 GHz
n260	39GHz	mmWave
n261	28GHz	mmWave
n2, n5, n66	1900MHz, 850MHz, 1700-2100MHz	DSS with LTE

See https://beebom.com/list-5g-bands-us-verizon-att-sprint-t-mobile/. At least the n40, n260, and

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n261 bands are dedicated to TDD communications. *See, e.g.*, 3GPP TS 38.521-1 V. 16.4.0 at 32, https://www.etsi.org/deliver/etsi_ts/138500_138599/13852101/16.04.00_60/ts_13852101v160400p.pdf (listing 5G bands that utilize TDD).

47. Base stations in Defendants' infringing 5G network are capable of bidirectional TDD communication with wireless access devices disposed at a plurality of subscriber premises in an associated cell site of said wireless access network. By way of example only, Verizon has recently boasted that its 5G Home customers "[e]xperience max download speeds up to 1Gbps, with typical download speeds of 300 Mbps." *See* https://www.verizon.com/about/news/verizon-expands-5g-home-internet. Verizon has also noted that its customers experience "[t]ypical upload speeds around 50Mbps." *Id.* Verizon has similarly touted its mobile users' communication speeds. *See id.*

48. As discussed in greater detail in the following paragraphs, the transceivers associated with the Defendants' infringing base stations satisfy all of the remaining elements of the asserted claims.

49. Transceivers in Verizon's 5G base stations include transmit path circuitry associated with a beamforming network. For example, and without limitation, Verizon has deployed Samsung's Massive MIMO, beamforming-capable equipment at Verizon 5G base stations. *See, e.g.*, https://news.samsung.com/global/verizon-and-samsung-complete-fully-virtualized-5g-data-session-on-c-band-spectrum (discussing Samsung's collaboration with Verizon on 5G technology using "Samsung's C-band 64T64R Massive MIMO radios that support digital/dynamic beamforming…"). Verizon has also deployed Ericsson equipment at its 5G base stations. *See, e.g.*, https://www.verizon.com/about/news/verizon-starts-c-band-equipment-deployment (discussing Verizon's deployment of Ericsson and Samsung equipment in its 5G network). Ericsson has likewise touted the beamforming capabilities of its 5G base station equipment. *See, e.g.* https://www.ericsson.com/en/reports-and-papers/white-papers/advanced-antenna-systems-for-

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5g-networks ("When transmitting, beamforming is the ability to direct radio energy through the radio channel toward a specific receiver…. Similarly, when receiving, beamforming is the ability to collect the signal energy from a specific transmitter.").

50. Transceivers in Verizon's 5G base stations include transmit path circuitry capable of transmitting directed scanning beam signals each directed to substantially only wireless access devices within a different one of a plurality of sectors of a cell site associated with said first base station. For example, and not limitation, Verizon's field tests of its 5G equipment have shown the significant downlink data speeds it achieved by transmitting directed scanning beam signals to substantially only wireless access devices within a different one of a plurality of sectors of a cell site:



See https://www.cnet.com/pictures/heres-what-verizons-5g-field-test-looks-like-pictures/8/. As Verizon explains in its Glossary of 5G-Related Terms, "Beamforming is a technology used by cellular base stations to handle the high speeds and traffic of 5G." *See* https://www.verizon.com/business/resources/5g/5g-business-mobility-capabilities/. "It refers to the process of concentrating transmit power to a small area using multiple antennas to increase coverage and capacity." *Id.* "This process identifies the most efficient route for data delivery to a specific user, while reducing interference for nearby users at the same time." *Id.* As Verizon has

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further explained, "[b]eamforming is a foundational technology that works hand in glove with massive MIMO to direct beams of transmission data both horizontally and vertically toward user devices." https://www.verizon.com/business/resources/articles/5g-beamforming-massive-mimo/.

