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

LEMKO CORPORATION,)
 	
             Plaintiff,)
 	
      v.)
 	
AT&T INC., AT&T ENTERPRISES LLC,)
AT&T COMMUNICATIONS LLC, AT&T)
MOBILITY LLC, AT&T MOBILITY LLC)
II, and AT&T SERVICES, INC.,)
 	
             Defendants.)
)
	Civil Action No. _____
	
	JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Lemko Corporation ("Lemko") files this Complaint for Patent Infringement and Demand for Jury Trial against Defendants AT&T Inc., AT&T Enterprises LLC, AT&T Communications LLC, AT&T Mobility LLC, AT&T Mobility LLC II, and AT&T Services, Inc. (collectively, "AT&T" or "Defendants") and alleges as follows:

1.   Lemko is seeking to protect its valuable intellectual property from AT&T's ongoing willful infringement. Lemko developed and patented novel technology that changed the way mobile networks operate. Lemko presented its ideas to AT&T and sought a partnership. AT&T chose to willfully infringe Lemko's patents rather than take a license, necessitating this action.

THE PARTIES

2.   Lemko is a corporation organized and existing under the laws of the State of Illinois, with its principal place of business located at 935 National Parkway, Suite 93510, Schaumburg, IL 60173.

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3.   AT&T Inc. ("AT&T Inc.") is a corporation organized and existing under the laws of the State of Delaware with its principal place of business at Whitacre Tower, 208 South Akard Street, Dallas, Texas 75202. AT&T Inc. has been registered to do business in Texas under Texas Secretary of State file number 0009294006 since October 2, 1992. AT&T may be served with process through its registered agent, CT Corporation System, located at 1999 Bryan Street, Suite 900, Dallas, Texas, 75201.

4.   AT&T Enterprises LLC ("AT&T Enterprises") is a limited liability company organized and existing under the laws of Delaware. AT&T Enterprises, Inc. was registered to do business in Texas under Texas SOS file number 0805330645. On May 16, 2024, AT&T Enterprises, Inc. changed its registration with the Texas secretary of state to AT&T Enterprises, LLC.

5.   AT&T Communications LLC ("AT&T Communications") is a Delaware corporation with its principal place of business at 208 South Ackard Street, Dallas, Texas, 75202. AT&T Communications may be served through its registered agent for service, the Corporation Trust Company, 1209 Orange Street, Wilmington, Delaware 19801.

6.   AT&T Mobility LLC ("AT&T Mobility") is a limited liability company organized and existing under the laws of the State of Delaware and maintains its principal place of business at 1025 Lenox Park Boulevard NE, Atlanta, Georgia 30319. Since November 21, 2000, AT&T Mobility has been registered to do business in Texas under Texas SOS file number 0707861123. AT&T Mobility may be served through its registered agent for service, CT Corporation System, located at 1999 Bryan Street, Suite 900, Dallas, Texas, 75201.

7.   AT&T Mobility LLC II ("AT&T Mobility II") is a limited liability company organized and existing under the laws of Delaware and maintains its principal place of business at 1025 Lenox Park Boulevard NE, Atlanta, Georgia 30319. AT&T Mobility II is identified by the Texas Secretary of State as having an "ACTIVE" right to transact business in Texas under Texas taxpayer number 18416599704, associated with the Texas mailing address 1010 N. Saint Mary's St., Room. 9-Y01, San Antonio, Texas, 78125-2109. AT&T Mobility II may be served through its registered agent for service, the Corporation Trust Company, 1209 Orange Street, Wilmington, Delaware, 19801.

8.   AT&T Services, Inc. ("AT&T Services") is a corporation organized and existing under the laws of Delaware and maintains its principal place of business at Whitacre Tower, 208 South Akard Street, Dallas, Texas 75202. As stated on the website of the Texas Secretary of State, AT&T Services, Inc.'s Filing Number is 0010935606 and the Original Date of Filing is April 5, 1996. AT&T Services may be served through its registered agent for service, CT Corporation System, located at 1999 Bryan Street, Suite 900, Dallas, Texas, 75201.

9.   AT&T sells, offers to sell, and uses products and services throughout the United States, including in this District, and introduces infringing products and services into the stream of commerce knowing that they would be sold and used in this District and elsewhere in the United States.

JURISDICTION AND VENUE

10.   This action for patent infringement arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq.,* including 35 U.S.C. § 271.

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

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12.   Venue is proper in this Court pursuant to 28 U.S.C. § 1400(b).

13.   This Court has general personal jurisdiction over AT&T Inc. because AT&T Inc. has a principal place of business located within the State of Texas at 208 South Akard Street, Dallas, Texas 75202.

14.   This Court has specific personal jurisdiction over AT&T Inc., AT&T Enterprises LLC, AT&T Communications LLC, AT&T Mobility LLC, AT&T Mobility LLC II, and AT&T Services, Inc. because each has committed acts of patent infringement and has induced and contributed to acts of patent infringement by others in the District, the State of Texas, and elsewhere in the United States. AT&T Inc., AT&T Enterprises LLC, AT&T Communications LLC, AT&T Mobility LLC, AT&T Mobility LLC II, and AT&T Services, Inc. directly and through their subsidiaries or intermediaries, have committed and continue to commit acts of infringement in this District by, among other things, designing, developing, manufacturing, importing, offering to sell, and selling products and services that infringe the Asserted Patents.

15.   Defendants, directly or through their subsidiaries and intermediaries, have purposefully and voluntarily placed one or more products and services in the stream of commerce that practice the Asserted Patents with the intention and expectation that they will be purchased and used by consumers in this District. These products and/or services have been, and continue to be, purchased and used in this District.

16.   Defendants have regular and established places of business in this District, including at least retail stores located at the following addresses that sell Defendants' infringing products and services:

(i)   6000 N Central Expressway, Plano, Texas 75074;

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(ii)   701 N Central Expressway, Suite 400, Plano, Texas 75075;

(iii)   1712 E Grand Ave, Marshall, TX 75670;

(iv)   3407 N 4th Street, Suite 107, Longview, TX 75605;

(v)   301 N Northwest Loop 323, Tyler, TX 75702;

(vi)   805 110 South, Beaumont, TX 77701;

(vii)   1905 Tulane Dr, Suite 103b, Lufkin, TX 75901;

(viii)   301 East US Highway 82, Suite 1a, Sherman, TX 75092;

(ix)   4901 N Stateline Ave, Suite 900, Texarkana, TX 75503;

(x)   701 N Central Expy., Ste 400, Plano, TX 75075;

(xi)   1681 N Central Expwy, Suite 450, McKinney, TX 75070; and

(xii)   8445 Preston Road, Suite 220, Frisco, TX 75034.

17.   Defendants have numerous employees who work in Texas, including within this District, including at the locations listed above.

18.   In recent actions, AT&T has either admitted or not contested that the Eastern District of Texas is a proper venue for patent infringement actions against AT&T and each Defendant. *See, e.g., Daingean Techs. Ltd. v. AT&T Inc.*, No. 2:23-cv-00123, Dkt. 22 ¶ 24 (E.D. Tex. June 1, 2023) ("AT&T does not contest that venue is proper in this district for purposes of this litigation"); *Wireless Alliance, LLC v. AT&T Mobility LLC*, No. 2:23-cv-00095, Dkt. 11 ¶¶ 9-10 (E.D. Tex. May 26, 2023); *Innovative Sonic Ltd., v. AT&T Corp.*, No. 2:23-cv-00489, Dkt. 29 at ¶ 8 (E.D. Tex. Jan. 18, 2024).

19.   Defendants are properly joined under 35 U.S.C. § 299(a) because, on information and belief, Defendants commonly or jointly make, use, sell, offer to sell, and import accused products and services such that at least one right to relief is asserted against

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Defendants jointly, severally, and in the alternative with respect to or arising out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, selling, offering to sell, and importing into the United States of the same accused products and services, such that questions of fact common to all Defendants will arise in this action.

LEMKO'S INNOVATIONS

20.   Lemko is a commercial network solution company founded in 2004. Its focus has been and continues to be making communications faster, cheaper, and more accessible. With its early roots in deploying commercial network solutions, Lemko has been and continues to be a pioneer and leading innovator in developing distributed mobile architecture systems. The Asserted Patents discussed below capture technology, features, and processes that reflect these innovations.

21.   At the time of Lemko's pioneering efforts that led to the inventions of the Asserted Patents, traditional cellular architecture was based on a hierarchical, circuit-switched architecture. All calls were carried from cell towers to regional call centers over expensive backhaul connections. The regional call centers relied on stacks of custom hardware to manage and route calls for an entire region. The cell towers had no functionality for managing and routing calls, since that capacity was located in the mobile switching station. This approach had many disadvantages, including the need for expensive backhaul to and from the mobile switching station, even when two parties to a phone call were in the same area, because the cell towers could not manage or connect calls without the mobile switching station.

22.   Lemko conceived of a "virtual core" to manage calls instead of using specialized hardware located in centralized mobile switching stations, as was the case for then-conventional mobile architectures. Lemko's "virtualized core" was implemented in software that distributed the switching functions, call set-up, call termination, and routing and that could

be implemented on common-off-the-shelf (COTS) servers. Lemko's "virtualized core" servers

could connect to form a peer-to-peer, distributed mobile architecture (DMA) network. This

decentralized approach allowed calls between nearby cell customers to be connected over the

distributed mobile architecture network, avoiding the need to traverse expensive backhaul

connections to connect to distant mobile switching centers.

23.   The efficiency of Lemko's technology translates into lower operational costs

(because of the reduced need for backhaul links) and significant reductions in latency. For

applications that demand processing and transmission of large amounts of data with minimal

delay—such as autonomous vehicles, factory automation, virtual reality, or instant replays of

NFL highlights for multiple users while watching the game in the stadium—the physical

constraints of signal transfer over long distance backhaul places an unacceptable limit for these

low-latency applications. By keeping the communications and content local, where possible,

Lemko's technology transcends these limits and enables ultra-low latency communications at

the lowest cost. Lemko's technology also allows companies to reduce both capital and

operational costs and to ensure vendor flexibility by running software on COTS servers,

avoiding vendor-lock to specific hardware.

24.   In addition, Lemko's technology enables on-premises enterprise cellular

networks under their firewall. Many enterprise customers want a local cellular network for

their factories, campuses, or mines which they control. They want this for three reasons:

security, low-latency, and reliability.

25.   First, enterprise customers want a solution that allows them to keep their data

secure by keeping the traffic local to a network that is on their premises and where the data

stays local. These companies seek to avoid relying on a cellular carrier's security procedures.

Second, they want their employees to have quick, low-latency access to their local databases

and application servers. And third, they want to maintain the ability to communicate even if

the carrier's network goes down.

26.   Lemko's solutions with its local routing and ability to be deployed in smaller

form factors on COTS servers enable these on-premises cellular networks while still allowing

employees' devices to access the broader carrier cellular network when they leave the

enterprise network.

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LEMKO'S ASSERTED PATENTS

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27.   The United States Patent and Trademark Office ("USPTO") awarded to Lemko

a series of patents covering its communications inventions.

28.   On November 23, 2010, the USPTO duly and legally issued to Lemko U.S.

Patent No. 7,840,230 (the "'230 Patent"), titled "Communications Using A Distributed Mobile

Architecture." Lemko is the owner by assignment of the '230 patent. Lemko filed the

application for the '230 Patent with the USPTO on May 22, 2009. A true and accurate copy of

the '230 Patent is attached as Exhibit 1.

29.   On July 12, 2011, the USPTO duly and legally issued to Lemko U.S. Patent No.

7,979,066 (the "'066 Patent"), titled "Multiple IMSI Connections." Lemko is the owner by

assignment of the '066 Patent. Lemko filed the application for the '066 Patent with the

USPTO on September 25, 2008. A true and accurate copy of the '066 Patent is attached as

Exhibit 2.

30.   On July 17, 2012, the USPTO duly and legally issued to Lemko U.S. Patent No.

8,224,322 (the "'322 Patent"), titled "Roaming Mobile Subscriber Registration in a Distributed

Mobile Architecture." Lemko is the owner by assignment of the '322 Patent. Lemko filed the

application for the '322 Patent with the USPTO on June 12, 2006. A true and accurate copy of the '322 Patent is attached as Exhibit 3.

31.   On November 13, 2012, the USPTO duly and legally issued to Lemko U.S. Patent No. 8,310,990 (the "'990 Patent"), titled "System, Method, and Device for Routing Calls Using a Distributed Mobile Architecture." Lemko is the owner by assignment of the '990 Patent. Lemko filed the application for the '990 Patent with the USPTO on November 9, 2010. A true and accurate copy of the '990 Patent is attached as Exhibit 4.

32.   On December 25, 2012, the USPTO duly and legally issued to Lemko U.S. Patent No. 8,340,667 (the "'667 Patent"), titled "System and Method To Control Wireless Communications." Lemko is the owner by assignment of the '667 Patent. Lemko filed the application for the '667 Patent on June 26, 2008. A true and accurate copy of the '667 Patent is attached as Exhibit 5.

33.   On January 22, 2013, the USPTO duly and legally issued to Lemko U.S. Patent No. 8,359,029 (the "'029 Patent"), titled "System, Method, and Device for Providing Communications Using a Distributed Mobile Architecture." Lemko is the owner by assignment of the '029 Patent. Lemko filed the application for the '029 Patent with the USPTO on November 15, 2010. A true and accurate copy of the '029 Patent is attached as Exhibit 6.

34.   On November 24, 2015, the USPTO duly and legally issued to Lemko U.S. Patent No. 9,198,020 (the "'020 Patent"), titled "OAMP for Distributed Mobile Architecture." Lemko is the owner by assignment of the '020 Patent. Lemko filed the application for the '020 Patent with the USPTO on December 22, 2011. A true and accurate copy of the '020 Patent is attached as Exhibit 7.

35.   The '230, '066, '322, '990, '667, '029, and '020 Patents are collectively referred to herein as the "Asserted Patents."

