

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

HEADWATER RESEARCH LLC,

Patent Owner.

Patent No. 8,023,425
Case No. IPR2026-00464

PETITION FOR *INTER PARTES* REVIEW

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<u>Exhibit</u>	<u>Description</u>
EX1001	U.S. Patent No. 8,023,425 to Raleigh (“the ’425 patent”).
EX1002	Prosecution History of U.S. Patent No. 8,023,425
EX1003	Declaration of Bill Lin, Ph.D.
EX1004	Curriculum Vitae of Bill Lin, Ph.D.
EX1005	U.S. Patent Appl. Publ. No. 2009/0017789 to Thomas et al. (“ <i>Thomas</i> ”).
EX1006	U.S. Patent Appl. Publ. No. 2008/0039102 to Sewall et al. (“ <i>Sewall</i> ”).
EX1007	Reserved
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EX1010	Reserved
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EX1012	U.S. Patent Appl. Publ. No. 2006/0031515 to Van Gassel et al. (“ <i>Van Gassel</i> ”).
EX1013	U.S. Patent Appl. Publ. No. 2003/0035397 to Haller et al. (“ <i>Haller</i> ”).
EX1014	U.S. Patent Appl. Publ. No. 2009/0046591 to Krishnaswamy et al. (“ <i>Krishnaswamy</i> ”).
EX1015	U.S. Patent Appl. Publ. No. 2007/0104169 to Polson (“ <i>Polson</i> ”).
EX1016	U.S. Patent Appl. Publ. No. 2005/0102529 to Buddhikot et al. (“ <i>Buddhikot</i> ”).
EX1017	U.S. Patent Appl. Publ. No. 2008/0080493 to Weintraub et al. (“ <i>Weintraub</i> ”).

<u>Exhibit</u>	<u>Description</u>
EX1018	U.S. Patent Appl. Publ. No. 2010/0043068 to Varadhan et al. (“ <i>Varadhan</i> ”)
EX1019	U.S. Patent Appl. Publ. No. 2008/0080458 to Cole (“ <i>Cole</i> ”)
EX1020	Reserved
EX1021	Reserved
EX1022	U.S. Patent No. 6,219,706 to Fan et al. (“ <i>Fan</i> ”)
EX1023	U.S. Patent Appl. Publ. No. 2002/0197991 to Anvekar et al. (“ <i>Anvekar</i> ”)
EX1024	U.S. Patent No. 7,453,793 to Jones et al. (“ <i>Jones</i> ”)
EX1025	<i>Headwater Research LLC v. Google LLC</i> , C.A. No. 3:26-cv-06230, Joint Claim Construction Statement, ECF No. 78 (W.D. Tex., June 5, 2026).

I. Introduction

Petitioner Google LLC respectfully requests *inter partes* review of claims 1-23 and 51 of U.S. Patent No. 8,023,425.

The '425 patent claims an end-user device capable of operating as an intermediate-networking device that communicates with a network system (e.g., the internet) over a wireless access network and provides a “forwarding service” to other devices (e.g., laptops), permitting them to communicate with the network system via the end-user device. The claimed end-user device implements conventional traffic-control service policies and user interfaces as were known in the art by January 28, 2009 (i.e., the earliest possible priority date). Specifically, the end-user device includes a forwarding agent comprising a policy implementation agent and a firewall agent configured to forward or redirect data flowing through the end-user device to various access networking paths according to an access network forwarding policy.

These features, however, were well known. For example, *Thomas* and *Buddhikot* disclose all the features of independent claims 1 and 51. The dependent claims 2-23 recite other conventional hotspot features that a skilled artisan would have found obvious based on *Thomas*, *Buddhikot*, and one of *Sewall*, *Haller*, *Polson*, or *Weintraub*.

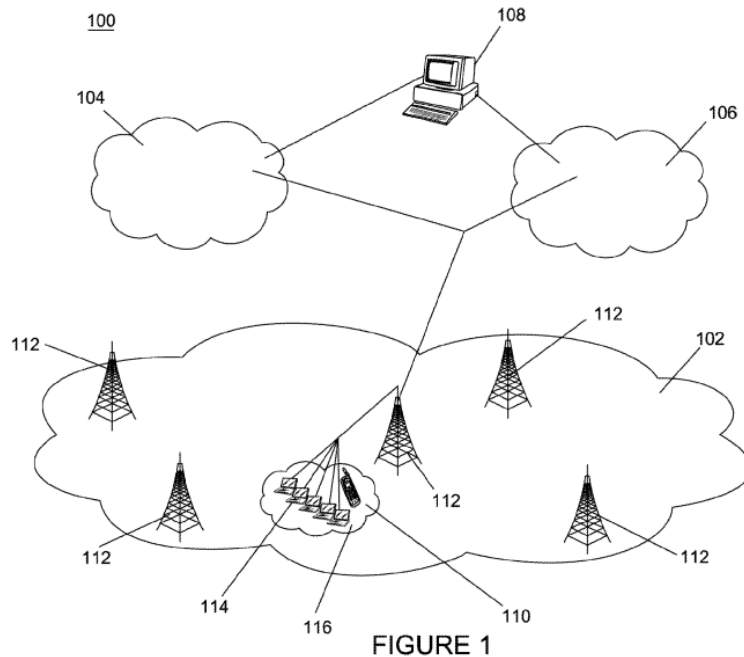
As detailed below and in the supporting declaration of Bill Lin, Ph.D., (EX1003), the challenged claims are unpatentable based on the grounds presented. EX1003, ¶¶1-7, 18-20, 40-192. The Board should institute review and cancel all challenged claims.

II. Technology Background

The following background discussion of the state of the prior art is based on Dr. Lin's testimony. EX1003, ¶¶40-51. Dr. Lin is a Professor of Electrical and Computer Engineering and the Associate Dean for Strategic Programs at the University of California, San Diego (UCSD). EX1003, ¶¶8-11. At UCSD, he is also a Principal Investigator in the UCSD Center for Networked Systems (CNS), where he contributes his expertise in the design of computer architecture solutions for wireless networking and mobile computing. EX1003, ¶¶12-17.

A. Overview of *Thomas*

Thomas discloses a network environment where “the wireless device 110 and the server 108, along with the WLAN 116, form an integrated networking capability for the client computing devices 114” that allows client computing devices 114 to “communicate normal traffic through the wireless device 110 to reach a network, such as the internet 104, or to access information on the server 108.” EX1005, ¶¶27, 47, Fig. 1; EX1003, ¶¶45-46.



EX1005, Fig. 1.

Thomas further discloses a message flow between wireless device 110 and server 107 “to configure the wireless device 110 for operation and to authorize the client computing device 114 for operation.” EX1005, ¶¶57-60, Fig. 7. As part of the “mobile, ad hoc point of presence” formed by wireless device 110, *Thomas* discloses an access network forwarding policy for metering usage and/or limiting number of concurrent users accessing the network through wireless device 110 (also referred to herein as *Thomas*’s hotspot device). EX1005, ¶¶46-47, 49-50, 54-55.

B. Overview of *Buddhikot*

Buddhikot discloses a gateway for mobile access. EX1016, ¶12. *Buddhikot*’s gateway provides quality-of-service (QoS) services, including providing

guaranteed bandwidth and adjusting bandwidth based on number of users.

EX1016, ¶¶176-179. *Buddhikot*'s gateway includes a firewall service with firewalling and packet-mangling rules to control data flow through its gateway.

EX1016, ¶¶74, 76. *Buddhikot* discloses that the firewall service "serve[s] the dual purpose of protecting the clients from malicious attacks coming from the Internet (such as PING floods, TCP syn floods, etc.), and of protecting the Gateway."

EX1016, ¶75. *Buddhikot*'s packet-mangling rules provide "automatic redirection of user's traffic." EX1016, ¶76; EX1003, ¶47.

C. Overview of Sewall

Sewall discloses a device (e.g., a cellular phone) capable of routing communications between client devices and the internet. EX1006, Abstract. This device, functioning as a personal hotspot, may implement access rules that limit network access to its traffic-forwarding service. EX1006, ¶¶7-9. The hotspot device may apply different network-access rules based on different identified users or user types. EX1006, ¶22; EX1003, ¶48.

D. Overview of Haller

Haller discloses a "hand-held device for providing communication between a wide area network and a wireless local area network." EX1013, ¶7. *Haller* discloses that "device 106 includes a display ... and a touchscreen, singly or in combination." EX1013, ¶69. *Haller* discloses that its cellular phone hotspot device

includes service level verification software that enforces service level agreements with users. EX1013, ¶¶54-56, 61, 140. *Haller* also discloses permitting unlimited amount of cellular traffic from its hotspot device during the night but limiting the traffic during the day. EX1013, ¶141; EX1003, ¶49.

E. Overview of *Polson*

Polson discloses a gateway adapted to establish a connection between itself and a WWAN with a WWAN interface adapted to receive data from and transfer data to the WWAN on behalf of devices of a LAN. EX1015, Abstract. *Polson* further discloses strategies for managing WWAN access, including adapting its gateway to prioritize specific data over the WWAN to manage conflicts between end-user devices of LANs that are sharing limited WWAN capacity. EX1015, ¶46. *Polson* also recognizes that the mobility of its gateway is important and that the ability to connect to multiple WWANs is necessary when one WWAN is not available due to the location of the user, issues with the service provider, or the features of a service agreement. EX1015, ¶¶52-53; EX1003, ¶50.

F. Overview of *Weintraub*

Weintraub discloses parental control policies that prohibit a customer device within the customer's premises from accessing adult content from the external network. EX1017, ¶10. *Weintraub* also discloses different restriction settings based on a type of network content, for example, instant messaging or Voice over IP

communications, peer-to-peer transmissions, e-mail transmissions, or streaming media. EX1017, ¶26. *Weintraub* discloses restricting forwarding of data based on source or destination, time of day, attachments, or type of content. *Id.*; EX1003, ¶51

III. The '425 Patent

The '425 patent was filed on March 2, 2009, and claims priority to a provisional application filed January 28, 2009.¹ EX1001, cover.

A. Overview

The '425 patent discloses a system that allows an end-user device to be used as an intermediate networking device. EX1001, 32:34-44, 35:21-29. Figure 15 reflects the purported invention:

¹ Petitioner reserves the right to challenge the priority date if Patent Owner attempts to antedate any of the prior art.

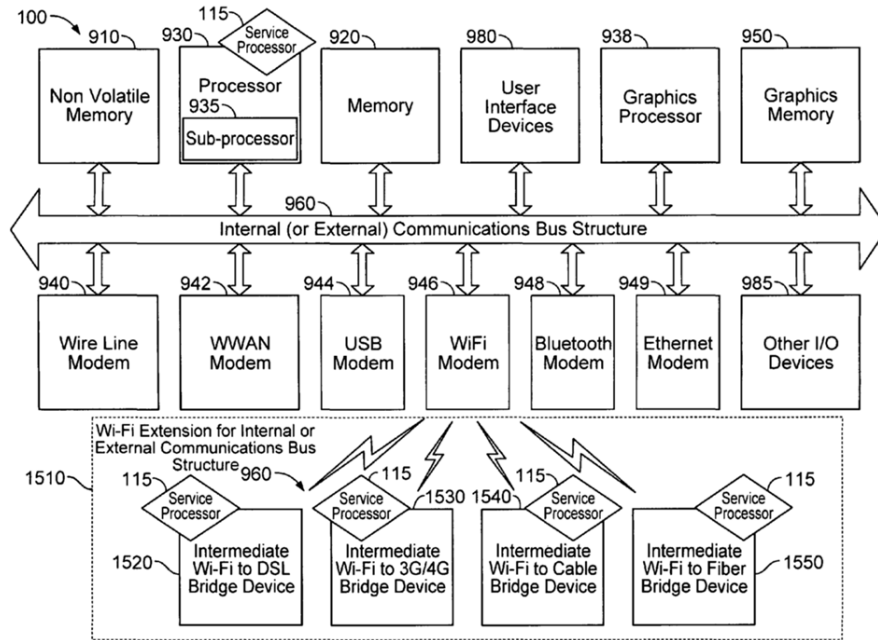


FIG. 15A

EX1001, Fig. 15A. The end-user device includes a modem. The memory stores service-policy settings for authorizing the end-user device to provide a forwarding service. The service processor obtains configuration information, obtains a user input through a user interface, and modifies a service-policy setting to enable or disable the forwarding service. EX1003, ¶42.

B. Prosecution History

During prosecution, the Examiner issued one office action, rejecting application claim 21 under 35 U.S.C. § 101 and application claims 1-8, 21, and 22 on the ground of nonstatutory double patenting over co-pending U.S. Application No. 12/380,769. EX1002, 241-251. The Examiner also rejected application claims 1-4, 9-11, 21, and 22 as anticipated by *Varadhan* (EX1018). EX1002, 251. In response, Applicant cancelled application claims 1-22 and presented new claims

23-77. EX1002, 120-130. The Examiner issued a Notice of Allowance, cancelling application claims 29, 30, and 35, adding the subject matter of these claims to the independent claims, and allowing the remaining application claims. EX1002, 77-95. In the reasons for allowance, the Examiner stated:

[The claims] are allowed over the prior art of record since the cited references taken individually or in combination fails to particularly disclose **the forwarding agent including a policy implementation agent configured to forward the data in the first end point device's communications stack, and a firewall agent configured to pass or redirect the data to one or more specific access network routing paths according to the access network forwarding policy.**

EX1002, 95 (emphasis in original). The Examiner, however, erred in allowing the claims over clear teachings in the prior art disclosing the claimed “forwarding agent,” as discussed in this Petition below. EX1003, ¶¶43-44.

IV. Level of Ordinary Skill

A person of ordinary skill in the art (“POSITA”) at the ’425 patent’s effective filing date would have at least a bachelor’s degree in computer science, electrical engineering, or a related field, and at least two years of work/research experience in the field of computer networking and networking devices.

EX1003, ¶¶52-53 More related education would compensate for fewer years of work experience (and vice versa). EX1003, ¶53.

V. Claim Construction

Claims in an IPR are construed under *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). For purposes of this Petition, no terms need to be expressly construed. EX1025. Petitioner reserves the right to respond to any claim-construction arguments raised by Patent Owner.

VI. Statement of Precise Relief Requested

Petitioner requests review under 35 U.S.C. § 311 of claims 1-23 and 51 of the '425 patent and cancellation of those claims as obvious under pre-AIA 35 U.S.C. § 103 based on the following unpatentability grounds.