51. Transceivers in Verizon's 5G network include transmit path circuitry that transmits, at a start of a TDD frame, a broadcast beam signal to wireless access devices within more than one of said sectors, the broadcast beam signal comprising a start of frame field. By way of example, and not limitation, the 5G standards describe a Broadcast Channel (BCH) that includes a "requirement to be broadcast in the entire coverage area of the cell, either as a single message or by beamforming different BCH instances." 3GPP TS 38.300 V. 16.2.0 at 35, https://www.etsi.org/deliver/etsi_ts/138300_138399/138300/16.02.00_60/ts_138300v160200p.pdf. On information and belief, Verizon's 5G base stations transmit a Broadcast Channel at the start of the frame. The BCH is carried by the Physical Broadcast Channel (PBCH), which includes, among other things, synchronization signals that indicate the start of a frame. *See id.* at 9, 20, 30.

52. Transceivers in Verizon's 5G network include transmit path circuitry that subsequently transmits, in a downlink portion of said TDD frame, first downlink data traffic to substantially only wireless access devices within one of said sectors using one of said directed scanning beam signals. Following transmission of the BCH, which is discussed above, Verizon's 5G base stations subsequently transmit downlink data in the Downlink Shared Channel (DL-SCH), which may be beamformed. *See id.* at 35-36. As discussed above, Verizon has deployed extensive beamforming technology in its 5G network. When transmitted on Verizon's 5G beamforming base station equipment, the DL-SCH transmits first downlink data traffic to substantially only wireless access devices located within one of said sectors using one of said directed scanning beam signals.

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53. For all the reasons discussed above, the Defendants' 5G network satisfies all the elements of Claim 1. The Defendants' 5G network also satisfies the additional limitation of dependent Claim 28. Claim 28 recites the following limitation:

> The transceiver as set forth in claim 1 wherein said transmit path circuitry transmits, in said downlink portion of said TDD frame, second downlink data traffic to substantially only wireless access devices within an other of said sectors using an other of said directed scanning beam signals.

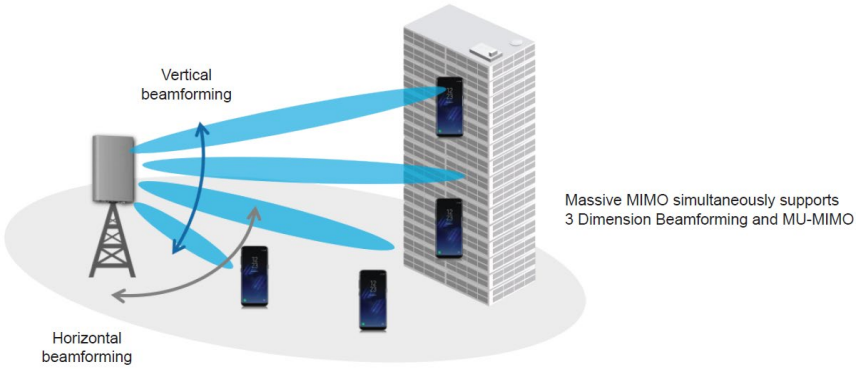
54. As discussed above, Defendants' 5G network includes transceivers that meet all the limitations of Claim 1. In addition, those transceivers include the required "said transmit path circuitry which transmits, in said downlink portion of said TDD frame, second downlink data traffic to substantially only wireless access devices within an other of said sectors using an other said directed scanning beam signals." For example and without limitation, Verizon's field tests of its 5G equipment show two different sectors (one blue, the other orange), each served by a different beamformed signal, as shown on the right. *See* https://www.cnet.com/pictures/heres-what-verizons-5g-field-test-looks-like-pictures/8/. Similarly, Verizon selected Samsung as a macro RAN supplier at least as early as 2018. *See* https://news.samsung.com/global/samsung-selected-as-a-4g-lte-open-ran-provider-on-verizons-4g-lte-network. The purpose of this collaboration was, in part, to "prepare a path for virtualized RAN and 5G commercialization." *Id.*



55. Samsung's macro RAN equipment is capable of simultaneously transmitting beamformed signals to wireless access devices located in different sectors. For example, and without limitation, Samsung's advanced beamforming antennas simultaneously transmit different downlink data traffic to wireless communication devices located in more than one sector, as depicted in the below image:

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Figure 1: Massive MIMO illustration – advanced 3D beamforming



Source: Samsung

See https://images.samsung.com/is/content/samsung/p5/global/business/networks/insights/white-paper/massive-mimo-comes-of-age/global-networks-insight-massive-mimo-comes-of-age-0.pdf.