36.   The Asserted Patents are not abstract and specifically claim inventive concepts that represent significant improvements over conventional networking technology. Each of the Asserted Patents describes specific software architectures that were not conventional at the time of their invention.

37.   The Asserted Patents disclose so much more than just a simple combination of generic components to perform conventional activities, such that they claim patent eligible inventions. The Asserted Patents improve networking systems, especially for use in edge networks, and solve specific problems that arise from switching from a centralized, hierarchical network paradigm, where the base transceiver station (BTS) nodes have no ability to manage or route calls and depend on centralized mobile switching center (MSC) hubs to control network traffic, to the new DMA paradigm, where call management functionality is distributed.

38.   Examples of the problems solved by the Asserted Patents to enable DMA networks and improve the efficiency, reliability, and affordability of networks include managing mobile device mobility within a distributed mobile architecture in order to allow for setup of group calls, managing devices which are associated with different networks in different countries, managing mobility and routing of calls between multiple private networks, and using distributed mobile architecture gateways (DMAG) to manage connections between separate DMA networks.

39.   The technology disclosed in the Asserted Patents was not conventional in the art at the time of the inventions because then-conventional networking systems did not use DMAs

or any equivalent architecture where the call management functionality was distributed to the local nodes. In addition, then-conventional networks did not use the various specific network designs covered by the claims of the Asserted Patents, which are based on the novel DMA paradigm

40.   Certain claims of the Asserted Patents variously recite elements not found in then-conventional networks, such as distributed mobile architecture systems, distributed mobile architecture servers, distributed mobile architecture gateways (DMAG) with interfaces to communicate with a legacy communication network, a home DMA register with a list of DMA nodes and designated to route communications to mobile devices, a visitor DMA register with a list of DMA nodes that are roaming with respect to the DMAG, and a community location register (CLR). Other claims of the Asserted Patents describe further specific and non-conventional functions and networking requirements of DMA servers and DMAGs.

41.   In addition, the Asserted Patents' claims are rooted in computer technology as they are directed to specific software architectures with different applications that improve communication between mobile devices and the hardware infrastructure supporting such communications. Thus, the claims of the Asserted Patents recite specific steps and components to accomplish the desired results and go beyond simply claiming results. Accordingly, the inventions of the Asserted Patents allow for a new kind of infrastructure and communications network that was not previously possible and that improves communications technology.

LEMKO MARKS ITS PATENT-PRACTICING PRODUCTS

42.   At all times Lemko has complied with 35 U.S.C. § 287(a) by marking its patent-practicing products with stickers identifying the applicable Asserted Patents covering those products and further identifying in writing the applicable Asserted Patents in the

documentation for its software products. Lemko has not made, offered for sale, or sold any unmarked patent-practicing products.

43.   The following is a representative example of Lemko's patent marking labelling, and identifies each of the Asserted Patents (in addition to other Lemko patents).
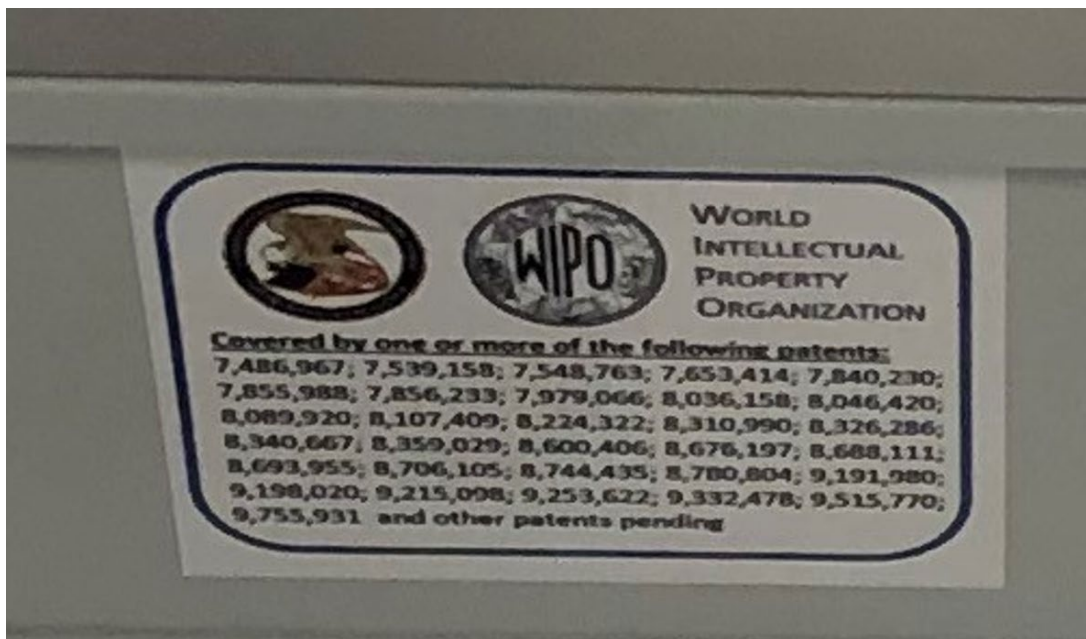
Detail of patent marking label listing the '230, '066, '322, '990, '667, '029, and '020 Patents.

Full view of Lemko's Node1 product with patent marking label.

AT&T'S ACCUSED PRODUCTS

44.   AT&T makes, uses, sells, offers for sale, and imports into the United States, the State of Texas, and this District a variety of products and services that infringe the Asserted Patents (the "Accused Products"), including AT&T Private 5G Edge as well as other products such as AT&T Private Mobile Connection.

45.   AT&T Private 5G Edge is a private-network product that connects customers' distributed facilities and allows access to rapid computing resources located at the network edge. AT&T Private 5G Edge infringes the Asserted Patents.

46.   AT&T touts AT&T Private 5G Edge as a "simple, flexible, reliable, secure, and easy-to-use private network." Exhibit 8 at 3 (https://www.edgeir.com/att-chats-up-private-5g-edge-compute-for-ford-using-microsoft-azure-20220403); Exhibit 9 (https://www.business.att.com/products/att-private-cellular-networks.html). According to AT&T, AT&T Private 5G Edge was "developed for mid-sized companies or large organizations with distributed facilities who desire dedicated connectivity with an edge compute solution. [AT&T's Private 5G Edge] solution prioritizes cost, security, flexibility and ease of use." Exhibit 10 at 1 (https://www.business.att.com/products/att-private-5g-edge.html). AT&T Private 5G Edge is a private cellular network for businesses, universities, and the public sector. Exhibit 11 (https://about.att.com/story/2022/private-5g-edge-microsoft-collaboration.html#:~:text=AT%26T) at 1.

47.   AT&T Private 5G Edge consists of on-site small cells dedicated to a private network where cellular data traffic can be kept within the private network. Exhibit 9 (https://www.business.att.com/products/att-private-cellular-networks.html) at 1.
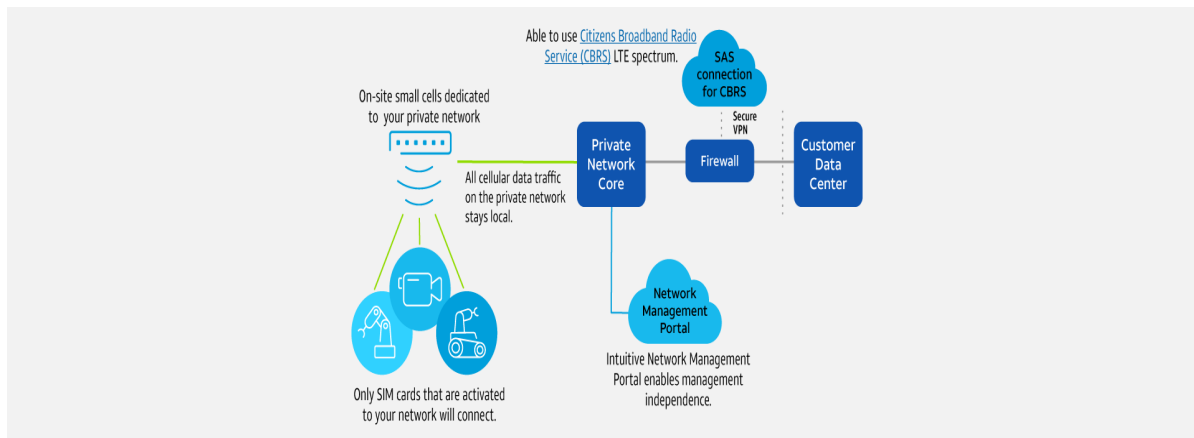
Id. at 2. SIMs cards are used to provide network privacy and must be registered and activated with the private network in order to connect to the private network. *Id.* at 1.

48.   AT&T Private 5G Edge networks can be configured as a "premise based core" that provides a private "island" of cellular service for customers. Exhibit 12 (*Strategic design considerations for Private Cellular*, AT&T, 2021) at 8.

Id.

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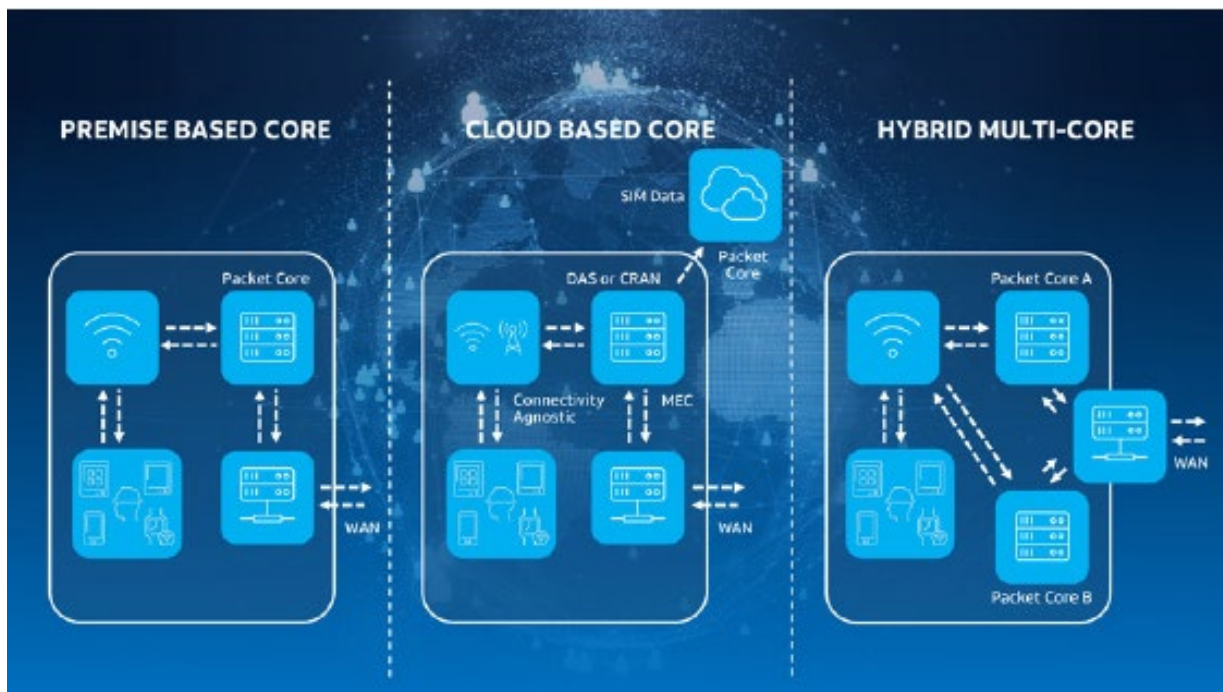
49.   In this configuration, customers have a dedicated private network, which uses

Private Subscriber Information Modules (SIM) or Public Land Mobile Network (PLMN) so

their traffic flows through a highly secure "pipeline." *Id.* at 8. Private networks of this type

can scale to a large number of users through virtualization. *Id*.

50.   AT&T Private 5G Edge employs servers running the Azure Private 5G Core

virtualized software. The servers may be common-off-the-shelf servers (COTS), including

Azure Stack Edge servers, or other COTS servers. As detailed on Microsoft's website, "Azure

Private 5G Core is an Azure cloud service for deploying and managing 5G core network

functions on an Azure Stack Edge device, as part of an on-premises private mobile network for

enterprises. The 5G core network functions connect with standard 4G and 5G standalone radio

access networks (RANs) to provide high performance, low latency, and secure connectivity for

5G Internet of Things (IoT) devices." Exhibit 13 (https://learn.microsoft.com/en-

us/azure/private-5g-core/private-5g-core-overview) at 1.

51.   Azure Stack Edge servers include models Pro 2, Pro, and Pro R. Exhibit 14

(https://azure.microsoft.com/en-us/products/azure-stack/edge) at 3-5. AT&T also uses

equivalent common-off-the-shelf servers.

52.   As part of AT&T's Private 5G Edge service, AT&T directs and controls

customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware

(the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones),

and the gateway routers. Exhibit 13 at 2-3.

53.   Each Azure Private 5G Core is a communications apparatus and provides core

network functions, service management, and visibility of the private mobile network. The

network functions include an instantiated single enterprise mobile network which is a complete set of 5G virtualized network functions. *Id.* at 4.

54.   AT&T's Private 5G Edge Network consists of a distributed cluster of sites, with each site being a physical enterprise location that provides coverage for user equipment and has transceivers to communicate with user equipment. *Id.* at 5. Each site is a packet core instance, an implementation of the 3GPP standards-defined 5G Next Generation Core (5G NGC or 5GC). *Id*. at 4.