	References	Basis	Challenged Claims
1	<i>Thomas and Buddhikot</i>	§ 103	Claims 1, 4-7, 9, 15-17, 20, 21, 23, and 51
2	<i>Thomas, Buddhikot, and Sewall</i>	§ 103	Claim 2
3	<i>Thomas, Buddhikot, and Haller</i>	§ 103	Claims 3 and 8
4	<i>Thomas, Buddhikot, and Polson</i>	§ 103	Claims 10, 18, 19, and 22
5	<i>Thomas, Buddhikot, and Weintraub</i>	§ 103	Claims 11-14

All references asserted in this Petition qualify as prior art under pre-AIA 35

U.S.C. § 102(a), (b), and/or (e) based on the earliest possible priority date of the '425 patent (January 29, 2009):

EX1005	U.S. Patent Publication 2009/0017789 (" <i>Thomas</i> "), filed January 22, 2008, published January 15, 2009; prior art under §§ 102(a), (e).
EX1006	U.S. Patent Publication 2008/0039102 (" <i>Sewall</i> "), filed Feb. 12, 2007, published Feb. 14, 2008; prior art under §§ 102(a), (e).
EX1013	U.S. Patent Publication 2003/0035397 (" <i>Haller</i> "), filed Aug. 17, 2001, published Feb. 20, 2003; prior art under §§ 102(a), (b), (e).
EX1015	U.S. Patent Publication 2007/0104169 (" <i>Polson</i> "), filed Nov. 10, 2006, published May 10, 2007; prior art under §§ 102(a), (b), (e).
EX1016	U.S. Patent Publication 2005/0102529 (" <i>Buddhikot</i> "), filed Oct. 20, 2003, published May 12, 2005; prior art under §§ 102(a), (b), (e).
EX1017	U.S. Patent Publication 2008/0080493 (" <i>Weintraub</i> "), filed Sep. 29, 2006, published Apr. 3, 2008; prior art under § 102(a), (e).

A. Ground 1: Claims 1, 4-7, 9, 15-17, 20, 21, 23, and 51 Are Obvious over *Thomas* and *Buddhikot*

1. Motivation to combine *Thomas* and *Buddhikot*

Thomas and *Buddhikot* are analogous art to the '425 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. EX1005, ¶¶2, 6, 9, 23, 28, 84-85, Figs. 1-11; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189, Figs. 1-15; EX1001, 32:34-35:20. They

also share a common goal with the '425 patent: using end-user devices for routing traffic from other devices to a network system (e.g., the internet), including providing services to improve customizability and monetization of mobile-hotspot technology (e.g., usage control, user interactivity and notifications via graphical user interfaces, and billing features). EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189; EX1001, 32:34-35:20, 65:31-67, Fig. 15A-F; EX1003, ¶55.

a. Combining *Buddhikot*'s firewalling and packet-mangling policies with *Thomas*'s hotspot device

Thomas discloses controlling traffic flow through wireless device 110—a hotspot device—and discloses a firewall configured to operate on the hotspot device. EX1005, ¶¶42, 54, 69. *Buddhikot* discloses a firewall service with firewalling and packet-mangling rules to control data flow through its gateway. EX1016, ¶¶74, 76, 114. A POSITA would have been motivated to implement *Buddhikot*'s firewall and packet-mangling rules on *Thomas*'s hotspot device because doing so would have provided a more refined way to control network traffic through *Thomas*'s hotspot device. EX1003, ¶56.

For example, *Buddhikot* discloses two benefits of its firewall service. EX1016, ¶¶75-76. First, *Buddhikot*'s firewalling rules protect both *Buddhikot*'s gateway and the client devices connected to the gateway from malicious attacks. EX1016, ¶75; EX1003, ¶57. Second, *Buddhikot*'s packet-mangling rules for

redirecting traffic to a local web cache help reduce network traffic flowing to the access network. EX1016, ¶76; EX1003, ¶57. A POSITA would have been motivated to implement *Buddhikot*'s access network forwarding policy (including firewall and packet-mangling rules) on *Thomas*'s hotspot device to obtain these same benefits. EX1003, ¶57. The implementation of *Buddhikot*'s firewalling and packet-mangling rules on *Thomas*'s hotspot device would have been nothing but a combination of familiar elements (e.g., firewalling and packet-mangling rules on a gateway) according to known methods (e.g., implementing the rules to forward or redirect data flowing through the gateway) to obtain predictable results (e.g., protecting devices from malicious attacks and reducing network traffic by redirection to the local DNS or web cache). EX1003, ¶57; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

A POSITA would have had a reasonable expectation of success in implementing *Buddhikot*'s QoS and firewall rules on *Thomas*'s hotspot device. EX1003, ¶58. *Thomas* already discloses using rules to meter usage, limit the number of concurrent connections, and allow data to flow through its hotspot device based on a desired service level. EX1005, ¶¶46-47, 49-50, 54-55. *Thomas* also discloses a firewall that may be implemented on its hotspot device. EX1005, ¶42. *Buddhikot* discloses how to implement the QoS, firewall, and packet-mangling rules to control the flow of data through a gateway device. EX1016,

¶¶74, 76, 114. Because *Thomas* already discloses the use of rules, implementing *Buddhikot*'s QoS, firewall, and packet-mangling rules on *Thomas*'s hotspot device would have involved known techniques as disclosed by *Thomas* and *Buddhikot* and would have been well within the skill level of a POSITA. EX1003, ¶58.

Accordingly, a POSITA would have had a reasonable expectation of success in combining *Buddhikot*'s teachings with *Thomas*. *KSR*, 550 U.S. at 421; EX1003, ¶58.

A POSITA would have also been motivated to modify *Thomas*'s server using *Buddhikot*'s teachings so that the modified *Thomas-Buddhikot* server provides *Buddhikot*'s firewalling and packet-mangling rules to *Thomas*'s hotspot device. EX1003, ¶59. A POSITA would have done so to obtain the same benefits of protecting devices from malicious attacks and reducing network traffic by redirection to the local DNS or web cache as discussed above. EX1003, ¶59.

A POSITA would have had a reasonable expectation of success in modifying *Thomas*'s server to implement *Buddhikot*'s firewalling and packet-mangling rules. EX1003, ¶60. *Thomas* already discloses that its server provides the rules to meter usage, limit the number of concurrent connections, and allow data to flow through its hotspot device based on a desired service level. EX1005, ¶¶46-47, 49-50, 54-55. *Thomas* also discloses that a firewall may be configured to operate on its server. EX1005, ¶42. Thus, modifying *Thomas*'s server to also provide

Buddhikot's firewall and packet-mangling rules to *Thomas*'s hotspot device would have been a combination of familiar elements (e.g., rules) according to known methods (e.g., providing rules from a server) to obtain predictable results (e.g., a modified server capable of providing a variety of rules to hotspot devices). EX1003, ¶60; *KSR*, 550 U.S. at 416, 421.

b. Combining *Buddhikot*'s network congestion management scheme with *Thomas*

Thomas discloses an access network forwarding policy for metering usage and/or limiting the number of concurrent users. EX1005, ¶¶46-47, 49-50, 54-55. *Buddhikot* discloses guaranteeing a minimum bandwidth to client devices connected to its gateway. EX1016, ¶78. *Buddhikot* also discloses adjusting the bandwidth provided to client devices when network congestion occurs, for example, by reducing bandwidth for all connected client devices instead of allowing some users to use all the bandwidth and blocking other users completely. EX1016, ¶78. *Buddhikot* explains that its approach is based on fairness to allow all users to access the network. EX1016, ¶78. A POSITA would have found it obvious to combine the access network forwarding policy of *Thomas* with the network congestion management scheme of *Buddhikot*. EX1003, ¶61.

A POSITA would have been motivated to implement *Buddhikot*'s congestion management scheme on *Thomas*'s hotspot device because doing so would ensure client end point devices connected to the access network through

Thomas's hotspot device are able to exchange data with the access network instead of being disconnected. A POSITA would have been motivated to do so to ensure fairness for all connected client devices and to improve the user experience and satisfaction with the forwarding service provided by the *Thomas-Buddhikot* hotspot device. EX1003, ¶62. The implementation of *Buddhikot*'s congestion management QoS rules on *Thomas*'s hotspot device would have been nothing but a combination of familiar elements (e.g., known QoS rules) according to known methods (e.g., implementing the QoS rules to forward or redirect data flowing through the gateway) to obtain predictable results (e.g., ensuring connected devices can exchange data with the access network even in the face of network congestion). EX1003, ¶62; *KSR*, 550 U.S. at 416. As also discussed, a POSITA would have had a reasonable expectation of success in combining *Buddhikot*'s QoS rules with *Thomas* because implementing rules was already taught by both *Thomas* and *Buddhikot*. *Supra* §VI.A.1.a.

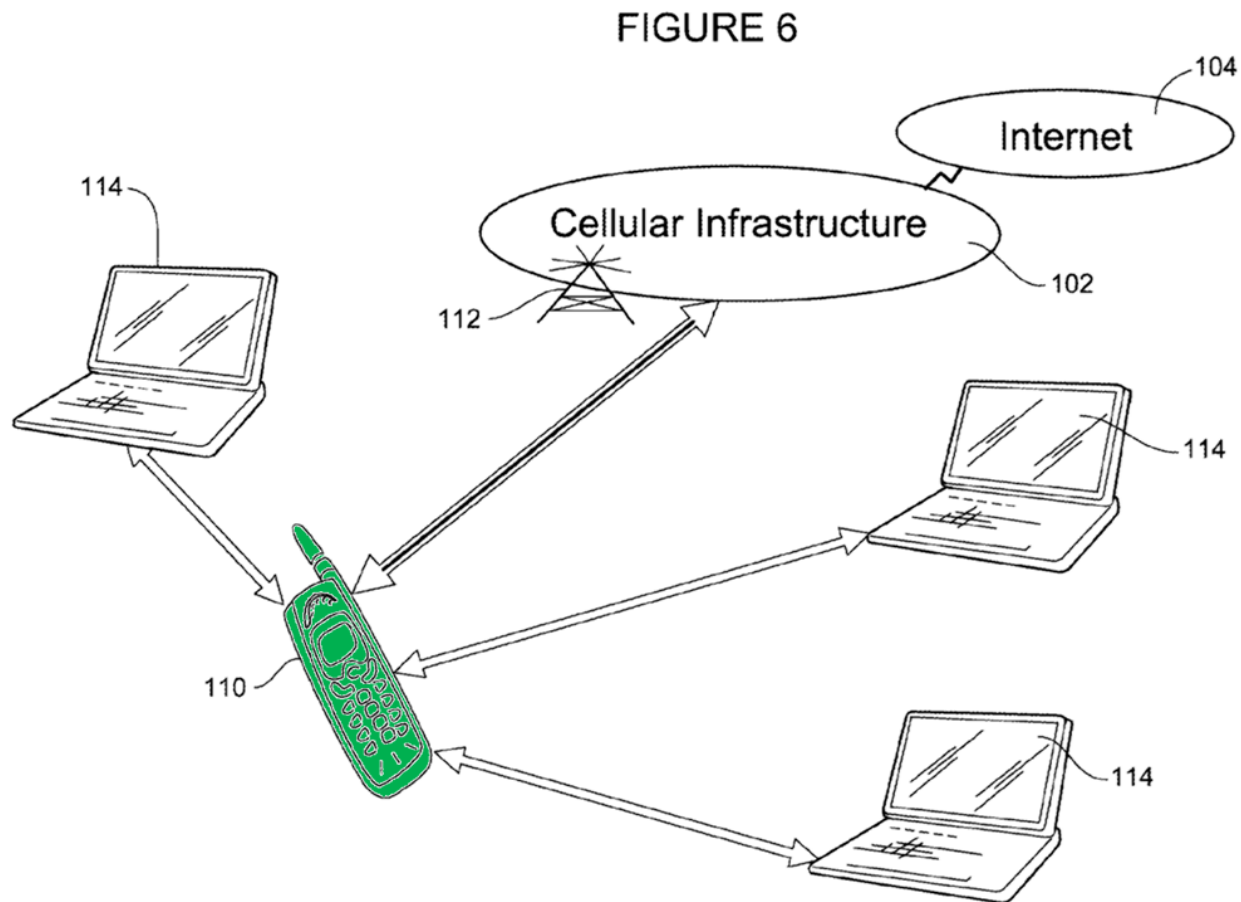
2. Independent Claim 1

The *Thomas-Buddhikot* combination discloses claim 1. EX1003, ¶¶63-89.

a. 1[pre]: “A first end point device comprising:”

Thomas discloses 1[pre]. EX1003, ¶64. *Thomas* discloses using a wireless device 110 as an ad-hoc point-of-presence on a wireless network so that other computing devices can access the internet via the end-user device. EX1005, ¶¶2,

23, 25. *Thomas* describes a cellular phone as providing such services. EX1005, ¶¶44-46, 52, Figs. 5, 6. *Thomas*'s **wireless device 110** is the **first end-point device** because it includes the claimed features. EX1003, ¶64; *infra* §§VI.A.2.b-VI.A.2.k.



EX1005, Fig. 6.

- b. 1[a]: “an **access network modem** configured to communicate data over at least one **access network**, the access network modem providing a connection via at least one **2G, 3G or 4G wireless network**;

Thomas discloses 1[a]. EX1003, ¶¶65-66. *Thomas* discloses that its **wireless device 110** includes a **radio-frequency front-end 300** for bi-directional

communication. EX1005, ¶33. *Thomas* also discloses that DSP 304 “modulates and demodulates data”—i.e., a modem—to process data transmissions to and from the wireless device. *Id.* (emphases added). Further, *Thomas*’s cellular network 102 provides voice and data services to wireless device 110 using 2.5G, 3G, 4G, or any future cellular-data-network technology. EX1005, ¶¶25, 32. Thus, as shown below, *Thomas*’s wireless device 110 includes a radio-frequency front-end 300 and DSP 304 (i.e., “access network modem”) that communicates data over cellular network 102 (i.e., “access network”) via at least a 3G or 4G wireless network as claimed. EX1003, ¶¶65-66.