56. As discussed above, Samsung's 5G base station equipment transmits a Broadcast Channel (BCH) at the start of each frame. *See generally* 3GPP TS 38.300 V. 16.2.0 at 35. Following transmission of the broadcast signal, Verizon's beamforming antennas transmit downlink data in the Downlink Shared Channel (DL-SCH), which may be beamformed. *See id.* at 35-36. When transmitted on Verizon's 5G beamforming base station equipment, the DL-SCH transmits "first downlink data traffic to substantially only wireless access devices located within one of said sectors using one of said directed scanning beam signals." Within the same downlink portion of the TDD frame, Verizon's 5G beamforming base station equipment also transmits "second downlink data traffic to substantially only wireless access devices within an other of said sectors using an other of said directed scanning beam signals."

57. Additionally, Verizon's base stations typically comprise more than one antenna array. For example, the 5G cell tower shown in the following image from Verizon's "This is 5G Built Right" ad depicts numerous antenna arrays, each pointed in a different direction and serving users located in different sectors of the cell site:

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Available at: https://www.ispot.tv/ad/OSES/verizon-5g-5g-built-right-network-mission. At the start of a given frame, all the antenna arrays at the cell site will transmit a broadcast beam signal to the entire coverage area of the cell. *See generally* 3GPP TS 38.300 V. 16.2.0 at 35 (the Broadcast Channel (BCH) includes a "requirement to be broadcast in the entire coverage area of the cell"). The BCH is carried by the Physical Broadcast Channel (PBCH), which includes, among other things, synchronization signals that indicate the start of a frame. *See id.* at 9, 20, 30. Subsequently within each frame, individual antenna arrays will transmit downlink data traffic to "substantially only wireless access devices within one of said sectors," while another one of the antenna arrays transmits "second downlink data traffic to substantially only wireless access devices within an other of said sectors using an other of said directed scanning beam signals."

58. The Defendants' infringing 5G network is widely used by Defendants and Defendants' wireless subscribers and business partners throughout the United States, including in this judicial district.

59. Defendants were made aware of the '931 Patent and their infringement thereof no later than the filing of this Complaint, perhaps earlier.

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60. On information and belief, since at least the time each Defendant received notice, each Defendant has induced and continues to induce others to infringe Claims 28 and 29 of the '931 Patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent or willful blindness, actively aiding and abetting others to infringe, including but not limited to each Defendant's partners, clients, customers, and end users, whose use of the Accused Instrumentalities constitutes direct infringement of Claims 28 and 29 of the '931 Patent.

61. In particular, each Defendant's actions aid and abet others such as its partners, customers, clients, and end users to infringe include advertising and promoting the use of its infringing 5G network. On information and belief, each Defendant has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement because each Defendant has had actual knowledge of the '931 Patent and knowledge that its acts were inducing infringement of the '931 Patent since at least the date each Defendant received this Complaint.

62. On information and belief, each Defendant is liable as a contributory infringer of the '931 Patent under 35 U.S.C. § 271(c) by offering to sell, selling and importing into the United States products especially made or adapted for use in an infringement of the '931 Patent. The Accused Instrumentalities are a material component for use in practicing the '931 Patent and are specifically made and are not a staple article of commerce suitable for substantial non-infringing use.

63. Defendants had knowledge of the '931 Patent at least since the filing of this Complaint. To the extent Defendants continue to infringe Claims 28 and 29 despite that knowledge, their infringement is willful.