55.   Azure Private 5G Core software performs multiple functions, including mobility and handover management (AMF: access and mobility function); session handling (SMF: session management function); authentication (UDM: unified data management); AUSF (authentication server function); and data routing (UPF: user plane function). *Id.* at 5.
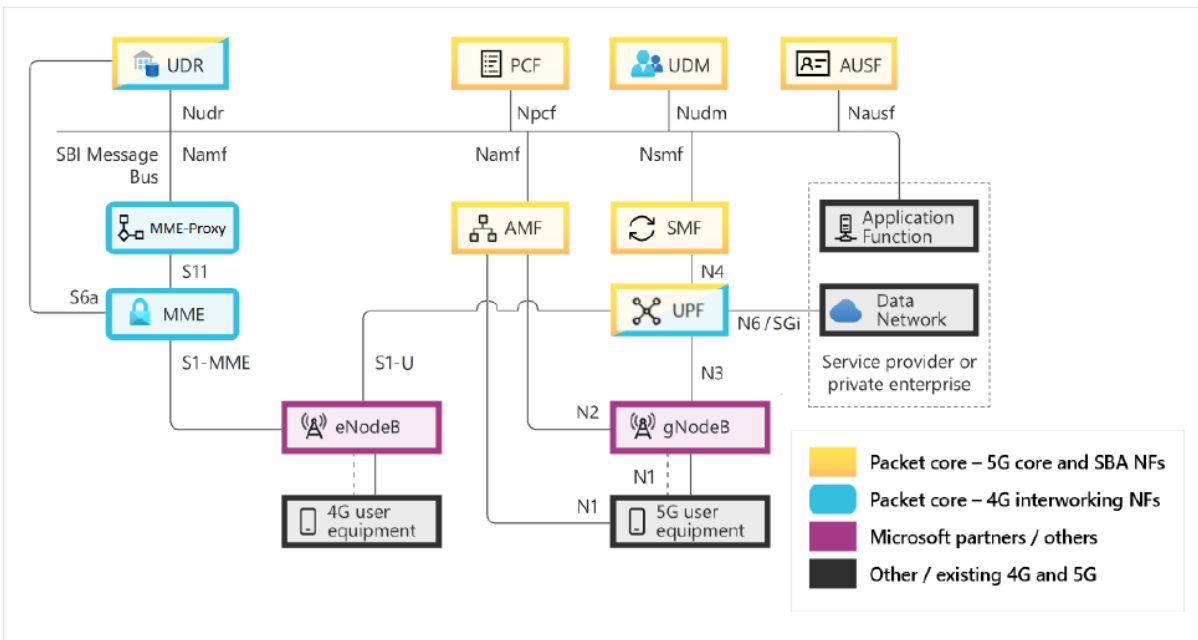
Id.

56.   AT&T's Private 5G Edge network servers running Azure Private 5G Core software are distributed mobile architecture (DMA) servers. As discussed above, these AT&T

Private 5G Edge servers are located at each physical location within the customers' private

networks, have distributed call routing and management functionality, and connect with other

peer Private 5G Edge servers to form DMA networks.

AT&T KNEW OF LEMKO PATENTS

57.   AT&T knew of Lemko's patented technology and that the Accused Products

infringe Lemko's patents, and AT&T has used Lemko's intellectual property without Lemko's

permission. As a result, AT&T's infringement of Lemko's Asserted Patents, both before and

after the filing of this suit, is willful. AT&T has used Lemko's patented technology to provide

ultra-low latency communications and avoid the expense of otherwise expanding traditional

cellular architecture that would have been required without the knowledge of Lemko's

invention.

58.   AT&T along with other cellular providers realized that it needed new

technology to operate its networks. An industry working group published a whitepaper in 2012

regarding the need to switch to a network function virtualization (NFV) paradigm. Exhibit 15

(the "2012 NFV White Paper") at 1, 3. AT&T participated in this working group and Margaret

Chiosi, AT&T's Assistant Vice President, co-authored the 2012 NFV White Paper.

59.   In November 2013, AT&T published a "Domain 2.0 Vision White Paper"

entitled "AT&T Vision Alignment Challenge Technology Survey." Exhibit 16 at 1-3. AT&T

predicted dramatic changes in "customer needs, changes in technologies, and changes in best

practices for operating networks in the near future." *Id.* at 3. AT&T anticipated that "[d]ata

demands would increase faster than the network could grow if we stuck with the traditional,

hardware-centric approach." Exhibit 17 (https://about.att.com/blogs/2023/satterlee-open-

disaggregated-platforms.html) at 1.

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60.   Through the 2012 NFV White Paper and its Domain 2.0 White Paper, AT&T

recognized that it had a critical need for technology to replace its dedicated hardware

technology used in its networks at the time with a more flexible, decentralized system based on

virtualized software—the solution of Lemko's patented inventions. Exhibit 16 at 3-4. AT&T

wanted to deploy this technology in order to permit elastic use of resources and dramatically
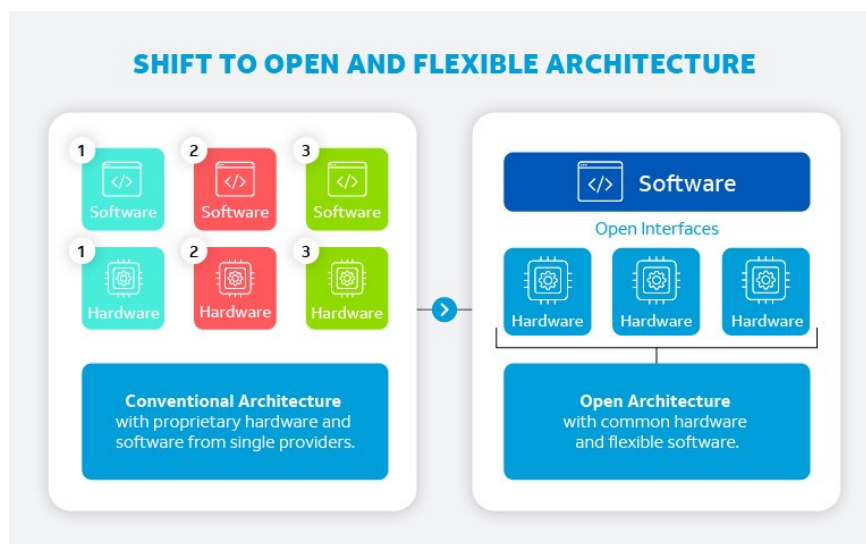
reduce its costs.

Exhibit 17 at 2 (reflecting AT&T's transition from a "Conventional Architecture" to an "Open

Architecture").

61.   AT&T acknowledged the shortcomings of its then-existing network

infrastructure because building networks with proprietary hardware appliances creates a

difficulty of "increasing costs of energy, capital investment, and rarity of skills necessary to

design, integrate and operate increasingly complex hardware-based appliances." Exhibit 16 at

8. AT&T appreciated that replacing this dedicated hardware with software deployed on

standard COTS servers would allow AT&T to build and expand its networks using a variety of

suppliers, at lower cost, and greater speed. *Id*. AT&T viewed this as "the network of the
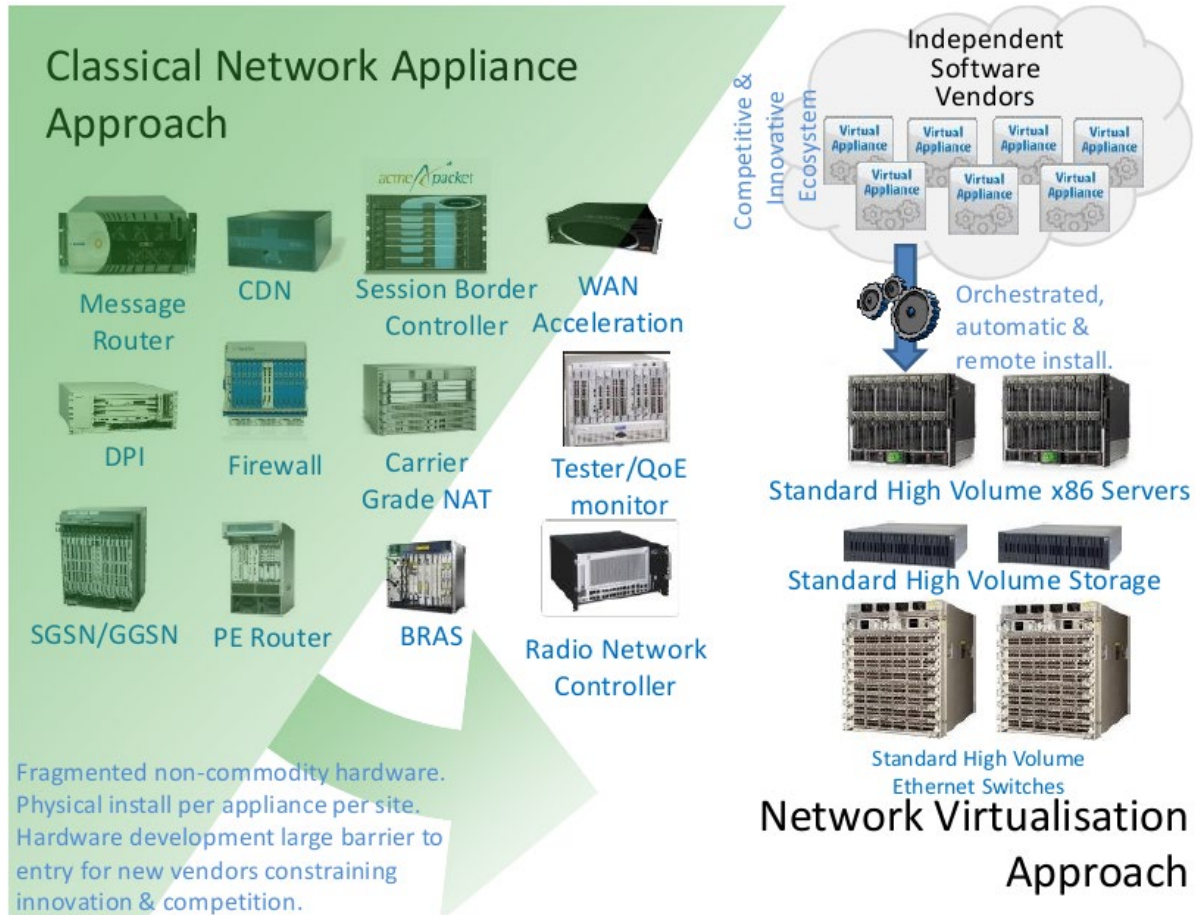
future." Exhibit 17 at 1.

Figure 2 – Network Virtualization

Exhibit 16 at 8.

62.   At the same time that AT&T had identified its critical need to virtualize its

network in 2013, Lemko began meeting with AT&T. On August 28, 2013, AT&T entered into

a non-disclosure agreement, which provided that Lemko owned its confidential information

and technology and AT&T was not permitted to copy or use it other than for purposes of

evaluating the technology to determine if it would purchase it from Lemko.

63.   Pursuant to the Lemko/AT&T non-disclosure agreement, Lemko presented its

distributed mobile architecture solution and products to AT&T during dozens of meetings,

including both in-person and telephonic meetings.

64.   At an in-person meeting held at AT&T Labs' research institute in Middletown, New Jersey on September 24, 2013, Lemko demonstrated operating models of its patent-practicing Node1 products. Given AT&T's focus on developing network virtualization technology, over 70 AT&T representatives, including Ms. Chiosi, participated in the meeting and observed Lemko's demonstrations. Lemko informed AT&T that its Node1 technology was covered by Lemko's patent portfolio and Lemko marked those models with the numbers of its patents. Lemko's slides used in during the presentation reiterated that Lemko's technology was covered by patents and included an appendix describing three families of Lemko's patents covering its products and technology. Lemko also explained how its technology would cause AT&T to achieve a more than seven-fold reduction in its costs.

65.   After observing this demonstration of Lemko's Node1 product, Ms. Chiosi stated that Lemko's patented technology had solved AT&T's problems addressed in her 2012 NFV Paper. Ms. Chiosi provided Lemko with a copy of her 2012 NFV Paper. Ms. Chiosi described Lemko's patent-practicing (and patent marked) Node1/DMA solution as "a radical design" that AT&T "should look at." Exhibit 18 at 1.

66.   Ms. Chiosi directed AT&T's Sam Habiby and Saroj Panda to coordinate with Lemko's Chief Strategy Officer, Norman Fekrat, to conduct "an economic study based on Lemko's vision of fully distributed EPC," referring to the opportunity for a more than seven-fold reduction in its costs. *Id*.

67.   As part of its economic study, AT&T investigated the distinguishing features of Lemko's technology. Exhibit 19 at 1-2. Lemko's "unique differentiators of [its] distributed mobile wireless network solution" included "Peer-to-Peer Communications," "[i]ndependent nodes that all act like one network," and software-based network functionality. *Id*. These

features specifically addressed AT&T's needs that it identified in its 2012 NFV White Paper

and Domain 2.0 White Paper. Exhibits 15, 16.

68.   As part of AT&T's investigation into Lemko's patented technology, Lemko

provided to AT&T additional details regarding its technology. For example, Mr. Fekrat sent to

AT&T's Sam Faraj (Assistant Vice Present for Content Delivery and Security Platforms) and

Steven Nurenberg (Assistant Vice President for Network Platform Strategy and Incubation) a

white paper further describing Lemko's technology. Exhibit 20 at 3. Lemko's white paper

listed 13 US patents covering its products, including Lemko's asserted '230 and '322 Patents,

and stated that "[o]ther patents are pending." Exhibit 21 (Lemko's 2012 White Paper) at 5.

Mr. Nurenberg acknowledged the novelty of Lemko's combination of core functions with

network function virtualization (NFV). Exhibit 20 at 2.

69.   On October 11, 2013, Ms. Chiosi, Mr. Fekrat, and multiple AT&T employees

held a multi-hour "Deep Drill Down" to discuss Lemko's technology. Exhibit 22 at 5. Lemko

provided AT&T with product specification documents. *Id.* at 4. After thanking Lemko for

"spending the time to help us better understand your product," AT&T requested additional

details on multiple aspects of Lemko's technology including the details of its handover

procedures. *Id.* at 3.

70.   For the remainder of 2013 through 2015, Lemko continued to present its

technology and patents to AT&T engineers and executives, including several Vice Presidents

(John Medamana and others) and Igal Elbaz, then AT&T's Vice President and now its

Network Chief Technology Officer.

71.   During this time Lemko exchanged hundreds of emails with numerous AT&T

personnel. Lemko included in the signature blocks of its emails a list of its patents covering

Lemko's "products, designs and architectures." This list identified sixteen US patents, including the asserted '230, '322,'990, '667, and '029 Patents, and stated that "Other patents pending." *See, e.g.,* Exhibit 23 at 1.