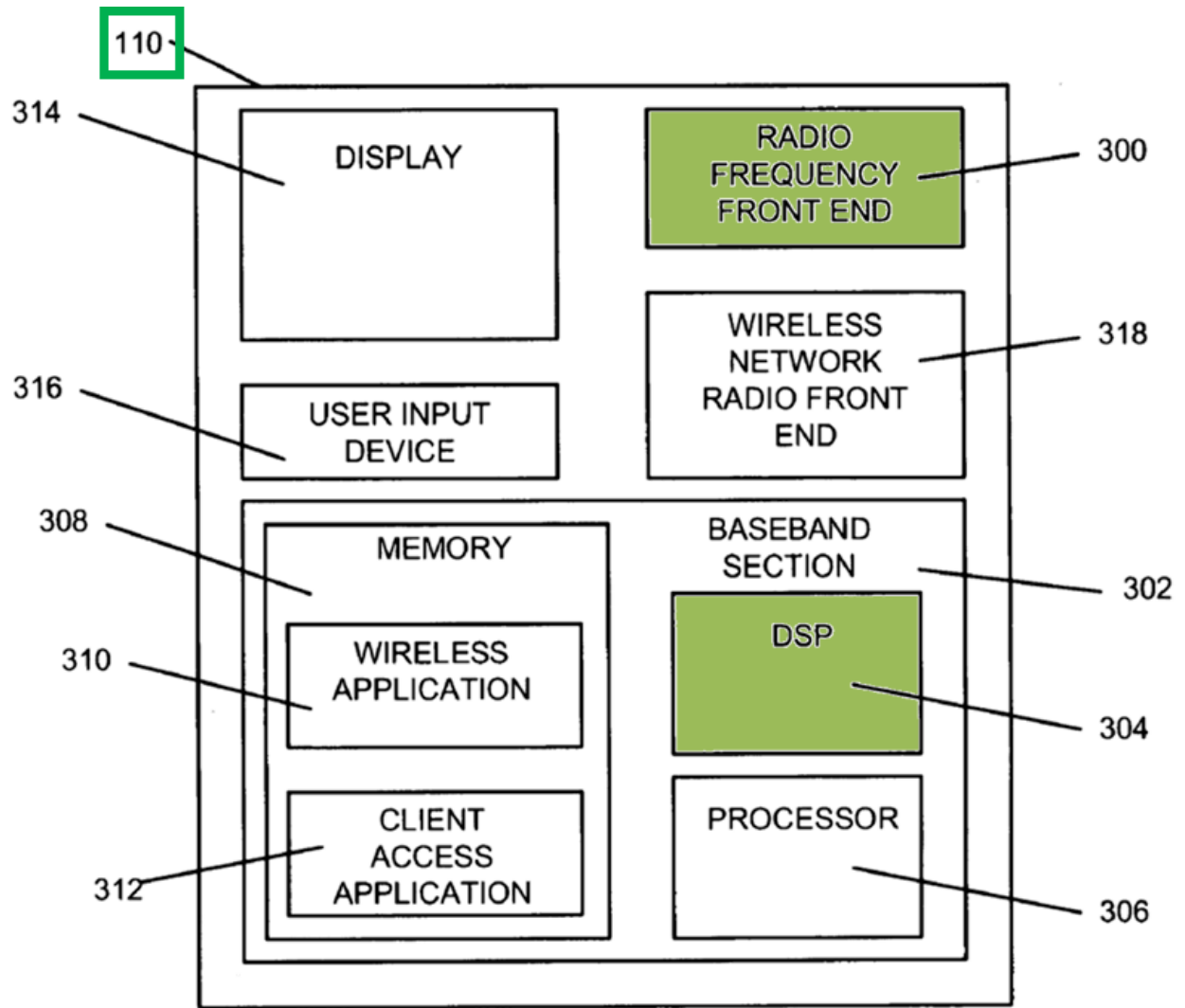
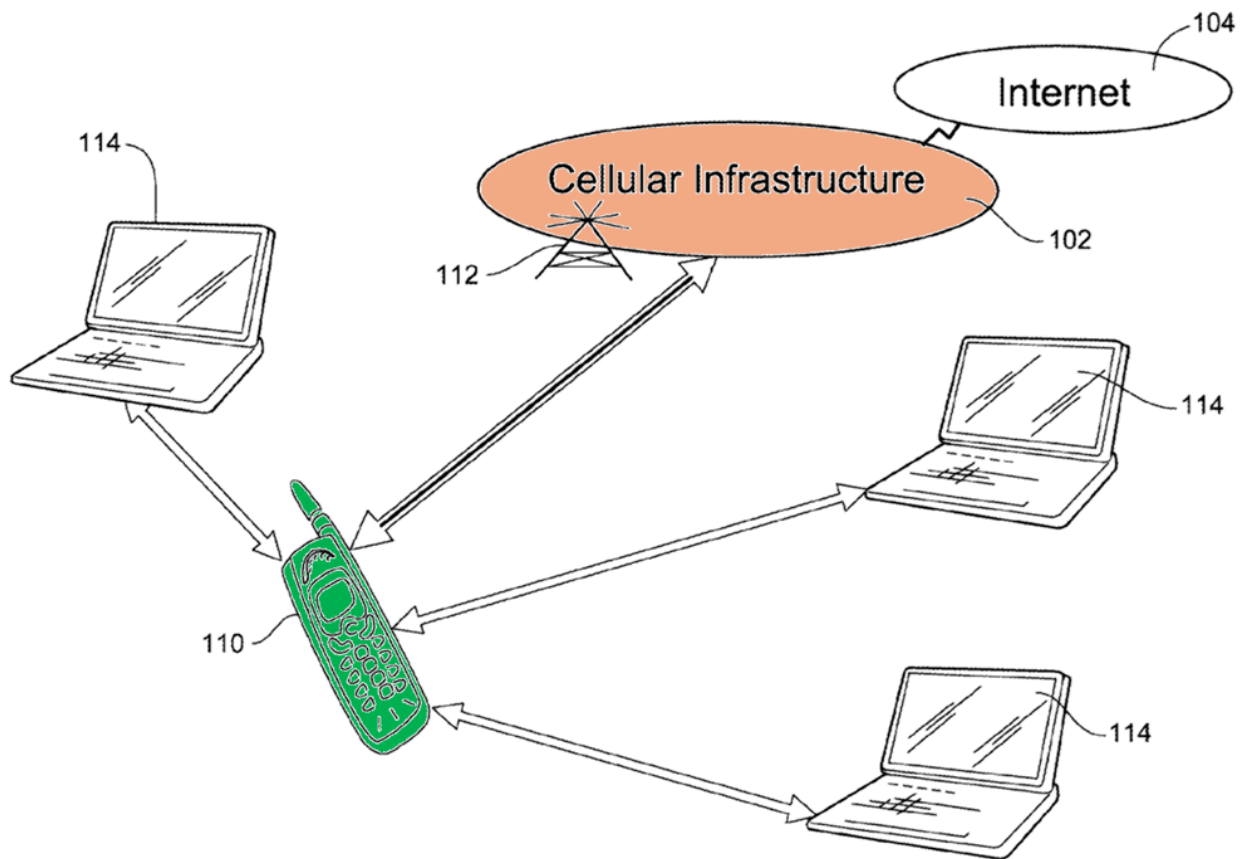


FIGURE 3

EX1005, Fig. 3.

FIGURE 6



EX1005, Fig. 6.

- c. 1[b]: “a **local area network modem** configured to communicate data with **one or more additional end point devices** over a local area network, the **local area network modem** providing a connection via at least one of Bluetooth, **Wi-Fi** or USB;”

Thomas discloses 1[b]. EX1003, ¶¶67-68. *Thomas* discloses “wireless network radio front end 318 provides communication capabilities for the **wireless device 110**.” EX1005, ¶34. *Thomas* discloses that **wireless device 110** provides data services to client-computing devices 114 via a shorter-range wireless-local-area network (WLAN) 116, which may use any suitable wireless protocol, such as

802.11 WLAN. EX1005, ¶25. *Thomas's* wireless device 110 includes “processor 306,” which “is further adapted to communicate via the wireless network radio front end with the at least one computing device.” EX1005, ¶33, claim 7. Thus, as shown below, *Thomas's* wireless device 110 includes processor 306 and wireless-network-radio front end 318 (i.e., “local area network modem”) that communicates data with client-computing devices 114 (i.e., “additional end point devices”) over 802.11 WLAN 116 (i.e., “local area network”) via Wi-Fi. EX1003, ¶¶67-68.

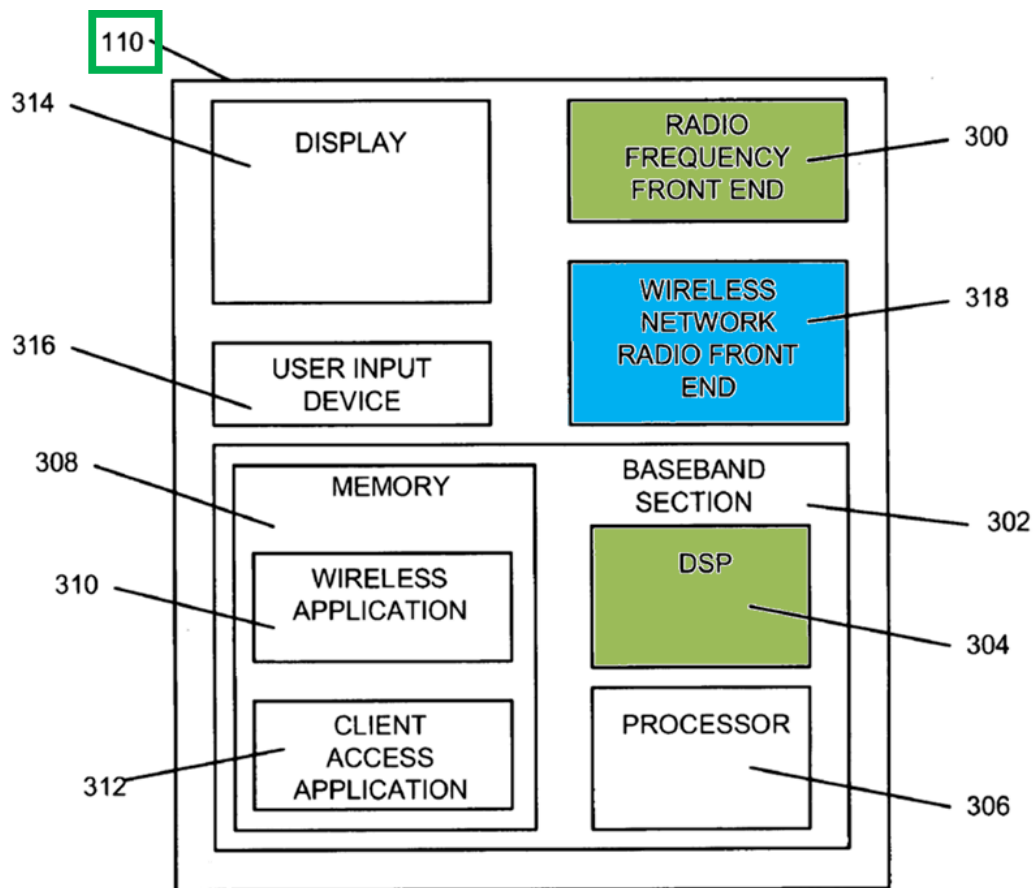
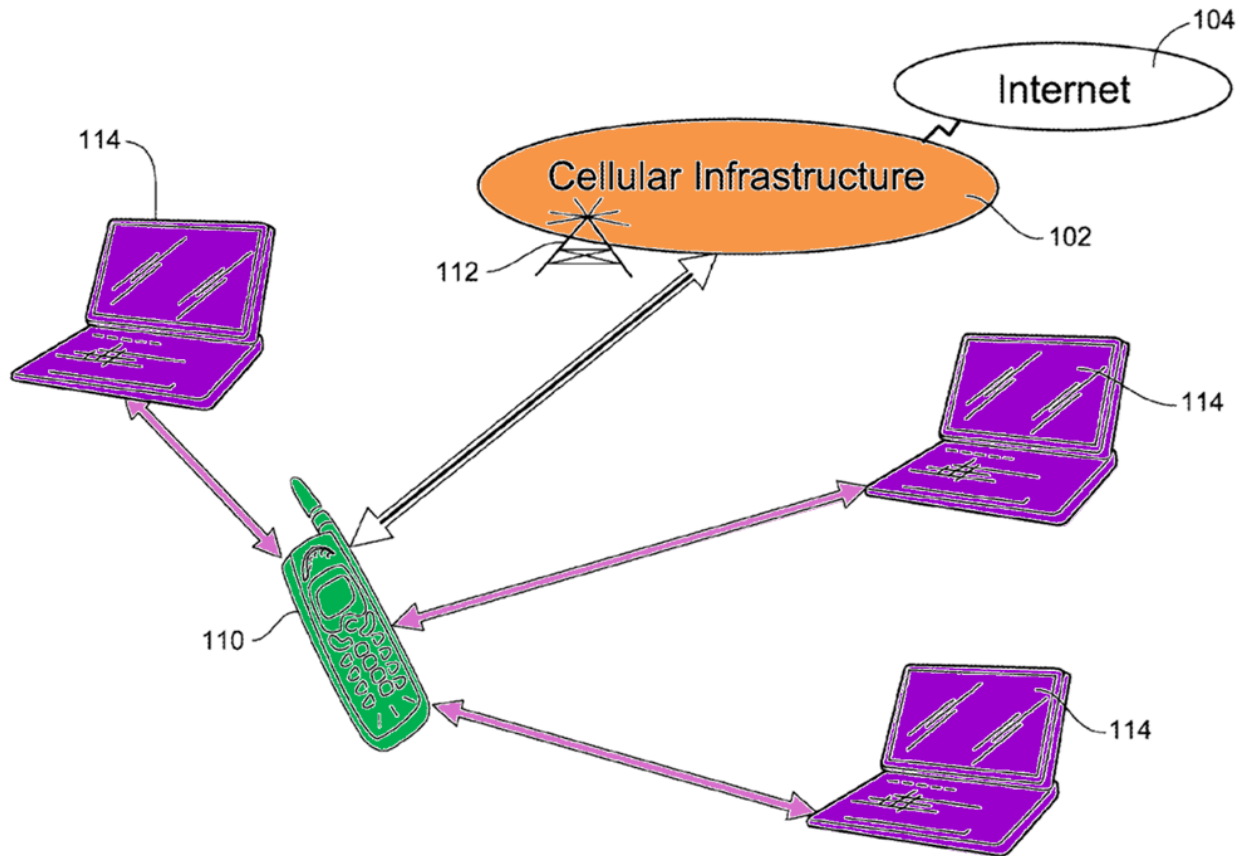


FIGURE 3

EX1005, Fig. 3.

FIGURE 6



EX1005, Fig. 6.

- d. 1[c]: “a forwarding agent configured to forward the data between the **access network modem** and the **local area network modem** according to an access network forwarding policy to implement a **network access forwarding service**, the forwarding agent including a **policy implementation agent** configured to forward the data in the first end point device’s communications stack, and a **firewall agent** configured to pass or redirect the data to one or more specific access network routing paths according to the access network forwarding policy; and”

The *Thomas-Buddhikot* combination discloses 1[c]. EX1003, ¶¶69-75.

Thomas's **client-access application 312 and associated software** are a "**policy implementation agent**," which together with *Thomas*'s **firewall** (i.e., "**firewall agent**") constitute the claimed "forwarding agent." *Thomas* discloses software running on wireless device 110 that distributes data services offered by cellular network 102 in local area networks (LAN) supported by 802.11. EX1005, ¶30; EX1003, ¶70.

Thomas discloses a "client access application 312" providing an "application-level point of presence capabilities within the wireless device 110." EX1005, ¶34. This **client-access application and its associated software** forward data in *Thomas*'s wireless-device-communication stack by forwarding data from client-computing device 114 through wireless device 110 to reach internet 104. EX1005, ¶¶27, 46, 47, 84, 85. Further, *Thomas* discloses a **firewall** (i.e., "**firewall agent**") configured to operate on either the wireless device 110 or the server 108. EX1005, ¶42; EX1003, ¶70.