64. General Access has been harmed by each Defendant's infringing activities.

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COUNT II – INFRINGEMENT OF U.S. PATENT NO. 9,426,794

65. General Access incorporates by reference and re-alleges the foregoing paragraphs of this Complaint.

66. On August 23, 2016, U.S. Patent No. 9,426,794 ("the '794 Patent"), entitled "Wireless Communication System and Device for Coupling a Base Station and Mobile Stations" was duly and legally issued by the United States Patent and Trademark Office. A true and correct copy of the '794 Patent is attached as Exhibit 2.

67. The Claims of the '794 Patent are directed to a wireless device containing a first transceiver that allows the wireless device to receive communications from a base station in a cellular wireless network using that base station's Wide Area Network ("WAN") communication protocol (e.g., 4G or 5G) and a second transceiver that uses the signal characteristics of downlink signals to route information to mobile stations using a local area network ("LAN") communication protocol (e.g., WiFi).

68. The Asserted Claims of the '794 Patent recite inventions that are not merely the routine or conventional use of pre-existing wireless communications technology. Instead, the Claims of the '794 Patent disclose the novel use of two transceivers in a wireless communication device, one of which communicates with a base station (e.g., a cellular base station) using a WAN communication protocol (e.g., 4G or 5G), and a second transceiver which uses the signal characteristics of downlink signals to route information to mobile stations using a "LAN" communication protocol (e.g., WiFi).

69. General Access is the assignee and owner of all right, title, and interest in and to the '794 Patent, including the right to assert all causes of action arising under said patent and the right to any remedies for infringement of the '794 Patent.

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70. The Defendants have infringed the Asserted Claims of the '794 Patent by making, using, importing, offering to sell, and/or selling the '794 Accused Products in the United States.

71. An overview of the Defendants' infringement of Claim 1 is described below, without limitation, for illustrative purposes.

72. For example, Claim 1 recites the following wireless communication device:

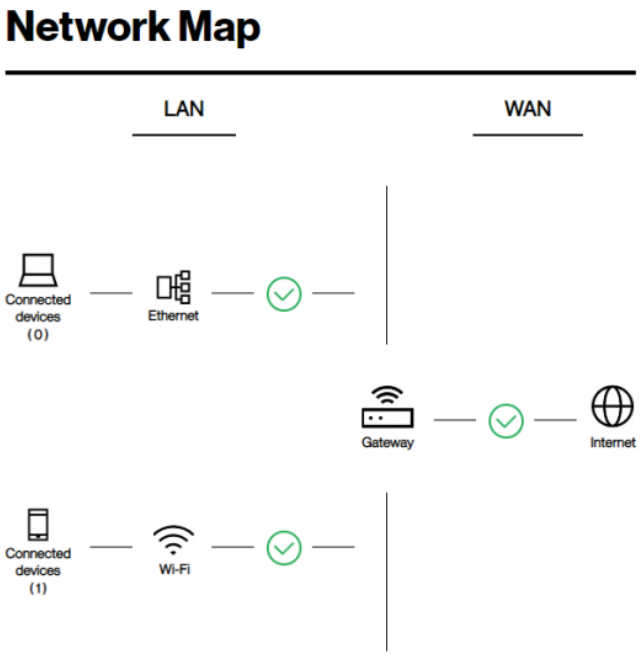
> A wireless communication device comprising:
> a first wireless transceiver operable to communicate with a base station, wherein the base station communicates with the first wireless transceiver and a plurality of other wireless communication devices according to a wide area wireless communication protocol; and
> a second wireless transceiver coupled to the first wireless transceiver and operable to directly communicate with a first mobile station and a second mobile station, wherein the second wireless transceiver communicates with the first mobile station and the second mobile station according to a local area wireless communication protocol,
> wherein the first wireless transceiver receives from the base station a first downlink signal intended for the first mobile station and provides the first downlink signal to the second wireless transceiver and wherein the second wireless transceiver receives the first downlink signal and re-transmits the first downlink signal to the first mobile station as a second downlink signal according to the local area wireless communication protocol, and
> wherein the second transceiver monitors first signal characteristics of the second downlink signal of the first mobile station and monitors second signal characteristics of the second mobile station, and based on the first signal characteristics and the second characteristics, routes information to the first mobile station and the second mobile station, respectively.