72.   In 2015, when AT&T was considering launching a first responder technology project, Lemko demonstrated to AT&T a vehicle equipped with Lemko's mobile Node1 DMA product. Lemko's Node1 product was marked with Lemko's patents. Later that year, AT&T began development on its deployable product, which closely resembles the functionality of Lemko's Node1 product.

73.   In sum, for more than two years, Lemko repeatedly disclosed its technology to AT&T, showed AT&T the benefits that it would obtain from using Lemko's technology, and notified AT&T that Lemko's technology was covered by its patent portfolio. Lemko demonstrated its patent-marked products to AT&T and responded to AT&T's repeated requests for additional information. Lemko's presentations stated that its products were patented, Lemko's emails included a list of Lemko's patents, and Lemko provided AT&T with a white paper listing its patents. Over 100 AT&T officers and engineers participated in these evaluations. When AT&T launched its infringing products, it did so fully aware that it was infringing Lemko's patents. Thus, AT&T's infringement of Lemko's Asserted Patents is willful.

COUNT I - DIRECT INFRINGEMENT OF THE '230 PATENT

74.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

75.   AT&T has infringed and continues to directly infringe at least exemplary Claim 8 of the '230 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling,

and offering for sale in the United States at least AT&T Private 5G Edge without the

permission, consent, authorization, or license of Lemko.

76.   AT&T's infringement is based upon literal infringement, infringement under the

doctrine of equivalents, or both.

77.   To the extent any components of the claimed systems are provided by AT&T's

customers, AT&T directly infringes by acting as the final assembler of the infringing system.

AT&T acts as the final assembler by configuring the final infringing system at the direction of

its customers. AT&T private cellular networks are a "[c]omplete solution that includes design,

installation, test and turn up, ongoing support for software updates, hardware support, and tier

1-3 support." Exhibit 9 (https://www.business.att.com/products/att-private-cellular-

networks.html) at 1. AT&T's solution includes a fully managed service where AT&T

"manag[es] end-to-end complex cellular networks—providing maintenance monitoring,

technology upgrades, and break/fix services." Exhibit 24

(https://www.business.att.com/products/das-system.html) at 1.

78.   AT&T further directly infringes by directing and controlling the infringing

systems, and obtaining benefits from its control of the systems as a whole, for example, when

AT&T configures and maintains the infringing systems as a paid service for its customers.

AT&T states that it will "plan, transform, and optimize your local networks. From SIM

activation to quality of service (QOS) guidance, we're here to help." Exhibit 9

(https://www.business.att.com/products/att-private-cellular-networks.html) at 1.

79.   By way of example of AT&T's infringement of the '230 Patent, AT&T Private

5G Edge meets all of the limitations of exemplary Claims 1 and 8 of the '230 Patent. Claim 8,

for example, recites the following limitations:

Claim 8. A communication apparatus, comprising:

a wireless transceiver;

a computer readable storage medium;

a home location register (HLR) module embedded in the computer readable storage medium;

a visitor location register (VLR) module embedded in the computer readable storage medium;

a mobile switching center (MSC) module embedded in the computer readable storage medium, wherein the MSC module includes an authentication, authorization, and accounting (AAA) module, the AAA module configured to support generation of a first set of call detail records at the communication apparatus;

a base station controller (BSC) module embedded in the computer readable storage medium; and

a group call program embedded in the computer readable storage medium, the group call program to provide a group call between four or more mobile communication devices in response to receiving a request to establish the group call, wherein telephony data associated with the group call is communicated to at least one mobile communication device of the four or more mobile communication devices via a second communication apparatus, wherein the second communication apparatus comprises:

a second wireless transceiver;

a second computer readable storage medium;

a second HLR module embedded in the second computer readable storage medium;

a second VLR module embedded in the second computer readable storage medium;

a second MSC module embedded in the second computer readable storage medium, wherein the second MSC module includes a second AAA module the second AAA module configured to support generation of a second set of call detail records at the second communication apparatus; and

a second BSC module embedded in the second computer readable storage medium.

80.   AT&T's Private 5G Edge servers running Azure Private 5G Core software, described above in the Section "AT&T's Accused Products," are communications apparatuses for delivering mobile voice and data services as well as multimedia activities. Azure Private

5G Core runs on common-off-the-shelf servers, such as Azure Stack Edge servers, all with non-transitory computer-readable storage to store the Azure Private 5G Core software.

81.   AT&T's Private 5G Edge servers running Azure Private 5G Core software at the edge of the network realize the substantial advantage of low-latency communications by being connected to wireless transceivers for low-latency communication with AT&T's end users. When a customer has multiple locations, each location has its own local Azure Private 5G Edge server (thus, there are at least two wireless transceivers, computer readable storage media, etc.). Example topologies, reproduced below, show that the radio access network (the radio connection between mobile devices and the wireless transceiver) is connected to servers at the network edge.
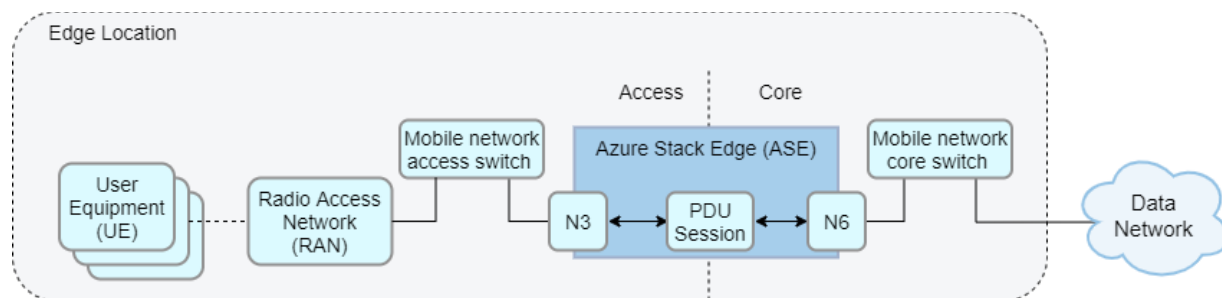

Exhibit 25 (https://learn.microsoft.com/en-us/azure/private-5g-core/private-mobile-network-design-requirements?pivots=ase-pro-2) at 5 (showing Azure Stack Edge located at the edge location and connected to the Radio Access Network).

82.   In the general case, radio access in 4G and 5G is connected to servers "On-premises," that is, at the premises of the Azure Private 5G Core client.
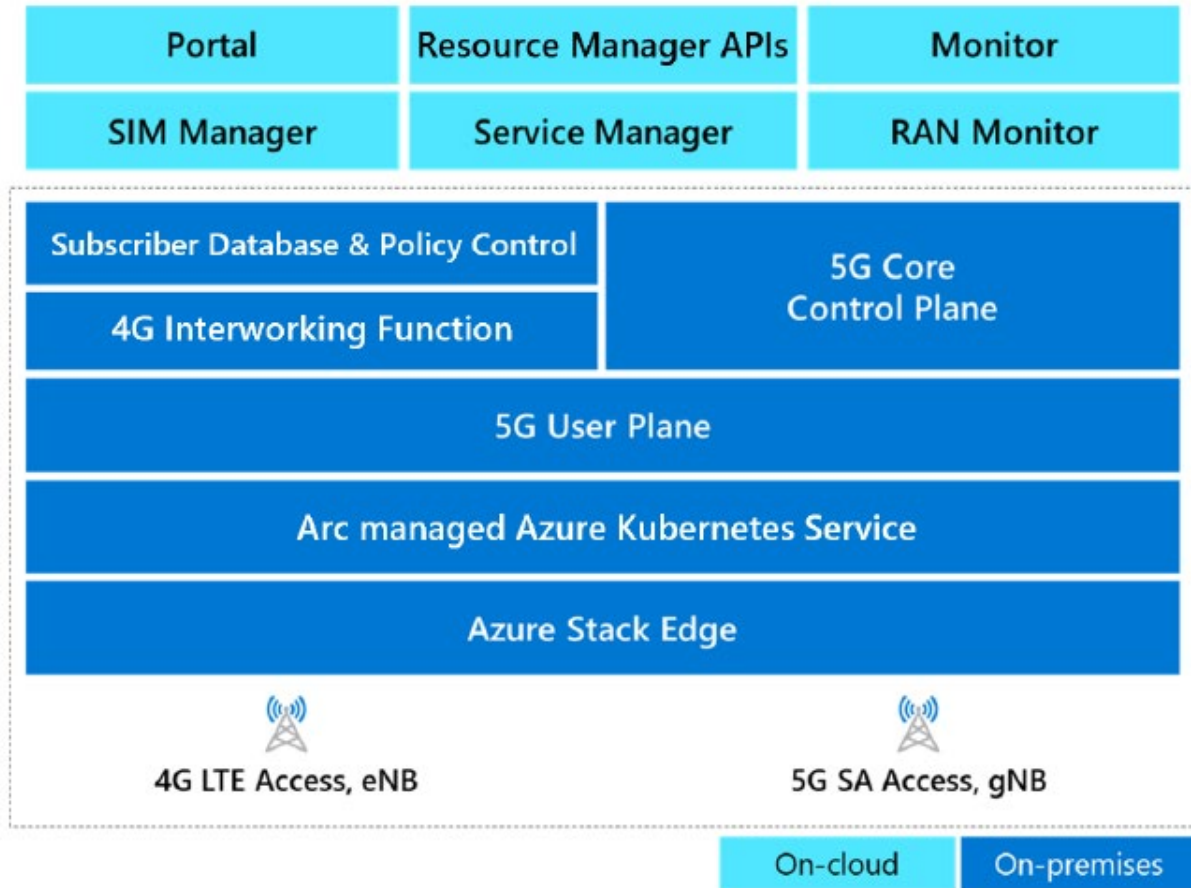
Exhibit 13 (https://learn.microsoft.com/en-us/azure/private-5g-core/private-5g-core-overview)
at 3 (showing that the Azure Stack Edge server running the 5G Core Control and 5G User
Plane software is located on-premises, i.e., at the network edge).

83.   The Azure Private 5G Core includes a module with home location register
(HLR) functionality. Running as a packet core instance, each Azure Private 5G Core site
includes user plane function (UPF), core control plane functions including policy and
subscriber management, a portfolio of service-based architecture elements, management
support elements. *Id.* at 5. As seen in the diagram below, where red rectangles have been
added for emphasis, Azure Private 5G Core supports the databases—the UDR (Unified

Database Repository) and UDM (Unified Data Management)—that are the 5G analogs of the 2G/3G home location register (HLR).
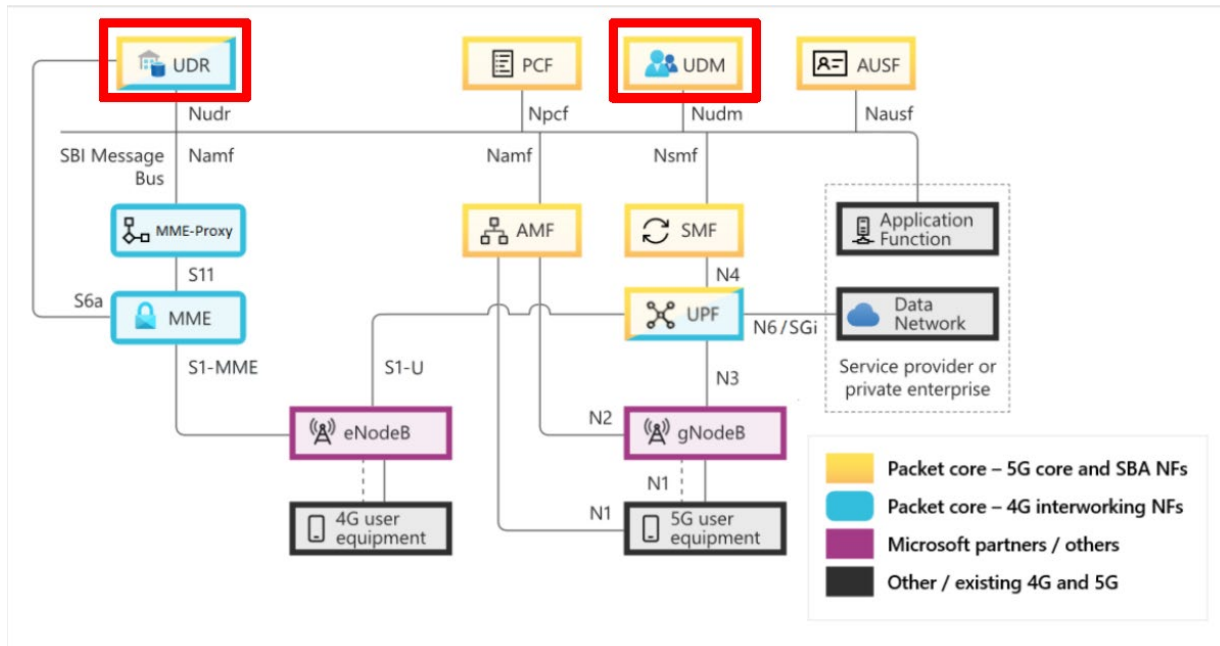
Id. (annotated).

84.   The UDR database operates as a home subscriber server (HSS). *Id.* at 6. The UDR stores user data such as customer profile information, customer authentication information, and encryption keys for the information. Exhibit 26 (https://www.sdxcentral.com/5g/definitions/key-elements-5g-network/what-is-unified-data-management/) at 1.

85.   As seen above in the on-premise-based core implementation, a stateful UDM database keeps data local and together with the function it supports. The stateful UDM database in Azure Private 5G Core has the function of the 2G/3G home location register (HLR), to store and manage subscriber information, ensuring seamless connectivity, efficient call routing, and service delivery across the network.