This forwarding agent in *Thomas* is "configured to forward the data between the **access network modem** and the **local area network modem** . . . to implement a network access forwarding service." *Thomas*'s wireless-network-radio front end 318 (i.e., "**local area network modem**") communicates data with client-computing devices 114, and *Thomas*'s radio-frequency front-end 300 and DSP 304 (i.e., "**access network modem**") communicates with **cellular network 102**. EX1005,

¶¶25, 32-34, Figs. 3, 6; *supra* §§VI.A.2.b, VI.A.2.c. *Thomas*'s forwarding agent (i.e., client-access application, its associated software, and firewall) forwards data between *Thomas*'s wireless-network-radio front end 318 (i.e., “local area network modem”) and *Thomas*'s radio-frequency front-end 300 and DSP 304 (i.e., “access network modem”). Forwarding data in this manner constitutes implementing a network access forwarding service. EX1003, ¶71.

Thomas also discloses forwarding such data according to an “access network forwarding policy.” *Thomas* discloses metering usage based on time duration of connection, number and size of packets sent or received, or QoS requirements. EX1005, ¶54. *Thomas* discloses that a number of concurrent users may be controlled based on a “service level” for the client access application 312. EX1005, ¶69. Metering usage based on service-level or QoS, and controlling number of concurrent users constitutes applying settings associated with an access-network-forwarding policy. EX1003, ¶72.

Thomas discloses a firewall, but does not explain explicitly how its firewall forwards or redirects data. *Buddhikot* discloses these features. *Buddhikot* discloses a gateway that provides data communication between a 3G cellular-access network and devices connected to the gateway via a LAN. EX1016, ¶¶12, 32, 34, 41-42. Like *Thomas*, *Buddhikot*'s gateway provides QoS services, including providing guaranteed bandwidth and adjusting bandwidth if there are too many users

connected to the gateway. EX1016, ¶¶46, 78-81, 176-179. Further, *Buddhikot*'s gateway supports a dynamic-stateful-firewall service. EX1016, ¶74. *Buddhikot*'s firewall service implements firewalling rules for protecting clients from malicious attacks from the internet and for protecting *Buddhikot*'s gateway against traffic from malicious clients. EX1016, ¶75; EX1003, ¶73.

Buddhikot's firewall service also implements packet-mangling rules for automatic redirection of user's traffic (i.e., data received from client devices connected to the gateway) to local services, such as a local DNS server or a web-cache. EX1016, ¶76. *Buddhikot* explains that a user's web requests to a web server 305 get redirected to the cache 304. EX1016, ¶113. When the cache does not have the requested information (i.e., cache miss), the requests are forwarded to a web server on the internet. *Id.* Conversely, if the cache has the requested information (i.e., cache hit), that information is provided without forwarding the data to the web server. *Id.* Thus, *Buddhikot*'s firewall service either forwards the data or redirects the data according to specific network routing paths (e.g., path to web server or path to local DNS server or cache) based on its packet-mangling rules. EX1003, ¶74. A POSITA would have found it obvious to implement *Buddhikot*'s QoS, firewalling, and packet-mangling functionality on *Thomas*'s hotspot device and would have had a reasonable expectation of success in doing so. *Supra* §VI.A.1; EX1003, ¶75.

Thomas modified with *Buddhikot*'s firewall service details (hereafter, the “*Thomas-Buddhikot* hotspot device”) renders obvious the forwarding agent of 1[c]. EX1003, ¶75.

e. 1[d]: “a service processor configured to:”

Thomas discloses 1[d]. EX1003, ¶76. *Thomas*'s wireless device 110 includes “processor 306” that “provides computational and processing capabilities for the wireless device 110 and includes signal processing capabilities.” EX1005, ¶33, Fig. 3. Processor 306 is a “service processor” because it provides processing capabilities to implement the network-access-forwarding service. EX1003, ¶76.

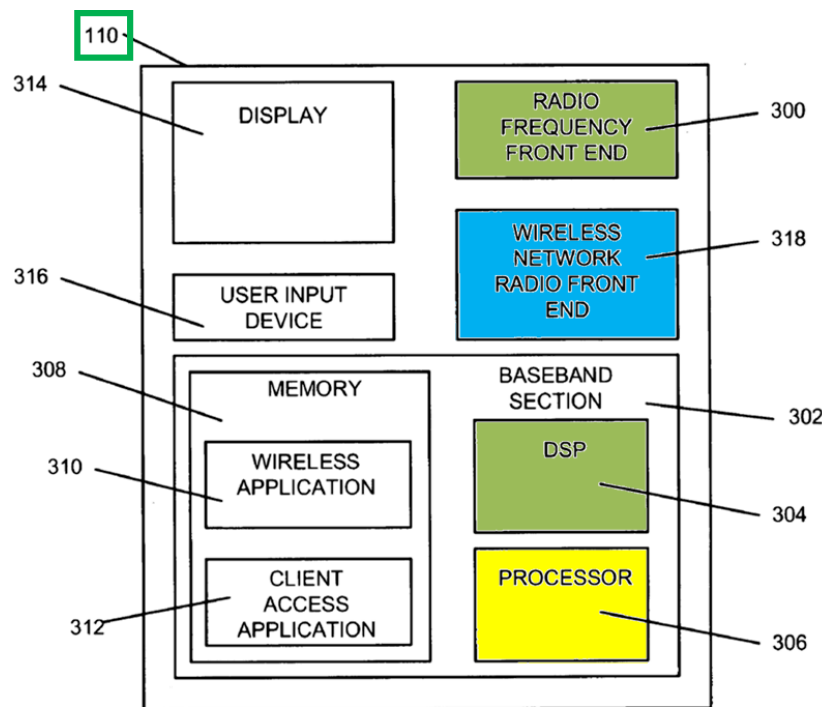


FIGURE 3

EX1005, Fig. 3.

f. 1[d][i]: “detect an event associated with the access network forwarding service;”

Thomas discloses 1[d][i]. EX1003, ¶¶77-78. *Thomas*’s wireless device 110 has a user interface to allow or disallow access to a connection via the internet 104 by computing devices within range of wireless device 110. EX1005, ¶¶44-46, 52, 76-77, Figs. 5, 6, 9, and 10 (disclosing user interfaces). *Thomas* discloses that a request to use the wireless device 110 may appear on a display 314 along with some identifier of the client device attempting to use device 110’s point-of-presence capabilities. EX1005, ¶46. Processor 306, which “provides computational and processing capabilities” and “signal processing capabilities” to wireless device 110 detects the client-device request for using the forwarding service provided by *Thomas*’s hotspot device. EX1005, ¶33; EX1003, ¶78. Processor 306 receiving the request constitutes “detecting an event.” EX1003, ¶78.

g. 1[d][ii]: “present a notification message to a user of the first end point device in response to the event, the notification message including an offer to activate the access network forwarding service;”

Thomas discloses 1[d][ii]. EX1003, ¶¶79-80. *Thomas*’s wireless device includes a display 314 that provides user-output capabilities and a user interface. EX1005, ¶¶34, 44-46, 52, 76-77, Figs. 5, 6, 9, 10. *Thomas* discloses that a request from a client device to use point-of-presence capabilities of wireless device 110 may appear on display 314. EX1005, ¶46. Processor 306, which “provides

computational and processing capabilities,” to wireless device 110 would receive the client-device request and in response, cause a notification regarding the request to be presented on a user interface on display 314 of *Thomas*’s hotspot device.

EX1003, ¶80. *Thomas* discloses that the operator of its hotspot device can accept or deny the request. EX1005, ¶46. The notification requesting to use the forwarding capabilities of *Thomas*’s hotspot device constitutes an offer to activate the access-network-forwarding service because it offers the device operator an opportunity to accept or deny the request. EX1003, ¶80.

h. 1[d][iii]: “receive a user response for activating the access network forwarding service;”

Thomas discloses 1[d][iii]. EX1003, ¶81. *Thomas*’s wireless device includes user-input device 316 that provides the user of wireless device 110 with input capabilities. EX1005, ¶34. The “user of the wireless device 110 may accept or deny the request to access the internet 104 through the wireless device 110.” EX1005, ¶46. A POSITA would understand that a user of *Thomas*’s hotspot device would use the device’s input capabilities to accept or deny the request and that processor 306 of *Thomas*’s hotspot device, which “provides computational and processing capabilities,” would receive such user response. EX1005, ¶33; EX1003, ¶81.

- i. **1[d][iv]: “provide information regarding the user response to an **activation server** as part of enabling the access network forwarding service for the first end point device; and”**

Thomas discloses 1[d][iv]. EX1003, ¶82. *Thomas* discloses that a user laptop seeking to access wireless device 110 for access to the internet would start as an unauthorized user and then may be authenticated at the wireless device 110 or the wireless device 110 may forward the request for authentication to **server 108**. EX1005, ¶47, Fig. 1. *Thomas*’s **server 108** is an “**activation server**” because it authorizes a client device (e.g., user laptop) for accessing the network, and provides a service level to the client device. *Id.*, ¶¶47, 57, 59; *compare* EX1001, 19:35-39 (activation functions include “devices can be recognized [and] gain access to the network, be provided with a service profile, be associated with a service account and/or be associated with a service plan”). *Thomas* discloses that “[o]nce authenticated, the client computing device 114 is allowed to communicate normal traffic through the wireless device 110 to reach a network, such as the Internet 104, or to access information on the server 108.” EX1005, ¶47. By forwarding the authentication request, *Thomas*’s hotspot device provides information regarding the hotspot device user’s response (allowance/denial of client device request) to **server 108** (i.e., “**activation server**”) as part of enabling the forwarding service on *Thomas*’s hotspot device. EX1003, ¶82.

- j. 1[d][v]: “receive a service profile including one or more access network forwarding settings from the **activation server**, the one or more access network forwarding settings including one or more restriction settings on the access network forwarding service, the one or more access network forwarding settings identifying which access network route or traffic redirection is to be used by the forwarding agent when attempting to forward traffic between the **one or more additional end point devices** and the **access network**; and”

Thomas alone or in combination with *Buddhikot* discloses 1[d][v].

EX1003, ¶¶83-86. *Thomas* discloses forwarding data between **client-computing devices 114** (i.e., “**additional end point devices**”) through wireless device 110 to **cellular network 102** (i.e., “**access network**”). *Supra* §§VI.A.2.a-VI.A.2.d. *Thomas* also discloses receiving a service profile including access-network-forwarding settings from **server 108**, which is an “**activation server**.” *Supra* §VI.A.2.i;

EX1003, ¶83. *Thomas* discloses that **server 108** receives a start message when the client-access application is started on *Thomas*’s wireless device 110. EX1005, ¶58. In response to determining whether the wireless device 110 is authorized, **server 108** sends a start-response message to the requesting wireless device 110. EX1005, ¶59. The start-response message includes parameters, such as service level, number of available IP addresses, lease time, short lease time, new software version, data amount remaining, byte count on/off, and port restriction on/off. *Id.* These parameters constitute access-network-forwarding settings of a service profile

because *Thomas*'s hotspot device forwards data through its hotspot device based on these settings. EX1003, ¶84. Processor 306 (i.e., "service processor") of *Thomas*'s hotspot device, which "provides computational and processing capabilities," would receive a service profile including access-network-forwarding settings from **server 108** (i.e., "**activation server**"). EX1005, ¶33; EX1003, ¶84.

The port-restriction parameter in the start message, identifies whether a port on *Thomas*'s hotspot device is available or unavailable for data forwarding and, therefore, constitutes a restriction setting. EX1005, ¶59; EX1003, ¶85. When port-restriction is "off," data may be forwarded along a network path associated with that port. EX1003, ¶85. When port-restriction is "on," data cannot be forwarded along that network path. EX1003, ¶85. Thus, the parameters received from server 108 (i.e., "access network forwarding settings") identify which network route (i.e., through port with port-restriction off) can be used by *Thomas*'s hotspot device to forward data. EX1003, ¶85.

Buddhikot also discloses this claim element. *Buddhikot* discloses that when a client device connects with its gateway, the gateway obtains policies including firewalling and packet-mangling rules from a server associated with the client device. EX1016, ¶¶74-76; *supra* §§II.B, VI.A.2.d. As explained above, a POSITA would have been motivated to implement *Buddhikot*'s firewalling and packet-mangling rules on *Thomas*'s hot spot device, and to modify *Thomas*'s server 108 to

provide these rules to the *Thomas-Buddhikot* device. *Supra* §VI.A.1. And, as discussed for claim 1[c], the *Thomas-Buddhikot* hotspot device, implemented with *Buddhikot*'s firewall and packet mangling rules, either forwards the data or redirects the data according to specific network routing paths (i.e., "access network route). *Supra* §VI.A.2.d; EX1003, ¶86.

- k. **1[d][vi]: "update the access network forwarding policy with one or more access network forwarding settings to enable the forwarding agent to forward the data."**

Thomas alone or in combination with *Buddhikot* discloses 1[d][vi].

EX1003, ¶¶87-88. *Thomas*'s wireless device 110 includes memory 308 that provides data storage and executable code space. EX1005, ¶33. A POSITA would have understood that upon receiving parameters in the start response message from server 108, processor 306 of *Thomas*'s wireless device 110 would store those parameters in memory 308. EX1003, ¶87. By storing parameters (i.e., "access network forwarding settings") received from server 108, processor 306 would update the access-network-forwarding policy because the forwarding settings are associated with the access-network-forwarding policy. EX1003, ¶87.

Similarly, *Buddhikot* discloses that its gateway includes "a persistent, non-volatile (e.g., on-disk) database 250" to store information such as "rules and address information." EX1016, ¶46. Further, *Buddhikot* discloses "Mobile-IP agents 221, 222 and the AAA server 242 upon successful authentication install

(through IPF 223) sets of rules that implement two major functionalities: firewalling and packet-mangling.” EX1016, ¶75. A POSITA would have been motivated to implement *Buddhikot*’s firewalling and packet-mangling rules on *Thomas*’s hotspot device. *Supra* §VI.A.1. A POSITA would understand that implementing *Buddhikot*’s rules would require storing them in memory 308 of the *Thomas-Buddhikot* hotspot device and that doing so would update the access-network-forwarding settings and therefore the access-network-forwarding policy. EX1003, ¶88.

Accordingly, the *Thomas-Buddhikot* combination discloses all limitations of claim 1 and renders it obvious.

3. Claim 4: “The first end point device of claim 1, wherein the detecting an event includes intercepting a request to perform access network forwarding.”

Claim 4 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* discloses the additional limitations of claim 4. EX1003, ¶¶90-92.

As discussed, *Thomas*’s processor 306 detects the request from a client device for using the forwarding service provided by *Thomas*’s hotspot device. *Supra* §VI.A.2.f (claim 1[d][i]). Detecting the request for using the forwarding service constitutes intercepting the request to perform access-network-forwarding.