73. The '794 Accused Products are wireless communication devices. For example and without limitation, Verizon provides LTE Home Internet service, which "is a broadband internet service delivered via the Verizon 4G LTE wireless network." As part of that service, Verizon sells the "Verizon Internet Gateway Router" which it says "delivers wider and reliable coverage throughout the house with dual-band Wi-Fi support." https://www.verizon.com/home/lte-home-internet/.

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74. The '794 Accused Products include a first wireless transceiver operable to communicate with a base station. For example and without limitation, in Verizon's LTE Home Internet, "[a] radio signal connects a 4G LTE cell tower to a receiver at [a user's] home." https://www.verizon.com/home/lte-home-internet/. *See also* https://scache.vzw.com/dam/support/pdf/user_guide/verizon-lte-home-router-user-guide.pdf at 6 ("LTE Home Router User Guide") (the router will "establish an LTE connection" within "a couple of minutes" after powering up).

75. The first wireless transceiver of the '794 Accused Products is operable to communicate with a base station wherein the base station communicates with the first wireless transceiver and a plurality of other wireless communication devices according to a wide area wireless communication protocol. For example, and without limitation, the Verizon LTE home router depicted as the "gateway" device in the middle of the below image includes a "first transceiver" that communicates via a WAN (or "wide area network") communication protocol with Verizon base stations as shown on the right of Verizon's diagram:



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See LTE Home Router User Guide at 21. *See also id.* at 25 (discussing the "Wide Area Network" or "WAN" settings of an LTE home router). Similarly, Verizon has sold Verizon 4G LTE home routers manufactured by Netgear. *See, e.g.*, https://www.verizonwireless.com/dam/support/pdf/user_guide/4g-lte-router.pdf ("Verizon 4G LTE Router Manual"). The below image depicts one such Netgear router communicating via a "Verizon 4G LTE Signal" with a "Verizon 4G LTE" base station on the left:



See https://www.downloads.netgear.com/files/GDC/MBR1515/MBR1515_NA_DS_26Oct12.pdf ("Netgear Router DataSheet").

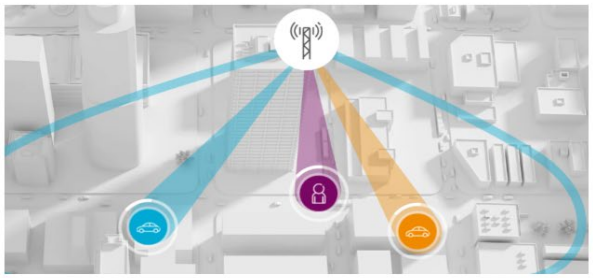
76. Base stations in Verizon's LTE network, including those that communicate with Verizon's LTE home routers, also communicate with a plurality of other wireless communication devices. For example, and without limitation, Verizon has deployed Ericsson base station equipment in its base stations. Ericsson's base station equipment is capable of communicating with numerous wireless communication devices. For example, and without limitation, the following images depict Ericsson base stations transmitting to multiple users in beamforming and non-beamforming modes:

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Traditional Site

- Traditional sites project radio waves in a fixed predefined pattern – similar to a flood light



Massive MIMO Site

- Massive MIMO sites project radio in narrow beams directed to the users – similar to a spot light
- Multiple beams can be created which will dynamically adjust to user locations & usage
- The end result is an increase in signal and a reduction in interference from other users in the sector – improved throughput to each user in the sector

See, https://www.xtreme5g.net/massivemimo.html.