86.   The Azure Private 4G Core software includes a module with visitor location register (VLR) functionality. The VLR temporarily stores information about subscribers when they roam outside their network, and acts as a temporary record for roaming users on a visited network, enabling proper call routing and service provision while they are away from their home carrier. Specifically, the Azure Private 4G Core software includes Home Subscriber Server ("HSS") functionality to store subscription-related information to support mobility and to set up user IP sessions. Exhibit 27 at 20 (explaining that the HSS stores the user identification and user profile information). The HSS includes both HLR and VLR functionality modules, which are databases of information for home network users and visiting users respectively. "Instead of an HLR, 4G networks have a Home Subscriber Server (HSS)." Exhibit 29 at 1 (https://www.emnify.com/iot-glossary/hlr); Exhibit 28 at 1-2. The HLR functionality is storage of the user subscription information for those users' home network. The VLR functionality is storage of the user subscription information for roaming users. Exhibit 28 at 3-4.

87.   The Azure Private 5G Core software also includes a module with visitor location register (VLR) functionality. It has an HLR/VLR module, performed by the UDM, the UDR, and the AUSF functions. The Unified Data Repository ("UDR") is a database with subscription data and data defining network and user policies. Exhibit 30 at 153. The AUSF (Authentication Server Function) authenticates devices using the credentials generated by the UDM. *Id.* at 152. The Unified Data Management ("UDM") is the front-end for user subscription data. *Id*.

88.   The Azure Private 5G Core software has mobile switching center (MSC) and

base station controller (BSC) functionality. In particular, Azure Private 5G Core software

includes modules for:

- access and mobility function (AMF);

- session management function (SMF);

- unified data management (UDM);

- authentication server function (AUSF); and

- user plane function (UPF).

Exhibit 13 at 5. Regarding charging, the user plane function (UPF), together with the session

management function (SMF), performs accounting functions and collects charging data based

on a particular user's usage that results in a call detail record. Exhibit 30 at 46, 97, 106;

Exhibit 31 at 9. Regarding subscription management, the access and mobility function (AMF),

authentication server function (AUSF), and unified data management (UDM) collectively serve

as an attachment point for subscribers and perform subscriber management and authentication,

authorization and accounting (AAA) functions.   Exhibit 30 at 97, 106; Exhibit 31 at 9. These

functionalities in Azure Private 5G Core software can be seen in the diagram below.
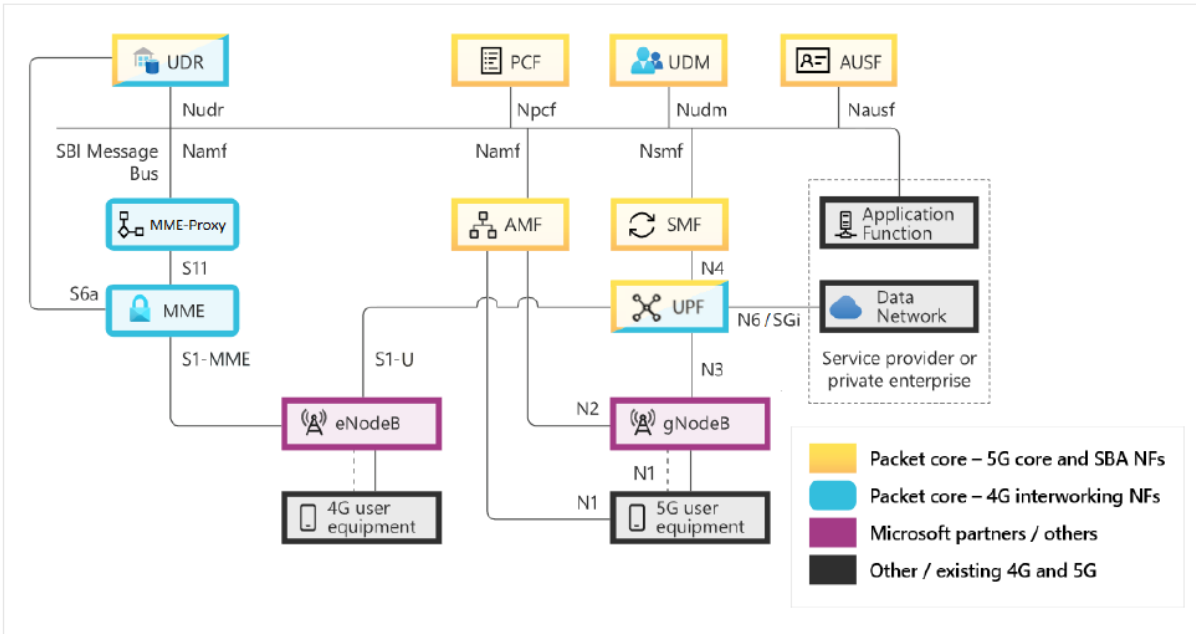
Exhibit 13 at 5.

89.   AT&T's Private 5G Edge facilitates group calls with multiple participants and allows users to make conference calls, including with four or more participants. For example, AT&T's IP Multimedia Subsystem (IMS) supports the setup of group calls as defined in the 3GPP standard: "The basic services for the IP Multimedia core network Subsystem (IMS), as defined in 3GPP TS 24.229[5], allow a user to initiate, modify and terminate media sessions based on the Session Initiation Protocol, as defined in RFC 3261[7]." Exhibit 32 at 10. Although these basic mechanisms already allow "multi party calls," more sophisticated services for communication between "multiple parties" can be made available by the network. *Id*.

90.   As described above, when there are multiple sites in an AT&T Private 5G Edge network, each site runs an instance of Azure Private 5G Core. Each core instance is capable of connecting calls and transferring data to another core instance at another location. This includes the ability to set up and perform group calls between four or more devices. In such

cases the telephony data for the group call is transmitted from the Azure Private 5G Core

instance at the first site, where the group call originates, to the second site with a separate

Azure Private 5G Core instance, where additional participants receive the call.

91.   AT&T's direct infringement of the '230 Patent has injured and continues to

injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

92.   AT&T has had knowledge of Lemko's patents since at least as early as 2013

and has had specific knowledge of its infringement of the '230 Patent since at least October

2013, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for

Lemko's patent rights.

93.   AT&T's infringement has caused and is continuing to cause damage and

irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury

unless and until that infringement is enjoined by this Court.

94.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of

infringement of the '230 Patent, justifying an award to Lemko of increased damages under 35

U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

95.   Lemko is entitled to injunctive relief, damages and any other relief in

accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '230

Patent.

COUNT II - INDIRECT INFRINGEMENT OF THE '230 PATENT

96.   Lemko repeats, realleges, and incorporates by references, as if fully set forth

herein, the allegations of the preceding paragraphs.

97.   As set forth above, AT&T has had knowledge of Lemko's patents since at least

as early as 2013 and has had specific knowledge of its infringement of the '230 Patent since at

least October 2013, if not earlier.

98.   As set forth with respect to Count I, at least AT&T Private 5G Edge directly infringes the '230 Patent. In addition to directly infringing the '230 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '230 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

99.   As discussed above, AT&T Private 5G Edge infringes the '230 Patent because it provides communication apparatuses with HLR, VLR, MSC, AAA, BSC, and group call modules. These are not optional features. Rather, they are always included in this product and are necessary for it to operate as intended. Thus, the installation and operation of AT&T Private 5G Edge necessarily infringe the '230 Patent.

100.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '230 Patent.

101.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

102.   AT&T's websites promote AT&T Private 5G Edge, describe the benefits of these products, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit

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9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at

1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34

(https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35

(https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These

websites encourage customers to purchase and use AT&T Private 5G Edge which, as described

above, necessarily infringes when put into service.

103.   AT&T has published numerous white papers that similarly promote and

encourage the purchase and use of the infringing AT&T Private 5G Edge product. Exhibit 36

at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020);

Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit

38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in

the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*,

AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix,

2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of

AT&T's Network Transformation*, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your

business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

104.   AT&T is also liable for contributory infringement of the '230 Patent pursuant to

35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to

infringement of the '230 Patent by offering to sell and selling in the United States AT&T

Private 5G Edge software. The AT&T Private 5G Edge software is not a staple article or

commodity of commerce suitable for substantial non-infringing use. This is because, as

discussed above, when connected to a wireless transceiver and used to operate a node in a

mobile network, the software infringes the '230 Patent. It has no function other than to provide

these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

105.   AT&T's indirect infringement of the '230 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

106.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

<u>COUNT III - DIRECT INFRINGEMENT OF THE '066 PATENT</u>

107.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

108.   AT&T has infringed and continues to directly infringe at least exemplary Claim 1 of the '066 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling, and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

109.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

110.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T

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"manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

111.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

112.   By way of example of AT&T's infringement of the '066 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 1 of the '066 Patent, which recites:

> 1. A system comprising:
>
> a first home location register module;
>
> a first visitor location register module;
>
> a first community location register module; and
>
> a first multiple International Mobile Subscriber Identity (IMSI) location register (MILR) module, wherein the first MILR module includes:
>
> user information associated with a plurality of mobile subscribers, and wherein for each of the plurality of mobile subscribers, the user information includes:
>
> a first IMSI number and a first Mobile Directory Number (MDN), wherein the first IMSI number and the first MDN are associated with a first country;
>
> a second IMSI number and a second MDN, wherein the second IMSI number and the second MDN are associated with a second country; and
>
> active location information,
>
> wherein when the active location information indicates that a particular mobile subscriber is located in the first country, the first IMSI number is active, the first MDN is an active local telephone number in the first country, and the second MDN is an active local telephone number in the second country, and
>
> wherein when the active location information indicates that the particular mobile subscriber is located in the second country, the second IMSI number is active, the first

MDN is an active local telephone number in the first country, and the second MDN is an active local telephone number in the second country.

113.   As described above, AT&T's Private 5G Edge network is a communications system for delivering mobile voice and data services. AT&T's Private 5G Edge network runs Azure Private 5G Core on common-off-the-shelf servers, such as AT&T's Azure Stack Edge servers.

114.   In Azure Private 5G Core, unified data management (UDM) provides home location register (HLR) and visitor location register (VLR) functionality. Exhibit 13 at 5; Exhibit 43 (https://msdynamicsworld.com/story/microsoft-previews-5g-core) at 1-2; Exhibit 44 (https://learn.microsoft.com/en-us/azure/private-5g-core/statement-of-compliance) at 3; Exhibit 30 at 152. The UDM uses the unified data repository (UDR), a database holding the subscription data and data defining network and user policies, to hold the data.   Exhibit 30 at 153. As the home location register (HLR) information is common between Azure Private 5G Core servers in different locations, the HLR functions as a community location register (CLR).

115.   In the on-premise-based core implementation of AT&T's Private 5G Edge network, a stateful UDM is "on-premises" on the servers of the client and keeps data local and together with the function it supports.

116.   The data held by the unified data management (UDM) and unified data repository (UDR) comprises International Mobility Subscriber Information (IMSI) and the user's Mobile Directory Number (MDN) that includes information on the SIM's country/region and issuer. Exhibit 45 (https://learn.microsoft.com/en-us/azure/private-5g-core/provision-sims-azure-portal) at 2-3; Exhibit 46 (https://www.techplayon.com/5g-udm-unified-data-management/) at 1.

117.   AT&T Private 5G Edge includes functionality for managing the scenario where a mobile device from one country is being served by a network node in a different country. AT&T's Private 5G Edge network maintains profiles for each subscriber with information for the country the subscriber is in. For example, when a mobile subscriber associated with a first country has active location information that the subscriber is in that first country, then the IMSI and MDN associated with the first country is active for that subscriber, and the MDN associated with a second country is active in that second country. Conversely, when the same subscriber is in a second country, then the IMSI and MDN associated with the second country are active, and the MDN for the first country is active in the first country. Exhibit 47 at 40; Exhibit 30 at 114; Exhibit 45 (https://learn.microsoft.com/en-us/azure/private-5g-core/provision-sims-azure-portal) at 2-3; Exhibit 13 at 6.

118.   AT&T's direct infringement of the '066 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

119.   AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '066 Patent since at least the date of this Complaint, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for Lemko's patent rights.

120.   AT&T's infringement has caused and is continuing to cause damage and irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court.

121.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '066 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

122.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '066 Patent.

COUNT IV - INDIRECT INFRINGEMENT OF THE '066 PATENT

123.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

124.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '066 Patent since at least the date of this Complaint, if not earlier.

125.   As set forth with respect to Count III, at least AT&T Private 5G Edge directly infringes the '066 Patent. In addition to directly infringing the '066 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '066 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

126.   As discussed above, AT&T Private 5G Edge infringes the '066 Patent because it provides a system with HLR, CLR, IMSI, and MDN modules. These are not optional features. Rather, they are always included in these products and are necessary for the products to operate as intended. Thus, the installation and operation of the AT&T Private 5G Edge network necessarily infringes the '066 Patent.

127.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to

enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '066 Patent.

128.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

129.   AT&T's websites promote AT&T Private 5G Edge and describe the benefits of these products, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit 9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at 1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34 (https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35 (https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These websites encourage customers to purchase and use AT&T Private 5G Edge which, as described above, necessarily infringes when put into service.