EX1003, ¶91. Accordingly, the *Thomas-Buddhikot* combination renders claim 4 obvious. EX1003, ¶¶90-92.

4. Claim 5: “The first end point device of claim 1, wherein the detecting an event includes detecting user interest in using the access network forwarding service.”

Claim 5 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* discloses the additional limitations of claim 5. EX1003, ¶¶93-95.

Thomas discloses that different wireless devices 110 within range of a given client-computing device 114 may offer different bandwidths because different wireless carriers have different bandwidth standards. EX1005, ¶32. *Thomas* explains that “a client computing device 114 using a Wi-Fi or other link may choose among different wireless devices 110 based upon available signal strength and bandwidth capacities of the respective wireless devices 110.” *Id.* Moreover, the request to use wireless device 110 may appear on a user interface of display 314 on the wireless device 110. EX1005, ¶46. Because a client device can choose which hotspot device to connect to, and because client requests appears on the hotspot device user interface, *Thomas* discloses that detecting the event (e.g., request to connect to hotspot) includes detecting user interest (e.g., interest of client device user in connecting to hotspot). EX1003, ¶94. Accordingly, the *Thomas-Buddhikot* combination renders claim 5 obvious. EX1003, ¶¶93-95.

5. Claim 6: “The first end point device of claim 1, wherein content of the notification message is received from the activation server.”

Claim 6 depends from claim 1, which is obvious over *Thomas* and *Buddhikot. Supra* §VI.A.2. *Thomas* discloses the additional limitations of claim 6. EX1003, ¶¶96-99.

Thomas discloses a client access application 312 provides application-level point-of-presence capabilities within a wireless device 110, including a display that provides user-output capabilities and a user interface. EX1005, ¶34, 44-46, 52, 76-77, Figs. 5, 6, 9, 10. *Thomas* discloses that a client-device request to use point-of-presence capabilities of wireless device 110 may appear on the display. EX1005, ¶46. The user interface provided by client-access application 312 displays notifications regarding the received requests. EX1003, ¶97.

Thomas discloses that server 108 may provision client-access application 312 on *Thomas*’s hotspot device. EX1005, ¶74. Scheduled upgrades of client access applications 312 may also be performed by server 108. EX1005, ¶41. Because client-access application 312 is provisioned or upgraded by *Thomas*’s server 108, which is the activation server (*see Supra* §VI.A.2.j), any notification messages included in and displayed by the client-access application 312 are also provisioned by the activation server and received from the activation server by

Thomas's hotspot device. EX1003, ¶98. Accordingly, the *Thomas-Buddhikot* combination renders claim 6 obvious. EX1003, ¶¶96-99.

6. Claim 7: “The first end point device of claim 1, wherein the forwarding agent is configured to adjust the access network forwarding service based on a network congestion state.”

Claim 7 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Buddhikot* discloses the additional limitations of claim 7. EX1003, ¶¶100-103.

Buddhikot discloses a gateway that provides QoS services, including multiple service classes, each with a guaranteed bandwidth. EX1016, ¶¶46, 77-78. *Buddhikot* also discloses controlling traffic from client devices to the internet including dropping or delaying packets. EX1016, ¶79. Thus, by delaying or dropping packets, *Buddhikot* discloses adjusting the access-network-forwarding-service based on a network congestion state. EX1003, ¶101.

Buddhikot provides an example where connection to the internet can handle a maximum data rate of 1.5 Mbps. Initially a single user (with 1.5 Mbps maximum allocated bandwidth) can forward data through the gateway at the maximum bandwidth. EX1016, ¶179. When a second user (with 1 Mbps maximum allocated bandwidth) joins, the first user's bandwidth drops to 1 Mbps and the second user is allowed a bandwidth of 500 Kbps. *Id.* And when a third user (with 500 Kbps maximum allocated bandwidth) joins, bandwidth is shared proportionally so that

the total bandwidth is 1.5 Mbps. *Id.* Thus, *Buddhikot* discloses adjusting the access-network-forwarding service (e.g., by adjusting bandwidth for each user for forwarding data through the gateway) as the network gets more congested due to addition of more client devices. EX1003, ¶102. As explained, a POSITA would have found it obvious to implement *Buddhikot*'s rules implemented on *Thomas*'s hotspot device (*supra* §VI.A.1), which consequently would include a forwarding agent that adjusts the access-network-forwarding service based on a network congestion state. EX1003, ¶102.

Accordingly, the *Thomas-Buddhikot* combination renders claim 7 obvious. EX1003, ¶¶100-103.

7. Claim 9: “The first end point device of claim 1, wherein the one or more restriction settings includes a setting for enabling or disabling the access network forwarding service.”

Claim 9 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* and *Buddhikot* disclose the additional limitations of claim 9. EX1003, ¶¶104-107.

Thomas's hotspot device receives a start message from server 108, the start message including a port-restriction on/off parameter (i.e., “restriction setting”). EX1005, ¶59. As explained, when a port-restriction is off, data may be forwarded via that port (i.e., enabling “access network forwarding service”) and when the

port-restriction is on, data cannot be forwarded via that port (i.e., disabling “access network forwarding service”). *Supra* §VI.A.2.j; EX1003, ¶105.

As also explained, in the *Thomas-Buddhikot* hotspot device, the firewall service uses firewalling rules to protect the hotspot device and/or client devices connected to the hotspot device from malicious attacks. EX1016, ¶¶74-75; *supra* §VI.A.2.d. A POSITA would have understood that when the data does not originate from a malicious source, the firewalling rules would permit data flow through the *Thomas-Buddhikot* hotspot device (i.e., enabling “access network forwarding service”). EX1003, ¶106. Conversely, when the data originates from a malicious source, the firewall rules would block data flow (i.e., disabling “access network forwarding service”). EX1003, ¶106. Accordingly, the *Thomas-Buddhikot* combination renders claim 9 obvious. EX1003, ¶¶104-107.

- 8. Claim 15: “The first end point device of claim 1, wherein based on an access network forwarding setting, the forwarding agent is configured to restrict a usage of a forwarding connection of the network access forwarding service, wherein the forwarding connection connects the one or more additional end point devices to the access network via the forwarding agent.”**

Claim 15 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Buddhikot* discloses the additional limitations of claim 15. EX1003, ¶¶108-111.

As discussed in claims [1c]-1[d][vi], the forwarding agent of the *Thomas-Buddhikot* device connects end-point devices to the access network. *Supra* §§VI.A.2.d-VI.A.2.k. As also explained, *Buddhikot* discloses an example where connection to the internet can handle a maximum data rate of 1.5 Mbps. EX1016, ¶179. The maximum data rate (1.5 Mbps) of the connection to the internet is an access-network-forwarding setting because *Buddhikot*'s gateway uses this setting to control flow of data through *Buddhikot*'s gateway. EX1003, ¶109. Further, *Buddhikot* discloses how the gateway adjusts bandwidth for each additional user device that connects to the gateway. *Supra* §VI.A.6 (citing EX1016, ¶179). The network paths connecting the users' devices to the internet through *Buddhikot*'s gateway constitute the forwarding connection of claim 15. EX1003, ¶109.

Buddhikot also explains that when the third user device connects to the gateway, the usage (e.g., bandwidth) for each of the users is restricted below their respective bandwidth allocations such that the total usage meets the maximum data rate of 1.5 Mbps. *Supra* §VI.A.6 (citing EX1016, ¶179).

As explained, a POSITA would have found it obvious to implement *Buddhikot*'s QoS rules on *Thomas*'s hotspot device. *Supra* §VI.A.1. Thus, the *Thomas-Buddhikot* hotspot device would include a forwarding agent that restricts usage of a forwarding connection of the network-access-forwarding service by reducing bandwidth for one or more user devices connected to the hotspot device.

EX1003, ¶110. Accordingly, the *Thomas-Buddhikot* combination renders claim 15 obvious. EX1003, ¶¶108-111.

- 9. Claim 16: “The first end point device of claim 15, wherein the restriction on usage is on an aggregate usage of the forwarding connection, and wherein the aggregate usage limit applies to a total usage for all additional end point devices.”**

Claim 16 depends from claim 15, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.8; EX1003, ¶¶112-113. *Buddhikot* discloses implementing QoS rules so that the aggregate bandwidth of the forwarding connection is restricted (e.g., to 1.5 Mbps). EX1016, ¶179; *Supra* §VI.A.8 (claim 15); EX1003, ¶112. As explained, a POSITA would have found it obvious to implement *Buddhikot*’s QoS rules on *Thomas*’s hotspot device. *Supra* §VI.A.1. Thus, this aggregate bandwidth limit for the *Thomas-Buddhikot* hotspot device would apply to the total bandwidth usage of all the user devices (i.e., all end point devices) connected to *Buddhikot*’s gateway. EX1016, ¶179; EX1003, ¶112. Accordingly, the *Thomas-Buddhikot* combination renders claim 16 obvious. EX1003, ¶¶112-113.

- 10. Claim 17: “The first end point device of claim 15, wherein the restriction on usage is on a data rate of usage of the forwarding connection.”**

Claim 17 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.8; EX1003, ¶¶114-115. *Buddhikot* discloses implementing

QoS rules so that the bandwidth (i.e., “data rate of usage”) of the forwarding connection is restricted (e.g., to 1.5 Mbps). EX1016, ¶179; *Supra* §VI.A.8 (claim 15). Accordingly, the *Thomas-Buddhikot* combination renders claim 17 obvious. EX1003, ¶¶114-115.

11. Claim 20: “The first end point device of claim 1, wherein a forwarding service notification is provided by the service processor to the user of the first end point device or a user of an additional end point device during use of the access network forwarding service.”

Claim 20 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* discloses the additional limitations of claim 20. EX1003, ¶¶116-118.

Thomas’s hotspot device (i.e., “first end point device”) includes a processor that executes a client-access application 312 that provides notifications to the hotspot device user via user interfaces. EX1005, ¶¶34, 44-46, 52, 76-77, Figs. 5, 6, 9, 10; EX1003, ¶117; *Supra* §§VI.A.2.g. *Thomas* discloses an exemplary user interface screen 900 of its hotspot device (i.e., “first endpoint device,” *supra* VI.A.2.a) that provides connection information (i.e., “forwarding service notification”) for the wireless device. EX1005, ¶76, Fig. 9.

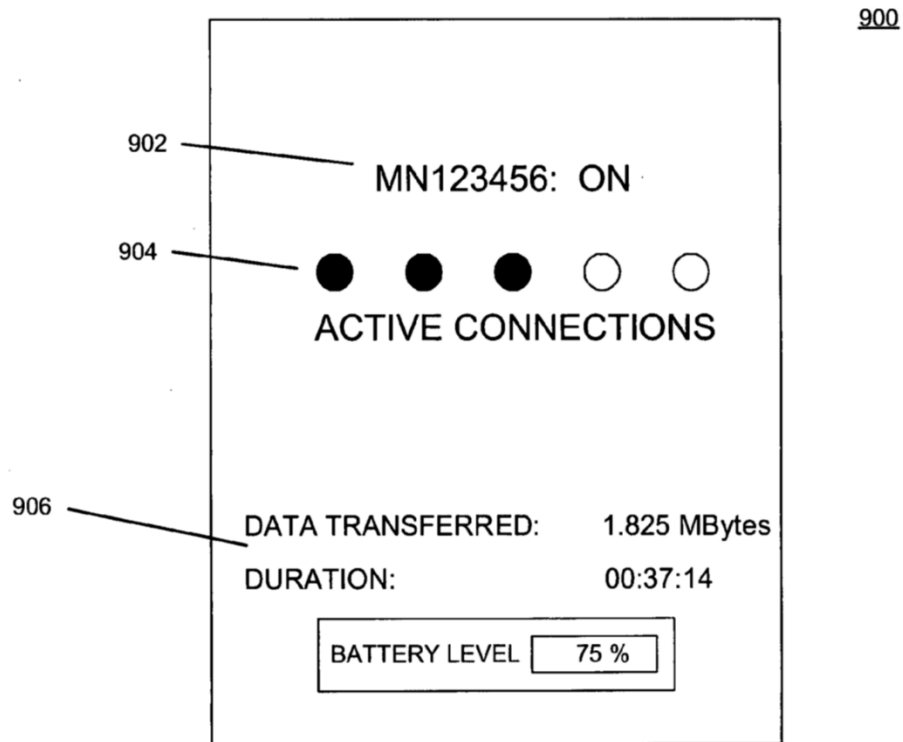


FIGURE 9

Accordingly, the *Thomas-Buddhikot* combination renders claim 20 obvious.

EX1003, ¶¶116-118.

12. **Claim 21:** “The first end point device of claim 20, wherein the forwarding service notification informs the user of **an amount of usage of the access network forwarding service**, a rate of usage of the access network forwarding service, that the access network forwarding service is being used on a particular access network, that a service usage restriction setting is in place for the access network forwarding service, that the access network forwarding service is available, or that the access network forwarding service is not available.”

Claim 21 depends from claim 20, which is rendered obvious over *Thomas* and *Buddhikot*, and the term “or” in claim 21 requires only one of the listed features to satisfy the claim. *Supra* §VI.A.11; EX1003, ¶¶119-120. As explained,

Thomas discloses an exemplary user interface screen 900 for the wireless device 110 (e.g., *Thomas-Buddhikot* hotspot device) that provides connection information (i.e., “forwarding service notification”) for the wireless device in which information section 906 provides detailed information, such as transferred data quantities (i.e., “an amount of usage of the access network forwarding service”), duration of the present session, and battery level. EX1005, ¶76, Fig. 9.

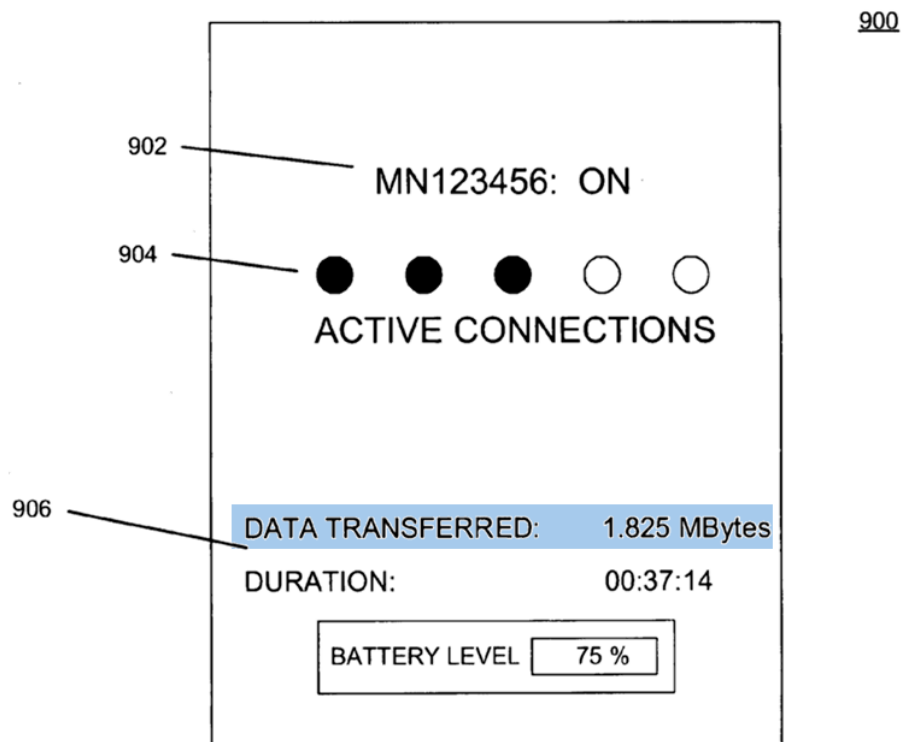


FIGURE 9

Accordingly, the *Thomas-Buddhikot* combination renders claim 21 obvious.
EX1003, ¶¶119-120.