77. The '794 Accused Products include a second wireless transceiver coupled to the first wireless transceiver and operable to directly communicate with a first mobile station and a second mobile station, wherein the second wireless transceiver communicates with the first mobile station and the second mobile station according to a local area wireless communication protocol. For example and without limitation, Verizon's 4G LTE home routers include WiFi transceivers coupled to their 4G transceivers. The WiFi transceivers are operable to directly communicate with a first mobile station and a second mobile station. For example and without limitation, in the below image of a Verizon Netgear 4G home router, the router is shown receiving a transmission from a Verizon 4G base station on a 4G transceiver, and communicating via its WiFi transceiver with a plurality of handheld devices, a notebook PC, and a desktop PC:

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See Netgear Router DataSheet. Similarly, as shown in the image following Paragraph 75 above, a Verizon LTE home router is shown communicating via WiFi with an unspecified number of "connected devices" on the bottom left. *See* LTE Home Router Manual at 21.

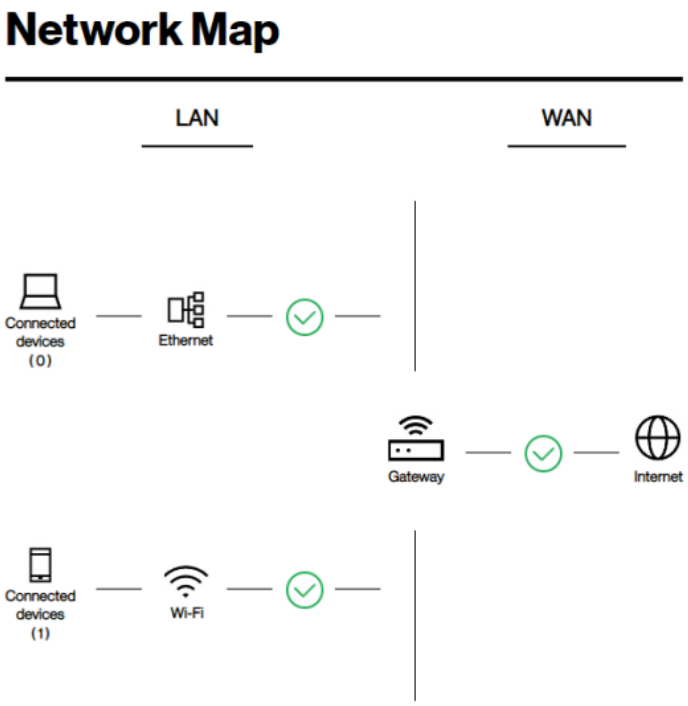
78. The first wireless transceivers in the '794 Accused Products are operable to communicate with a base station wherein the first wireless transceiver receives from the base station a first downlink signal intended for the first mobile station and provides the first downlink signal to the second wireless transceiver. For example and without limitation, the first wireless transceiver in a Netgear router is operable to receive 4G cellular signals from a base station that are intended for one of the mobile stations connected to the Netgear router. The first wireless transceiver then provides the first downlink signal to the WiFi transceiver in the Netgear router. *See, e.g.*, Negear Router DataSheet at 2.

System Requirements

- Verizon 4G LTE Mobile Broadband service with activated SIM card
- 802.11 b/g/n 2.4 GHz wireless adapter or Ethernet adapter and cable for each computer

79. The second wireless transceivers in the '794 Accused Products are operable to directly communicate with a first mobile station and second mobile station, wherein the second wireless transceiver receives the first downlink signal and re-transmits the first downlink signal to the first mobile station as a second downlink signal according to the local area wireless communication protocol. For example and without limitation, the Verizon LTE home router depicted as the "gateway" device in the middle of the below image includes a "second transceiver" (e.g., the WiFi