130.   AT&T has published numerous white papers that similarly promote and encourage the purchase and use of the infringing AT&T Private 5G Edge products. Exhibit 36 at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020); Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit 38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*, AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix, 2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of*

AT&T's Network Transformation, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

131.   AT&T is also liable for contributory infringement of the '066 Patent pursuant to 35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to infringement of the '066 Patent by offering to sell and selling in the United States AT&T Private 5G Edge. The software of AT&T Private 5G Edge is not a staple article or commodity of commerce suitable for substantial non-infringing use. This is because, as discussed above, when connected to a wireless transceiver and used to operate a node in a mobile network, the software infringes the '066 Patent. It has no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

132.   AT&T's indirect infringement of the '066 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

133.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

COUNT V - DIRECT INFRINGEMENT OF THE '322 PATENT

134.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

135.   AT&T has infringed and continues to directly infringe at least exemplary Claim 1 of the '322 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling, and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

136.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

137.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T "manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

138.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

139.   By way of example of AT&T's infringement of the '322 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 1 of the '322 Patent, which recites:

> 1. A method comprising:
>
> receiving a registration request from a first visiting mobile subscriber unit at a first distributed mobile architecture (DMA) node of a DMA network that includes a plurality of coverage sites, wherein the DMA network includes at least the first DMA node and a second DMA node, wherein the first DMA node is associated with a first coverage site of the DMA network, and wherein the second DMA node is associated with a second coverage site of the DMA network that is different from the first coverage site;
>
> in response to receipt of the registration request at the first DMA node, storing an identifier of the first visiting mobile subscriber unit at a first visitor location register (VLR) located at the first DMA node, wherein the first VLR stores first registration

information associated with a first set of visiting mobile subscriber units that are located within the first coverage site of the DMA network and that are supported by the first DMA node;

transmitting the identifier of the first visiting mobile subscriber unit from the first DMA node to a visitor location register (VLR) gateway via the second DMA node of the DMA network,

wherein the VLR gateway is located at a different location than the first DMA node,

wherein a second VLR that is located at the second DMA node stores second registration information associated with a second set of visiting mobile subscriber units that are located within the second coverage site of the DMA network and that are supported by the second DMA node,

wherein the VLR gateway stores an Internet Protocol (IP) address of the first DMA node and the identifier of the first visiting mobile subscriber unit at a memory location within the VLR gateway to indicate that the first visiting mobile subscriber unit has registered at the first DMA node,

wherein the VLR gateway stores the first registration information associated with the first set of visiting mobile subscriber units that are located within the first coverage site of the DMA network and that are supported by the first DMA node and stores the second registration information associated with the second set of visiting mobile subscriber units that are located within the second coverage site of the DMA network and supported by the second DMA node, and wherein at least one mobile subscriber unit in the first set of visiting mobile subscriber units is associated with a home coverage site that is distinct from the first coverage site and the second coverage site,

wherein registration information associated with a particular visiting mobile subscriber unit includes an identifier of the particular visiting mobile subscriber unit and an IP address of a particular DMA node that supports the particular visiting mobile subscriber unit, and

wherein the VLR gateway is coupled to an element of a wide area wireless network.

140.   As described above in the Section "AT&T's Accused Products," AT&T's Private 5G Edge is a network of DMA nodes. AT&T's Private 5G Edge network servers running Azure Private 5G Core software are DMA nodes. These AT&T Private 5G Edge servers are located at each coverage site within the customers' private networks, have distributed call routing and management functionality, and connect with other peer Private 5G Edge servers to form DMA networks.

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141.   In Azure Private 5G Core, unified data management (UDM) provides home location register (HLR) and visitor location register (VLR) functionality. Exhibit 13 at 5; Exhibit 43 (https://msdynamicsworld.com/story/microsoft-previews-5g-core) at 1-2; Exhibit 44 (https://learn.microsoft.com/en-us/azure/private-5g-core/statement-of-compliance) at 3; Exhibit 30 at 152. The UDM uses the unified data repository (UDR), a database holding the subscription data and data defining network and user policies, to hold the data. Exhibit 30 at 153.

142.   In the premise-based core implementation of AT&T's Private 5G Edge network, a stateful UDM is "on-premises" on the servers of the client and keeps data local and together with the function it supports.

143.   The data held by the unified data management (UDM) and unified data repository (UDR) comprises the SUPI (Subscription Permanent Identifier) of the subscriber as well as the IP address of the Access and Mobility Function (AMF) and Session Management Function (SMF) serving the device—the 5G correlates to the IP address of a DMA node. Exhibit 48 at 9-13; Exhibit 49 at 29; Exhibit 47 at 23-40.

144.   The DMA nodes in AT&T's Private 5G Edge network with Azure Private 5G Core have various interfaces called gateways to communicate with other members of the network by Internet Protocol. In AT&T's Private 5G Edge network, visitor location register (VLR) gateways are associated with DMA servers.

145.   When a mobile device enters the coverage area of a DMA node in a Private 5G Edge network it sends a registration request to register with the AT&T Private 5G Edge network associated with that DMA node. Exhibit 47 at 23-45.

146.   This registration request contains information which identifies the mobile subscriber, such as the SUPI (Subscription Permanent Identifier) of the subscriber. This information is held in a visitor location register (VLR) at the DMA node. The DMA node synchronizes this stored information with the visitor location register gateway (VLRG) by transmitting to the visitor location register gateway various identifiers, which include (1) the subscriber identifier as well as (2) the IP address of the DMA nodes serving this subscriber (that is, the IP address of the session management function (SMF) and access and mobility management function (AMF))—which allow the visitor location register gateway (VLRG) to know where the device is located in the network. Exhibit 13 at 5; Exhibit 48 at 9-12; Exhibit 49 at 29-30; Exhibit 47 at 23-45.

147.   In the situation where the AT&T Private 5G Edge Network has an on-premises cluster of DMA nodes with a subscriber management system that keeps track of local users and is synchronized to the broader AT&T network, this system allows users to be tracked both within the on-premises cluster and also throughout AT&T's broader network.

148.   When a visitor to a first DMA in the on-premises cluster in AT&T's Private 5G Edge network comes within range of the coverage area of that first DMA, the first DMA receives the registration request and transmits the identifiers (subscriber identifiers, IP address) to the visitor location register gateway (VLRG). Exhibit 50 at 12-13; Exhibit 51 at 19-20, 69-70.

149.   When a second visitor to a second DMA in the on-premises cluster in AT&T's Private network comes within range of the coverage area of that second DMA, the second DMA both receives the identifier of the first visitor at the first DMA and stores information of the identifiers of the second visitor and transmits the identifiers (subscriber identifiers, IP

address) to the visitor location register gateway (VLRG). Exhibit 50 at 12-13; Exhibit 51 at 19-20, 69-70.

150.   The VLR Gateway associates with the DMA server, which itself forms a wide area wireless network (i.e., a wireless network with a broad geographic reach). Exhibit 51 at 16; Exhibit 30 at 18-21.

151.   AT&T's direct infringement of the '322 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

152.   AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '322 Patent since at least October 2013, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for Lemko's patent rights.

153.   AT&T's infringement has caused and is continuing to cause damage and irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court.

154.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '322 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

155.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '322 Patent.

COUNT VI - INDIRECT INFRINGEMENT OF THE '322 PATENT

156.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

157.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '322 Patent since at least October 2013, if not earlier.

158.   As set forth with respect to Count V, at least AT&T Private 5G Edge directly infringes the '322 Patent. In addition to directly infringing the '322 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '322 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

159.   As discussed above, AT&T Private 5G Edge infringes the '322 Patent because it provides a system with DMA, VLR Gateways, and UDM nodes and modules. These are not optional features. Rather, they are always included in these products and are necessary for the products to operate as intended. Thus, the installation and operation of the AT&T Private 5G Edge network necessarily infringes the '322 Patent.

160.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '322 Patent.

161.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones),

and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

162.   AT&T's websites promote AT&T Private 5G Edge and describe the benefits of these products, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit 9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at 1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34 (https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35 (https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These websites encourage customers to purchase and use AT&T Private 5G Edge which, as described above, necessarily infringes when put into service.

163.   AT&T has published numerous white papers that similarly promote and encourage the purchase and use of the infringing AT&T Private 5G Edge products. Exhibit 36 at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020); Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit 38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*, AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix, 2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of AT&T's Network Transformation*, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

164.   AT&T is also liable for contributory infringement of the '322 Patent pursuant to 35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to infringement of the '322 Patent by offering to sell and selling in the United States AT&T

Private 5G Edge. The software of AT&T Private 5G Edge is not a staple article or commodity of commerce suitable for substantial non-infringing use. This is because, as discussed above, when connected to a wireless transceiver and used to operate a node in a mobile network, the software infringes the '322 Patent. It has no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

165.   AT&T's indirect infringement of the '322 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

166.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

COUNT VII - DIRECT INFRINGEMENT OF THE '990 PATENT

167.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

168.   AT&T has infringed and continues to directly infringe at least exemplary Claim 1 of the '990 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling, and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

169.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

170.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of

its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T "manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

171.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

172.   By way of example of AT&T's infringement of the '990 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 1 of the '990 Patent, which recites:

> 1. A non-transitory computer-readable storage medium comprising instructions that, when executed by a processor, cause the processor to:
>
> receive, at a first distributed mobile architecture (DMA) gateway of a DMA gateway communications network, communications information associated with a communications network that is accessible by a second DMA gateway of the DMA gateway communications network;
>
> store the communications information at a memory of the first DMA gateway;
>
> receive a communication associated with a destination device that is indicated by the communications information to be served by the second DMA gateway; and
>
> route the communication to the destination device by relaying the communication from the first DMA gateway to the second DMA gateway via the DMA gateway communications network.

173.   As described above, AT&T's Private 5G Edge network runs on common-off-the-shelf servers with non-transitory computer readable storage for storing and running Azure Private 5G Core software.

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174.   Servers in AT&T's Private 5G Edge network with Azure Private 5G Core have

interfaces to communicate with other networks, including the server clusters at other locations

within the private network. The Azure Private 5G Core servers with these interfaces to other

networks are DMA Gateways (DMAGs) and the network connecting these DMAGs is a DMA

Gateway communications network, often a private IP network. Virtualized functions, such as

the user plane function (UPF), receive and store information in a DMA Gateway and regulate

how data are sent from one device through a communications network to a destination device.

Exhibit 30 at 148-49; Exhibit 44 at 1.

175.   When multiple user plane function (UPF) modules acting as DMA Gateways

(DMAG) are connected via the DMA Gateway communications network, the data for a

destination device are routed from a first DMAG to a second DMAG using the communication

information stored in the first DMAG. The following diagram generated by Lemko illustrates

how two connected user plane function (UPF) nodes are interposed between a local network

and the AT&T broader network. Exhibit 30 at 68-69.
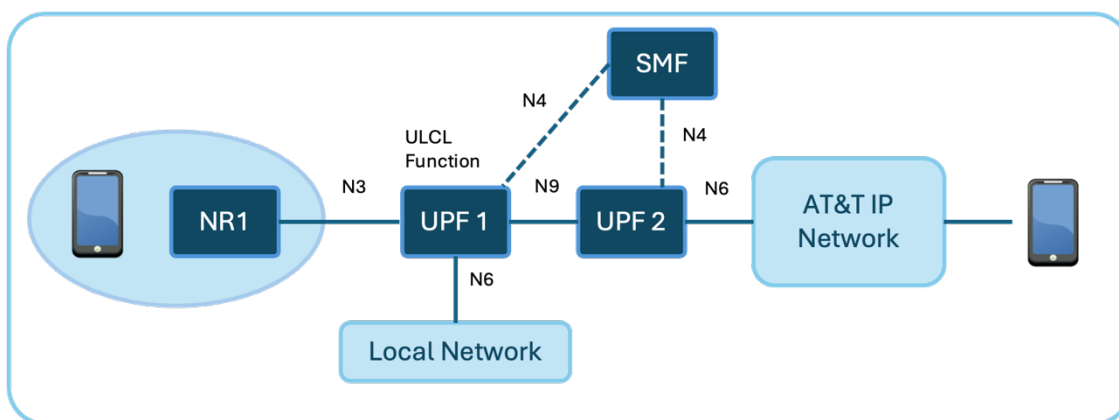
Schematic diagram illustrating interconnection of UPF in network.

176.   When a call from a local network activates the first user plane function, here

"UPF 1," the first UPF receives and stores information to set up an Uplink Classifier (ULCL)

associated with the communications network accessible by the second UPF, here "UPF 2."
Exhibit 30 at 68-69. This ULCL identifies which packets should be routed to the local
network, and which should be allowed through to the broader AT&T network, here "AT&T IP
network."

177.   With this configuration, communications destined for devices served by the
second UPF (that is, the second DMAG) are received by the first UPF and routed to the second
UPF. In other words, the packets to be sent to the destination device are relayed from the first
DMAG to the second DMAG via the DMAG communications network.

178.   AT&T's Private 5G Edge network receives the communication information
associated with a second DMA Gateway, the second UPF, stores that information at the first
DMA Gateway, the first UPF, and routes the communication, that is, the data packets
associated with a call, either back to the local network or to AT&T's broader network.

179.   AT&T's direct infringement of the '990 Patent has injured and continues to
injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

180.   AT&T has had knowledge of Lemko's patents since at least as early as 2013
and has had specific knowledge of its infringement of the '990 Patent since at least October
2013, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for
Lemko's patent rights.

181.   AT&T's infringement has caused and is continuing to cause damage and
irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury
unless and until that infringement is enjoined by this Court.

182.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '990 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

183.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '990 Patent.

COUNT VIII - INDIRECT INFRINGEMENT OF THE '990 PATENT

184.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

185.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '990 Patent since at least October 2013, if not earlier.

186.   As set forth with respect to Count VII, at least AT&T Private 5G Edge directly infringes the '990 Patent. In addition to directly infringing the '990 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '990 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

187.   As discussed above, AT&T Private 5G Edge infringes the '990 Patent because it provides DMA Gateways that store information and route communications. These are not optional features. Rather, they are always included in this product and are necessary for it to operate as intended. Thus, the installation and operation of AT&T Private 5G Edge necessarily infringes the '990 Patent.

188.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings,

reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '990 Patent.

189. As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

190. AT&T's websites promote AT&T Private 5G Edge, describe the benefits of this product, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit 9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at 1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34 (https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35 (https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These websites encourage customers to purchase and use AT&T Private 5G Edge which, as described above, necessarily infringes when put into service.