- 13. Claim 23: “The first end point device of claim 20, wherein the forwarding service notification is provided when the access network forwarding service is enabled and the at least one access network includes a roaming access network.”**

Claim 23 depends from claim 20, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.11. *Thomas* discloses the additional limitations of claim 23. EX1003, ¶¶121-124.

Thomas discloses that the “roaming management function may be performed to run on top of the WAN transport supplied by a given carrier.” EX1005, ¶71. *Thomas* explains that “data plans may be provided by which a user may include roaming within the plan coverage.” *Id.* A POSITA would understand that when *Thomas*’s hotspot device is located outside its plan coverage area, it would connect to a cellular network based on the user’s roaming plan coverage. EX1003, ¶122. A POSITA would also understand that *Thomas*’s hotspot device would provide notifications similar to those discussed for claim 20 (*supra* §VI.A.11) even when the hotspot device is connected to a cellular network based on the user’s roaming plan coverage. EX1003, ¶123.

Accordingly, the *Thomas-Buddhikot* combination renders claim 23 obvious. EX1003, ¶¶121-124.

14. Independent Claim 51

The *Thomas-Buddhikot* combination discloses claim 51. EX1003, ¶¶125-131. Independent claim 51 largely recites corresponding claim elements to independent claim 1, except for the content of a notification provided to the user of the first end-point device. EX1003, ¶125. In particular, the *Thomas-Buddhikot* combination renders obvious elements 51[pre]-51[d] and 51[d][iii]-51[d][iv] for reasons similar to elements 1[pre]-1[d] and 1[d][v]-1[d][vi], respectively. EX1003, ¶¶125-127; *supra* §§VI.A.2.a-VI.A.2.e, VI.A.2.j-VI.A.2.k, VI.A.1. *Thomas* also discloses 51[d][i] and 51[d][ii]. EX1003, ¶¶127-131.

a. 51[d][i]: “detect an event associated with the access network forwarding service;”

Thomas discloses 51[d][i]. EX1003, ¶128. *Thomas* discloses that when the hotspot-device operator starts the client access application 312, a start message is sent to the server 108. EX1005, ¶58. In response, the server 108 determines whether the hotspot device is authorized to operate within the network and sends a start response message that includes a “response (e.g., okay to run or never start).” *Id.* In response to receiving the start response message, *Thomas*’s hotspot device will either start the client access application 312 or will stop its attempts. *Id.* A POSITA would understand that processor 306 of *Thomas*’s hotspot device would receive the server response and thus detect an event associated with the access-network-forwarding service. EX1003, ¶128.

- b. 51[d][ii]: “present a notification message to a user of the first end point device in response to the event, the notification message including an indication that the access network forwarding service is unavailable;”**

Thomas discloses 51[d][i]. EX1003, ¶¶129-131. *Thomas*’s hotspot device (i.e., “first end point device”) includes a processor that executes a client access application 312 that provides notifications to the hotspot device user via user interfaces. EX1005, ¶¶34, 44-46, 52, 76-77, Figs. 5, 6, 9, 10; EX1003, ¶129; *Supra* §VI.A.2.g. *Thomas* discloses an exemplary user-interface screen 900 of its hotspot device that provides connection information (i.e., “forwarding service notification”) for the wireless device in which “activation status 902 indicates whether the client access application 312 is on or off.” EX1005, ¶76, Fig. 9; EX1003, ¶129. As discussed, *Thomas*’s hotspot device may receive a start-response message from server 108 that includes a response indicating the client-access application 312 should not start. EX1005, ¶58; *supra* §VI.A.14.a. A POSITA would, therefore, have understood that in this situation, “activation status 902” on the *Thomas-Buddhikot* device would indicate on user-interface screen 900 that client-access application 312 is unavailable or off. EX1003, ¶130. Thus, *Thomas* discloses providing information to the hotspot device owner that the access-network-forwarding service is unavailable (i.e., off). EX1003, ¶130 (explaining *Buddhikot* also discloses unavailability through bandwidth maximums).

Accordingly, the *Thomas-Buddhikot* combination discloses all limitations of claim 51 and renders it obvious. EX1003, ¶¶125-131.

B. Ground 2: Claim 2 Is Obvious over *Thomas, Buddhikot, and Sewall*

1. Motivation to combine *Thomas, Buddhikot, and Sewall*

Like *Thomas* and *Buddhikot*, *Sewall* is also analogous art to the '425 patent because it is in the same field of endeavor: mobile devices and wireless access points (or hotspots) for computer networking. EX1006, Abstract, ¶¶7-11, 14-19, 22-28, Figs. 3-6. Like *Thomas* and *Buddhikot*, *Sewall* also shares a common goal with the '425 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including the provisioning of services seeking to improve the customizability and monetization of mobile-hotspot technology (e.g., usage control, user interactivity and notifications via graphical user interfaces, and billing features). EX1006, ¶¶7-11, 14-19, 22-32, 42-56; EX1001, 32:34-35:20, 65:31-67, Fig. 15A-F; EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189; EX1003, ¶132.

A POSITA would have been motivated to combine *Sewall* with *Thomas* and *Buddhikot* to enhance the management of traffic flow and user experience in the *Thomas-Buddhikot* hotspot device. EX1003, ¶133. *Thomas* discloses its hotspot device may be used to allow some or all of its bandwidth to be used by “strangers,” that is, devices belonging to users not necessarily known by the user of *Thomas*’s

hotspot device. EX1005, ¶52. But *Thomas* does not provide granular control over the bandwidth for different user types. Similarly, *Buddhikot* discloses that its “system can be configured with three classes (Gold, Silver, Bronze) and each class can be guaranteed minimum bandwidth.” EX1016, ¶78. But *Buddhikot* does not disclose allowing the hotspot user to control the bandwidth allocations for the three classes. *Sewall* addresses the limitations of *Thomas* and *Buddhikot* by disclosing that different users, such as strangers and users known to the hotspot-device operator, may have different internet-access rules than a hotspot-device operator. EX1006, ¶22. *Sewall* also discloses that the operator can provide configuration data to customize internet-access rules for different users via a user interface. EX1006, ¶¶23-24; EX1003, ¶133.

A POSITA would have recognized the benefits of implementing *Sewall*’s teachings on the *Thomas-Buddhikot* hotspot device. EX1003, ¶134. For example, doing so would have allowed the *Thomas-Buddhikot* hotspot-device operator to reserve sufficient bandwidth for the operator’s use, while allowing other users to use the remaining unused bandwidth of the hotspot device. EX1003, ¶134. Further, the *Thomas-Buddhikot* hotspot-device operator would be able to differentiate bandwidth allocation between known and anonymous users. EX1003, ¶134. Such customization would have also allowed the hotspot-device operator to adjust internet-access rules dynamically, such as during roaming or periods of low

network bandwidth. EX1003, ¶134; EX1005, ¶¶29, 54-56, Figs. 5, 6. Thus, modifying the *Thomas-Buddhikot* hotspot device to also provide *Sewall*'s user-preference functionality would have been a combination of familiar elements (e.g., bandwidth allocation) according to known methods (e.g., allowing a user to specify bandwidth for particular types of users) to obtain predictable results (e.g., reserving sufficient bandwidth for the operator). EX1003, ¶134; *KSR*, 550 U.S. at 416.

A POSITA would have had a reasonable expectation of success in implementing *Sewall*'s user-preference functionality on the *Thomas-Buddhikot* hotspot device. EX1003, ¶135 *Thomas* already discloses user interfaces for its hotspot device and *Buddhikot* already discloses assigning different guaranteed minimum bandwidths for different classes of users. EX1003, ¶135. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Sewall*'s teachings with *Thomas* and *Buddhikot*. EX1003, ¶135.

2. Claim 2: “The first end point device of claim 1, wherein the user response includes user preferences for the access network forwarding service.”

Claim 2 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* discloses the additional limitations of claim 2. EX1003, ¶¶136-140.

Thomas discloses that “in response to receipt of the join request for access to the Internet 104, the wireless device 110 sends an add client message to the server

108.” EX1005, ¶62. *Thomas* discloses that the add-client message may include various parameters and that “additional add client message parameters are possible.” *Id.*; EX1003, ¶137.

Sewall discloses a personal hotspot, such as a cellular telephone, that allows a user to connect laptop or desktop computers or personal digital assistants (PDAs) to access the internet via the hotspot. EX1006, ¶7. *Sewall* discloses that its personal hotspot 10 includes configuration data 42 including access rules for hotspot 10. EX1006, ¶23. *Sewall* also discloses that certain internet-access rules may apply to the operator of personal hotspot 10, other internet-access rules may apply to users known to or authorized by the operator, and yet other internet-access rules may apply to anonymous users. EX1006, ¶22. *Sewall* discloses an example in which its hotspot 10 sends a communication requesting a web page for updating configuration data 42. EX1006, ¶24. A web server returns a user interface having controls for updating configuration data and the hotspot operator’s selections are used by the profile engine 46 to update configuration data 42. *Id.* Thus, *Sewall* discloses allowing the hotspot device owner to provide user preferences in the form of configuration data containing internet-access rules for forwarding data via its hotspot. EX1003, ¶138.

A POSITA would have found it obvious to implement *Sewall*’s configuration setting features in the *Thomas-Buddhikot* hotspot device to allow the

hotspot-device operator to customize allocation of available bandwidth to users.

Supra §VI.B.1; EX1003, ¶139. Accordingly, the *Thomas-Buddhikot-Sewall* combination renders claim 2 obvious. EX1003, ¶¶136-140.

C. Ground 3: Claims 3 and 8 Are Obvious over *Thomas, Buddhikot, and Haller*

1. Motivation to combine *Thomas, Buddhikot, and Haller*

Like *Thomas* and *Buddhikot*, *Haller* is also analogous art because it is in the same field of endeavor: mobile devices and wireless access points (or hotspots) for computer networking. EX1013, Abstract, ¶¶7, 15, 35-38, 54, 61, Figs. 1-6. Like *Thomas* and *Buddhikot*, *Haller* also shares a common goal with the '425 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including the provisioning of services seeking to improve the customizability and monetization of mobile-hotspot technology (e.g., usage control, user interactivity and notifications via graphical user interfaces, and billing features). EX1013, Abstract, ¶¶7, 15, 35-37, 54, 56, 90-91, 104, 121-124, 129, 139-141, Figs. 1-6; EX1001, 32:34-35:20, 65:31-67, Fig. 15A-F; EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189; EX1003, ¶141.

A POSITA would have been motivated to combine *Haller* with *Thomas* and *Buddhikot* for several reasons. EX1003, ¶142. First, *Haller* discloses the use of touchscreens, a technology that was well established in PDAs prior to the '425

patent's priority date. EX1006, ¶7; EX1013, 6:16-19; EX1016, ¶7. Integrating a touchscreen into the disclosed user-interface of the *Thomas-Buddhikot* hotspot device would have made user input more intuitive and accessible, especially compared to buttons or keyboards, which are often constrained by the limited size of mobile devices. EX1003, ¶142. A POSITA would have understood that adopting a touchscreen interface would facilitate easier and more efficient user interactions on such devices. EX1003, ¶142. Modifying the *Thomas-Buddhikot* hotspot device to also provide *Haller*'s touchscreen functionality would have been a combination of familiar elements (e.g., touchscreen) according to known methods (e.g., providing a touchscreen display on a mobile device) to obtain predictable results (e.g., allowing a user to provide inputs into a display window). EX1003, ¶142; *KSR*, 550 U.S. at 416. A POSITA would have had a reasonable expectation of success in combining *Haller* with *Thomas* and *Buddhikot* because *Thomas* already discloses a display for its hotspot mobile device and *Haller* further discloses using a touchscreen as a display on a mobile device. EX1003, ¶142. Accordingly, a POSITA would have been motivated to implement a touchscreen on the *Thomas-Buddhikot* hotspot device to make it easier for a user to provide touch inputs. EX1003, ¶142.

Second, *Haller* teaches controlling network bandwidth according to the time of day, limiting traffic during peak hours and allowing greater access when

demand is low. EX1013, ¶141. The *Thomas-Buddhikot* hotspot device already supports bandwidth-based forwarding settings. *Supra* §§VI.A.2.d, VI.A.2.j. A POSITA would have been motivated to incorporate *Haller*'s time-based traffic control in the *Thomas-Buddhikot* device to optimize user access during busy periods, thereby maximizing the number of users served and minimizing dissatisfaction due to denied access. EX1003, ¶143. The combination of *Haller*'s bandwidth rules with the *Thomas-Buddhikot* hotspot device would have been a combination of familiar elements (e.g., bandwidth control rules) according to known methods (e.g., implementing the bandwidth control rules in a manner similar to implementation of the firewall and packet-mangling rules) to obtain predictable results (e.g., maximizing the number of connected users). EX1003, ¶143; *KSR*, 550 U.S. at 416.

As explained, implementing rules on *Thomas*'s hotspot device would have involved known techniques as disclosed by *Thomas* and *Buddhikot* and would have been well within the skill level of a POSITA. *Supra* §VI.A.1; EX1003, ¶144. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Haller*'s teachings with the *Thomas-Buddhikot* hotspot device. EX1003, ¶144.

2. Claim 3: “The first end point device of claim 1, wherein the user response is received as input into a display window associated with the notification message.”

Claim 3 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Thomas* and *Haller* discloses the additional limitations of claim 3. EX1003, ¶¶145-148.

Thomas discloses “[a] display 314 provides user output capabilities and a user input device 316 provides the user of the wireless device 110 with input capabilities for interaction with the wireless device 110.” EX1005, ¶34. *Haller* discloses a “hand-held device for providing communication between a wide area network and a wireless local area network.” EX1013, ¶7. *Haller* discloses terminals 107 coupled to wireless device 106 via short-range radio signals via a LAN. EX1013, ¶54. *Haller* discloses that device 106 is coupled to a cellular network. EX1013, ¶56. *Haller*’s device 106 is a cellular handset, PDA, or laptop computer. EX1013, ¶61. *Haller* discloses that “device 106 includes a display ... and a touchscreen, singly or in combination.” EX1013, ¶69. A POSITA would have understood that *Haller*’s touchscreen would allow a user to provide inputs into a display window. EX1003, ¶146.