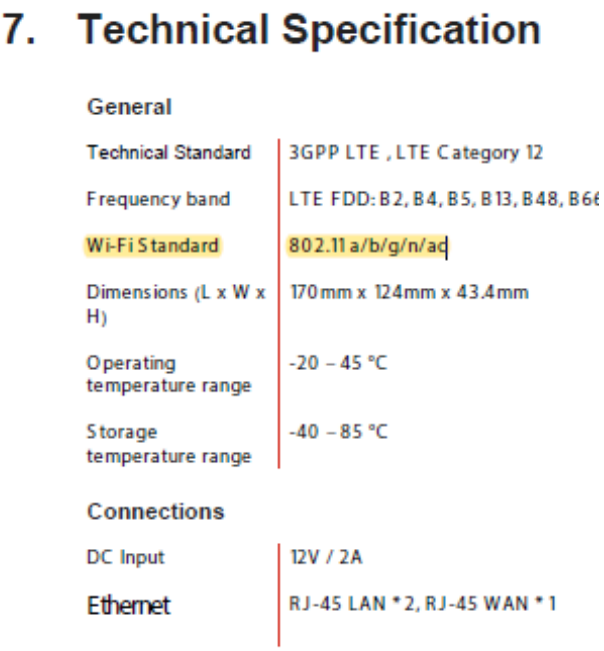
transceiver) that receives the first downlink signal from the "first transceiver" (e.g., the 4G LTE transceiver) in the gateway device. The "second transceiver" then re-transmits the first downlink signal to the first mobile station (e.g., one of the "connected devices (1)" on the bottom left below) as a second downlink signal utilizing a local area network protocol (e.g., a WiFi protocol, as shown below).



See LTE Home Router Manual at 21. *See also id.* at 27-28 (discussing the "Local Area Newtork" or "LAN" settings of an LTE home router).

80. The second wireless transceivers in the '794 Accused Products are operable to directly communicate with a first mobile station and a second mobile station, wherein the second transceiver monitors first signal characteristics of the second downlink signal of the first mobile station and monitors second signal characteristics of the second mobile station, and based on the first signal characteristics and the second characteristics, routes information to the first mobile station and the second mobile station, respectively. For example, and without limitation, a Verizon LTE home routers includes the following Wi-Fi capabilities:

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7. Technical Specification

General

Technical Standard	3GPP LTE , LTE Category 12
Frequency band	LTE FDD: B2, B4, B5, B13, B48, B66
Wi-Fi Standard	802.11 a/b/g/n/ac
Dimensions (L x W x H)	170mm x 124mm x 43.4mm
Operating temperature range	-20 – 45 °C
Storage temperature range	-40 – 85 °C

Connections

DC Input	12V / 2A
Ethernet	RJ-45 LAN * 2, RJ-45 WAN * 1

81. *See* LTE Home Router Manual at 53. The WiFi transceivers in Verizon's LTE home routers monitor signal characteristics from the first mobile station and second mobile station, and based on these signal characteristics route information to the first mobile station and the second mobile station, respectively. *See, e.g.*, Perahia, Eldad & Stacey, Robert, *Next Generation Wireless LANs: 802.11n and 802.11ac*, Cambridge University Press, Chapter 15 ("Fast Link Adaptation").

82. Each and every element of Claim 1 described above is also met by other '794 Accused Products.

83. General Access has been harmed by Defendants' infringing activities.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff General Access demands judgment for itself and against each Defendant as follows:

a. A finding and judgment that each Defendant has infringed, and continues to infringe, the '931 Patent, either literally or under the doctrine of equivalents;

b. A finding and judgment that each Defendant has infringed the '794 Patent, either literally or under the doctrine of equivalents;

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c. An award of damages to be paid by each Defendant adequate to compensate General Access for each Defendant's past infringement of the '794 Patent and the '931 Patent, and any continuing or future infringement of the '931 Patent, including interest, costs, expenses and an accounting of all infringing acts including, but not limited to, those acts not presented at trial;

d. A finding and judgment that Defendants' infringement of the '931 Patent has been willful, and awarding General Access enhanced damages for willful infringement as provided by 35 U.S.C. § 284;

e. An order and judgment requiring Defendants to pay General Access pre-judgment and post-judgment interest on any damages award;

f. A finding and judgment that this case is exceptional under 35 U.S.C. § 285, and an award of Plaintiff's reasonable attorneys' fees; and

g. An award to General Access of such further relief at law or in equity as the Court deems just and proper.

JURY DEMAND

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, General Access demands a trial by jury.

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Dated: October 10, 2022

Respectfully submitted,

/s/Glen E. Summers, by permission Andrea L. Fair

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