191. AT&T has published numerous white papers that similarly promote and encourage the purchase and use of the infringing AT&T Private 5G Edge product. Exhibit 36 at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020); Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit 38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*,

AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix, 2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of AT&T's Network Transformation*, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

192.   AT&T is also liable for contributory infringement of the '990 Patent pursuant to 35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to infringement of the '990 Patent by offering to sell and selling in the United States AT&T Private 5G Edge software. The AT&T Private 5G Edge software is not a staple article or commodity of commerce suitable for substantial non-infringing use. This is because, as discussed above, the software infringes the '990 Patent. It has no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

193.   AT&T's indirect infringement of the '990 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

194.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

COUNT IX - DIRECT INFRINGEMENT OF THE '667 PATENT

195.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

196.   AT&T has infringed and continues to directly infringe at least exemplary Claim 1 of the '667 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling,

and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

197.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

198.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T "manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

199.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

200.   By way of example of AT&T's infringement of the '667 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 1 of the '667 Patent, which recites:

Claim 1. A network communication system, comprising:

a first distributed mobile architecture gateway (DMAG) including:

a first interface to communicate with at least one legacy communication network;

a second interface to communicate with a private internet protocol (IP) network; and

logic to forward voice traffic received via the first interface to a first distributed mobile architecture (DMA) server via the private IP network, wherein the voice traffic is directed to a wireless communication device associated with the first DMA server and the first DMA server is one of a first plurality of DMA servers designated by a communications service provider to communicate via the first DMAG;

a community distributed mobile architecture location register, the community distributed mobile architecture location register including information related to each of a second plurality of DMA servers designated to communicate via a second DMAG;

a home distributed mobile architecture location register comprising information related to each of the plurality of DMA servers designated to communicate via the first DMAG; and

a visitor distributed mobile architecture location register including information related to visitor DMA location that are temporarily registered with the first DMAG and that are designated to communicate via at least the second DMAG.

201.   As described above, AT&T's Private 5G Edge network is a communications system for delivering mobile voice and data services. AT&T's Private 5G Edge network runs Azure Private 5G Core software on common-off-the-shelf servers, such as AT&T's Azure Stack Edge servers. These servers are distributed mobile architecture (DMA) servers.

202.   Running as a packet core instance, each Azure Private 5G Core site includes user plane function (UPF), core control plane functions including policy and subscriber management, a portfolio of service-based architecture elements, management support elements—and supports the 4G HSS (Home Subscriber Server) and 5G UDM (Unified Data Management) and UDR (Unified Database Repository) database functions. Exhibit 13 at 5.

203.   Unified data management (UDM) and unified data repository (UDR) provide home location register (HLR) and visitor location register (VLR) functionality. Exhibit 43 (https://msdynamicsworld.com/story/microsoft-previews-5g-core) at 1-2; Exhibit 44 (https://learn.microsoft.com/en-us/azure/private-5g-core/statement-of-compliance) at 3; Exhibit 30 at 152. The UDM uses the unified data repository (UDR), a database holding the subscription data and data defining network and user policies, to hold the data. Exhibit 30 at

153. As the home location register (HLR) information is shared between Azure Private 5G

Core servers in different locations, the HLR functions as a community location register (CLR).

204.   In the on-premise-based core implementation of AT&T's Private 5G Edge

network, a stateful UDM is "on-premises" on the servers of the client and keeps data local and

together with the function it supports.

205.   The DMA servers in AT&T's Private 5G Edge network have various interfaces

to communicate with other members of the network by Internet Protocol, and the servers with

the interfaces are DMA Gateways (DMAG). Virtualized functions, such as the user plane

function (UPF), receive and store information in a DMA Gateway and regulate how data is

sent from one device to another. Exhibit 30 at 149-50; *id*. at 148-49; Exhibit 44 at 1.

206.   Lemko generated the following figure to illustrate the scenario where a user

device moves from a connection with one DMA server to a connection with a second DMA

server in AT&T's Private 5G Edge network.
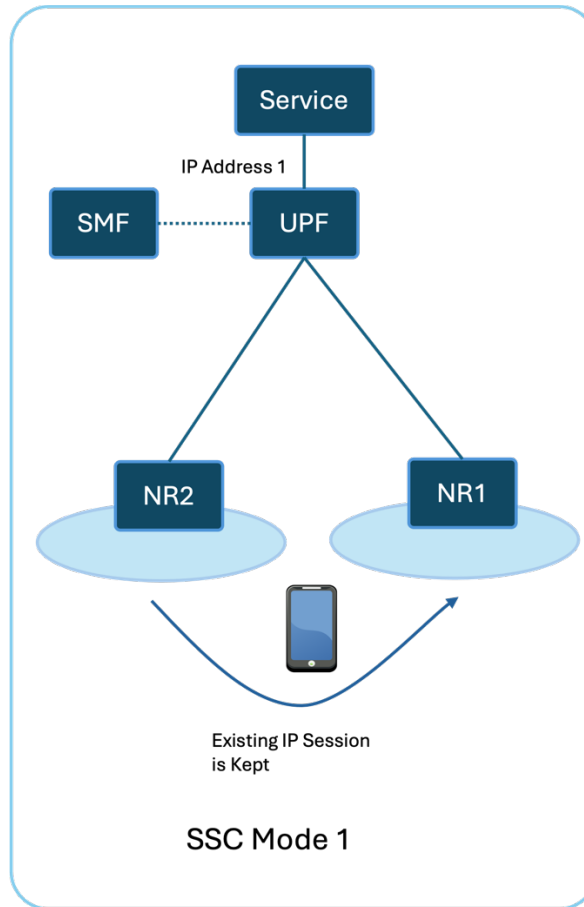
Schematic diagram illustrating the configuration of the components in SSC Mode 1.

207.   Under the 3GPP standard Session and Service Continuity (SSC) mode 1 ("SSC Mode 1"), when a device moves from an area served by one DMA server to another, seen here moving from NR2 to NR1, SSC Mode 1 dictates that the user plane function (UPF) acts as a mobility anchor maintaining the IP address of the device to the external legacy network. The user plane function (UPF) communicates to the DMA servers, NR2 and NR1, through a private IP network. Call data from the legacy network is received at the user plane function (UPF) and routed to the DMA server, NR1, via that private IP network.

208.   In this situation the device registration information is stored at the UPF. That information identifies that the mobile device is adapted to communicate via NR1 – that is, the device has attached to NR1 and is capable of receiving packets from the UPF.

209.   When a user in AT&T's Private 5G network moves from the area served by one DMA server (NR2, the home node) to an area served by a different DMA server (NR1, the visiting node), the information indicating the association with the first DMA server, NR2, can be thought of as the home location register (HLR) and the information indicating the association with the second DMA server, NR1, as the visiting location register (VLR).

210.   The logic in AT&T's Private 5G Edge network steers voice traffic from a device to a specific DMA Gateway and then on to a DMA server based on the user plane function's (UPF) registration information for that device. The voice traffic will thus be routed from the legacy network to the appropriate DMA Gateway and DMA server based on this information.

211.   AT&T's direct infringement of the '667 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

212.   AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '667 Patent since at least October 2013, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for Lemko's patent rights.

213.   AT&T's infringement has caused and is continuing to cause damage and irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court.

214.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '667 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

215.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '667 Patent.

<div align="center">

COUNT X - INDIRECT INFRINGEMENT OF THE '667 PATENT

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216.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

217.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '667 Patent since at least October 2013, if not earlier.

218.   As set forth with respect to Count IX, at least AT&T Private 5G Edge directly infringes the '667 Patent. In addition to directly infringing the '667 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '667 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

219.   As discussed above, AT&T Private 5G Edge infringes the '667 Patent because it provides a system with DMA, private IP network, DMAG, CLR, and HLR nodes and modules. These are not optional features. Rather, they are always included in these products and are necessary for the products to operate as intended. Thus, the installation and operation of the AT&T Private 5G Edge network necessarily infringes the '667 Patent.

220.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to

enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '667 Patent.

221.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

222.   AT&T's websites promote AT&T Private 5G Edge and describe the benefits of these products, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit 9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at 1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34 (https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35 (https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These websites encourage customers to purchase and use AT&T Private 5G Edge which, as described above, necessarily infringes when put into service.

223.   AT&T has published numerous white papers that similarly promote and encourage the purchase and use of the infringing AT&T Private 5G Edge products. Exhibit 36 at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020); Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit 38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*, AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix, 2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of*

AT&T's Network Transformation, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

224.   AT&T is also liable for contributory infringement of the '667 Patent pursuant to 35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to infringement of the '667 Patent by offering to sell and selling in the United States AT&T Private 5G Edge. The software of AT&T Private 5G Edge is not a staple article or commodity of commerce suitable for substantial non-infringing use. This is because, as discussed above, when used to operate a node in a mobile network, the software infringes the '667 Patent. It has no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

225.   AT&T's indirect infringement of the '667 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

226.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

COUNT XI - DIRECT INFRINGEMENT OF THE '029 PATENT

227.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

228.   AT&T has infringed and continues to directly infringe at least exemplary Claim 1 of the '029 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling, and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

229.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

230.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T "manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

231.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

232.   By way of example of AT&T's infringement of the '029 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 1 of the '029 Patent, which recites:

> 1. A non-transitory computer readable storage medium of a first distributed management architecture (DMA) system, the non-transitory computer readable storage medium comprising:
>
> an authentication, authorization, and accounting (AAA) module that includes:
>
> a first home location register (HLR) that stores information associated with one or more mobile subscribers that are registered with the first DMA system; and
>
> a first community location register (CLR) storing information associated with a second HLR of a second DMA system, wherein the second HLR stores information associated with one or more mobile subscribers that are registered with the second DMA system, and wherein the second DMA system includes a second CLR; and

instructions that, when executed by a processor, cause the processor to initiate connection of a call from a first mobile subscriber to a second mobile subscriber via the first DMA system and the second DMA system when the second mobile subscriber is registered with the second DMA system.

233.   As described above, AT&T's Private 5G Edge servers running Azure Private 5G Core software are DMA servers, have non-transitory computer readable storage, form a DMA system of interconnected DMA servers, and include AAA, HLR, and CLR modules. As explained below, Private 5G Edge servers include functionality to initiate connection of a call from a first mobile subscriber to a second mobile subscriber via the first DMA system and the second DMA system when the second mobile subscriber is registered with the second DMA system, for example, when the first subscriber is located at a first location within the private network (such as a first factory) and the second subscribed is located at a second location within the private network (such as a warehouse).

234.   Running as a packet core instance, each Azure Private 5G Core site includes user plane function (UPF), core control plane functions including policy and subscriber management, a portfolio of service-based architecture elements, management support elements—and supports the 4G HSS (Home Subscriber Server) and 5G UDM (Unified Data Management) and UDR (Unified Database Repository) database functions that are the 4G and 5G analogs of the 2G/3G home location register (HLR) and visitor location register (VLR). Exhibit 13 at 5.

235.   In the context of Azure Private 5G Core, the unified data management (UDM) front-end is analogous to how the home location register (HLR), community location register (CLR) and visitor location register (VLR) function in earlier 2G/3G/4G networks. Exhibit 30 at 152-53 (Sec 6.2.7).   The UDM uses the unified data repository (UDR), a database holding the subscription data and data defining network and user policies. *Id.* at 153.

236.   The home location register (HLR) and visitor location register (VLR) information in each DMA system in AT&T's Private 5G Edge network support the initiation of a call from a first subscriber associated with a first DMA node to a second subscriber associated with a second DMA system, using the information in the home location register (HLR) and visitor location register (VLR) to assign the DMA node to which each subscriber is registered.

237.   The requirement that the first DMA system initiates a call from a first mobile subscriber to a second mobile subscriber via the first DMA system and the second DMA system when the second mobile subscriber is registered with the second DMA system is satisfied by the Push-to-Talk (PTT) feature. Support for Mission-Critical Push-to-Talk (MCPTT) is standardized in both 4G and 5G in 3GPP 23.379. Exhibit 52 at 15, 34-99*; see also id*. at 14, 26-171; Exhibit 53 at 12-22.

238.   AT&T's direct infringement of the '029 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

239.   AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '029 Patent since at least October 2013, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for Lemko's patent rights.

240.   AT&T's infringement has caused and is continuing to cause damage and irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court.

241.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '029 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

242.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '029 Patent.

COUNT XII - INDIRECT INFRINGEMENT OF THE '029 PATENT

243.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

244.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '029 Patent since at least October 2013, if not earlier.

245.   As set forth with respect to Count XI, at least AT&T Private 5G Edge directly infringes the '029 Patent. In addition to directly infringing the '029 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '029 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

246.   As discussed above, AT&T Private 5G Edge infringes the '029 Patent because it provides AAA, HLR, and CLR modules. These are not optional features. Rather, they are always included in this product and are necessary for it to operate as intended. Thus, the installation and operation of AT&T Private 5G Edge necessarily infringes the '029 Patent.

247.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release

notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to enable and encourage the infringing use and installation of AT&T Private 5G Edge to infringe the '029 Patent.

248.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

249.   AT&T's websites promote AT&T Private 5G Edge, describe the benefits of this product, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit 9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at 1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34 (https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35 (https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These websites encourage customers to purchase and use AT&T Private 5G Edge which, as described above, necessarily infringes when put into service.

250.   AT&T has published numerous white papers that similarly promote and encourage the purchase and use of the infringing AT&T Private 5G Edge product. Exhibit 36 at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020); Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit 38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*, AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix,

2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of AT&T's Network Transformation*, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

251.   AT&T is also liable for contributory infringement of the '029 Patent pursuant to 35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to infringement of the '029 Patent by offering to sell and selling in the United States AT&T Private 5G Edge software. The AT&T Private 5G Edge software is not a staple article or commodity of commerce suitable for substantial non-infringing use. This is because, as discussed above, when used to operate a node in a mobile network, the software infringes the '029 Patent. It has no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

252.   AT&T's indirect infringement of the '029 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

253.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

COUNT XIII - DIRECT INFRINGEMENT OF THE '020 PATENT

254.   Lemko repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs, as set forth above.

255.   AT&T has infringed and continues to directly infringe at least exemplary Claim 9 of the '020 Patent in violation of 35 U.S.C. § 271(a) by making, using, importing, selling, and offering for sale in the United States at least AT&T Private 5G Edge without the permission, consent, authorization, or license of Lemko.