A POSITA would have been motivated and found it obvious to implement *Haller*’s touchscreen in the *Thomas-Buddhikot* hotspot device to make it easier for users to provide inputs into a display window. *Supra* §VI.C.1; EX1003, ¶147.

Accordingly, the *Thomas-Buddhikot-Haller* combination renders claim 3 obvious.

EX1003, ¶¶145-148.

3. Claim 8: “The first end point device of claim 1, wherein the forwarding agent is configured to adjust the access network forwarding service based on a time of day.”

Claim 8 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. *Haller* discloses the additional limitations of claim 8.

EX1003, ¶¶149-152.

Haller discloses that its cellular phone hotspot device includes service level verification software that enforces service level agreements with users. EX1013, ¶¶54-56, 61, 140. *Haller* also discloses that an unlimited amount of cellular traffic is permitted from its hotspot device during the night but a limited amount during the day. EX1013, ¶141. *Haller* explains that if traffic from the hotspot device exceeds the limited amount of data permitted during the day, the service level verification software drops packets. *Id.*; EX1003, ¶150.

A POSITA would have found it obvious to implement *Haller*’s time-of-day based bandwidth-control rules on the *Thomas-Buddhikot* hotspot device to enable a larger number of users to use the hotspot device even when demand for bandwidth is high at particular times of day. EX1003, ¶151; *Supra* §VI.C.1. Accordingly, the *Thomas-Buddhikot-Haller* combination renders claim 8 obvious. EX1003, ¶¶149-152.

D. Ground 4: Claims 10, 18, 19, 22 Are Obvious over *Thomas*, *Buddhikot*, and *Polson*

1. Motivation to combine *Thomas*, *Buddhikot*, and *Polson*

Like *Thomas* and *Buddhikot*, *Polson* is also analogous art to the '425 patent. It is in the same field of endeavor: mobile devices and wireless access points for computer networking. EX1015, Abstract, ¶¶2, 16, 20-23, 26, 56, , Figs. 1, 2, 9-15. Like *Thomas* and *Buddhikot*, *Polson* also shares a common goal with the '425 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including the provisioning of services seeking to improve the customizability and monetization of mobile-hotspot technology (e.g., usage control, user interactivity and notifications via graphical user interfaces, and billing features). EX1015, Abstract, ¶¶2, 16, 20-23, 26, 29-35, 38-39, 44-46, 52-53, 56, 78-79, Figs. 1, 2, 9-15; EX1001, 32:34-35:20, 65:31-67, Fig. 15A-F; EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189; EX1003, ¶153.

a. Different settings for different access networks

Polson discloses a hotspot device that can connect to multiple WWANs. EX1015, ¶¶20, 52-55. *Polson* explains that doing so “facilitates the switching of WWAN interfaces in areas where another provider having a different WWAN interface is stronger, or where the provider associated with the current WWAN

interface 110 does not provide service.” EX1015, ¶¶52-55. This “facilitates the mobility of the gateway 108.” EX1015, ¶53; EX1003, ¶154.

A POSITA would have been motivated to implement the multiple WWAN capability of *Polson* on the *Thomas-Buddhikot* hotspot device. EX1003, ¶155. Doing so would have enabled the *Thomas-Buddhikot* hotspot device to allow client devices to exchange data with the internet in different geographic locations even if one or more cellular networks did not provide service in that geographical location. A POSITA would have been motivated to operate the *Thomas-Buddhikot* hotspot device based on the service agreements (e.g., access network forwarding settings) associated with a particular WWAN modem to ensure the cellular networks are able to accurately bill the clients for their usage of the respective WWANs. EX1003, ¶155.

Implementing *Polson*’s teaching of connecting to multiple cellular networks on the *Thomas-Buddhikot* hotspot device would have been a combination of familiar elements (WWAN modems capable of exchanging data with different cellular networks) according to known methods (e.g., providing more than one WWAN modem in the *Thomas-Buddhikot* hotspot device) to obtain predictable results (e.g., ensuring client devices connected to the *Thomas-Buddhikot* hotspot device can exchange data with the internet in different geographical locations). EX1003, ¶156; *KSR*, 550 U.S. at 416. A POSITA would have had a reasonable

expectation of success in implementing *Polson*'s multiple WWAN capability on the *Thomas-Buddhikot* hotspot device. EX1003, ¶156. *Thomas* already discloses a hotspot device having a WWAN modem. *Supra* §§VI.A.2.b, VI.A.2.c. *Polson* discloses that its gateway includes devices like *Thomas*'s hotspot device, capable of facilitating transmission of data between LANs and WANs. EX1015, ¶20. *Polson* also discloses a gateway device that has more than one WWAN modem. EX1015, ¶¶52-55. Thus, implementing more than one WWAN modem on the *Thomas-Buddhikot* hotspot device would have involved known techniques as disclosed by *Polson* and would have been well within the skill level of a POSITA. EX1003, ¶156. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Polson*'s teachings with *Thomas* and *Buddhikot*. EX1003, ¶156.

b. Restriction to a maximum number of additional end point devices

Polson also discloses establishing "limitations on the number of simultaneous WiFi . . . connections." EX1015, ¶30. A POSITA would have understood that such limitations may ensure that each device connected via the Wi-Fi connection can access the network using a minimum bandwidth to ensure user satisfaction with the connection. EX1003, ¶157.

A POSITA would have been motivated to implement *Polson*'s limitation on the number of simultaneous Wi-Fi connections on the *Thomas-Buddhikot* hotspot

device to obtain these same benefits—namely, adequate minimum bandwidth for each WiFi connection. EX1003, ¶158. For example, *Thomas* already discloses a maximum number of available IP addresses for the WLAN connections. EX1005, ¶69. Implementing *Polson*’s limits would constitute a combination of familiar elements (e.g., a setting specifying maximum number of simultaneous WiFi connections) according to known methods (e.g., implementing rules in the *Thomas-Buddhikot* hotspot device) to obtain predictable results (e.g., ensuring client devices connected to the *Thomas-Buddhikot* hotspot device can exchange data with the internet at a minimum bandwidth). EX1003, ¶158; *KSR*, 550 U.S. at 416.

A POSITA would have had a reasonable expectation of success in implementing *Polson*’s limits on the maximum number of simultaneous Wi-Fi connections on the *Thomas-Buddhikot* hotspot device. EX1003, ¶159. *Thomas* already discloses rules that specify the maximum number of available IP addresses. EX1005, ¶69. The *Thomas-Buddhikot* combination also already discloses techniques for implementing additional firewalling and packet-mangling rules on the *Thomas-Buddhikot* hotspot device. *Supra* §VI.A.1.a. Thus, implementing *Polson*’s restriction setting or rule limiting the maximum number of simultaneous Wi-Fi connections on the *Thomas-Buddhikot* hotspot device would have involved known techniques as disclosed by *Thomas*, *Buddhikot*, and *Polson* and would have

been well within the skill level of a POSITA. EX1003, ¶159. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Polson*'s teachings with *Thomas* and *Buddhikot*. EX1003, ¶159.

c. User options to purchase additional cellular network access.

Polson discloses providing notifications to allow a user to purchase additional network forwarding service such as quantity of bytes downloaded. EX1015, ¶¶26, 31, 81; Figs. 9-16. A POSITA would have been motivated to implement these features on the *Thomas-Buddhikot* hotspot device to allow customization of the forwarding service to meet user needs. EX1003, ¶160. This would allow the operator of the *Thomas-Buddhikot* hotspot device to customize the forwarding service, for example, by purchasing more data to extend a VOIP call or transfer large files. EX1003, ¶160. Implementing *Polson*'s teachings on the *Thomas-Buddhikot* hotspot device would constitute a combination of familiar elements (e.g., notifications regarding purchasing additional bandwidth) according to known methods (e.g., displaying such notifications on a display device) to obtain predictable results (e.g., allowing an operator of the *Thomas-Buddhikot* hotspot device to purchase additional bandwidth). EX1003, ¶160; *KSR*, 550 U.S. at 416.

A POSITA would have had a reasonable expectation of success in combining *Polson* with *Thomas* and *Buddhikot*. *Thomas* already discloses the use

of user interfaces to provide notifications. EX1005, ¶¶34, 44-46, 52, 76-77, Figs. 5, 6, 9, 10. The provision of notifications on a user interface of the *Thomas-Buddhikot* device to allow purchase on additional bandwidth would have been implementation of a well-known technique as disclosed by *Thomas*. EX1003, ¶161. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Polson*'s teachings with *Thomas* and *Buddhikot*. EX1003, ¶161.

2. **Claim 10: "The first end point device of claim 1, wherein based on an access network forwarding setting, the forwarding agent is configured to restrict providing a forwarding connection of the network access forwarding service to a maximum number of additional end point devices, wherein the forwarding connection connects the one or more additional end point devices to the access network via the forwarding agent."**

Claim 10 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.2. The *Thomas-Buddhikot* combination discloses restriction settings for the forwarding connection. *Supra* §VI.A.2.j; EX1003, ¶¶162-166.

As discussed in claims [1c]-1[d][vi], the forwarding agent of the *Thomas-Buddhikot* device connects end-point devices to the access network. *Supra* §§VI.A.2.d-VI.A.2.k. Further, *Thomas* discloses restriction settings that specify a maximum number of end point devices. EX1005, ¶¶59, 69. For example, *Thomas* discloses that the start response message sent by its server 108 to wireless device

110 includes parameters such as a “number of available IP addresses.” EX1005, ¶¶59, 69. A POSITA would have understood that the *Thomas-Buddhikot* hotspot device would not be able to connect additional client devices if the total number of connected devices exceeded the maximum number of available IP addresses. EX1003, ¶163. Thus, the *Thomas-Buddhikot* combination alone discloses the additional limitations of claim 43.

To the extent Patent Owner disputes that the *Thomas-Buddhikot* combination discloses the additional features of claim 10, *Polson* discloses these limitations.

Polson discloses a gateway that provides data communication between a 3G cellular-access network and devices connected to the gateway via a LAN. EX1015, Abstract, ¶¶16, 20-23, 26, 29-33. Thus, *Polson*’s gateway is a forwarding agent configured to forward the data between the access network modem (i.e., 3G cellular-access network) and the local area network modem (i.e., LAN). EX1003, ¶165. *Polson* discloses that its gateway requests features of a service agreement associated with the cellular-access network from a server. EX1015, ¶78. *Polson* discloses that such “features include a limitation on a number of simultaneous Wi-Fi or Ethernet LAN connections of the gateway.” *Id.* A POSITA would have found it obvious to implement *Polson*’s limits on the number of simultaneous client devices connected to the *Thomas-Buddhikot* hotspot device to help ensure that each connected device receives a minimum bandwidth. *Supra* §VI.D.1. Accordingly, the

Thomas-Buddhikot-Polson combination renders claim 10 obvious. EX1003, ¶¶162-166.

3. **Claim 18: “The first end point device of claim 1, wherein the service processor is further configured to facilitate enabling the access network forwarding service on at least two access networks, and wherein the one or more access network forwarding settings include at least one setting that is different for different access networks.**

Claim 18 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. Section VI.A.2. *Polson* discloses the additional limitations of claim 18. EX1003, ¶¶167-170.

Polson discloses a gateway that connects devices to a 3G cellular-access network. EX1015, Abstract, ¶¶16, 20-23, 26, 29-33. *Polson* discloses that “more than one WWAN interface 110 may be available for use by gateway 108 to establish a WWAN 112 connection” and that the gateway may operate each interface according to an associated service agreement. EX1015, ¶29. *Polson* discloses that the service agreements may restrict access in many ways, including QoS (e.g., sufficient bandwidth to support Voice-over-IP), throughput provided, or cumulative bits over time. EX1015, ¶30. *Polson* also discloses that its gateway facilitates switching of WWAN interfaces in areas where another provider having a different WWAN interface is stronger, or where the provider associated with the current WWAN interface 110 does not provide service. EX1015, ¶52; EX1003, ¶168.

A POSITA would have found it obvious to combine *Polson*'s multiple WWAN capability with the *Thomas-Buddhikot* hotspot device to allow it to provide forwarding service in different geographies. *Supra* §VI.D.1. A POSITA would have also found that at least one access-network-forwarding setting (e.g., throughput or cumulative number of bits) would be different for the different access networks based on the service agreement associated with the cellular-network being used in a particular geography. EX1003, ¶169. Accordingly, the *Thomas-Buddhikot-Polson* combination renders claim 18 obvious. EX1003, ¶¶167-170.

4. **Claim 19: "The first end point device of claim 18, wherein the different access networks include a home access network and a roaming access network, and wherein the access network forwarding settings used to implement the access network forwarding service are dependent on whether the first end point device is connected to the home access network or the roaming access network."**

Claim 19 depends from claim 18, which is obvious over *Thomas, Buddhikot*, and *Polson*. *Supra* §VI.D.3; EX1003, ¶¶171-173. As explained, the *Thomson-Buddhikot* device modified with *Polson* would be capable of connecting to more than one cellular network, each cellular network having different access-network-forwarding settings. *Supra* §VI.D.3. As also explained, the *Thomas-Buddhikot* hotspot device, when located in a geographic area outside its plan coverage area, connects to a different cellular network based on a roaming plan. *Supra* §VI.A.13;

EX1005, ¶71; EX1003, ¶171. The plan coverage area for the *Thomas-Buddhikot* device corresponds to the “home access network” and geographic areas outside the plan coverage area correspond to the “roaming access network.” EX1003, ¶171. Both *Thomas* and *Polson* disclose forwarding data based on access-network-forwarding settings corresponding to the particular cellular network to which a gateway or hotspot device is connected. EX1005, ¶71; EX1015, ¶¶29-30. Thus, a POSITA would have understood that the *Thomson-Buddhikot* device modified with *Polson* when connected to a cellular network with a roaming plan (i.e., outside its plan coverage area), would forward data from client devices to a cellular network using access-network-forwarding settings based on the roaming plan (i.e., according to roaming, rather than home, access network). EX1003, ¶172.

Accordingly, the *Thomas-Buddhikot-Polson* combination renders claim 19 obvious. EX1003, ¶¶171-173.

5. Claim 22: “The first end point device of claim 20, wherein the forwarding service notification provides the user with an option to purchase additional access network forwarding service.”

Claim 22 depends from claim 20, which is obvious over *Thomas* and *Buddhikot*. *Supra* §VI.A.11. *Polson* discloses the additional limitations of claim 22. EX1003, ¶¶174-177.

Polson discloses that its gateway includes display screens and that graphical user interfaces are displayed on the display screens. EX1015, ¶¶26, 81, Figs. 9-16.

Polson further discloses that a user of *Polson*'s gateway can purchase WWAN access based on a period of time, a certain quantity of bytes downloaded, or other parameters. EX1015, ¶31. A POSITA would understand that access for a period of time or total amount of bytes would constitute an access-network-forwarding setting that would determine duration for which *Polson*'s gateway can forward data. EX1003, ¶175.

A POSITA would have found it obvious to implement *Polson*'s options for purchasing additional cellular-network access (e.g., additional time duration or increase limit of maximum bytes transferred) on the *Thomas-Buddhikot* hotspot device. *Supra* §VI.D.1. Accordingly, the *Thomas-Buddhikot-Polson* combination renders claim 22 obvious. EX1003, ¶176.

E. Ground 5: Claims 11-14 Are Obvious over *Thomas, Buddhikot, and Weintraub*

1. Motivation to combine *Thomas, Buddhikot, and Weintraub*

Like *Thomas* and *Buddhikot*, *Weintraub* is also analogous art to the '425 patent. It is in the same field of endeavor: mobile devices and wireless access points for computer networking. EX1017, Abstract, ¶¶10-15, 19, 21, Figs. 1-8 Like *Thomas* and *Buddhikot*, *Weintraub* also shares a common goal with the '425 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including the provisioning of services seeking to improve the customizability of mobile-hotspot technology (e.g., usage control,

user interactivity and notifications via graphical user interfaces). EX1017, Abstract, ¶¶10-15, 19, 21, 25-27, 31-32, Figs. 1-8; EX1001, 32:34-35:20, 65:31-67, Fig. 15A-F; EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1016, Abstract, ¶¶2, 32, 45-47, 52-53, 182-189; EX1003, ¶178.

a. Network traffic classification of the data

Weintraub discloses exemplary network traffic classifications such as VOIP, IM, e-mail, or other types of traffic. EX1017, ¶26. *Weintraub* also discloses restricting such traffic based on, for example, time of day or size of attachments, etc. EX1017, ¶26. A POSITA would have been motivated to implement *Weintraub*'s restriction settings based on network traffic classification to manage bandwidth usage, an issue also highlighted in *Buddhikot*. EX1003, ¶179. For example, during times of high demand (e.g., during the day) a POSITA would have been motivated to restrict network traffic associated with VOIP or large email attachments because this traffic consumes a lot of available bandwidth leaving less bandwidth for all the users. EX1003, ¶179.

Implementing *Weintraub*'s teaching of limiting traffic based on a network traffic classification on the *Thomas-Buddhikot* hotspot device would have been a combination of familiar elements (e.g., rules for limiting bandwidth based on classification) according to known methods (e.g., implementing additional traffic control rules providing in the *Thomas-Buddhikot* hotspot device) to obtain

predictable results (e.g., ensuring client devices connected to the *Thomas-Buddhikot* hotspot device can exchange data with a minimum bandwidth).

EX1003, ¶180; *KSR*, 550 U.S. at 416. A POSITA would have had a reasonable expectation of success in implementing *Weintraub*'s teaching of limiting traffic based on a network traffic classification on the *Thomas-Buddhikot* hotspot device. EX1003, ¶180. *Thomas* already discloses rules for controlling traffic through its hotspot device. EX1005, ¶¶68-69. The *Thomas-Buddhikot* combination also already teaches or suggests techniques for implementing additional firewalling and packet-mangling rules on the *Thomas-Buddhikot* hotspot device. *Supra* §VI.A.2.d. Thus, implementing *Weintraub*'s rules for restricting traffic based on network classification on the *Thomas-Buddhikot* hotspot device would have involved known techniques as disclosed by *Thomas*, *Buddhikot*, and *Weintraub* and would have been well within the skill level of a POSITA. EX1003, ¶180. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Weintraub*'s teachings with the *Thomas-Buddhikot* hotspot device. EX1003, ¶180.

b. Parental control policy

Weintraub discloses policies that allow a parent to restrict adult content from devices associated with young children in the household. EX1017, ¶10. A POSITA would have understood that implementing such parental control policies on the *Thomas-Buddhikot* hotspot device would have allowed children to safely access

the internet via the hotspot device without being at risk of being exposed to age-inappropriate content. EX1003, ¶181; EX1017, ¶10. A POSITA would have been motivated to implement such parental control policies on the *Thomas-Buddhikot* hotspot device to achieve the same benefits, namely to allow parents to restrict inappropriate content (e.g., adult content unsuitable for children) from being forwarded by the *Thomas-Buddhikot* hotspot device to the children's end point devices. Implementing *Weintraub*'s teaching of restricting content based on a parental control policy on the *Thomas-Buddhikot* hotspot device would have been a combination of familiar elements (rules for restricting content based on type of content) according to known methods (e.g., implementing additional traffic control rules providing in the *Thomas-Buddhikot* hotspot device) to obtain predictable results (e.g., inappropriate adult content is not delivered to children's end point devices). EX1003, ¶181; *KSR*, 550 U.S. at 416.

A POSITA would have had a reasonable expectation of success in implementing *Weintraub*'s teaching of restricting content based on a parental control policy on the *Thomas-Buddhikot* hotspot device. EX1003, ¶182. *Thomas* already discloses rules for controlling traffic through its hotspot device. EX1005, ¶¶68-69. The *Thomas-Buddhikot* combination already teaches or suggest techniques for implementing additional firewalling and packet-mangling rules on the *Thomas-Buddhikot* hotspot device. *Supra* §VI.A.2.d. Thus, implementing

Weintraub's rules restricting traffic based on network classification on the *Thomas-Buddhikot* hotspot device would have involved known techniques as disclosed by *Thomas*, *Buddhikot*, and *Weintraub* and would have been well within the skill level of a POSITA. EX1003, ¶182. Accordingly, a POSITA would have had a reasonable expectation of success in combining *Weintraub*'s teachings with *Thomas* and *Buddhikot*. EX1003, ¶182.

2. Claim 11: “The first end point device of claim 1, wherein based on an access network forwarding setting, the forwarding agent is configured to restrict data associated with certain network destinations from being forwarded.”

Claim 11 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. Section VI.A.2. *Weintraub* discloses the additional limitations of claim 11. EX1003, ¶¶183-185.

Weintraub discloses parental control policies that prohibit a customer device within the customer's premises from accessing adult content from the external network. EX1017, ¶10. A POSITA would understand that *Weintraub*'s policies restrict forwarding of a request to access a network destination (e.g., site providing adult content) received from a child's device. EX1003, ¶184. As explained, a POSITA would have been motivated and found it obvious to implement *Weintraub*'s policies restricting adult content on the *Thomas-Buddhikot* hotspot device to help ensure requests for adult content from children's client devices connected to the *Thomas-Buddhikot* hotspot device would not be forwarded to the

site providing the adult content. *Supra* §VI.E.1. Accordingly, the *Thomas-*

Buddhikot-Weintraub combination renders claim 11 obvious. EX1003, ¶¶183-185.

3. **Claim 12: “The first end point device of claim 11, wherein the network destinations that are restricted are determined by a parental control policy stored on the first end point device.”**

Claim 12 depends from claim 11, which is obvious over *Thomas*, *Buddhikot*, and *Weintraub*. *Supra* §VI.E.2; EX1003, ¶186. The *Thomas-Buddhikot-Weintraub* combination renders claim 12 obvious for reasons similar to those for claim 11.

Supra §VI.E.2; EX1003, ¶186.

4. **Claim 13: “The first end point device of claim 1, wherein based on an access network forwarding setting, the forwarding agent is configured to restrict a certain data content type from being forwarded.”**

Claim 13 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. Section VI.A.2. *Weintraub* discloses the additional limitations of claim 13. EX1003, ¶¶187-189.

Weintraub discloses different restriction settings based on a type of network content, for example, instant messaging or Voice over IP communications (e.g., restricted based on time of day, destination, origin, or content), peer-to-peer transmissions (e.g., restricted based on source/destination), e-mail transmissions (e.g., to restricted based on time of day, source/destination, attachments, words in the e-mail transmissions, etc.), or streaming media (e.g., to restrict media based on

time of day, ratings. EX1017, ¶26. A POSITA would have been motivated and found it obvious to implement *Weintraub*'s teachings on the *Thomas-Buddhikot* hotspot device to allow it to restrict traffic based on a network classification such as type of data (instant messaging, voice over IP, peer-to-peer transmissions, email transmissions, streaming media transmissions) at particular times of day, to ensure sufficient bandwidth is available to all users. EX1003, ¶188; *Supra* §VI.E.1. Accordingly, the *Thomas-Buddhikot-Weintraub* combination renders claim 13 obvious. EX1003, ¶¶187-189.

5. **Claim 14: “The first end point device of claim 1, wherein the service processor is further configured to determine a network traffic classification for the data, and wherein the one or more restriction setting includes restriction settings that vary depending on the network traffic classification of the data.**

Claim 14 depends from claim 1, which is obvious over *Thomas* and *Buddhikot*. Section VI.A.2. *Weintraub* discloses the additional limitations of claim 14. EX1003, ¶¶190-191.

Weintraub discloses different restriction settings based on a network traffic classification of data, such as a type of network content. EX1017, ¶26; *Supra* §VI.E.4. The *Thomas-Buddhikot-Weintraub* combination renders claim 14 obvious for reasons similar to those for claim 13. *Supra* §VI.E.4; EX1003, ¶191.

VII. Mandatory Notices

A. Real Parties-in-Interest

Google LLC² is the real party-in-interest.

Out of an abundance of caution, Google identifies Apple Inc. (“Apple”) as a real party-in-interest. Apple and Headwater have recently entered into “a worldwide settlement whereby Headwater licensed its patents to Apple.” Patent Owner’s Request for Discretionary Denial of Institution, *Google LLC v. Headwater Research LLC*, IPR2026-00048, Paper 8, 2 (PTAB Jan. 7, 2026).

As identified in the related matters below, the ’425 patent is being asserted against multiple Carriers in 2:25-cv-00914, 2:25-cv-00919, and 2:25-cv-00921. On December 1, 2025, the Carriers in those cases filed a joint opposed motion to stay the litigations under, among other things, the customer-suit exception. *See* Defendants’ Joint Opposed Motion to Stay, *Headwater Res. LLC v. DISH Network Corp.*, 2:25-cv-00921 (Dec. 1, 2025), ECF No. 52. On December 8, 2025, a redacted version of that motion was made publicly available. *See id.* ECF No. 63. On December 19, 2025, Headwater filed a sealed response to the motion. *See id.* ECF No. 73. On January 9, 2026, the Carriers filed a sealed reply. *See id.* ECF

² Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc.

No. 82. In light of these filings, Google names the following Carriers (the named defendants in these cases) as real parties-in-interest to this proceeding:

- DISH Network Corporation f/k/a EchoStar Communications Corporation
- DISH Network LLC
- Dish Wireless, LLC d/b/a Boost Mobile
- Charter Communications, Inc.
- Charter Communications, LLC
- Charter Communications Operating, LLC
- Comcast Cable Communications, LLC d/b/a Xfinity
- Comcast Cable Communications Management, LLC
- Comcast Corporation
- Comcast of Houston, LLC d/b/a Xfinity
- Spectrum Gulf Coast, LLC
- Spectrum Management Holding Company, LLC

Charter Communications, Inc., Charter Communications, LLC, Charter Communications Operating, LLC, Spectrum Gulf Coast, LLC, Spectrum Management Holding Company, LLC and Headwater Research LLC filed a Joint Motion to Stay All Deadlines and Notice of Settlement on August 5, 2026. *See id.* ECF No. 110.

Comcast Cable Communications, LLC d/b/a Xfinity, Comcast Cable Communications Management, LLC, Comcast of Houston, LLC, and Headwater Research LLC filed a Joint Motion to Stay All Deadlines and Notice of Settlement on August 7, 2026. *See id.* ECF No. 112.

To be clear, none of these Carriers funded, directed, or controlled the filing or preparation of this petition, nor did Google prepare or file the petition at the Carriers' behest. Instead, Google makes this identification out of an abundance of caution and in the interest of over-disclosure.

B. Related Matters

The '425 patent is or has been involved in the following proceedings:

Name	Number	Forum	Filed
<i>Google LLC v. Headwater Research LLC</i>	IPR2026-0465	P.T.A.B.	Aug. 28, 2026
<i>Headwater Research LLC v. Comcast Cable Communications, LLC d/b/a Xfinity et al</i>	2:25-cv-00914	E.D. Tex.	Aug. 29, 2025
<i>Headwater Research LLC v. Charter Communications, Inc. et al</i>	2:25-cv-00919	E.D. Tex.	Aug. 29, 2025
<i>Headwater Research LLC v. DISH Network Corporation et al</i>	2:25-cv-00921	E.D. Tex.	Aug. 29, 2025
<i>Headwater Research LLC v. Apple Inc.</i>	7:25-cv-00375	W.D. Tex.	Aug. 27, 2025
<i>Headwater Research LLC v. Google LLC</i>	7:25-cv-00376	W.D. Tex.	Aug. 27, 2025
<i>Headwater Research LLC v. AT&T Inc. et al</i>	2:25-cv-00428	E.D. Tex.	Apr. 23, 2025

Name	Number	Forum	Filed
<i>Headwater Research LLC v. Cellco Partnership, d/b/a Verizon Wireless et al</i>	2:25-cv-00391	E.D. Tex.	Apr. 15, 2025
<i>Headwater Research LLC v. Sprint LLC et al</i>	2:25-cv-00359	E.D. Tex.	Apr. 8, 2025

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D. Service Information

Petitioner consents to being served electronically at the e-mail addresses provided above and at HeadwaterIPRTeam@finnegan.com.

VIII. Grounds for Standing

Petitioner certifies that the '425 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds in this Petition.

IX. Conclusion

Petitioner requests IPR and cancellation of claims 1-23 and 51. The Office may charge any required fees to Deposit Account No. 06-0916.

Date: August 28, 2026

Respectfully submitted,

By: /Erika H. Arner/
Erika H. Arner, Lead Counsel
Reg. No. 57,540

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, Petitioner certifies that the word count of Petitioner's Petition for *Inter Partes* Review (exclusive of any table of contents, table of authorities, mandatory notices under § 42.8, certificates of service and word count, and list of exhibits or claim listing) as measured by Microsoft Word is 13,570.

Date: August 28, 2026

Respectfully submitted,

By: /Erika H. Arner/
Erika H. Arner, Lead Counsel
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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on August 28, 2026, a copy of the foregoing Petition for *Inter Partes* Review, the associated power of attorney, and Exhibits 1001-1006, 1012-1019, 1022-1025 were served by FedEx Priority Overnight on the correspondence address of record indicated in the Patent Office's Patent Center website for U.S. Patent No. 8,023,425:

James Harris
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Date: August 28, 2026

By: /Lisa C. Hines/
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