256.   AT&T's infringement is based upon literal infringement, infringement under the doctrine of equivalents, or both.

257.   To the extent any components of the claimed systems are provided by AT&T's customers, AT&T directly infringes by acting as the final assembler of the infringing system. AT&T acts as the final assembler by configuring the final infringing system at the direction of its customers. AT&T private cellular networks are a "[c]omplete solution that includes design, installation, test and turn up, ongoing support for software updates, hardware support, and tier 1-3 support." Exhibit 9 at 1. AT&T's solution includes fully managed service where AT&T "manag[es] end-to-end complex cellular networks—providing maintenance monitoring, technology upgrades, and break/fix services." Exhibit 24 at 1.

258.   AT&T further directly infringes by directing and controlling the infringing systems, and obtaining benefits from its control of the systems as a whole, for example, when AT&T configures and maintains the infringing systems as a paid service for its customers. AT&T states that it will "plan, transform, and optimize your local networks. From SIM activation to quality of service (QOS) guidance, we're here to help." Exhibit 9 at 1.

259.   By way of example of AT&T's infringement of the '020 Patent, AT&T Private 5G Edge meets all of the limitations of exemplary Claim 9 of the '020 Patent, which recites:

> 9. A non-transitory computer-readable storage medium comprising instructions that, when executed by a processor, cause the processor to:
>
> receive a first call at a first distributed mobile architecture gateway (dMAG) of a plurality of dMAGs, each of the plurality of dMAGs coupled to a dMAG interface of a legacy network, wherein the first call is placed to a called mobile station that is accessible by the dMAG interface via the first dMAG;
>
> determine, at the first dMAG, a routing path for the first call based on register data of the first dMAG, wherein the routing path includes at least one component of the first dMAG, at least one component of a first distributed mobile architecture (dMA) node of a first group of a plurality of groups of dMA nodes, each of the plurality of groups of

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dMA nodes coupled to the legacy network via a different one of the plurality of dMAGs, and at least one component of a private Internet Protocol (IP network)

send one or more command messages to reserve the at least one component of the first dMAG, the at least one component of the first dMA node, and the at least one component of the private Internet Protocol (IP) network;

receive one or more confirmation messages indicating that the at least one component of the first dMAG, the at least one component of the first dMA node, and the at least one component of the private IP network are reserved to route the first call;

and connect the first call to the called mobile station via the reserved at least one component of the first dMAG, the reserved at least one component of the first dMA node, and the reserved at least one component of the private IP network;

wherein the register data includes first data identifying dMA nodes local to the first dMAG, second data identifying dMA nodes visiting the first dMAG, third data including calling information for each mobile station local to one of the dMA nodes identified by the second data, and fourth data including calling information for each mobile station visiting one of the dMA nodes identified by the second data, wherein the first dMA node is indicated by the second data and information for each mobile station visiting one of the dMA nodes identified by the second data, wherein the first dMA node is indicated by the second data and calling information for the called mobile station is indicated by the third data or the fourth data, and wherein the routing path is determined based in part on the calling information for the called mobile station.

260.   As described above, AT&T's Private 5G Edge network is a communications system for delivering mobile voice and data services. AT&T's Private 5G Edge network runs Azure Private 5G Core software on common-off-the-shelf servers, such as AT&T's Azure Stack Edge servers. These servers are distributed mobile architecture (DMA) servers, which are distributed mobile architecture nodes in the DMA network, and the software is stored on non-transitory computer-readable storage media.

261.   Running as a packet core instance, each Azure Private 5G Core site includes user plane function (UPF), core control plane functions including policy and subscriber management, a portfolio of service-based architecture elements, and management support elements. Exhibit 13 at 5.

262.   As discussed above, the DMA servers in AT&T's Private 5G Edge network

have various interfaces to communicate with other members of the network by Internet

Protocol as well as with external legacy networks, and the servers with the interfaces are DMA

Gateways (DMAGs).

263.   Virtualized functions, such as the user plane function (UPF), receive and store

information in a DMA Gateway and regulate how data are sent from one device through a

communications network to a destination device. Exhibit 30 at 148-49; Exhibit 44 at 1. The

call data are routed based on the calling information of a particular mobile station and the

relationship of a particular distributed mobile architecture (DMA) to a particular mobile

architecture gateway (DMAG). Based on this information, a routing path is established and

session setup occurs for the mobile station.

264.   The following schematic illustrates how AT&T's Private 5G Edge network

infringes Claim 9 of the '020 Patent through provision of a network that routes call information

based on the calling information of a particular mobile station and the relationship of a

particular distributed mobile architecture (DMA) to a particular distributed mobile architecture

gateway (DMAG) to establish a routing path and session startup for a mobile station.
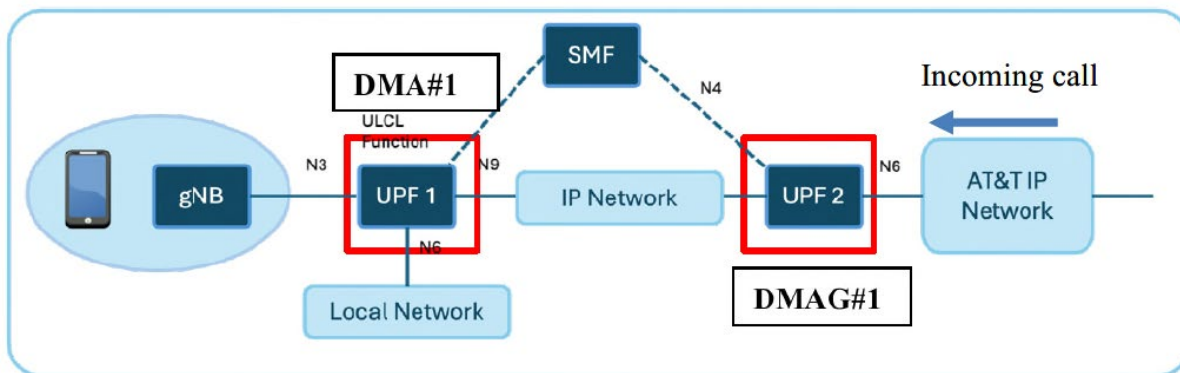
265.   In AT&T's Private 5G network, an incoming call from the AT&T IP Network is received and buffered at DMAG#1, which is user plane function #2 (UPF2), which signals this to the session management function (SMF). The session management session (SMF) then sends a series of requests and receives confirmations from DMA#1, which is user plane function #1 (UPF1), and the radio, the gNB, to establish a protocol data unit (PDU) session startup for a mobile station.

266.   Routing of data traffic for the call occurs by the configurations of DMAG#1 (user plane function #2 (UPF 2)) and DMA#1 (user plane function #1 (UPF 1)). DMAG#1 and DMA#1 are configured by the session management function (SMF), working in conjunction with the uplink classifier (ULCL) in DMA#1, to classify data traffic so as to decide whether to tap off data traffic to the local network or connect it to the legacy AT&T IP network.

267.   Session establishment for the call involves setting up user-plane tunnels. These "tunnels" "encapsulate" the user-plane packets, meaning that the IP packets are wrapped within new IP packets with the IP addresses of the new wrapped packets being the IP addresses of the network elements (i.e., the DMA, the DMAG, or gNB). Exhibit 54 at 13-17. This session establishment and setting of tunnels includes sending command messages and reserves resources at DMAG#1, DMA#1, and the IP network. Once the resources have been established, acknowledgment messages confirm the reservation of resources to route the call. *Id*. at 34-40.

268.   AT&T's Private 5G Edge network thus routes data traffic based on the relationship of a particular DMAG to a particular DMA, as based on the configuration of the user plane function (UPF) that routes traffic based on the nature of the data and the

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classification of the various DMA and DMAGs in the network, and then uses reserved tunnel resources to convey the data.

269.   AT&T's direct infringement of the '020 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty.

270.   AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '020 Patent since at least the date of this Complaint, if not earlier. AT&T's actions are willful, blatant, and in egregious disregard for Lemko's patent rights.

271.   AT&T's infringement has caused and is continuing to cause damage and irreparable injury to Lemko, and Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court.

272.   AT&T acted recklessly, willfully, wantonly, and deliberately engaged in acts of infringement of the '020 Patent, justifying an award to Lemko of increased damages under 35 U.S.C. § 284, and attorney's fees and costs incurred under 35 U.S.C. § 285.

273.   Lemko is entitled to injunctive relief, damages and any other relief in accordance with 35 U.S.C. §§ 283, 284, and 285 for AT&T's direct infringement of the '020 Patent.

COUNT XIV - INDIRECT INFRINGEMENT OF THE '020 PATENT

274.   Lemko repeats, realleges, and incorporates by references, as if fully set forth herein, the allegations of the preceding paragraphs.

275.   As set forth above, AT&T has had knowledge of Lemko's patents since at least as early as 2013 and has had specific knowledge of its infringement of the '020 Patent since at least the date of this Complaint, if not earlier.

276.   As set forth with respect to Count XIII, at least AT&T Private 5G Edge directly infringes the '020 Patent. In addition to directly infringing the '020 Patent, AT&T has actively, knowingly, and intentionally induced and continues to induce direct infringement of the '020 Patent under 35 U.S.C. § 271(b) by instructing, encouraging, directing, and requiring third parties to make, install and use AT&T Private 5G Edge in an infringing manner.

277.   As discussed above, AT&T Private 5G Edge infringes the '020 Patent because it provides DMAG and DMA nodes and a private IP network. These are not optional features. Rather, they are always included in these products and are necessary for the products to operate as intended. Thus, the installation and operation of the AT&T Private 5G Edge network necessarily infringes the '020 Patent.

278.   AT&T instructs and encourages its customers on how to use each of these core features of AT&T Private 5G Edge, including through direct communication, trainings, reference materials, user guides, promotional materials, support contracts, sales calls, release notes, webinars, guidelines, videos, manuals, and white papers, all of which are intended to enable and encourage the infringing use and installation of AT&T 5G Private Edge to infringe the '020 Patent.

279.   As noted above, for AT&T's Private 5G Edge service, AT&T directs its customers to buy a specific BOM (bill of materials) consisting of: Azure Stack Edge hardware (the physical server), the RAN (wireless transceiver), the SIMs (the SIM cards for the phones), and the gateway routers that are then combined with AT&T's software to form the infringing communications apparatuses. Exhibit 13 at 2.

280.   AT&T's websites promote AT&T Private 5G Edge and describe the benefits of these products, and detail various service plans available to customers. Exhibit 33 at 1; Exhibit

9 at 1; Exhibit 24 (AT&T Managed In-Building Wireless Solutions for Businesses (att.com) at

1; Exhibit 10 (https://www.business.att.com/products/att-private-5g-edge.html) at 1; Exhibit 34

(https://www.business.att.com/categories/att-on-premise-edge.html) at 1; Exhibit 35

(https://www.business.att.com/products/network-functions-virtualization.html) at 1-2. These

websites encourage customers to purchase and use AT&T Private 5G Edge which, as described

above, necessarily infringes when put into service.

281.   AT&T has published numerous white papers that similarly promote and

encourage the purchase and use of the infringing AT&T Private 5G Edge products. Exhibit 36

at 4 (*AT&T and HPE Bring Low-Latency Edge Computing to Enterprises*, AT&T, 2020);

Exhibit 37 (*Cloud and network fusion at the enterprise edge*, AT&T and IBM, 2021); Exhibit

38 (*Enterprise-grade 5G for business of all sizes,* AT&T, 2020); Exhibit 39 (*Your network in

the 5G era*, AT&T, 2020); Exhibit 12 (*Strategic design considerations for Private Cellular*,

AT&T, 2021); Exhibit 40 (*Creating the agile and flexible hybrid network*, AT&T/Equinix,

2022); Exhibit 41 (*The dawn of the 5G world*, AT&T, 2018); Exhibit 42 (*7 Principles of

AT&T's Network Transformation*, AT&T, version 07.3, 2020); Exhibit 33 (*Redefine your

business operations with AT&T Multi-Access Edge Computing (MEC)*, AT&T, 2023).

282.   AT&T is also liable for contributory infringement of the '020 Patent pursuant to

35 U.S.C. § 271(c) by knowing or being willfully blind to the fact that it is contributing to

infringement of the '020 Patent by offering to sell and selling in the United States AT&T

Private 5G Edge. The software of AT&T Private 5G Edge is not a staple article or commodity

of commerce suitable for substantial non-infringing use. This is because, as discussed above,

when used to operate a node in a mobile network, the software infringes the '020 Patent. It has

no function other than to provide these core infringing functionalities. Thus, there is no substantial non-infringing use for AT&T Private 5G Edge.

283.   AT&T's indirect infringement of the '020 Patent has injured and continues to injure Lemko in an amount to be proven at trial, but not less than a reasonable royalty. Lemko will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by the Court.

284.   Pursuant to 35 U.S.C. §§ 283, 284, and 285, Lemko is entitled to injunctive relief, damages, and attorney's fees and costs.

PRAYER FOR RELIEF

WHEREFORE, Lemko prays for judgment and relief as follows:

A.   Entry of judgment that AT&T has infringed and is infringing the Asserted Patents, has induced infringement and is inducing infringement of the Asserted Patents, and has contributorily infringed and continues to contribute to infringement of the Asserted Patents;

B.   A preliminary and permanent injunction against AT&T and its officers, employees, agents, servants, attorneys, instrumentalities, and those in privity with them, from infringing, directly or indirectly, the Asserted Patents, and for all further and proper injunctive relief pursuant to 35 U.S.C. § 283;

C.   An award to Lemko of damages to be proven at trial to compensate Lemko for AT&T's infringement of the Asserted Patents that will account for infringement up to trial based on the relevant information and financials produced, where said damages will be no less than a reasonable royalty;

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D.   An award to Lemko of increased damages under 35 U.S.C. § 284 based on,

inter alia, AT&T's willful infringement of the Asserted Patents;

E.   A finding that this case is "exceptional" and an award to Lemko of its costs and

reasonable attorneys' fees, as provided by 35 U.S.C. § 285;

F.   An accounting of all infringing sales and revenues from the first date of

infringement of the Asserted Patents;

G.   Post judgment interest and prejudgment interest; and

H.   Such further and other relief as the Court may deem proper and just.

Respectfully submitted,

Dated: March 17, 2025

/s/ Elizabeth L. DeRieux
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